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Field Instruments for Process Automation

Process Automation

Catalog FI 01

Edition March 2015

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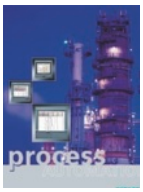

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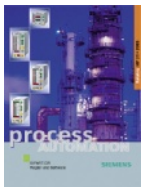

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Field Instruments for Process Automation

Process Automation

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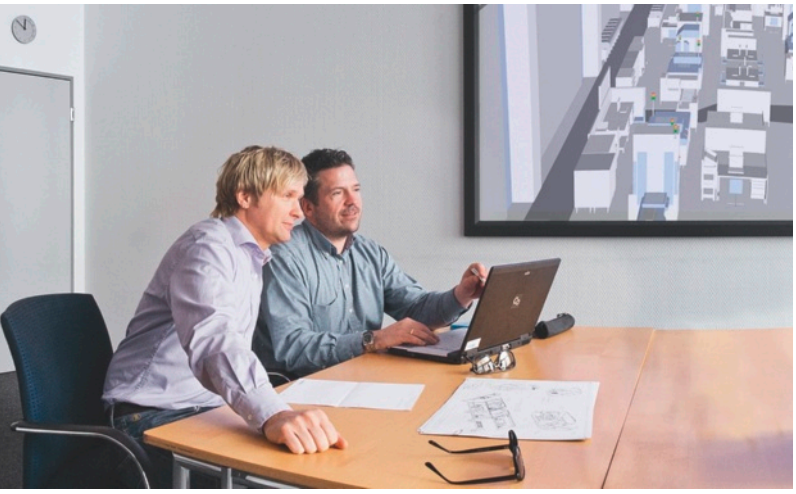

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Answers for industry.

Integrated technologies, vertical market expertise and services for greater productivity, energy efficiency, and flexibility.

Siemens is the world's leading supplier of innovative and environmentally friendly products and solutions for industrial companies. End-to-end automation technology and industrial software, solid market expertise, and technology-based services are the levers we use to increase our customers' productivity, efficiency and flexibility.

We consistently rely on integrated technologies and, thanks to our bundled portfolio, we can respond more quickly and flexibly to our customers' wishes. With our globally unmatched range of automation technology, industrial control and drive technology as well as industrial software, we equip companies with exactly what they need over their entire value chain – from product design and development to production, sales and service. Our industrial customers benefit from our comprehensive portfolio, which is tailored to their market and their needs.

Market launch times can be reduced by up to 50% due to the combination of powerful automation technology and industrial software. At the same time, the costs for energy or waste water for a manufacturing company can be reduced significantly. In this way, we increase our customers' competitive strength and make an important contribution to environmental protection with our energy-efficient products and solutions.

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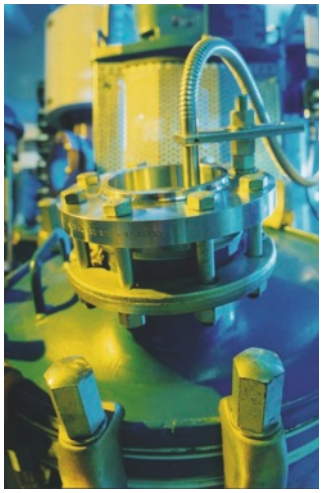
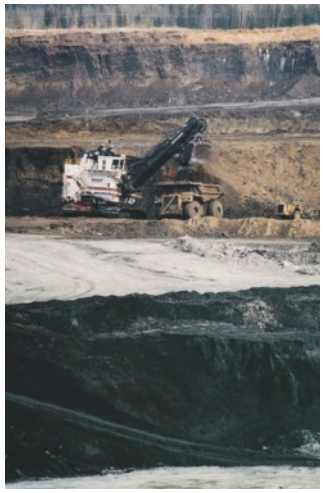
Industries

In the field of process instrumentation, process analytics and weighing technology, Siemens focuses on a number of key industries such as:

- Chemical
- Pharmaceutical
- Water/wastewater
- Mining, aggregates, cement
- Oil and gas/hydrocarbon processing
- Pulp and paper
- Food and beverage
- Marine





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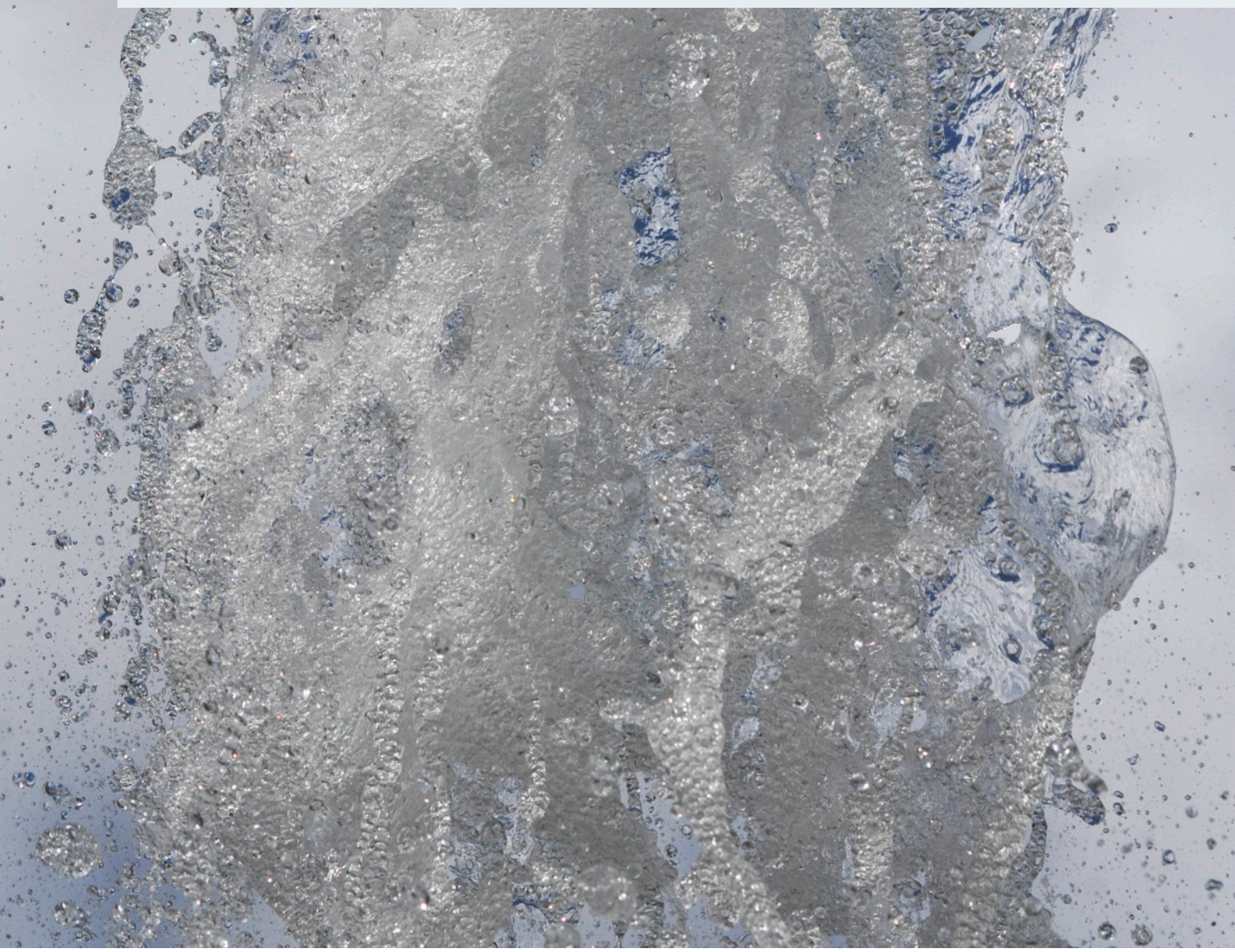
Process Instrumentation

Siemens offers a comprehensive range of process instruments for pressure, temperature, flow and level measurement. Pneumatic valve positioners, process controllers, process recorders and process protection devices complete the package. Whether you need a single instrument or a complete instrumentation package, Siemens is your professional supplier for any project.



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Pressure Measurement

SITRANS P comprises a complete range of instruments for measuring gauge, differential and absolute pressure. In addition to high measuring precision and ruggedness, defining features include the convenience and functionality of a modular system as well as the perfect safety concept. We have a proven range of products for all pressure applications.

SITRANS P500
Digital transmitter for high precision applications with unmachted specifications for total performance and long term stability.

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Overview of the SITRANS P range:

■ SITRANS LH100 [1]

Convenient hydrostatic level measurement.

SITRANS LH100 submersible pressure transmitter is used for hydrostatic level measurements. It is immersed in the process connected by a vented cable. The sensor has a stainless steel enclosure and is suitable for applications ranging from drinking water to corrosive liquids.

■ SITRANS P200/210/220 [2]

The fixed range transmitter for gauge and absolute pressure.

SITRANS P200: ceramic diaphragm
SITRANS P210: stainless steel diaphragm
SITRANS P220: stainless steel diaphragm fully welded

■ SITRANS P250 [3]

Fixed range transmitter for differential pressure.

The differential pressure will be detected with a ceramics sensor and transformed into an output signal of 4–20 mA-, 0 –5 V resp. 0 –10 V.

■ SITRANS P280 [4]

The SITRANS P280 is a WirelessHART pressure transmitter that provides all measured process values as well as diagnostic information, parameters and functions via wireless communication. The device is powered by an internal battery and designed for ultralow power consumption. The compact and rugged design makes it specially suitable for direct mounting on tanks and pipes in remote parts of plants, and on moving or rotating equipment for process monitoring or asset management applications.

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Pressure Measurement

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SITRANS P Compact [1]

For the special requirements of the food and beverage, pharmaceutical and biotechnology industries.

The increased hygiene demands are satisfied by a range of stainless steel process connections. Cleaning and sterilization procedures (CIP, SIP) are standard practice.

SITRANS P300 [2]

offers measuring precision and ruggedness, and advanced operation. The SITRANS P300 was designed for the food and beverage industry as well as pharmaceutical processes. It is an integral component of the SITRANS P family because of its measurement deviation of less than 0.075 %, a hygienic stainless steel housing with laser-etched nameplate, and the proven SITRANS P DS III local operating philosophy.

The SITRANS P300 meets the requirements of the EHEDG, FDA and 3A. This makes it ideal for applications in the food and pharmaceutical industries.

You can read the process data via a HART, PROFIBUS PA or Fieldbus FOUNDATION protocol. The SITRANS P300 is also available combined with absolute or relative pressure measuring cells with flush mounted diaphragms. A wide range of process connections are available for the food and beverage, pharmaceutical, and paper industries, including threaded and flanged versions.

SITRANS P DS III [3]

Digital transmitters with integral diagnostics function, HART, PROFIBUS PA or Fieldbus Foundation communication, and convenient key operation. Within a range from 1 mbar to 700 bar, the SITRANS P DS III works well even with extreme chemical and mechanical loads or electromagnetic influences. It offers additional safety functions such as plant and self-monitoring, fault diagnostics and provides maintenance messages advising when the next calibration is due. The self-test function is unique for fail-safe operation. Measuring cells can be quickly and easily replaced so that on-site repairs are fast, simple and cost-effective. In addition to convenient local operation, SITRANS P transmitters can be connected to networks using the PROFIBUS PA, Foundation Fieldbus, or HART protocol.

SITRANS P DS III is designed for nominal pressures up to PN 420 (5800 psi). The wetted parts are available in stainless steel, Tantalum, Hastelloy, Monel, or gold plated. Explosion-proof versions are also available. The high safety level is documented by globally recognized certificates, including ATEX, SIL, CENELEC, FM, CSA, NEPSI. It is tested according to the NAMUR guidelines.

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■ SITRANS P500 [4]

Digital transmitters for high precision applications.

The SITRANS P500 ensures a maximum reference accuracy below 0.03 % of calibrated span up to a turndown of 10:1. Combined with its low static pressure and temperature errors, it guarantees a total performance of 0.09 % up to a turndown of 5:1 and 0.14 % up to a turndown of 10:1.

The excellent long-term sensor stability reduces recalibration costs and gives you the measurement that you can trust on the long run. The cutting edge design of the measurement cell allows use at process temperatures up to 257 °F (125 °C) without requiring a remote seal system.

In case of critical applications where fast response times are required the SITRANS P500 helps to keep your plant safe thanks to its step response time (T63) of only 88 ms.

The configuration of the device can be done via standard HART-protocol compatible tools and also using the local push buttons and LCD display.

SITRANS P500 offers an easy-to-understand multilingual plain text menu which includes a rich set of diagnostic features and a quick start wizard for a simple, error-free configuration. The graphic display of the transmitter can be used to show trends and enables process monitoring.

This transmitter is available for different ranges to be used for differential pressure and level applications. In addition the transmitter can be combined with different kinds of remote seals.

■ Remote seals [5]

The measuring possibilities of the SITRANS P line are extended by a wide range of remote seals. These seals are used when measuring hot, corrosive, highly viscous, or crystallizing material. The following types of remote seals are available:

- Flanges according to EN, ASME, and other connections, either rigid connection to the transmitter or via flexible capillary.
- Various filling liquids for temperatures of material up to 400 °C (750 °F).
- Various diaphragm material options.
- Special versions specific to each industry.

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Temperature Measurement

The instruments in the SITRANS T line are true temperature measurements, even under extreme conditions. Whether high or low temperatures or hazardous areas, the SITRANS T with communications capability can meet all demands in a wide variety of industries.

SITRANS TS500
Temperature Sensors for a wide range of applications

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Whether you require a sensor, head, rail or field-mounted transmitter, or a complete measuring station – we can offer you this individually or as a complete package.
The cost-effective SITRANS T transmitters can measure accurately in any application, and can be connected simply and rapidly to thermocouples or resistance thermometers. You can set the parameters using the intelligent SIMATIC PDM software package in no time at all, and without input errors. The following units are available:

Transmitters for head-mounting

■ **SITRANS TH100 [1]**

Pt100 transmitter. Low-cost and compact, configurable using PC (SIPROM T).

■ **SITRANS TH200 [2]**

Universal transmitter, configurable using PC (SIPROM T). Cost-saving service features.

■ **SITRANS TH300 [2]**

HART universal transmitter, configurable using SIMATIC PDM or HART protocol. Cost-saving service features. Diagnostics and simulation functions, remotely or locally.

■ **SITRANS TH400 [2]**

Fieldbus transmitter in designs for PROFIBUS PA or FOUNDATION Fieldbus.

Configurable using SIMATIC PDM (PA) or AMS (FF). Comprehensive diagnostics and simulation functions, transmission of important device and process data over the bus cable.

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Temperature Measurement

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Transmitters for rail-mounting

■ SITRANS TR200 [1]

Universal transmitter programmable via PC (SIPROM T). Cost-saving operational functions and diagnostics LED.

■ SITRANS TR300 [1]

HART universal transmitter configurable via SIMATIC PDM or HART protocol. Costsaving operational functions and diagnostics LED. Remote or local diagnostics and simulation.

■ SITRANS TW [2]

Universal 4-wire transmitter for rail-mounting with HART communication, comprehensive diagnostics and simulation functions, configurable using SIMATIC PDM, optional limit value relay.

Transmitters for field-mounting

■ SITRANS TF [3]

Transmitter for mounting in the field where excessive heat or vibrations are present at the measuring point; IP67 degree of protection, programmable, HART, PROFIBUS PA, FOUNDATION Fieldbus optional programmable digital display. Can also be used as remote display without transmitter for any 4 to 20 mA signal.

■ SITRANS TF280 [4]

is a WirelessHART temperature transmitter that provides all measured process values as well as diagnostic information, parameters and functions via radio. The device is powered by an internal battery and designed for ultralow power consumption. Its compact and rugged design makes it specially suitable for direct mounting on tanks and pipes in remote parts of plants, and on moving or rotating equipment for process monitoring or asset management applications.

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SITRANS TS temperature sensors

SITRANS TS100 - cable sensors [5]

This cable temperature sensor product series comes with a direct mounted cable. As a basic or mineral-insulated version a wide field of application is supported. The installation is easy and flexible by using compression or soldering fittings. With the optional adapter surface measurement is simple to apply. The intrinsic safe version has the approval for operating even in zone 0 without an additional protection tube. In such application the excellent response time of the sensor will be an outstanding benefit.

SITRANS TS200 - compact sensors [6]

The compact temperature sensor series adds to the excellent benefits of our SITRANS TS100. Instead of the flexible cable, it comes with a fixed connection M12, Lemo etc.

SITRANS TS300 - for food and pharma [7]

Our food and pharma temperature sensor product series is featured with a wide range of appropriate process connections – the classical method. With the clamp-on temperature sensor Siemens strikes a new path. Comparable with built-in measurement regarding response time and accuracy the advantages especially at small pipe diameters are obviously. No welding and welding validation, no process disturbance, easy pigging, easy dismantling for recalibration.

SITRANS T temperature sensors – special for high temperatures and flue gas [8]

Our flue gas resistance thermometers and straight thermocouples for combustion plants and furnances.

SITRANS TS500 - for pipes and vessels [9]

The industry temperature sensor series supports a wide field of measurements, from simple applications up to solutions for harsh environments. Designed as a modular system of tubular or barstock thermowell, extension, connection head and optional transmitter and display, the customers profit from the use of standard components for individual applications. Intrinsic safe versions are available as well as Ex d.

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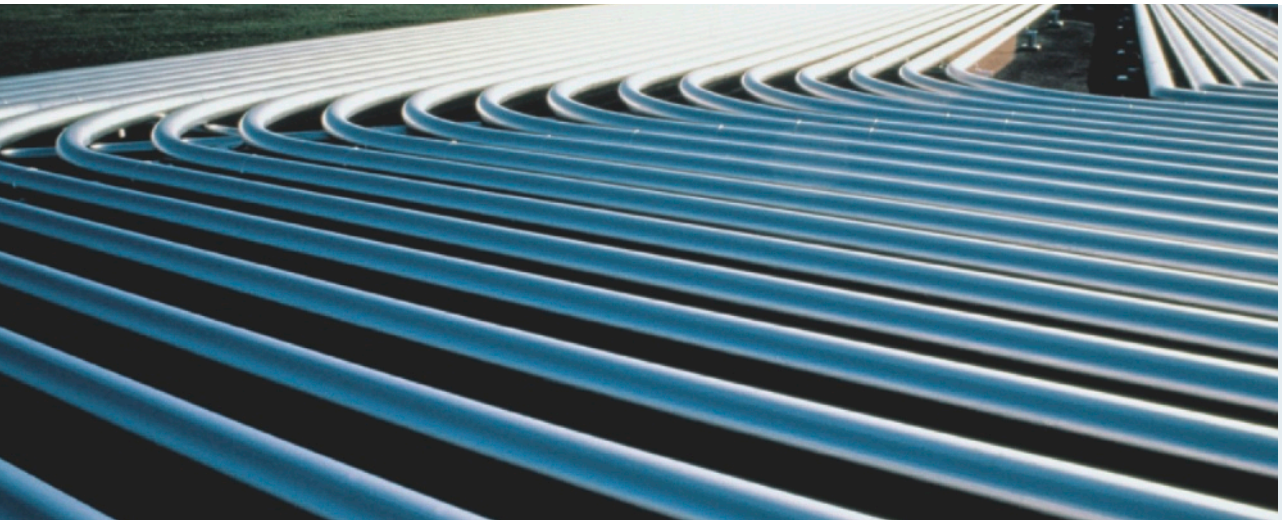
Flow Measurement



Choosing the right flowmeter for the right application can dramatically improve your bottom line. In all industries, Siemens offers a compre-hensive selection of electromagnetic, Coriolis, ultrasonic, vortex, rotary piston and differential pressure flowmeters suitable for measuring a variety of liquids.

SITRANS FC430
The digitally based SITRANS FC430 features market-leading compactness, very high accuracy of 0.1%, low pressure loss, extremely stable zero point, best-in-class data update with 100 Hz high-speed signal transfer and the first SIL 3 certification on a Coriolis system. Unique support tools provide direct access to backup data, settings, certificates, and audit trails.

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SITRANS F M – Electromagnetic flowmeters

measure the volume flow of electrically conductive fluids like e.g. water, chemicals, food and beverage, slurries, sludge, paper stock, and mining slurries with magnetic particles.
The SITRANS F M product range is divided into three meter types:

Modular pulsed DC meters

SITRANS F M DN 2 to DN 2000 (1/12" to 78")

- Full transmitter program MAG 5000/MAG 6000/ MAG 6000 I compact or remote mounting.
- Multiple I/O as standard and communication modules PROFIBUS PA/DP, FOUNDATION Fieldbus, HART and Modbus RTU.
- MAG 5100 W [1] sensor designed for water and waste-water applications.
- MAG 3100 P designed for process industry and the harsh requirements in the chemical industry.
- MAG 3100/MAG 3100 HT [2] sensor for general process industry.
- MAG 1100/1100 HT sensor for general process industries.
- MAG 1100 F [3] sensor for food and beverage and pharmaceutical industries.

Battery-operated water meters

MAG 8000 DN 25 to DN 1200 (1" to 48") [4]

Designed for the water industry, the MAG 8000 program is a battery-powered solution that makes it easier than ever to install a reliable water meter virtually anywhere.

- Battery lifetime up to 6+ years.
- Mains powered 24 V AC/DC, 115 V AC/230 V AC with battery backup.
- IP68 (NEMA 6P) enclosure for sensor and transmitter in compact or remote version.
- MAG 8000 for abstraction and distribution network.
- MAG 8000 CT for revenue and bulk metering.
- MAG 8000 Irrigation for agriculture.

High-powered AC meters

TRANSMAG 2 / 911/E DN 15 to DN 1000 (1/2" to 40") [5]

Specially designed for heavy mining slurries with or without magnetic particles as well as the most difficult applications in the pulp and paper industry.

- A wide choice of corrosion-resistant liner materials.
- Heavy duty industrial enclosure.
- No movable parts.

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Flow Measurement

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SITRANS F C Coriolis mass flowmeters

measure the direct mass flow rate of liquids and gases in almost any application.

It is a multivariable device delivering reliable information on mass flow, volume flow, temperature, density and concentration (e. g. Brix or Baume).

Flexibility and high performance with the MASS 6000 transmitter [4]

The flexible MASS 6000 transmitters are designed for high performance and easy operation ensuring a low cost of ownership.

Seamless integration with the SIFLOW FC070 module [2]

SIFLOW FC070 is a true multi-parameter Coriolis transmitter ready for quick installation and system integration into SIMATIC S7 and SIMATIC PCS 7 automation systems. SIFLOW FC070 is the most compact, space-saving and versatile module available.

Innovation and user-friendliness transmitter SITRANS FCT030

The FCT030 transmitter is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy installation and maintenance. The FCT030 can be remote connected or compact mounted with all sensors of type FCS400.

Sensors meeting the toughest challenges.

Optimum measuring performance is achieved through an intelligent sensor design with a strong focus on safety, repeatability, and quality, enabling a high accuracy 0.1 % of rate with a large turndown ratio. Sensor of capacity ranges from few g/h to 510 000 kg/h (few oz/h to 1 124 300 lb/h), covering applications ranging from mini-plants to bulk loading.

FCS400 sensors DN 15 - DN 80 in standard, hygienic (3A, EHEDG) and NAMUR versions [1]
0 to 136 000 kg/h (0 to 300 000 lb/h)

Fulfill the need for high performance at Chemical, Food & Beverage, Pharma and Hydrocarbon applications. Market -leading compactness saves space and money, with enough flexibility for installation anywhere and the ability to fit multiple units into tight spaces.

MASS 2100 DI 1.5 [3]
0 to 65 kg/h (0 to 143 lb/h):

Ideal for low flow applications measuring liquid or gas.

FC300 DN 4
0 to 350 kg/h (0 to 772 lb/h):

Low flow sensor with focus on compactness and machine integration.

MASS 2100 DI 3 – DI 40 [4]
0 to 52 000 kg/h (0 to 114 600 lb/h):

Medium range sensors for general purpose applications.

FCS200 DN 10 – DN 25 [5]
0 to 30 000 kg/n (0 to 66 138 lb/h)

Ideal for measuring in CNG (Compressed Natural Gas) applications.

Standard MC2 DN 50 – DN 150
0 to 510 000 kg/h (0 to 1 124 300 lb/h):

Large sensors offering ideal fit between size and maximum flow capacity.

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SITRANS F US ultrasonic flowmeters

are available as in-line and clamp-on versions. Both meter types can be used with homogeneous conductive and non-conductive liquids and gases (only clamp-on). In addition to standard volume flow, they can also provide information on media quality and temperature. Meter calibration can be certified to industry standards.

In-line ultrasonic flowmeters [6]

Ultrasonic in-line flowmeters are suitable for industrial applications with pipe sizes ranging from DN 50 to DN 1200 (2" to 48"). Full 2-track and 4-track sensors are available in combination with the SITRANS FUS060 transmitter.

- Option between mild and stainless steel sensors.
- Transducers can be exchanged without interrupting operation.

Retrofit flowmeter type, SONOKIT [7]

The SONOKIT system up to DN 4000 (160") is designed for in-line retrofitting on all existing pipelines as a 1-track or 2-track flowmeter. The unique design enables installation on empty pipes or pipes under pressure without process shut-down.

- Robust version can be buried and withstands constant flooding.
- Outstanding accuracy; the bigger the pipe, the more accurate the result.

SITRANS FUS380 [8] and FUE380

For the utility industry the 2-track flowmeters, SITRANS FUS380 and FUE380, are designed to measure water flow in district heating plants, local networks, boiler stations, substations and other general water applications.

- Custody transfer approvals for district heating custody transfer applications.
- Battery or mains power enables installation where needed. Battery lifetime up to 6 years.
- Ideal for energy metering together with the SITRANS FUE950 [9] energy calculator.

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Flow Measurement

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Clamp-on ultrasonic flowmeters

The key feature of the clamp-on ultrasonic flow technology is the externally mounted sensors. They are quickly and easily installed on the outside of the pipe, making them the perfect choice for retro-fit applications and applications where corrosive, toxic or high pressure liquids and gases rule out the option of cutting the pipe. The technology provides highly accurate measurement of both liquids and gases on pipes ranging from DN 6 to DN 9140 (0.25" to 360") in size.

Clamp-on ultrasonic flowmeters are available in seven different families suitable for a wide range of industries and applications:

- SITRANS FUS1010 [1] for general industry
- SITRANS FUP1010 [2] portable meter
- SITRANS FUE1010 for HVAC
- SITRANS FUH1010 for hydrocarbon
- SITRANS FUG1010 for gas
- SITRANS FST020 [3] for basic water, wastewater and HVAC applications
- SITRANS FUT1010 [4] for hydrocarbon liquid and gas applications

Most families are available in single, dual or four channel configurations that offer great cost saving options. The dual channel version can be set up on two separate applications and can also provide arithmetic functions between the two channels. The 4-channel meter does not offer mathematical functions, but can monitor multi channels and paths.

The clamp-on ultrasonic flowmeters are also available as check metering kits for general liquid, water and wastewater, energy and gas applications. They all come in a sturdy rolling case, containing all the equipment necessary for performing flow measurement tasks. These kits are ideal for verifying existing applications regardless of measurement technology or application where no metering exists.

For the most basic flow applications, the SITRANS FST020 is the solution. It combines reliable measurement with simple configuration and set-up wrapped in a single channel design. It features an IP65 (NEMA 4X) enclosure, RS 232 communication and the WideBeam flow measurement technology (optional).

The SITRANS FUT1010 is available in a liquid and gas version. With performance meeting OIML R 117 and API recommendations, the ultrasonic flowmeter can be used for numerous upstream, midstream and downstream measurement tasks. A wide variety of sensor sizes ensures availability for virtually any application, including custody transfer applications where the permanent TransLoc system allows laboratory calibration.

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[5] [6] [7] [8] [9]

SITRANS F X – Vortex flowmeters

provide accurate standard volumetric and mass flow measurement of steam, gases, conductive and non-conductive liquids. The Vortex flowmeter functions as an "All-in-one-solution" with integrated temperature and pressure compensation together with an optional energy calculation.

It is specially designed for applications that require reliable flow measuring independent of pressure, temperature, viscosity and density. This makes it perfectly applicable in especially the chemical industry, HVAC & power, food & beverage, oil & gas and pharma.

The SITRANS F X Vortex flowmeters are available as flanged or sandwich versions in the following configurations:

SITRANS FX300 [5]

- Volumetric flowmeter. Measurement of steam, gases, conductive and non-conductive liquids. Temperature compensation for saturated steam included in basic version as standard.
- Mass flowmeter. With pressure and temperature compensation for mass and standard volume flow measurement of gases or superheated steam. Integrated temperature and pressure sensors.
- Option with pressure sensor and isolation valve allows the pressure sensor to be shut off for the purpose of pressure or leak testing of the pipeline or for being exchanged without interrupting the process.

SITRANS FX300 dual transmitter [6]

- Dual measurement for twofold reliability.
- Redundant system with two independent sensors and two converters.

SITRANS LUT400 [7]

Reliable for open channel flow monitoring in water/wastewater and plant effluent applications. Non-contact Echomax series ultrasonic transducers are used to complete the control system.

SITRANS F R – rotary piston meters [8]

Used to measure the volume flow of conductive and non-conductive liquids. High viscosity media, acids and alco-holbased concentrates are accurately recorded. Even measurements subject to calibration standards can be undertaken. No inflow and outflow runs required.

SITRANS F O – differential pressure flowmeters [9]

Universal flow measurement for liquids, gases and vapors. Always provide accurate results even with large bores, high temperature and extreme pressure.

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Level Measurement

Siemens level measurement instruments serve process industries worldwide, including water and wastewater, aggregate, cement, mining, dry-bulk storage, chemical, petrochemical, oil and gas, food and beverage, and pharmaceutical. A wide portfolio of technologies and products lets you choose the right solution for your application.

SITRANS LUT400
features industry-leading 1 mm (0.04") accuracy, setup in under a minute, and intuitive local user interface navigation. The controller is compatible with the full line of Siemens Echomax transducers, with an operating range of 0.3 to 60 meters (1 to 200 feet), depending on transducer.
Key applications: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage

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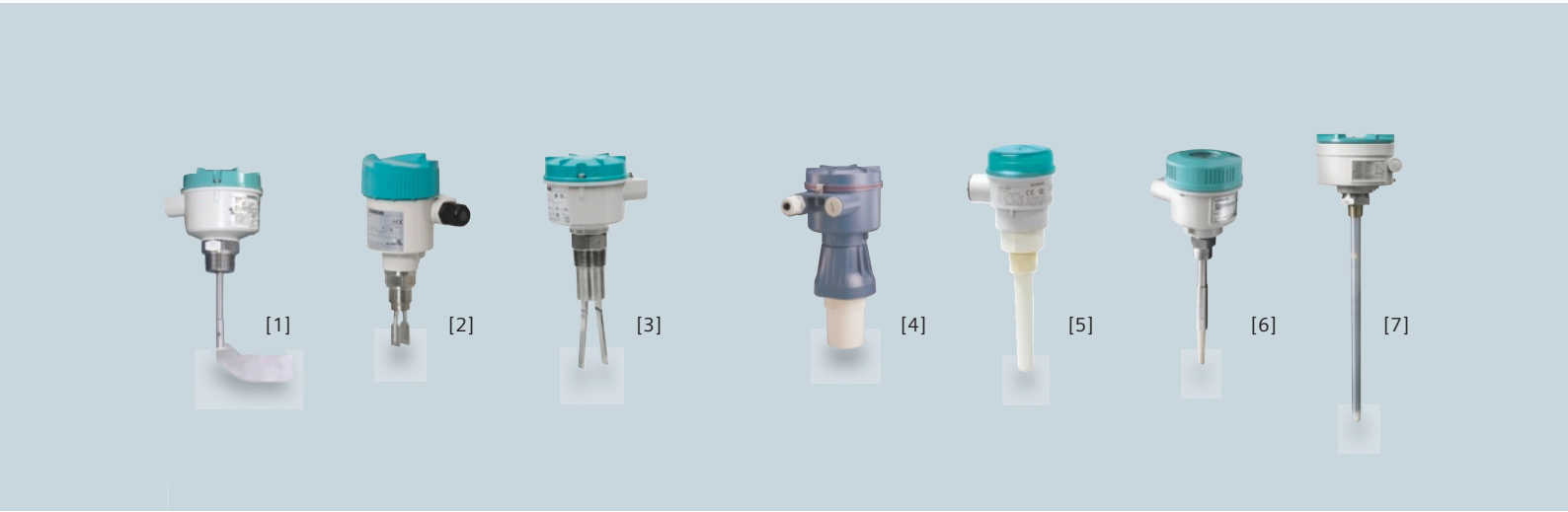

POINT LEVEL DETECTION

Vibration, rotary paddle and tilt

Siemens rotary or vibrating point level switches are a cost-effective solution for solids and liquids applications. Their robust design lasts in harsh and abrasive environments. They detect high, low, and demand levels in solids, liquids and slurry applications, specializing in low bulk density applications. We offer a wide variety of configuration options suitable for any environment. SITRANS vibration and rotary paddle switches are simple to use with no complicated setup or configuration. Standard aluminum enclosures and a wide variety of process connections provide exceptional resistance to mechanical forces, long service life, and low cost of ownership.

- SITRANS LPS200 [1] rotary paddle switch detects solids with densities as low as 15 g/l (0.94 lb/ft³).
- SITRANS LVL100 and LVL200 [2] vibrating level switches for liquid and slurry applications, including high, low, and demand level alarms and pump protection.
- SITRANS LVS100 and LVS200 [3] vibratory switch detects solids with densities as low as 5 g/l (0.3 lb/ft³).

Ultrasonic

Pointek ULS200 [4] is a non-contacting ultrasonic level switch with two switch points, effective in bulk solids, liquids, and slurries, and is ideal for sticky materials.

Capacitance

Siemens Pointek inverse frequency shift capacitance point level switches provide accurate, reliable, and repeatable measurement in dusty, turbulent, and vaporous environments or applications with product buildup. Small changes in level create large changes in frequency. As a result Pointek devices have greater sensitivity and consistently outperform conventional devices. With their robust aluminum enclosures and process connections, Siemens Pointek switches are proven superior performers in liquids, solids, slurries and interfaces.

- Pointek CLS100 [5] – compact 2- or 4- wire switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam.
- Pointek CLS200 and CLS300 [6] – level switch for detecting liquids, solids, slurries, foam, and interfaces even in demanding conditions where high pressure and temperatures are present.
- Pointek CLS500 [7] – level switch for critical conditions of more extreme temperatures and pressures.

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Level Measurement

[1]

[2]

[3]

[4]

[5]

[6]

CONTINUOUS LEVEL MEASUREMENT

Sonic Intelligence and Process Intelligence

Our patented Sonic Intelligence and Process Intelligence signal processing technologies were developed using knowledge provided by our field service engineers and data from devices installed in real applications. Siemens instruments offer the unique advantage of this technology. Both signal processing technologies differentiate between true echoes from the material and false echoes from obstructions or electrical noise. The sophisticated software is continually updated and supported by field data gained from more than a million applications. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is a repeatable, fast and reliable measurement you can trust.

Radar

Even in harsh process conditions, Siemens radar transmitters are virtually unaffected. Non-contacting radar technology means low maintenance and provides reliable continuous level measurement for short to long-range applications.

Siemens offers a variety of radar instruments. Process Intelligence signal processing software ensures reliable and accurate level measurement and features Auto False-Echo Suppression, a technique that can automatically detect and suppress false echoes from vessel obstructions. This ensures high performance and is easy to implement, using just a few parameter entries on the infrared handheld interface or via configuration tools such as SIMATIC PDM, Pactware, or AMS.

- SITRANS Probe LR [1] – 2-wire, 6 GHz pulse radar level transmitter for basic continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).
- SITRANS LR200 [2] – 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids. Ideally suited for complex, turbulent process vessels including high temperatures and pressures to a range of 20 m (66 ft).
- SITRANS LR250 [3] – 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage/process vessels including high temperature and pressure, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.
- SITRANS LR260 [4] – is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids in storage vessels including extreme levels of dust and high temperatures, to a range of 30m (98.4 ft).
- SITRANS LR460 [5] – 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of solids in vessels to a range of 100 m (329 ft). Ideal for applications with extreme dust and high temperatures to 200 °C (392 °F) and very bulk density/low dielectric media.
- SITRANS LR560 [6] – 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids. Very narrow 4 degree beam angle with 3" lens antenna. For ranges up to 100 m (328 ft).

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[7]

[8]

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Ultrasonic

Siemens is the world leader in ultrasonic level technology. SITRANS LUT400 is an easy to use and highly accurate level, volume and pump controller. For advanced solutions controllers are available with remotely mounted non-contacting ultrasonic transducers. Whether you select the transmitter or the controller you get a cost-effective non-contacting solution for a wide range of applications in virtually any industry.

- SITRANS Probe LU [7] – 2-wire, loop powered ultrasonic transmitter for level/volume/flow monitoring of liquids in storage vessels, simple process vessels, and open channels.
- SITRANS LUT400 [8] – Compact, single point ultrasonic controller for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.
- Rugged Echomax transducers [9] are built for harsh environments. They are impervious to dust, moisture, corrosion, vibration, flooding, and extreme temperature. They are easy to install and virtually maintenance-free.
- HydroRanger 200 [10] – Level controller for up to 6 pumps including pump control, differential control, and open channel flow monitoring.

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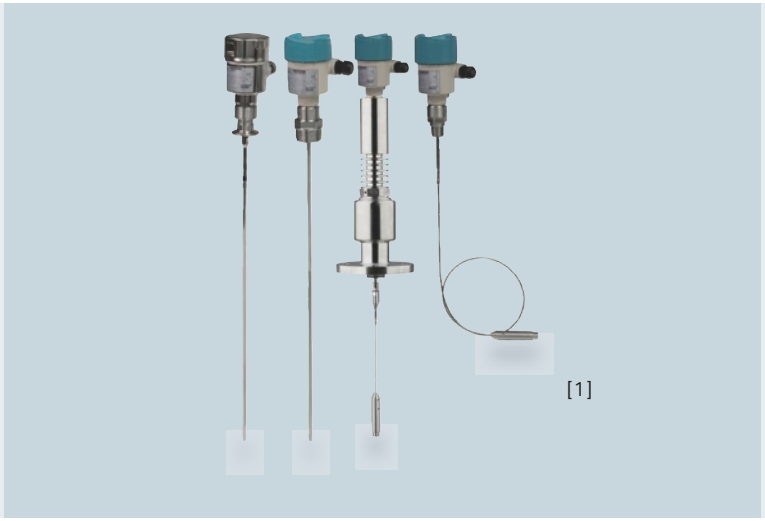
Level Measurement



[1]

Guided Wave Radar

uses Time Domain Reflectometry (TDR) to measure level by guiding an electromagnetic pulse down a probe (solid steel rod, steel cable or coaxial probe) toward the material. When the pulse reaches the material surface, the change in dielectric value between air and the material causes a portion of the pulse to reflect back toward the transmitter. Guided wave radar is unaffected by vapor, density, foam, dielectric fluctuations, temperature, and pressure changes, and works well for short and medium-range measurements, and materials with low dielectric constants such as liquified gases. Interface of two liquids (i. e. oil/water) can also be measured with both level and interface reported over the HART output.

SITRANS LG series [1]

- SITRANS LG240 – For use in hygienic application environments.
- SITRANS LG250 – Highly flexible solution for liquid level and interface applications. Extremely versatile for many applications.
- SITRANS LG260 – Ideal for measuring level in medium range solids applications including grains, plastics and cement.
- SITRANS LG270 – Offers configuration options for extreme conditions including high temperature and high pressure applications.

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[2]

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Capacitance

Our unique inverse frequency shift approach to capacitance technology ensures accurate, reliable, and repeatable measurement, even in dusty, turbulent, and vaporous environments, or in situations with product buildup. Because even a small level change creates a large change in frequency, our instruments provide better resolution and consistently outperform conventional devices. With special features such as Active-Shield technology, and modular probe options available on various models, they offer practical solutions to a wide variety of continuous level, and interface applications.

- SITRANS LC300 [2] is an inverse frequency shift capacitance continuous level transmitter for liquids and solids applications. It is ideal for industrial applications in chemical, hydrocarbon processing, food and beverage, mining, aggregate and cement industries. Patented Active-Shield technology protects the measurement from the effects of moisture, vapors, foam, temperature or pressure variations, and material buildup.
- SITRANS LC500 [3] is an inverse frequency shift capacitance level or interface transmitter with active shield for critical applications, such as high-pressure coalescers, FPSO ships, LNG processing plants, cryogenic materials, and offshore oil and gas platforms. It performs in liquids, solids, interfaces, and foam and is unaffected by vapors, product deposits, dust, or condensation and is highly resistant to toxic and aggressive materials. SITRANS LC500 is the right solution if you're looking for high-precision level or interface measurement under extreme conditions.

Hydrostatic

Low-cost level measurement for direct mounting or mounting with remote seals on tanks and vessels. SITRANS LH100 [4] and SITRANS P DS III [5] can handle extreme chemical and mechanical loads as well as electromagnetic interference. They are widely applied in the chemical and petrochemical industries.

Gravimetric

Gravimetric level measurement with SIWAREX [6] weighing technology offers highly precise measurement without material contact independent of medium temperature, tank shape, built-in parts and material characteristics.

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Positioners

Positioners from Siemens have been guaranteeing safe and trouble-free operation around the globe for nearly 20 years. They accurately control every valve type and process, while handling special tasks with perfect reliability. We continually develop our product range to satisfy your exacting specifications and demands that your process requirements place on positioners.

SIPART PS2
State-of-the-art positioner with innovative features such as optional external non contacting position detection and many more.

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[1]

[2]

[3]

SIPART PS2 [1] [2] [3]

is currently the most widely used positioner for linear and part-turn actuators in a wide range of process industries. The proven all-round design has a particularly flexible stroke range, intelligent diagnostics, and different communication protocols.

- Versions with external non-contacting travel sensors.
- High flexibility in the stroke range from 3 to 200 mm (0.1 to 7.9 inch) (more on request).
- Communication via PROFIBUS PA, FOUNDATION Fieldbus or HART.
- Ex d explosion-proof version.
- SIPART PS2 is available in Makrolon, aluminum and stainless steel casings.
- SIPART PS2 prevents the closing of fittings during the solenoid valve test, or monitors open/close fittings as an "intelligent solenoid valve".
- Extreme low air consumption to minimize total cost of ownership.

Extended online diagnostics

Our intelligent SIPART PS2 is equipped with comprehensive functionalities, and deliver diagnostic data on themselves, their environment and the valve and actuator. With these premium diagnostics, these positioners set the standards for cost efficiency, reduce maintenance requirements in the plant, guarantee safe process control, and provide high functional safety in emergency situations. The following valve and actuator failures can be detected.

- Friction and clogging of a valve.
- Pneumatic leakage (e. g. tear in actuator membrane).
- Growing deposits in a pipeline or tear of valve plug for continuous processes.
- Wear and tear of valve seat or valve plug.
- Deposits or incrustations on valve seat or valve plug.
- Stiction of stuffing box.
- "Partial Stroke Test" (PST) for open/close valves (e. g. safety valves, ESD) and control valves.

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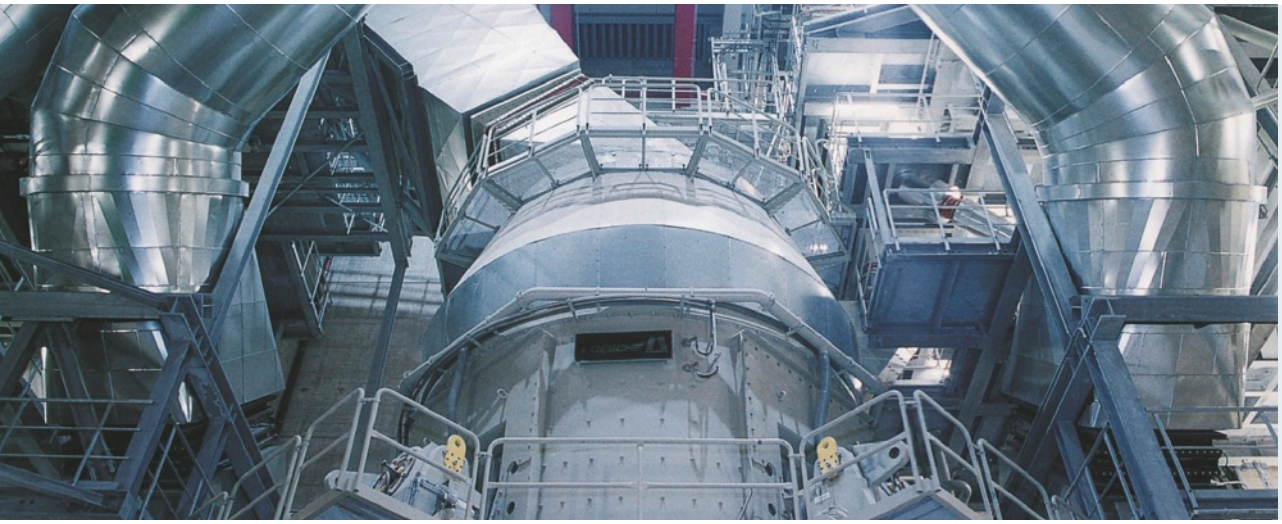
Process Protection



Detect to protect your process. Detect flow problems, blockages, screen faults, machinery slowdowns, or burst filter bags. Process protection devices can be an early warning system to avoid costly process interruptions and breakdowns of equipment. Rugged construction makes them impervious to dust, dirt, buildup and moisture.

SITRANS AS100
Acoustic sensor for material flow monitoring with compact stainless-steel design.

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[1]

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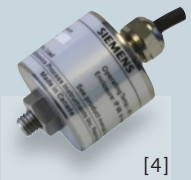
[4]

MOTION SENSORS

Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.

■ Milltronics MFA 4p with MSP or XPP probes [1]

This sensitive, single-setpoint motion sensor system can be used even in hazardous, high temperature, and harsh conditions because of its superior sensing probe design. The system protects equipment by detecting absence of motion, as well as underspeed or overspeed conditions.

■ SITRANS WM100 [2]

This heavy-duty, zero-speed alarm switch detects absence or presence of motion of rotating, reciprocating or conveying equipment.

ACOUSTIC SENSORS

■ Acoustic sensors for material flow monitoring

The SITRANS AS100 [4] acoustic sensor detects high frequency acoustic emissions from friction or the impact of dust, powders, granules and other solids in motion. It signals flow/no flow or high/low flow. It features compact stainless steel construction for harsh environments and non-invasive mounting. The SITRANS AS100 can be connected to a SITRANS CU02 [3], which processes signals from the sensor, providing relay and analog outputs for connection into a process, or it can be connected directly to a PLC analog input.

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Supplementary Components

Supplementary Components are designed to work with most types of instrumentation to provide enhanced functionality such as seamless wireless communications, remote displays, and remote monitoring solutions. Customers can add Ethernet, web, logging and other functions to instruments.

SITRANS RD500 [5]
remote data manager provides remote monitoring solutions for instrumentation anytime, anywhere via the web.

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[1]

[2]

[3]

[4]

REMOTE DIGITAL DISPLAYS

- SITRANS RD100 [1] loop powered remote display, and RD200 [1] universal remote digital displays make measurement data visible and accessible from a remote location. They can be used with all types of field instruments in varying process conditions, and are easy to set up and program. SITRANS RD200 includes freely available logging and monitoring software, allowing multiple displays to be monitored from one PC.

REMOTE DATA MANAGER

- SITRANS RD500 [5] is a remote data manager providing remote monitoring through datalogging, web access and alarming for instrumentation. It offers integrated web and ftp server, email and sms for alarming, and up to 2 gigabytes for data-logging of instrumentation with no programming required. It enables remote monitoring of inventory levels, process and environmental applications, and provides web access to most types of field instrumentation, including flow, level, pressure, temperature measurement and weighing. With SITRANS RD500 it is as simple as typing an IP-address in your web browser to access the data from remotely installed instrumentation. SITRANS RD500 collects and sends sensor data to logistics systems providing up to date, timely and accurate information used in decision making. Without the need for additional software you bring data from remote instrumentation via Ethernet or Modem (PSTN/GSM/GPRS) to your desktop, no matter where you are or where your instruments are.

WirelessHART Accessories

- The SITRANS AW210 [2] and the SITRANS AW200 [3] are WirelessHART adapter for normal or for hazardous areas which allows standard wired HART/4 ... 20 mA devices to be connected to a WirelessHART network. By installing the SITRANS AW200 on an existing analog-wired HART device, users can utilize all diagnostic information at the maintenance station without any risk of impairing operation. It is possible to connect also several devices to one adapter. Due to its battery the SITRANS AW200 is able to supply also the connected field device with electrical power.
- The IE/WSN-PA LINK [4] is a WirelessHART gateway for connecting a WirelessHART network to a plant host application. With the integrated network manager it is easy to configure WirelessHART networks and optimize network performance and security settings.

The link also supports redundancy in both ways, to the WirelessHART network and to plant host applications. Funktion block libraries allow easy integration of WirelessHART into the process control system SIMATIC PCS 7 and into PLC families S7-300 and S7-400.

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Communication and Software

Reliable communication between process devices and control systems is essential for efficient and safe processes. With different communication protocols and the necessary software Siemens offers the right tools to integrate their process instruments and analyzers into the world of process automation. The platform of Totally Integrated Automation from Siemens ensures a high level of transparency at all plant levels – from the field up to the production control level and the corporate management level.

SITRANS MDS
(Maintenance and Diagnostic Station) is a Windows-based application for retrieving and managing maintenance information from field devices.

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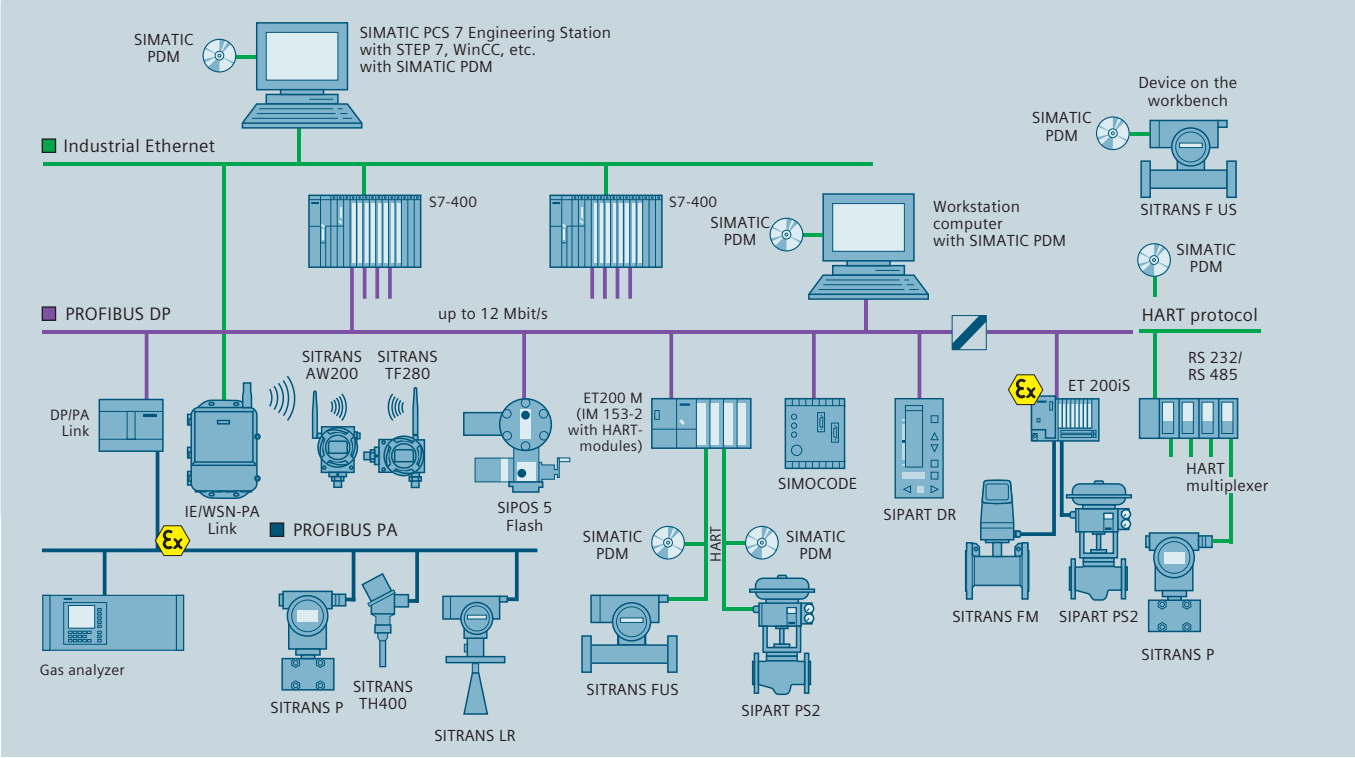

SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, non-proprietary tool for the configuration, parameterization, commissioning, diagnostics and maintenance of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control room devices, compact controllers).

Over 1,200 process devices from more than 100 manufacturers are supported by SIMATIC PDM. The design and function of the devices can be described using the Electronic Device Description Language (EDDL), based on the leading EDD international standard (Electronic Device Description; IEC 61804).

SIMATIC PDM uses this to automatically create an easy-to-use interface providing the required information on the process devices. The latest release of this standard allows the implementation of state-of-the-art user interfaces:

– Intuitive Quick Start Wizards
– Enhanced graphical interface

Communication with process devices is by HART, PROFIBUS or alternative protocols. SIMATIC PDM can be used as a universal parameterization tool as well as in the integrated version in the SIMATIC Step7/PCS 7 environment.

SIMATIC PDM meets all requirements from field level to various types of industrial communication and central engineering service and maintenance.

Asset Management

comprises all activities and measures designed to maintain or increase the value of a plant. This primarily includes value-enhancing service and maintenance (plant-specific asset management) in addition to business management, process management and process optimization. Because of its comprehensive functionality SIMATIC PDM is particularly suited to provide the device data required for plant-specific asset management and transfer it to higher-level asset management systems in XML format via a uniform interface. However, SIMATIC PDM is much more than just a data logger for higher-level asset management systems. It offers a wide range of asset management functions as well.

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Communication and Software

PROFIBUS

Decentralized automation solutions based on open field buses are currently standard in many areas of the production and process industry. The benefits of digital communication can be fully exploited in combination with field buses, including improved resolution of measurement values, diagnostics options and remote parameterization.

PROFIBUS is currently the most successful open field bus, providing a flexible platform for a variety of applications. Based on the IEC 61158 standard, it is a reliable investment and suitable for fast communication in production and process automation. It is the first field bus and meets the requirements of both sectors with the same communication performance.

PROFIBUS PA is tailored to the requirements of the process industry, handling both the power supply for the devices and communication between the devices and higher-level systems.

PROFIBUS PA is intrinsically safe and can be used in hazardous areas.

FOUNDATION Fieldbus

Field devices for measuring pressure, temperature, flow, level and actuators are also available for the intrinsically safe FF bus. Communication via FF is also based on the EDD standard and thus also offers the benefits of digital communication.

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HART – field communication protocol

The HART communication standard is used by more than 30 million installed smart process instruments with increasing numbers. The standard is managed by the HCF (HART Communication Foundation) and extends analog 4 –20 mA signals to modulated, industry-quality, digital HART signals. The advantage is the combination of tried-and-tested analog measurement-value transfer and simultaneous digital communication with bi-directional, acyclic transfer. This allows transfer of diagnostics, maintenance and process information from field devices to higher-level systems. Standardized parameter sets can be used for the non-proprietary operation of all HART devices.

Enhanced electronic device descriptions (EDD) are used to integrate HART devices into the SIMATIC PDM.

This ensures simple operation and commissioning of field devices, even in inaccessible locations.

WirelessHART

is an intelligent advancement of the proven wired 4 –20 mA HART technology towards wireless communication as part of HCF Specification V7. WirelessHART is backward compatible with wired HART technology, and as such offers maximum protection for investments in hardware and software, tools and expertise. WirelessHART is designed to communicate measured process variables or setpoints via the network but also diagnostic and maintenance information and para-meters. WirelessHART uses state-of-the-art security technologies to ensure network and data protection. Theses are e.g. meshed network topology including redundancy, data encryption, message integrity, etc.

SITRANS DTM

Enhanced electronic device descriptions (EDD) are used to integrate field devices in SIMATIC PDM or other tools like AMS.
Some tools in the market like PACTware or Fieldcare are based on a technique called FDT (Field Device Tool). SITRANS DTM integrates EDDs from our devices in these FDT-based tools.

Emerson AMS

Many of Siemens HART and FF devices also have EDDs designed for AMS by Emerson.

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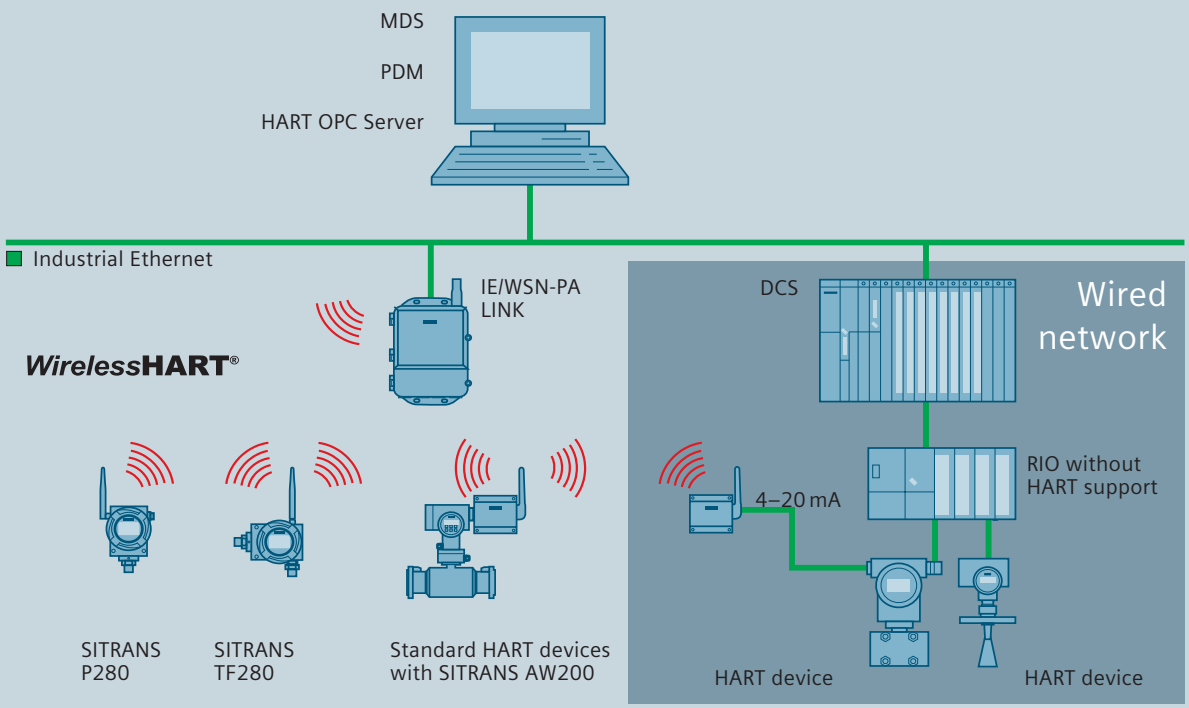
Communication and Software



SITRANS MDS

(Maintenance and Diagnostic Station) is a Windows-based application for retrieving and managing maintenance and diagnostic information from field devices.

Features:

- Use of SIMATIC PDM to retrieve maintenance and diagnostic.
- All devices reachable by SIMATIC PDM are supported.
- Device list is shown in tree form, with properties and maintenance information in a column on the right-hand side.
- Selectable update interval for all devices.
- Visualization of the maintenance status with SIMATIC-specific icons or NAMUR (NE 107) icons.
- Archiving of recent events for each device.
- User-editable report.

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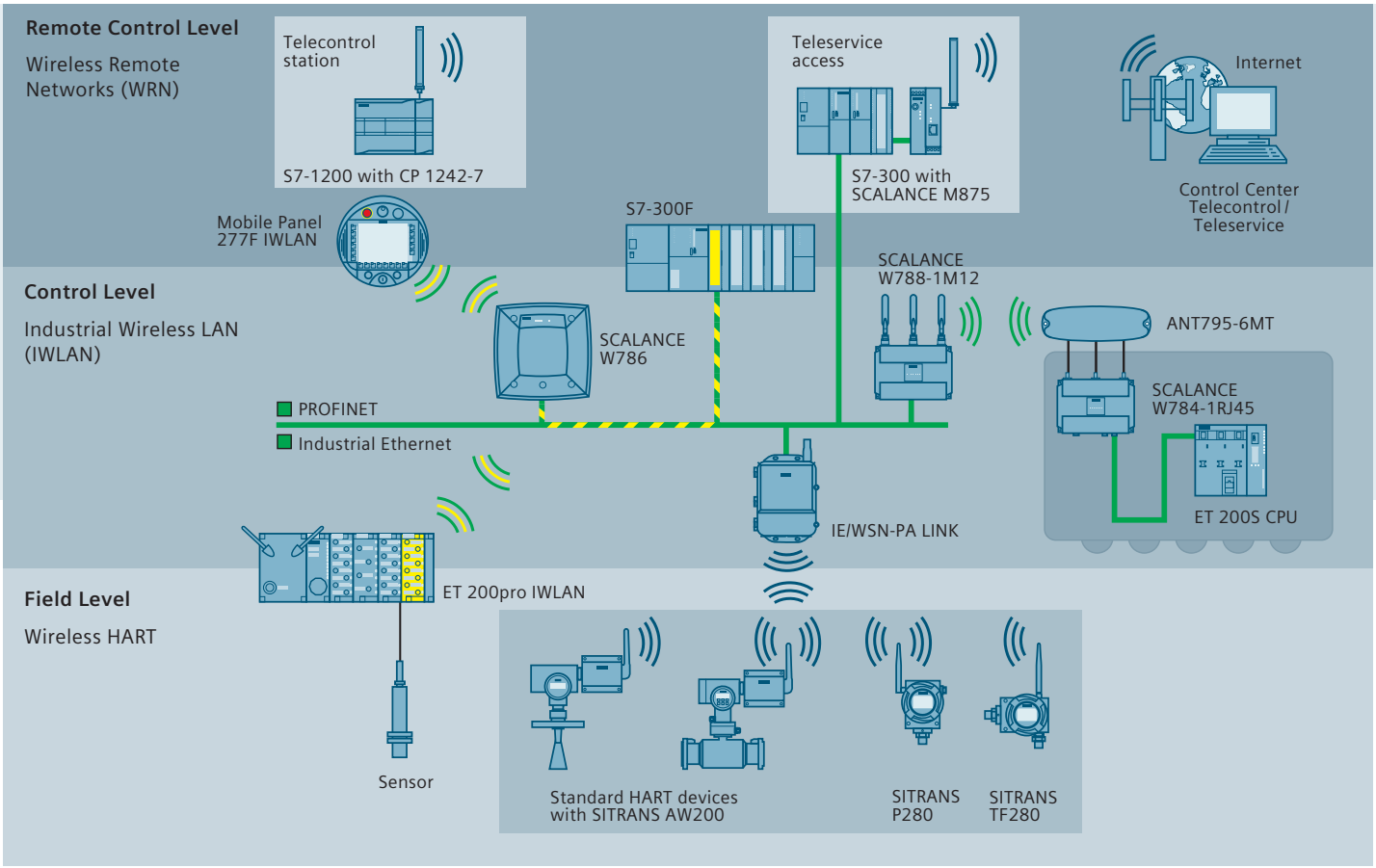

WirelessHART®

Success factor Industrial Wireless Communication

Industrial Wireless LAN (IWLAN) and GSM/GPRS-based wireless wide area networks play a successful and important part at control and remote control level.

WirelessHART answers your challenge and opens up new communication options.

- Flexible for installation, replacement or upgrading; ideal for temporary measurements and on moving or rotating equipment.
- Cost-efficient for remote and difficult to access facilities: significant cost savings for cabling, commissioning and engineering. Reduced operating costs thanks to increased plant efficiency and lower maintenance expenditure.
- Maintenance-friendly thanks to access to valuable diagnostic information.
- High plant availability and production quality due to cost-effective measurement points and higher transparency throughout the plant.

The optimum use of wired and wireless devices in one system creates the best basis for a new standard of performance in automation.

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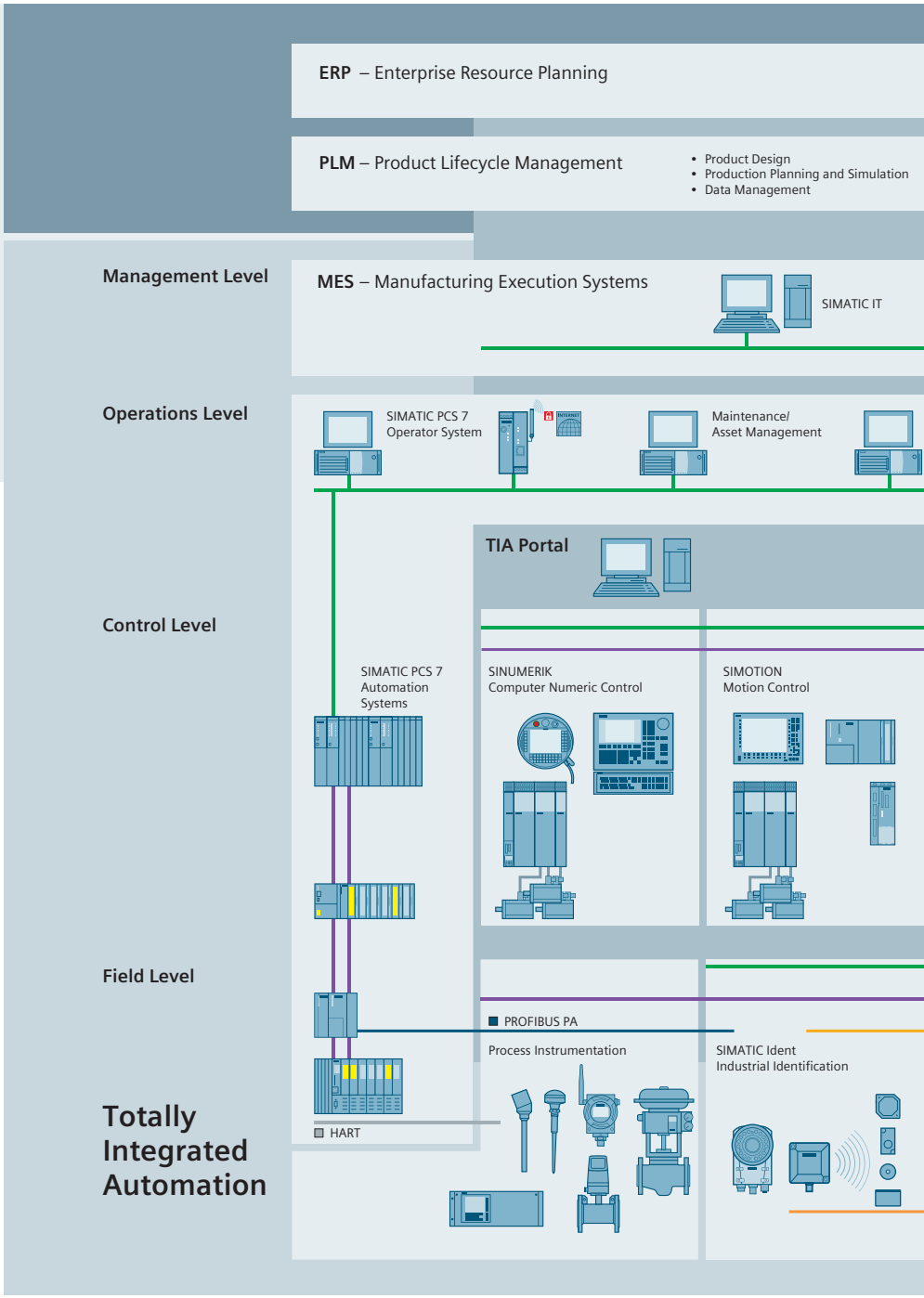

Totally Integrated Automation – TIA

is characterized by its unique degree of integration which ensures a high level of transparency at all plant levels – from the field level to the production control level and the corporate management level. This concept provides considerable benefits throughout the entire plant life cycle, from the initial planning and engineering stages, commissioning, operations and maintenance right through to modernization. The process instruments designed by Siemens have been perfectly integrated into the TIA concept.

The SIMATIC PDM (Process Device Manager) is used as a central parameterization tool to allow the user continuous access to all the field devices of his plant.

Thanks to modern fieldbus communication like HART, PROFIBUS or FOUNDATION Fieldbus the field devices can be integrated into the overall plant. By integrating the devices into the PCS7 Asset Management system the user receives diagnostics information from the field devices whenever he needs it, allowing him to optimize the servicing and maintenance of his plant and avoid downtime.

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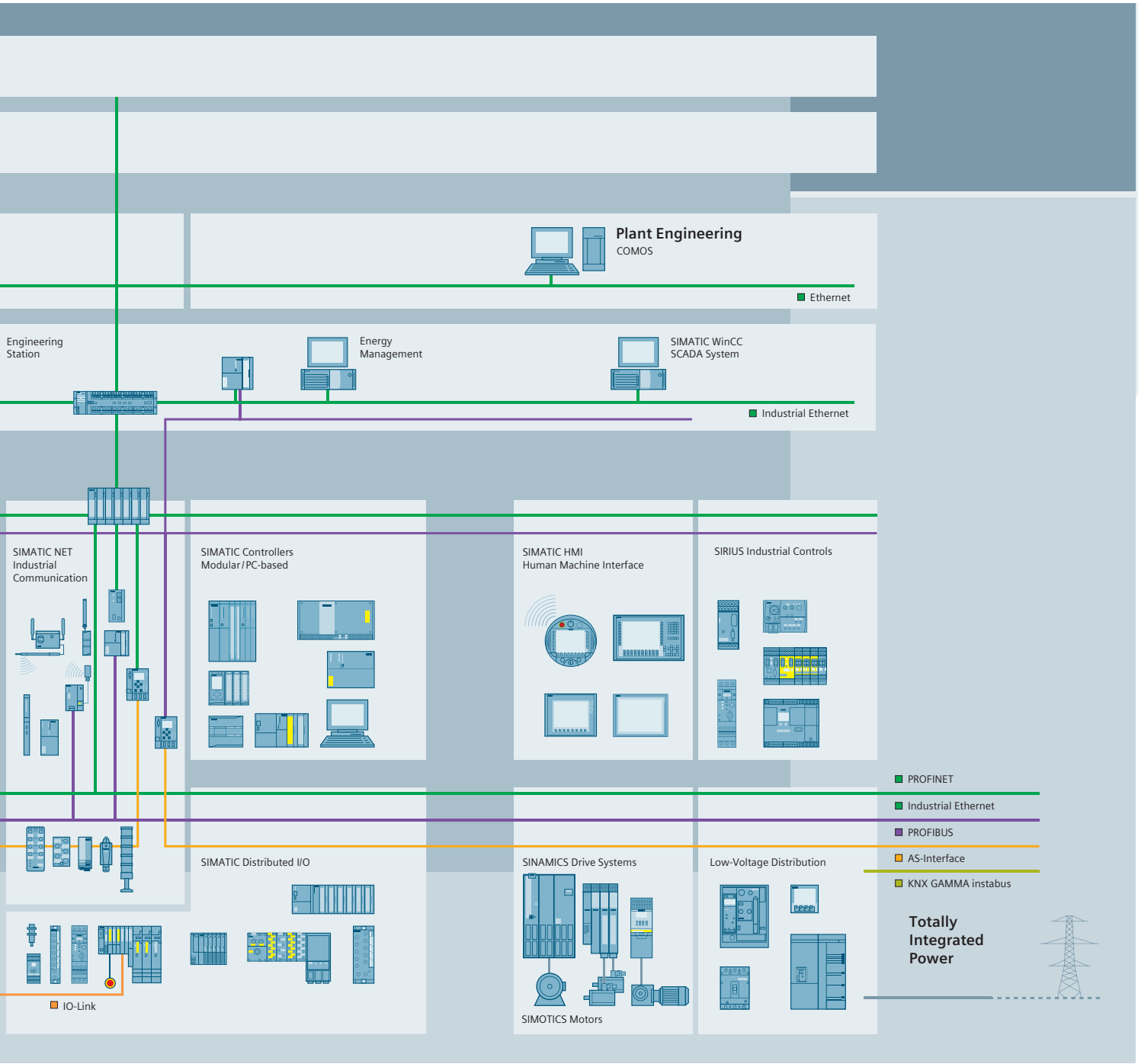

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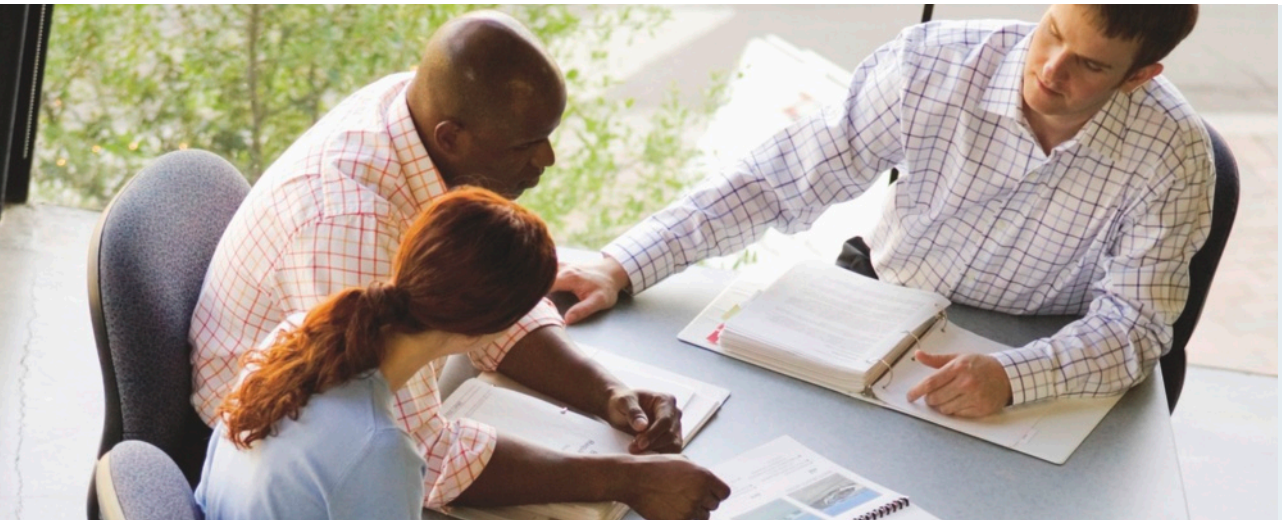
Complete Solutions



Siemens offers a complete service package to assist you in engineering, designing, supplying, installing and commissioning measurement solutions for complete industrial plants. In addition, we guarantee seamless after-sales service based on user-friendly documentation of the solution and your plant.

Real-world measurement technology from Siemens is a multifaceted offering. For example, we provide all field instruments from a single source, as requested by many customers. Our "one-stop shopping" approach includes both sensors and actuators. Siemens supports integrated engineering of your complete process instrumentation all the way to integration with your process control system. Additional industrial components and systems integrate seamlessly into the overall plant and ensure smooth process flows.

Overview of our services portfolio:

- Plant engineering and scheduling by an experienced project management team.
- Specialists assist you in the selection and use of the field instruments.
- SIPLAN C/E is state-of-the-art software available for effective plant engineering and order processing. This program is also very useful for providing actual customer documentation.
- Plant documentation comprises:
  - Basic documentation, including device specifications, product and use lists.
  - Higher-level documentation, including plant, process, identification and grounding concepts.
  - Mechanical documentation, including setup and installation diagrams, hookups, cable routings.
  - Electrical documentation, including circuit and wiring diagrams, cable lists.
- Specification and delivery of all required process instruments.
- Intensive preparation for installation.
- Reliable supply of installation material.
- Installation and/or installation supervision.
- Commissioning and/or commissioning supervision.
- Comprehensive after-sales service.

Regardless of the solution we offer you, the focus is always on customer value.

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1/272 - 3-way and 5-way valve manifolds DN 5
1/275 - 3-way valve manifold DN 8
1/278 - Valve manifold combination DN 5/DN 8
1/280 - Valve manifold combination DN 8
1/282 - 2-, 3- and 5-spindle valve manifolds for installing in protective boxes
1/286 - 3- and 5-spindle valve manifolds for vertical angular diff. pressure lines
1/289 - Low-pressure multiway cock
Accessories
1/291 - Oval flange
1/292 - Adapters
1/293 - Connection glands
1/294 - Connection parts G½
1/295 - Water traps, Sealing rings to EN 837-1
1/296 - Pressure surge reducers
1/297 - Primary shut-off valves
1/299 - Compensation vessels
1/300 - Connection parts

You can download all instructions, catalogs and certificates for SITRANS P free of charge at the following Internet address: www.siemens.com/sitransp

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Overview

	Application	Description		Software for parameterization
SITRANS P · Transmitters for basic requirements				
	Two or three-wire transmitters for measuring gauge and absolute pressure	**SITRANS P200** • Single-range transmitters for gauge and absolute pressure • Ceramic measuring cell • For general applications	1/5	–
		SITRANS P210 • Single-range transmitters for gauge pressure • Stainless steal measuring cell • For low-pressure applications	1/11	–
		SITRANS P220 • Single-range transmitters for gauge pressure • Stainless steel measuring cell, fully welded • For high-pressure applications and refrigeration technology	1/16	–
	Two or three-wire transmitter for measuring differential pressure	**SITRANS P250** • Compact single-range transmitters • Analog electronics • Available ex stock	1/22	–
	Two-wire transmitter for measuring hydrostatic levels	**SITRANS LH100** • For measuring liquid levels in wells, tanks, channels, dams etc. • With ceramic diaphragm, Ø 23.4 mm	1/27	–
	Two-wire transmitter for measuring hydrostatic levels	**SITRANS P MPS** • For measuring liquid levels in wells, tanks, channels, dams etc. • With staninless steel diaphragm, Ø 27 mm	1/31	–
	Transmitters for gauge and absolute pressure for food, pharmaceuticals and biotechnology	**SITRANS P Compact** • Single-range transmitters in two-wire system • Hygiene-based design with various aseptic connections according to EHEDG, FDA and GMP recommendations.	1/36	–
SITRANS P · Transmitters with WirelessHART communication				
	Wireless transmitter with Wireless HART for measuring gauge and absolute pressure	**SITRANS P280** • Wireless communication with WirelessHART • Battery operation • Parameterization using 3 buttons and SIMATIC PDM with HART modem or wireless with WirelessHART	1/45	SIMATIC PDM

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	Application	Description		Software for parameterization
SITRANS P · Transmitters for food, pharmaceuticals and biotechnology				
	Two-wire transmitters for measuring gauge and absolute pressure CERTIFIED HYGIENIC ENGINEERING & DESIGN EUROPEAN EHEDG TYPE EL SEPTEMBER 2001	**SITRANS P300** • Hygiene-based design according to EHEDG, 3A, FDA and GMP • Parameterization using 3 buttons and communication over HART, PROFIBUS PA or FOUNDATION Fieldbus • Standard process connection G½", ½-NPT and front-flush process connections available • Range adjustment 100 : 1	1/50	SIMATIC PDM
		Factory-mounting of valve manifolds on SITRANS P300 transmitters • Simplified assembly • With pressure test • Stainless steel valve manifolds	1/71	–
SITRANS P · Transmitter for gauge pressure for the paper industry				
	Two-wire transmitters for measuring gauge pressure	**SITRANS P300 and SITRANS P DS III with PMC connection for the paper industry** • Range adjustment 100 : 1 • Process connections for the paper industry • Parameterization using 3 buttons and HART, PROFIBUS PA or FOUNDATION Fieldbus	1/73	SIMATIC PDM
SITRANS P · Transmitter for general requirements				
	Two-wire transmitters for measuring: • Gauge pressure, • Absolute pressure, • Differential pressure and • Flow or • Level	**SITRANS P DS III** Range adjustment: 100 : 1 Parameterization using: • 3 buttons and HART for SITRANS P DS III HART • 3 buttons and PROFIBUS PA for SITRANS P DS III PA series • 3 buttons and FOUNDATION Fieldbus for SITRANS P DS III FF series • Available ex stock	1/90	SIMATIC PDM
	Supplementary electronics for adaptation of two-wire transmitters for four-wire connections	Output: 0/4 ... 20 mA Power supply: 24 V AC/DC, 230 V AC	1/164	–
		Factory mounting of valve manifolds on gauge, absolute or differential pressure transmitters SITRANS P DS III • Simplified assembly • With pressure test • Stainless steel valve manifolds	1/172	–

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	Application	Description		Software for parameterization
SITRANS P - Transmitters for High Performance requirements				
	Two-wire transmitters for measuring: • Differential pressure • Volume flow • Mass flow • Level • Volume • Mass	**SITRANS P500** • Range adjustment: 200 :1 • High measuring accuracy • Very fast response time • Extremely good long-term stability Parameterization: • 3 buttons or HART	1/176	SIMATIC PDM
	Supplementary electronics for adaptation of two-wire transmitters for four-wire connections	Output: 0/4 ... 20 mA Power supply: 24 V AC/DC, 230 V AC	1/198	–
		Factory-mounting of manifolds on differential pressure transmitters SITRANS P500 • Simplified assembly • With pressure test • Stainless steel valve manifolds	1/203	–
Remote seals for transmitters and pressure gauges				
	Remote seals for measuring viscous, corrosive or fibrous media (as well as media at extreme temperatures)	Remote seals in sandwich and flange designs Quick-release remote seals for the food industry Wide range of diaphragm materials and fill fluid available	1/206	–
Fittings				
	Shutting off the lines for the medium and differential pressure Mounting of transmitter on valve manifold or shut-off fitting	Shut-off fittings and valve manifolds available in steel, brass or stainless steel Valve manifolds available for the various process connections of the SITRANS P transmitters	1/258	–

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Overview

The SITRANS P200 pressure transmitter measures the gauge and absolute pressure of liquids, gases and vapors.

- Ceramic measuring cell
- Gauge and absolute measuring ranges 1 to 60 bar (15 to 1000 psi)
- For general applications

Benefits

- High measuring accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

Application

The SITRANS P200 pressure transmitter for gauge and absolute pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Power engineering
- Chemical industry
- Water supply

Design

Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a round plug M12 (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

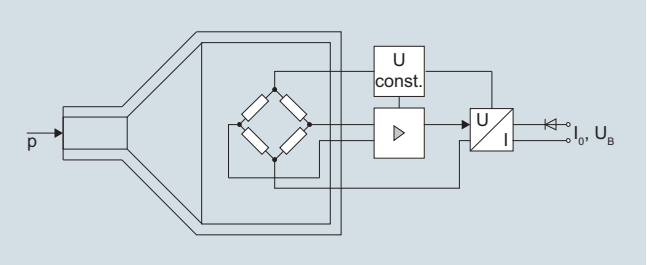
Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65) or a round plug M12 (IP67) connected electrically. The output signal is between 4 and 20 mA.

Function

The pressure transmitter measures the gauge and absolute pressure of liquids and gases as well as the level of liquids.

Mode of operation



SITRANS P200 pressure transmitters (7MF1565-...), functional diagram

The ceramic measuring cell has a thin-film resistance bridge to which the operating pressure p is transmitted through a ceramic diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

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Technical specifications

Application	
Gauge and absolute pressure measurement	Liquids, gases and vapors
Mode of operation	
Measuring principle	Piezo-resistive measuring cell (ceramic diaphragm)
Measured variable	Gauge and absolute pressure
Inputs	
Measuring range	
• Gauge pressure - Metric - US measuring range	 1 … 60 bar (15 … 870 psi) 15 … 1000 psi
• Absolute pressure - Metric - US measuring range	 0.6 … 16 bar a (10 … 232 psia) 10 … 300 psia
Output	
Current signal	4 ... 20 mA
• Load	$(U_B$ - 10 V)/0.02 A
• Auxiliary power U_B	DC 7 ... 33 V (10 ... 30 V for Ex)
Voltage signal	0 ... 10 V DC
• Load	≥ 10 kΩ
• Auxiliary power U_B	12 ... 33 V DC
• Power consumption	< 7 mA at 10 kΩ
Characteristic curve	Linear rising
Measuring accuracy	
Error in measurement at limit setting incl. hysteresis and reproducibility	• Typical: 0.25 % of full-scale value • Maximum: 0.5 % of full-scale value
Step response time T_{99}	< 5 ms
Long-term stability	
• Lower range value and measuring span	0.25 % of full-scale value/year
Influence of ambient temperature	
• Lower range value and measuring span	0.25 %/10 K of full-scale value
• Influence of power supply	0.005 %/V
Conditions of use	
Process temperature with gasket made of:	
• FPM (Standard)	-15 ... +125 °C (+5 ... +257 °F)
• Neoprene	-35 ... +100 °C (-31 ... +212 °F)
• Perbunan	-20 ... +100 °C (-4 ... +212 °F)
• EPDM	-40 ... +145 °C (-40 ... +293 °F), usable for drinking water
Ambient temperature	-25 ... +85 °C (-13 ... +185 °F)
Storage temperature	-50 ... +100 °C (-58 ... +212 °F)
Degree of protection (to EN 60529)	• IP 65 with connector per EN 175301-803-A • IP 67 with M12 connector • IP 67 with cable • IP 67 with cable quick screw connection
Electromagnetic compatibility	• acc. IEC 61326-1/-2/-3 • acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation ≤ 1 %

Design	
Weight	Approx. 0.090 kg (0.198 lb)
Process connections	See dimension drawings
Electrical connections	• Connector per EN 175301-803-A Form A with cable inlet M16x1.5 or ½-14 NPT or Pg 11 • M12 connector • 2 or 3-wire (0.5 mm^2) cable (∅ ± 5.4 mm) • Quickon cable quick screw connection
Wetted parts materials	
• Measuring cell	Al_2O_3 - 96 %
• Process connection	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Gasket	• FPM (Standard) • Neoprene • Perbunan • EPDM
Non-wetted parts materials	
• Enclosure	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Rack	Plastic
• Cables	PVC
Certificates and approvals	
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Lloyd's Register of Shipping (LR)	12/20010
Germanischer Lloyd (GL)	GL19740 11 HH00
American Bureau of Shipping (ABS)	ABS_11_HG 789392_PDA
Bureau Veritas (BV)	BV 271007A0 BV
Det Norske Veritas (DNV)	A 12553
Drinking water approval (ACS)	ACS 11 ACC NY 055
GOST	GOST-R
Underwriters Laboratories (UL)	
• for USA and Canada	UL 20110217 - E34453
• worldwide	IEC UL DK 21845
Explosion protection	
Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125 °C Da/Db
EC type-examination certificate	SEV 10 ATEX 0146
Connection to certified intrinsically-safe resistive circuits with maximum values:	$U_i \leq 30$ V DC; $I_i \leq 100$ mA; $P_i \leq 0.75$ W
Effective internal inductance and capacity for versions with plugs per EN 175301-803-A and M12	$L_i = 0$ nH; $C_i = 0$ nF

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Selection and ordering data

Article No. 7MF1565 - ■■■■■ - ■■■■ Order code ■■■

SITRANS P 200 pressure transmitters for pressure and absolute pressure for general applications ↗
Characteristic curve deviation typ. 0.25 %
Wetted parts materials: Ceramic and stainless steel + sealing material
Non-wetted parts materials: stainless steel
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Measuring range		Overload limit Min.		Overload limit Max.		Burst pressure			Article No.
For gauge pressure									
0 ... 1 bar	(0 ... 14.5 psi)	-1 bar	(-14.5 psi)	2.5 bar	(36.26 psi)	> 2.5 bar	(> 36.3 psi)	▶⬟	3BA
0 ... 1.6 bar	(0 ... 23.2 psi)	-1 bar	(-14.5 psi)	4 bar	(58.02 psi)	> 4 bar	(> 58.0 psi)	▶⬟	3BB
0 ... 2.5 bar	(0 ... 36.3 psi)	-1 bar	(-14.5 psi)	6.25 bar	(90.65 psi)	> 6.25 bar	(> 90.7 psi)	▶⬟	3BD
0 ... 4 bar	(0 ... 58.0 psi)	-1 bar	(-14.5 psi)	10 bar	(145 psi)	> 10 bar	(> 145 psi)	▶⬟	3BE
0 ... 6 bar	(0 ... 87.0 psi)	-1 bar	(-14.5 psi)	15 bar	(217 psi)	> 15 bar	(> 217 psi)	▶⬟	3BG
0 ... 10 bar	(0 ... 145 psi)	-1 bar	(-14.5 psi)	25 bar	(362 psi)	> 25 bar	(> 362 psi)	▶⬟	3CA
0 ... 16 bar	(0 ... 232 psi)	-1 bar	(-14.5 psi)	40 bar	(580 psi)	> 40 bar	(> 580 psi)	▶⬟	3CB
0 ... 25 bar	(0 ... 363 psi)	-1 bar	(-14.5 psi)	62.5 bar	(906 psi)	> 62.5 bar	(> 906 psi)	▶⬟	3CD
0 ... 40 bar	(0 ... 580 psi)	-1 bar	(-14.5 psi)	100 bar	(1450 psi)	> 100 bar	(> 1450 psi)	▶⬟	3CE
0 ... 60 bar	(0 ... 870 psi)	-1 bar	(-14.5 psi)	150 bar	(2175 psi)	> 150 bar	(> 2175 psi)	▶⬟	3CG
Other version, add Order code and plain text: Measuring range: ... up to... bar (psi)									9AA H1Y
For absolute pressure									
0 ... 0.6 bar a	(0 ... 8.7 psia)	0 bar a	(0 psia)	3 bar a	(43.51 psia)	> 2.5 bar a	(> 36.3 psia)		5AG
0 ... 1 bar a	(0 ... 14.5 psia)	0 bar a	(0 psia)	2.5 bar a	(36.26 psia)	> 2.5 bar a	(> 36.3 psia)	▶⬟	5BA
0 ... 1.6 bar a	(0 ... 23.2 psia)	0 bar a	(0 psia)	4 bar a	(58.02 psia)	> 4 bar a	(> 58.0 psia)	▶⬟	5BB
0 ... 2.5 bar a	(0 ... 36.3 psia)	0 bar a	(0 psia)	6.25 bar a	(90.65 psia)	> 6.25 bar a	(> 90.7 psia)	▶⬟	5BD
0 ... 4 bar a	(0 ... 58.0 psia)	0 bar a	(0 psia)	10 bar a	(145 psia)	> 10 bar a	(> 145 psia)	▶⬟	5BE
0 ... 6 bar a	(0 ... 87.0 psia)	0 bar a	(0 psia)	15 bar a	(217 psia)	> 15 bar a	(> 217 psia)	▶⬟	5BG
0 ... 10 bar a	(0 ... 145 psi)	0 bar a	(0 psia)	25 bar a	(362 psia)	> 25 bar a	(> 362 psia)	▶⬟	5CA
0 ... 16 bar a	(0 ... 232 psi)	0 bar a	(0 psia)	40 bar a	(580 psia)	> 40 bar a	(> 580 psia)	▶⬟	5CB
Other version, add Order code and plain text: Measuring range: ... up to ... mbar a (psia)									9AA H2Y
Measuring ranges for gauge pressure (only for US market)									
	(0 ... 15 psi)		(-14.5 psi)		(35 psi)		(> 35 psi)		4BB
	(3 ... 15 psi)		(-14.5 psi)		(35 psi)		(> 35 psi)		4BC
	(0 ... 20 psi)		(-14.5 psi)		(50 psi)		(> 50 psi)		4BD
	(0 ... 30 psi)		(-14.5 psi)		(80 psi)		(> 80 psi)		4BE
	(0 ... 60 psi)		(-14.5 psi)		(140 psi)		(> 140 psi)		4BF
	(0 ... 100 psi)		(-14.5 psi)		(200 psi)		(> 200 psi)		4BG
	(0 ... 150 psi)		(-14.5 psi)		(350 psi)		(> 350 psi)		4CA
	(0 ... 200 psi)		(-14.5 psi)		(550 psi)		(> 550 psi)		4CB
	(0 ... 300 psi)		(-14.5 psi)		(800 psi)		(> 800 psi)		4CD
	(0 ... 500 psi)		(-14.5 psi)		(1400 psi)		(> 1400 psi)		4CE
	(0 ... 750 psi)		(-14.5 psi)		(2000 psi)		(> 2000 psi)		4CF
	(0 ... 1000 psi)		(-14.5 psi)		(2000 psi)		(> 2000 psi)		4CG
Other version, add Order code and plain text: Measuring range: ... up to ... psi									9AA H1Y
Measuring ranges for absolute pressure (only for US market)									
	(0 ... 10 psia)		(0 psia)		(35 psia)		(> 35 psia)		6AG
	(0 ... 15 psia)		(0 psia)		(35 psia)		(> 35 psia)		6BA
	(0 ... 20 psia)		(0 psia)		(50 psia)		(> 50 psia)		6BB
	(0 ... 30 psia)		(0 psia)		(80 psia)		(> 80 psia)		6BD
	(0 ... 60 psia)		(0 psia)		(140 psia)		(> 140 psia)		6BE
	(0 ... 100 psia)		(0 psia)		(200 psia)		(> 200 psia)		6BG
	(0 ... 150 psia)		(0 psia)		(350 psia)		(> 350 psia)		6CA
	(0 ... 200 psia)		(0 psia)		(550 psia)		(> 550 psia)		6CB
	(0 ... 300 psia)		(0 psia)		(800 psia)		(> 800 psia)		6CC
Other version, add Order code and plain text: Measuring range: ... up to ... psia									9AA H2Y

▶ Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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1

SITRANS P200 for gauge and absolute pressure

Selection and ordering data		Article No.	Order code
SITRANS P 200 pressure transmitters for pressure and absolute pressure for general applications Accuracy typ. 0.25 % Wetted parts materials: Ceramic and stainless steel + sealing material Non-wetted parts materials: stainless steel		**7MF1565 -**	**-**
Output signal			
4 ... 20 mA; two-wire system; power supply 7 ... 33 V DC (10 ... 30 V DC for ATEX versions)	►⬟		**0**
0 ... 10 V; three-wire system; power supply 12 ... 33 V DC			**1 0**
Explosion protection (only 4 ... 20 mA)			
None	►⬟		**0**
With explosion protection Ex ia IIC T4	►⬟		**1**
Electrical connection			
Connector per DIN EN 175301-803-A, stuffing box thread M16 (with coupling)	►⬟		**1**
Round connector M12 per IEC 61076-2-101 (not for gauge pressure ranges ≤ 16 bar)			**2**
Connection via fixed mounted cable, 2 m (not for type of protection "Intrinsic safety i")			**0 3**
Quickon cable quick screw connection PG9 (not for type of protection "Intrinsic safety i")			**0 4**
Connector per DIN EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling)			**5**
Connector per DIN EN 175301-803-A, stuffing box thread PG11 (with coupling)			**6**
Fixed mounted cable, length 5 m			**0 7**
Special version			**9** **N 1 Y**
Process connection			
G½" male per EN 837-1 (½" BSP male) (standard for metric pressure ranges mbar, bar)	►⬟		**A**
G½" male thread and G1/8" female thread			**B**
G¼" male per EN 837-1 (¼" BSP male)			**C**
7/16"-20 UNF male			**D**
¼"-18 NPT male (standard for pressure ranges inH_2O and psi)			**E**
¼"-18 NPT female			**F**
½"-14 NPT male			**G**
½"-14 NPT female			**H**
7/16"-20 UNF female			**J**
M20x1.5 male			**P**
Special version			**Z** **P 1 Y**
Sealing material between sensor and enclosure			
Viton (FPM, standard)	►⬟		**A**
Neoprene (CR)			**B**
Perbunan (NBR)			**C**
EPDM			**D**
Special version			**Z** **Q 1 Y**
Version			
Standard version	►⬟		**1**
Further designs			
Supplement the Article No. with "**-Z**" and add Order code.			
Manufacturer's test certificate M per IEC 60770-2 (calibration certificate) supplied		**C11**	
Oxygen application, oil and grease-free cleaning (only in conjunction with the sealing material Viton between sensor and enclosure and not with explosion portection version)		**E10**	

► Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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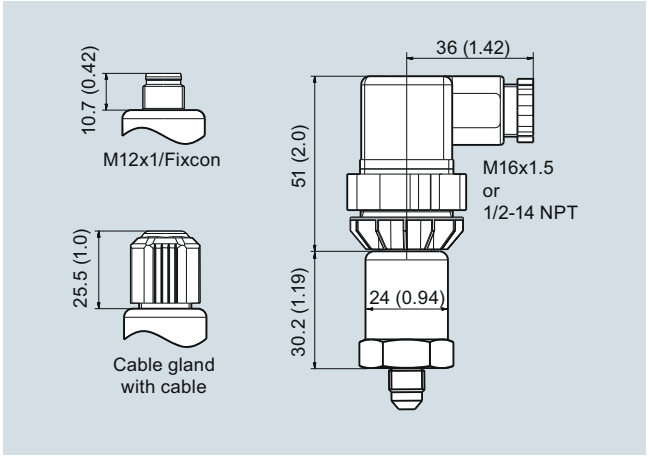
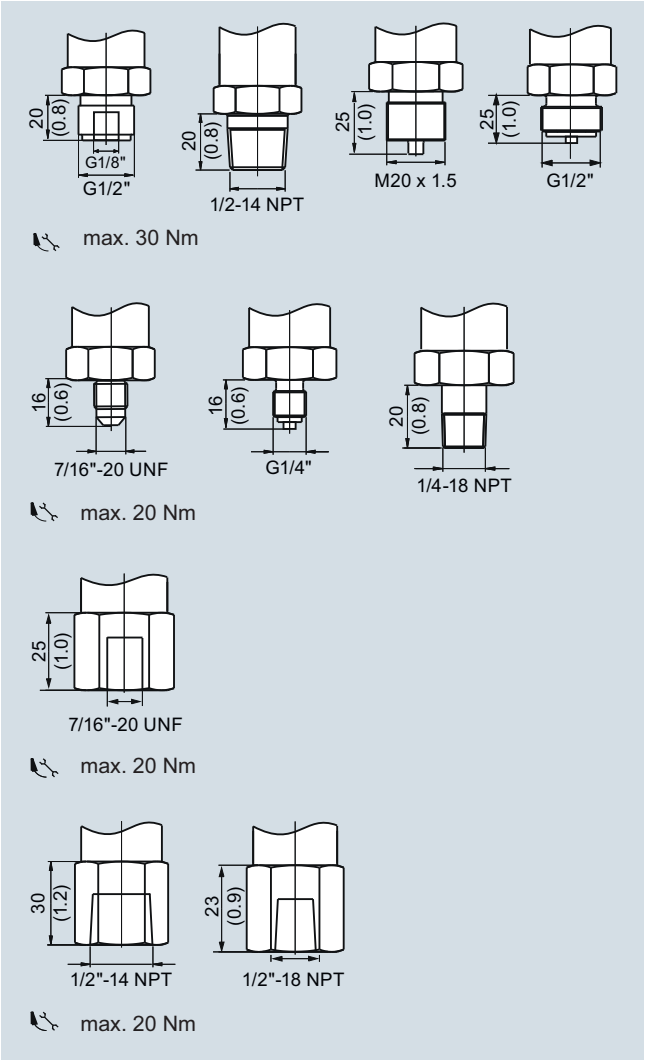
Dimensional drawings



SITRANS P200, electrical connections, dimensions in mm (inch)



SITRANS P200, process connections, dimensions in mm (inch)

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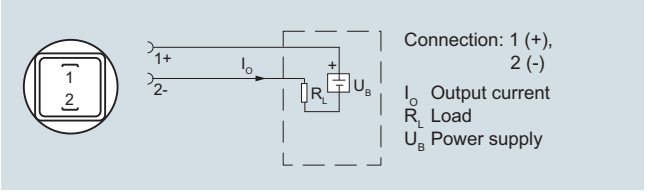
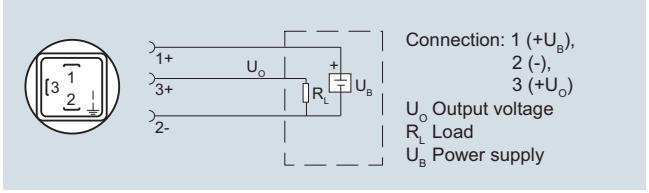
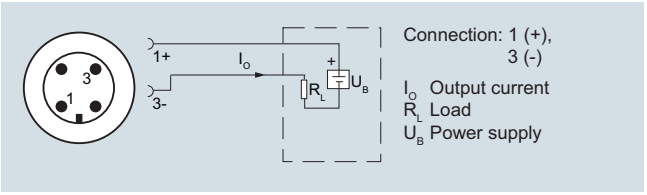
Schematics



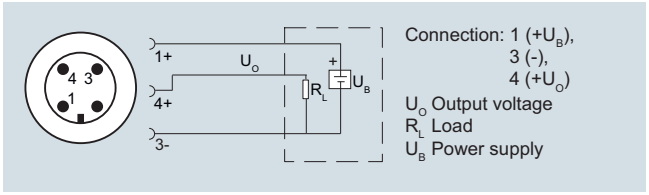
Connection with current output and connector per EN 175301



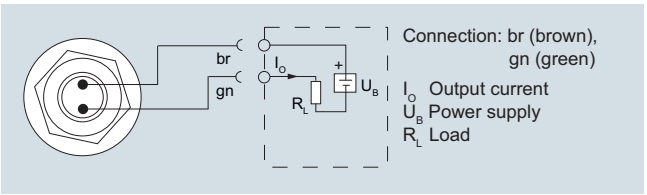
Connection with voltage output and connector per EN 175301



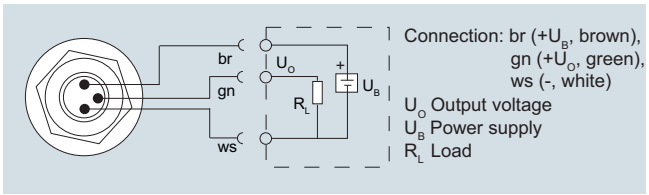
Connection with current output and connector M12x1



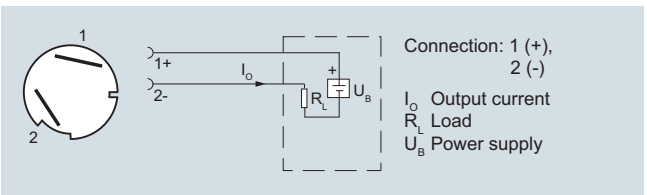
Connection with voltage output and connector M12x1



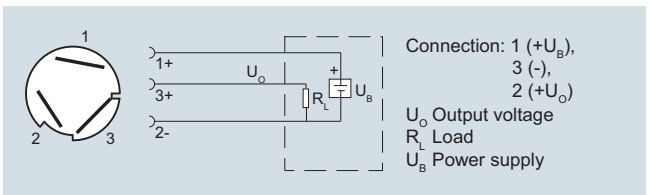
Connection with current output and cable



Connection with voltage output and cable



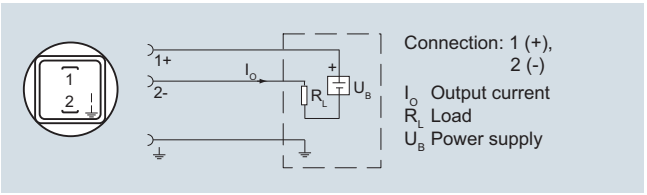
Connection with current output and Quickon cable quick screw connection



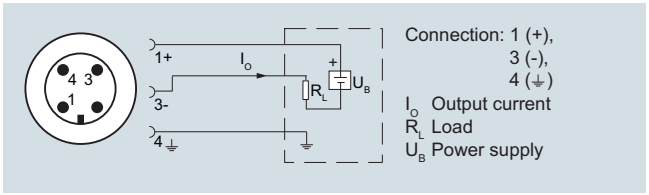
Connection with voltage output and Quickon cable quick screw connection

Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and connector M12x1 (Ex)

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Overview

The pressure transmitter SITRANS P210 measures the gauge pressure of liquids, gases and vapors.

- Stainless steal measuring cell
- Measuring ranges 100 to 600 mbar (1.45 to 8.7 psi) relative
- For low-pressure applications

Benefits

- High measuring accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- Compact design

Application

The pressure transmitter SITRANS P210 for gauge pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Power engineering
- Chemical industry
- Water supply

Design

Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a round plug M12 (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

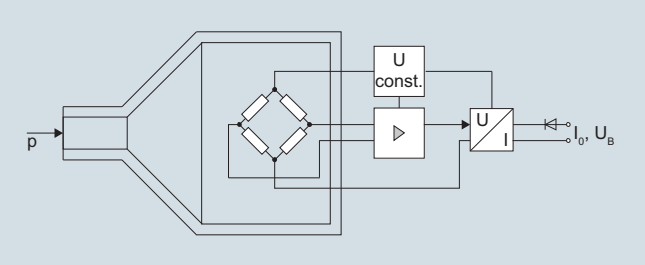
Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65) or a round plug M12 (IP67) connected electrically. The output signal is between 4 and 20 mA.

Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

Mode of operation



SITRANS P210 pressure transmitters (7MF1566-...), functional diagram

The stainless steel measuring cell has a thin-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

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Technical specifications

Application	
Gauge measurement	Liquids, gases and vapors
Mode of operation	
Measuring principle	Piezoresistive measuring cell (stainless steel diaphragm)
Measured variable	Gauge pressure
Inputs	
Measuring range	
• Gauge pressure	100 … 600 mbar (1.5 … 8.7 psi)
Output	
Current signal	4 ... 20 mA
• Load	$(U_B - 10\ V)/0.02\ A$
• Auxiliary power U_B	DC 7 ... 33 V (10 ... 30 V for Ex)
Voltage signal	0 ... 10 V DC
• Load	≥ 10 kΩ
• Auxiliary power U_B	12 ... 33 V DC
• Power consumption	< 7 mA at 10 kΩ
Characteristic curve	Linear rising
Measuring accuracy	
Error in measurement at limit setting incl. hysteresis and reproducibility	• Typical: 0.25 % of full-scale value • Maximum: 0.5 % of full-scale value
Step response time T_{99}	< 5 ms
Long-term stability	
• Lower range value and measuring span	0.25 % of full-scale value/year
Influence of ambient temperature	
• Lower range value and measuring span	• 0.25 %/10 K of full-scale value • 0.5 %/10K of full-scale value for a measuring range 100 … 400 mbar
• Influence of power supply	0.005 %/V
Conditions of use	
Process temperature with gasket made of:	
• FPM (Standard)	-15 ... +125 °C (+5 ... +257 °F)
• Neoprene	-35 ... +100 °C (-31 ... +212 °F)
• Perbunan	-20 ... +100 °C (-4 ... +212 °F)
• EPDM	-40 ... +145 °C (-40 ... +293 °F), usable for drinking water
Ambient temperature	-25 ... +85 °C (-13 ... +185 °F)
Storage temperature	-50 ... +100 °C (-58 ... +212 °F)
Degree of protection (to EN 60529)	• IP 65 with connector per EN 175301-803-A • IP 67 with M12 connector • IP 67 with cable • IP 67 with cable quick screw connection
Electromagnetic compatibility	• acc. IEC 61326-1/-2/-3 • acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation ≤ 1 %
Mounting position	upright

Design	
Weight	Approx. 0.090 kg (0.198 lb)
Process connections	See dimension drawings
Electrical connections	• Connector per EN 175301-803-A Form A with cable inlet M16x1.5 or ½-14 NPT or Pg 11 • M12 connector • 2 or 3-wire (0.5 mm^2) cable (∅ ± 5.4 mm) • Quickon cable quick screw connection
Wetted parts materials	
• Measuring cell	Stainless steel, mat.-No. 1.4435
• Process connection	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Gasket	• FPM (Standard) • Neoprene • Perbunan • EPDM
Non-wetted parts materials	
• Enclosure	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Rack	Plastic
• cables	PVC
Certificates and approvals	
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; meets requirements as per article 3, paragraph 3 (good engineering practice)
Lloyd's Register of Shipping (LR)	12/20010
Germanischer Lloyd (GL)	GL19740 11 HH00
American Bureau of Shipping (ABS)	ABS_11_HG 789392_PDA
Bureau Veritas (BV)	BV 271007A0 BV
Det Norske Veritas (DNV)	A 12553
Drinking water approval (ACS)	ACS 11 ACC NY 055
GOST	GOST-R
Underwriters Laboratories (UL)	
• for USA and Canada	UL 20110217 - E34453
• worldwide	IEC UL DK 21845
Explosion protection	
Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125 °C Da/Db
EC type-examination certificate	SEV 10 ATEX 0146
Connection to certified intrinsically-safe resistive circuits with maximum values:	$U_i \leq 30\ V$ DC; $I_i \leq 100\ mA$; $P_i \leq 0.75\ W$
Effective internal inductance and capacity for versions with plugs per EN 175301-803-A and M12	$L_i = 0\ nH$; $C_i = 0\ nF$

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Selection and ordering data

Article No. 7MF1566 - ■■■■■ - ■■■■ Order code

SITRANS P 210 pressure transmitters for gauge pressure for low pressure applications ↗
Accuracy typ. 0.25 %
Wetted parts materials: Stainless steel + sealing material
Non-wetted parts materials: stainless steel

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Measuring range	Overload limit min.	Overload limit max.	Burst pressure		Article No.	Order code
For gauge pressure						
0...100 mbar (1.45 psi)	-400 mbar (-5.8 psi)	400 mbar (5.8 psi)	1 bar	(14.5 psi) ►⬟	3AA	
0...160 mbar (2.32 psi)	-400 mbar (-5.8 psi)	400 mbar (5.8 psi)	1 bar	(14.5 psi) ►⬟	3AB	
0...250 mbar (3.63 psi)	-800 mbar (-11.6 psi)	1000 mbar (14.5 psi)	2 bar	(29.0 psi) ►⬟	3AC	
0...400 mbar (5.8 psi)	-800 mbar (-11.6 psi)	1000 mbar (14.5 psi)	2 bar	(29.0 psi) ►⬟	3AD	
0...600 mbar (8.7 psi)	-1000 mbar (-14.5 psi)	2000 mbar (29.0 psi)	3 bar	(43.5 psi) ►⬟	3AG	
Other version, add Order code and plain text: Measuring range: ... up to ... mbar (psi)					9AA	H1Y

		Article No.	Order code
Output signal			
4 ... 20 mA; two-wire system; power supply 7 ... 33 V DC (10 ... 30 V DC for ATEX versions)	►⬟	0	
0 ... 10 V; three-wire system; power supply 12 ... 33 V DC		10	
Explosion protection (only 4 ... 20 mA)			
None	►⬟	0	
With explosion protection Ex ia IIC T4	►⬟	1	
Electrical connection			
Connector per DIN EN 175301-803-A, stuffing box thread M16 (with coupling)	►⬟	1	
Connection via fixed mounted cable, 2 m (not for type of protection "Intrinsic safety i")		03	
Quickon cable quick screw connection PG9 (not for type of protection "Intrinsic safety i")		04	
Connector per DIN EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling)		5	
Connector per DIN EN 175301-803-A, stuffing box thread PG11 (with coupling)		6	
Fixed mounted cable, length 5 m		07	
Special version		9	N1Y
Process connection			
G½" male per EN 837-1 (½" BSP male) (standard for metric pressure ranges mbar, bar)	►⬟	A	
G½" male thread and G1/8" female thread		B	
G¼" male per EN 837-1 (¼" BSP male)		C	
7/16"-20 UNF male		D	
¼"-18 NPT male (standard for pressure ranges inH_2O and psi)		E	
¼"-18 NPT female		F	
½"-14 NPT male		G	
½"-14 NPT female		H	
7/16"-20 UNF female		J	
M20x1.5 male		P	
Special version		Z	P1Y
Sealing material between sensor and enclosure			
Viton (FPM, standard)	►⬟	A	
Neoprene (CR)		B	
Perbunan (NBR)		C	
EPDM		D	
Special version		Z	Q1Y
Version			
Standard version	►⬟	1	

Further designs

	Article No.	Order code
Supplement the Article No. with "**-Z**" and add Order code.		
Manufacturer's test certificate M per IEC 60770-2 (calibration certificate) supplied	C11	

► Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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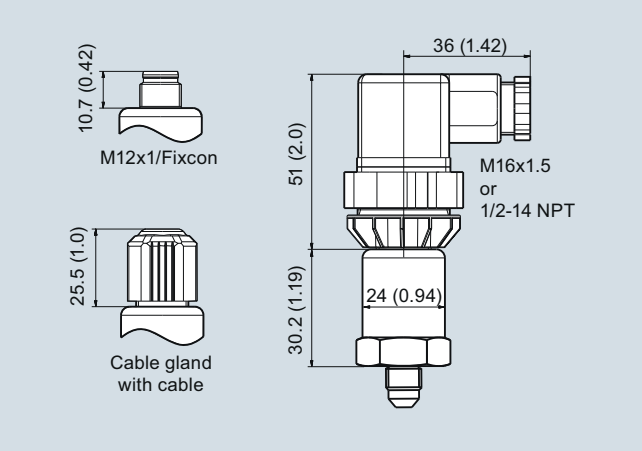
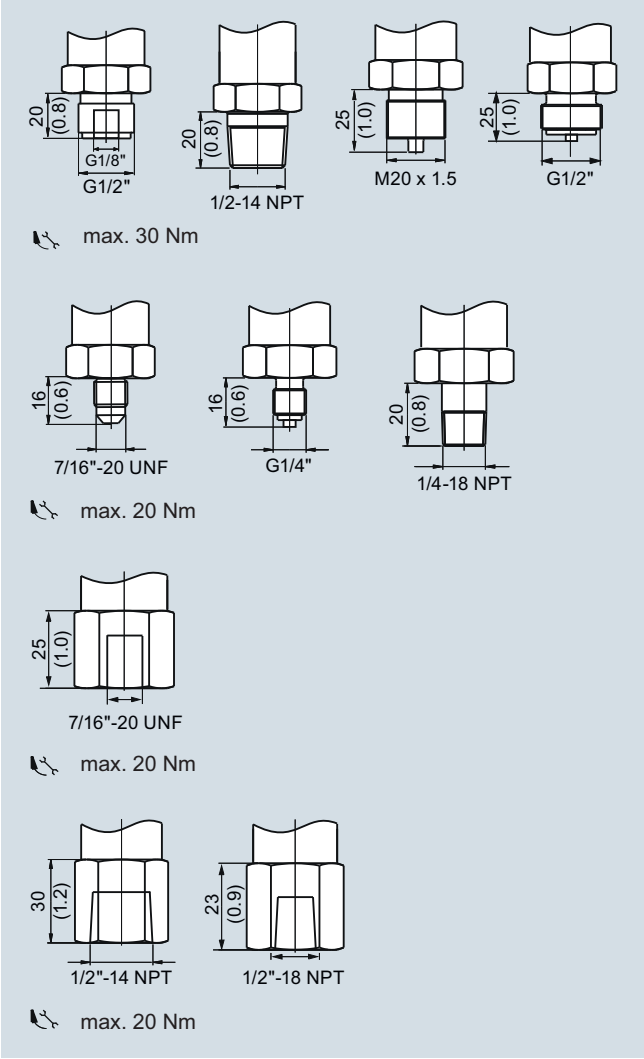
Dimensional drawings



SITRANS P210, electrical connections, dimensions in mm (inch)



SITRANS P210, process connections, dimensions in mm (inch)

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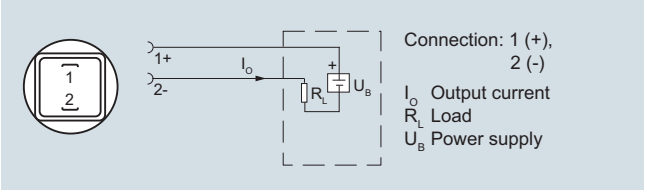
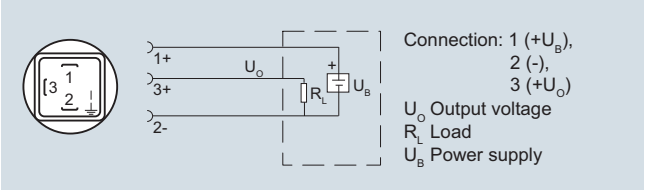
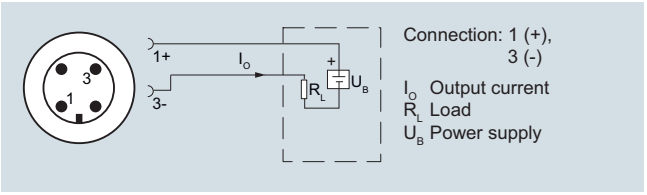
Schematics



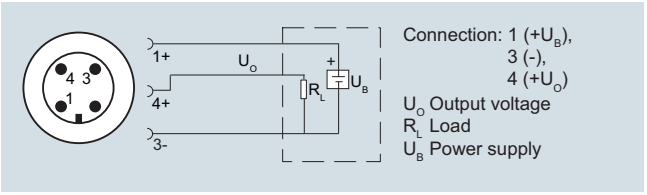
Connection with current output and connector per EN 175301



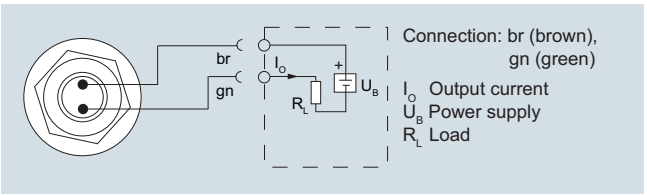
Connection with voltage output and connector per EN 175301



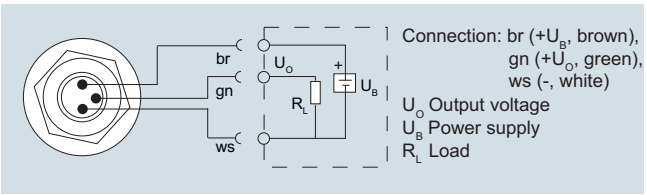
Connection with current output and connector M12x1



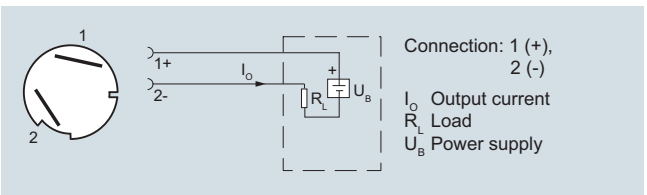
Connection with voltage output and connector M12x1



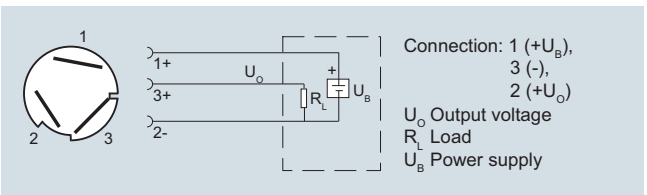
Connection with current output and cable



Connection with voltage output and cable



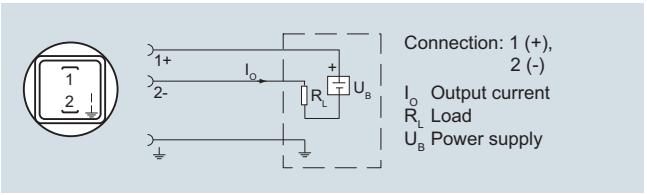
Connection with current output and Quickon cable quick screw connection



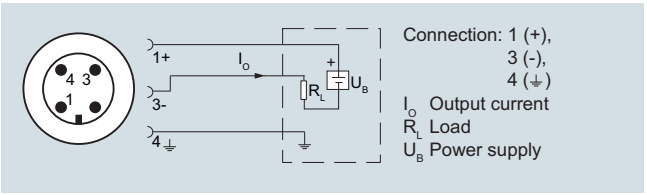
Connection with voltage output and Quickon cable quick screw connection

Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and connector M12x1 (Ex)

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SITRANS P220 for gauge pressure

Overview

The pressure transmitter SITRANS P220 measures the gauge pressure of liquids, gases and vapors.

- Stainless steel measuring cell, fully welded
- Measuring ranges 2.5 to 600 bar (36.3 to 8702 psi) relative
- For high-pressure applications and refrigeration technology division

Benefits

- High measuring accuracy
- Rugged stainless steel enclosure
- High overload withstand capability
- For aggressive and non-aggressive media
- For measuring the pressure of liquids, gases and vapors
- Compact design
- Gasket-less

Application

The pressure transmitter SITRANS P220 for gauge pressure is used in the following industrial areas:

- Mechanical engineering
- Shipbuilding
- Power engineering
- Chemical industry
- Water supply

Design

Device structure without explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65), a round plug M12 (IP67), a cable (IP67) or a Quickon cable quick screw connection (IP67) connected electrically. The output signal is between 4 and 20 mA or 0 and 10 V.

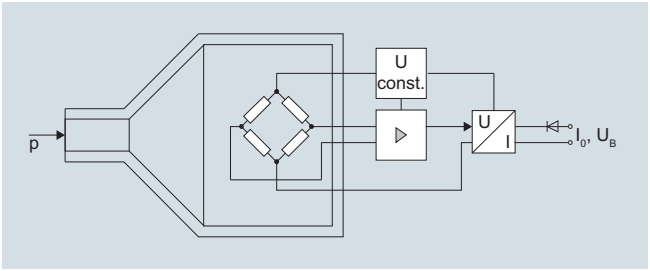
Device structure with explosion protection

The pressure transmitter consists of a piezoresistive measuring cell with a diaphragm installed in a stainless steel enclosure. It can be used with a connector per EN 175301-803-A (IP65) or a round plug M12 (IP67) connected electrically. The output signal is between 4 and 20 mA.

Function

The pressure transmitter measures the gauge pressure of liquids and gases as well as the level of liquids.

Mode of operation



SITRANS P220 pressure transmitters (7MF1567-...), functional diagram

The stainless steel measuring cell has a thick-film resistance bridge to which the operating pressure p is transmitted through a stainless steel diaphragm.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

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Technical specifications

Application	
Gauge pressure measurement	Liquids, gases and vapors
Mode of operation	
Measuring principle	Piezoresistive measuring cell (stainless steel diaphragm)
Measured variable	Gauge pressure
Inputs	
Measuring range	
• Gauge pressure	
- Metric	2.5 … 600 bar (36 … 8700 psi)
- US measuring range	30… 8700 psi
Output	
Current signal	4 ... 20 mA
• Load	(U_B - 10 V)/0.02 A
• Auxiliary power U_B	DC 7 ... 33 V (10 ... 30 V for Ex)
Voltage signal	0 ... 10 V DC
• Load	≥ 10 kΩ
• Auxiliary power U_B	12 ... 33 V DC
• Power consumption	< 7 mA at 10 kΩ
Characteristic curve	Linear rising
Measuring accuracy	
Error in measurement at limit setting incl. hysteresis and reproducibility	• Typical: 0.25 % of full-scale value • Maximum: 0.5 % of full-scale value
Step response time T_{99}	< 5 ms
Long-term stability	
• Lower range value and measuring span	0.25 % of full-scale value/year
Influence of ambient temperature	
• Lower range value and measuring span	0.25 %/10 K of full-scale value
• Influence of power supply	0.005 %/V
Conditions of use	
• Process temperature	-30 ... +120 °C (-22 ... +248 °F)
• Ambient temperature	-25 ... +85 °C (-13 ... +185 °F)
• Storage temperature	-50 ... +100 °C (-58 ... +212 °F)
• Degree of protection (to EN 60529)	• IP 65 with connector per EN 175301-803-A • IP 67 with M12 connector • IP 67 with cable • IP 67 with cable quick screw connection
Electromagnetic compatibility	• acc. IEC 61326-1/-2/-3 • acc. NAMUR NE21, only for ATEX versions and with a max. measuring deviation ≤ 1 %

Design	
Weight	Approx. 0.090 kg (0.198 lb)
Process connections	See dimension drawings
Electrical connections	• Connector per EN 175301-803-A Form A with cable inlet M16x1.5 or ½-14 NPT or Pg 11 • M12 connector • 2 or 3-wire (0.5 mm^2) cable (∅ ± 5.4 mm) • Quickon cable quick screw connection
Wetted parts materials	
• Measuring cell	Stainless steel, mat.-No. 1.4016
• Process connection	Stainless steel, mat. No. 1.4404 (SST 316 L)
Non-wetted parts materials	
• Enclosure	Stainless steel, mat. No. 1.4404 (SST 316 L)
• Rack	Plastic
• cables	PVC
Certificates and approvals	
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Lloyd's Register of Shipping (LR)	12/20010
Germanischer Lloyd (GL)	GL19740 11 HH00
American Bureau of Shipping (ABS)	ABS_11_HG 789392_PDA
Bureau Veritas (BV)	BV 271007A0 BV
Det Norske Veritas (DNV)	A 12553
Drinking water approval (ACS)	ACS 11 ACC NY 055
GOST	GOST-R
Underwriters Laboratories (UL)	
• for USA and Canada	UL 20110217 - E34453
• worldwide	IEC UL DK 21845
Explosion protection	
Intrinsic safety "i" (only with current output)	Ex II 1/2 G Ex ia IIC T4 Ga/Gb Ex II 1/2 D Ex ia IIIC T125 °C Da/Db
EC type-examination certificate	SEV 10 ATEX 0146
Connection to certified intrinsically-safe resistive circuits with maximum values:	U_i ≤ 30 V DC; I_i ≤ 100 mA; P_i ≤ 0.75 W
Effective internal inductance and capacity for versions with plugs per EN 175301-803-A and M12	L_i = 0 nH; C_i = 0 nF

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Selection and ordering data — Article No. 7MF1567- ▢▢▢▢▢-▢▢A▢ ▢▢▢ — Order code

SITRANS P 220 pressure transmitters for gauge pressure, high-pressure and refrigeration applications, fully-welded version
Accuracy typ. 0.25 %
Wetted parts materials: stainless steel
Non-wetted parts materials: stainless steel

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Measuring range	Overload limit: Minimum	Overload limit: Max.	Burst pressure		Order code
For gauge pressure					
0 ... 2.5 bar (0 ... 36.3 psi)	-1 bar (-14.5 psi)	6.25 bar (90.7 psi)	25 bar (363 psi)	▶⬟	3BD
0 ... 4 bar (0 ... 58 psi)	-1 bar (-14.5 psi)	10 bar (145 psi)	40 bar (870 psi)	▶⬟	3BE
0 ... 6 bar (0 ... 87 psi)	-1 bar (-14.5 psi)	15 bar (217 psi)	60 bar (522 psi)	▶⬟	3BG
0 ... 10 bar (0 ... 145 psi)	-1 bar (-14.5 psi)	25 bar (362 psi)	60 bar (870 psi)	▶⬟	3CA
0 ... 16 bar (0 ... 232 psi)	-1 bar (-14.5 psi)	40 bar (580 psi)	96 bar (1392 psi)	▶⬟	3CB
0 ... 25 bar (0 ... 363 psi)	-1 bar (-14.5 psi)	62.5 bar (906 psi)	150 bar (2176 psi)	▶⬟	3CD
0 ... 40 bar (0 ... 580 psi)	-1 bar (-14.5 psi)	100 bar (1450 psi)	240 bar (3481 psi)	▶⬟	3CE
0 ... 60 bar (0 ... 870 psi)	-1 bar (-14.5 psi)	150 bar (2175 psi)	360 bar (5221 psi)	▶⬟	3CG
0 ... 100 bar (0 ... 1450 psi)	-1 bar (-14.5 psi)	250 bar (3625 psi)	600 bar (8702 psi)	▶⬟	3DA
0 ... 160 bar (0 ... 2320 psi)	-1 bar (-14.5 psi)	400 bar (5801 psi)	960 bar (13924 psi)	▶⬟	3DB
0 ... 250 bar (0 ... 3625 psi)	-1 bar (-14.5 psi)	625 bar (9064 psi)	1500 bar (21756 psi)	▶⬟	3DD
0 ... 400 bar (0 ... 5801 psi)	-1 bar (-14.5 psi)	1000 bar (14503 psi)	2400 bar (34809 psi)	▶⬟	3DE
0 ... 600 bar (0 ... 8702 psi)	-1 bar (-14.5 psi)	1500 bar (21755 psi)	2500 bar (36260 psi)	▶⬟	3DG
Other version, add Order code and plain text: Measuring range: ... up to... bar (psi)					9AA H1Y
Measuring ranges for gauge pressure (only for US market)					
(0 ... 30 psi)	(-14.5 psi)	(75 psi)	(360 psi)		4BE
(0 ... 60 psi)	(-14.5 psi)	(150 psi)	(580 psi)		4BF
(0 ... 100 psi)	(-14.5 psi)	(250 psi)	(580 psi)		4BG
(0 ... 150 psi)	(-14.5 psi)	(375 psi)	(870 psi)		4CA
(0 ... 200 psi)	(-14.5 psi)	(500 psi)	(1390 psi)		4CB
(0 ... 300 psi)	(-14.5 psi)	(750 psi)	(2170 psi)		4CD
(0 ... 500 psi)	(-14.5 psi)	(1250 psi)	(3480 psi)		4CE
(0 ... 750 psi)	(-14.5 psi)	(1875 psi)	(5220 psi)		4CF
(0 ... 1000 psi)	(-14.5 psi)	(2500 psi)	(5220 psi)		4CG
(0 ... 1500 psi)	(-14.5 psi)	(3750 psi)	(8700 psi)		4DA
(0 ... 2000 psi)	(-14.5 psi)	(5000 psi)	(13920 psi)		4DB
(0 ... 3000 psi)	(-14.5 psi)	(7500 psi)	(21750 psi)		4DD
(0 ... 5000 psi)	(-14.5 psi)	(12500 psi)	(34800 psi)		4DE
(0 ... 6000 psi	(-14.5 psi)	(15000 psi)	(34800 psi)		4DF
(0 ... 8700 psi)	(-14.5 psi)	(21000 psi)	(52200 psi)		4DG
Other version, add Order code and plain text: Measuring range: ... up to ... psi					9AA H1Y

Output signal

		Order code
4 ... 20 mA; two-wire system; power supply 7 ... 33 V DC (10 ... 30 V DC for ATEX versions)	▶⬟	0
0 ... 10 V; three-wire system; power supply 12 ... 33 V DC		10

Explosion protection (only 4 ... 20 mA)

		Order code
None	▶⬟	0
With explosion protection Ex ia IIC T4	▶⬟	1

Electrical connection

		Order code
Connector per DIN EN 175301-803-A, stuffing box thread M16 (with coupling)	▶⬟	1
Round connector M12 per IEC 61076-2-101 (not for gauge pressure ranges ≤ 16 bar)		2
Connection via fixed mounted cable, 2 m (not for type of protection "Intrinsic safety i")		03
Quickon cable quick screw connection PG9 (not for type of protection "Intrinsic safety i")		04
Connector per DIN EN 175301-803-A, stuffing box thread 1/2"-14 NPT (with coupling)		5
Connector per DIN EN 175301-803-A, stuffing box thread PG11 (with coupling)		6
Fixed mounted cable, length 5 m		07
Special version		9 N1Y

▶ Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and ordering data		Article No.	Order code
SITRANS P 220 pressure transmitters for gauge pressure, high-pressure and refrigeration applications, fully-welded version Accuracy typ. 0.25 % Wetted parts materials: stainless steel Non-wetted parts materials: stainless steel		**7MF1567 -** ■■■■■■ **-** ■■ **A** ■	■■■
Process connection			
G½" male per EN 837-1 (½" BSP male) (standard for metric pressure ranges mbar, bar)	►⬟		**A**
G½" male thread and G1/8" female thread			**B**
G¼" male per EN 837-1 (¼" BSP male)			**C**
7/16"-20 UNF male			**D**
¼"-18 NPT male (standard for pressure ranges in H_2O and psi)			**E**
¼"-18 NPT female (Only for measuring ranges ≤ 60 bar (870 psi))			**F**
½"-14 NPT male			**G**
½"-14 NPT female (Only for measuring ranges ≤ 60 bar (870 psi))			**H**
7/16"-20 UNF female			**J**
M20x1.5 male			**P**
Special version			**Z** **P 1 Y**
Version			
Standard version	►⬟		**1**
Further designs			
Supplement the Article No. with "**-Z**" and add Order code.			
Manufacturer's test certificate M per IEC 60770-2 (calibration certificate) supplied		**C11**	
Oxygen application, oil and grease-free cleaning (Not in conjunction with explosion protection version)		**E10**	

► Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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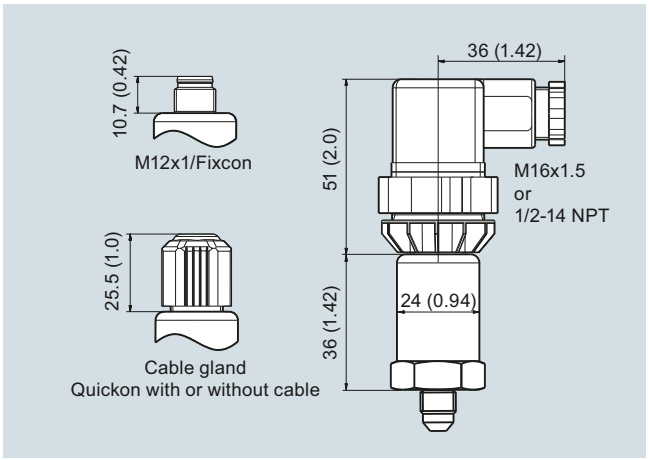
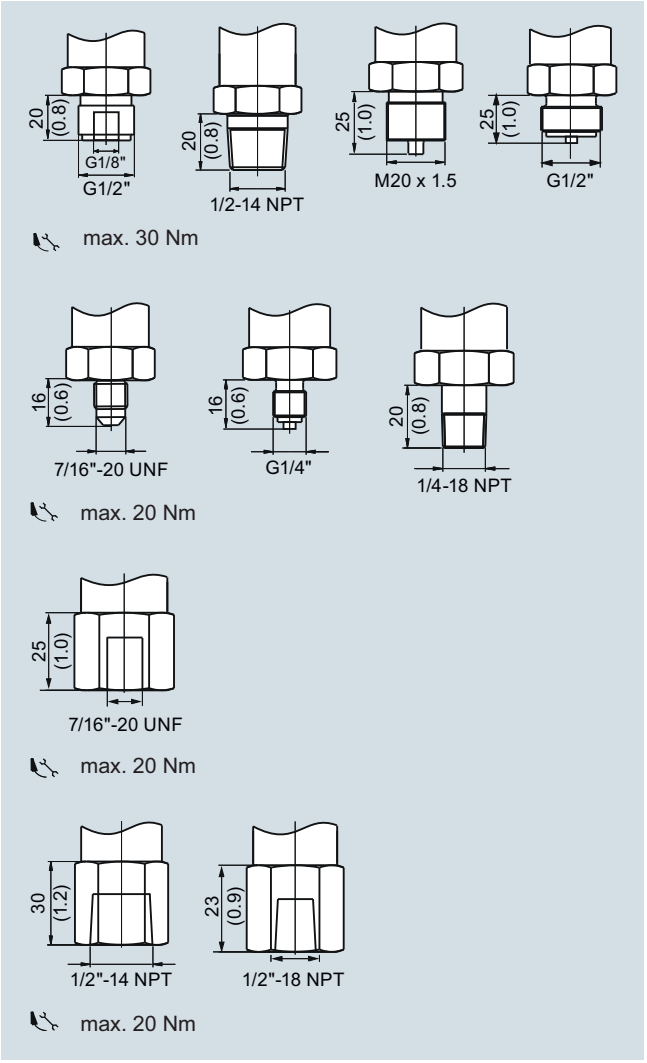
Dimensional drawings



SITRANS P220, electrical connections, dimensions in mm (inch)



SITRANS P220, process connections, dimensions in mm (inch)

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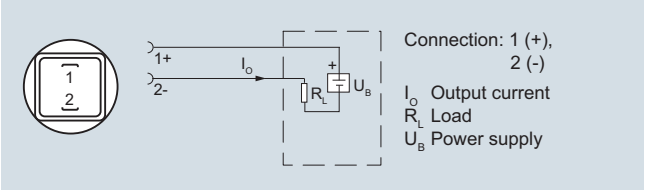
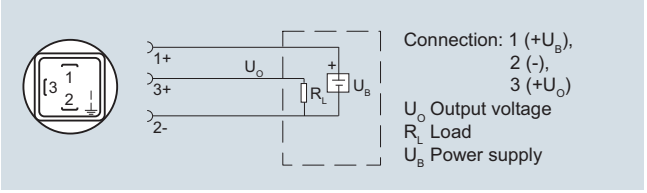
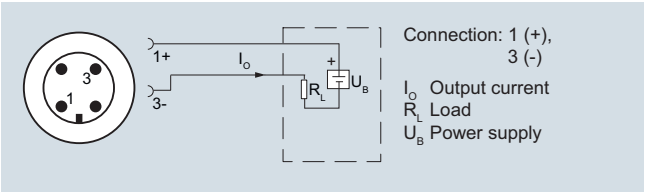
Schematics



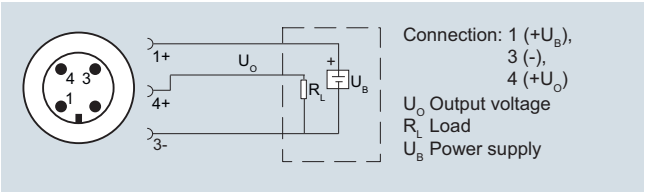
Connection with current output and connector per EN 175301



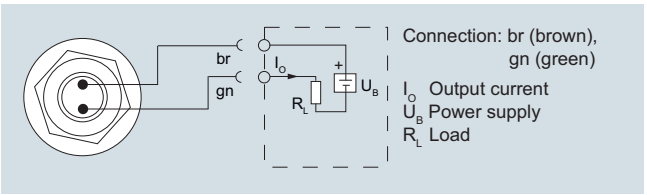
Connection with voltage output and connector per EN 175301



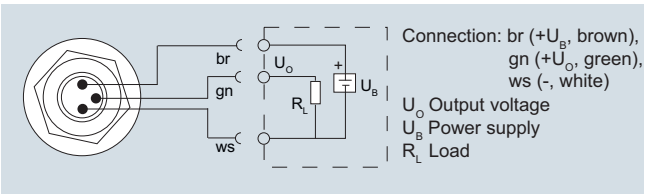
Connection with current output and connector M12x1



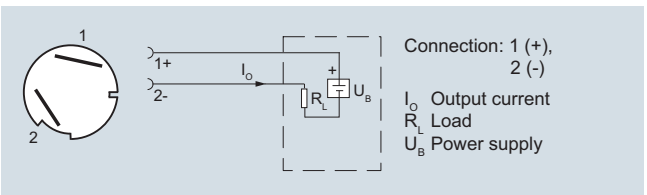
Connection with voltage output and connector M12x1



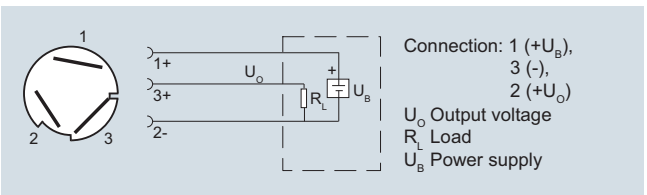
Connection with current output and cable



Connection with voltage output and cable



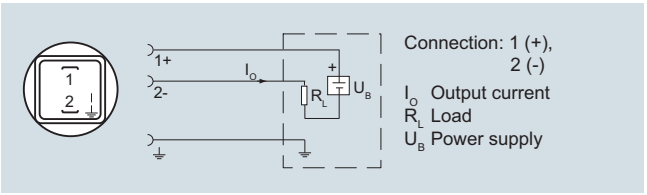
Connection with current output and cable quick screw connection Quickon



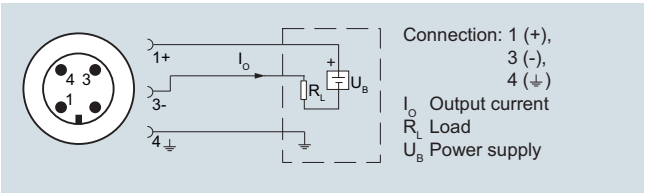
Connection with voltage output and cable quick screw connection Quickon

Version with explosion protection: 4 ... 20 mA

The grounding connection is conductively bonded to the transmitter enclosure



Connection with current output and connector per EN 175301 (Ex)



Connection with current output and connector M12x1 (Ex)

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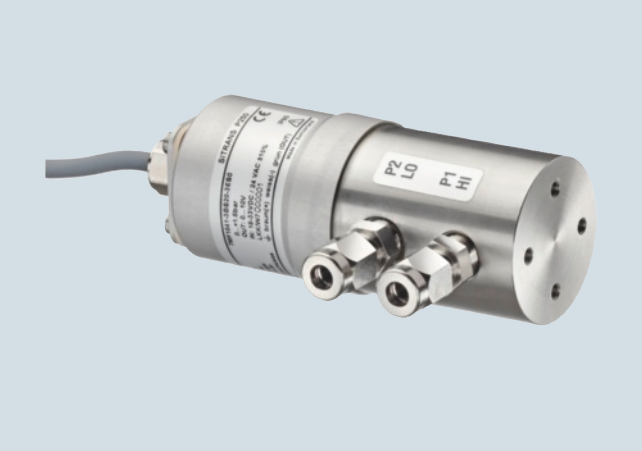
1

SITRANS P250 for differential pressure

Overview



The SITRANS P250 transmitter measures the differential pressure of liquids and gases.

Benefits

- High measuring accuracy
- Sturdy stainless steel enclosure
- For aggressive and non-aggressive media
- For the measurement of the differential pressure of liquids and gases
- Temperature-compensated measuring cell
- Compact design

Application

The SITRANS P250 transmitter for differential pressure is primarily used in the following industries:

- Chemical industry
- Heating, ventilation and air conditioning technology
- Food industry
- Mechanical engineering
- Shipbuilding
- Water supply

Design

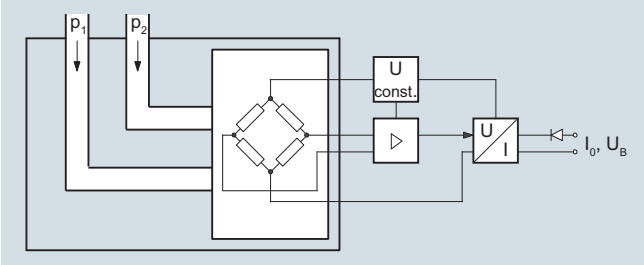
Main components:

- Stainless steel enclosure with piezo-resistive ceramic measuring cell (temperature-compensated) and electronics module
- Process connection made of stainless steel in diverse designs (see Selection and Ordering data)
- Electrical connection through connectors acc. to EN 175301-803-A and round connectors M12, as well as with permanently fixed cable

Function

The pressure transmitter measures the differential pressure of liquids and gases.

Mode of operation



SITRANS P250 pressure transmitter, function diagram

The piezo-resistive measuring cell (ceramic membrane) has a Wheatstone bridge circuit, on which the operating pressure P1 and P2 of the media acts at both ends.

The voltage output from the measuring cell is converted by an amplifier into an output current of 4 to 20 mA or an output voltage of 0 to 5 or 10 V DC.

The output current and voltage are linearly proportional to the input pressure.

Technical specifications

SITRANS P250 differential pressure transmitter	
Application	
Differential pressure transmitter	Liquids and neutral gases
Mode of operation	
Measuring principle	Piezo-resistive measuring cell (ceramic diaphragm)
Input	
Measured variable	Differential pressure
Measuring range	0 ... 0.1 to 0 ... 25 bar (0 ... 1.45 to 0 ... 363 psi)
Operating pressure	≤ 25 bar at a differential pressure range > 6 bar ≤ 50 bar at a differential pressure range > 10 bar
Burst pressure	1.5 x operating pressure
Output	
Output signal	
• Current output signal	4 ... 20 mA
• Voltage output signal	0 ... 5 V DC and 0 ... 10 V DC
Load	
• 3-wire	> 10 kΩ
• 2-wire	≤ (U_H - 11 V) / 0.02 A
Measuring accuracy	
Error in measurement at limit setting incl. hysteresis and reproducibility	≤ 1 % of typical full-scale value, see "Measuring range" table"
Long-term stability acc. to IEC 60770	≤ 0.5 % of full-scale value/year
Influence of ambient temperature	
• Start of scale	≤ 0.6 % / 10 K of full-scale value (≤ 1.2 % / 10K for measuring cell 0 ... 0.1 bar (1.45 psi))
• Full-scale value	≤ 0.22 % /10 K of full-scale value (≤ 0.37 % / 10K for measuring cell 0 ... 0.1 bar (1.45 psi))
Dynamic behavior	Suitable for static and dynamic measurements
Step response time T_{99}	< 5 ms
Load variation	< 50 Hz

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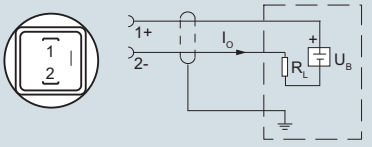
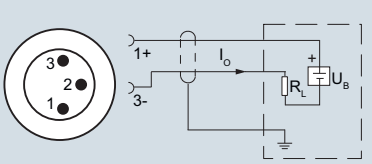
Rated conditions	
Ambient conditions	
• Temperature of medium	-15 ...+85 °C (5 ... 185 °F)
• Ambient temperature	-15 ...+85 °C (5 ... 185 °F)
• Storage temperature	-40 ...+85 °C (-40 ... +185 °F)
Degree of protection acc. to EN 60529	IP65
Mounting position	Any
Mounting	Mounting bracket, included in delivery
Design	
Weight	Approx. 430 g (approx. 0.95 lb)
Enclosure material	Stainless steel 1.4305/AISI 303
Electrical connection	• Plug EN 175301-803-A • Circular plug EN 60130-9 • Cable 1.5 m
Process connection	• Hose sleeve Ø 4 mm/6 mm • Pipe union Ø 6 mm/8 mm • Male thread 7/16-20 UNF, G1/8" • Female thread 1/8-27 NPT • (Standard), G1/8"
Wetted parts materials	
• Process connection	Stainless steel 1.4305/AISI 303, brass nickel-plated
• Diaphragm	Ceramic Al_2O_3 (96 %)
• Sealing material	FPM (standard), EPDM, NBR, MVQ, CR
Power supply U_H	
Terminal voltage on pressure transmitter	
• 2-wire, 4 ... 20 mA	11 ... 33 V DC
• 3-wire, 0 ... 5 V DC	11 ... 33 V DC/24 V AC ±15 %
• 3-wire, 0 ... 10 V DC	18 ... 33 V DC/24 V AC ±15 %
Current consumption at nominal pressure	
• 2-wire	< 20 mA
• 3-wire	< 5 mA
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.
Certificates and approvals	
Approval	CE conformity

Measuring range		Max. perm. operating pressure (on either side)	Burst pressure	Max. perm. operating pressure (on one side)	Accuracy
[bar]	[inH_2O]				
0 ... 0.1	0 ... 40.18	25 bar (363 psi)	37.5 bar (544 psi)	0.6 bar (241 inH_2O)	≤ 1.0 %
0 ... 0.2	0 ... 80.37	25 bar (363 psi)	37.5 bar (544 psi)	0.6 bar (241 inH_2O)	≤ 0.8 %
0 ... 0.25	0 ... 100.46	25 bar (363 psi)	37.5 bar (544 psi)	0.6 bar (241 inH_2O)	≤ 0.5 %
0 ... 0.3	0 ... 120.56	25 bar (363 psi)	37.5 bar (544 psi)	0.6 bar (241 inH_2O)	≤ 0.5 %
0 ... 0.4	0 ... 160.74	25 bar (363 psi)	37.5 bar (544 psi)	1.2 bar (482 inH_2O)	≤ 0.8 %
0 ... 0.5	0 ... 200.9	25 bar (363 psi)	37.5 bar (544 psi)	1.2 bar (482 inH_2O)	≤ 0.5 %
0 ... 0.6	0 ... 241.0	25 bar (363 psi)	37.5 bar (544 psi)	1.2 bar (482 inH_2O)	≤ 0.5 %
0 ... 1.0	0 ... 402.0	25 bar (363 psi)	37.5 bar (544 psi)	2 bar (804 inH_2O)	≤ 0.5 %
0 ... 1.6	0 ... 643.0	25 bar (363 psi)	37.5 bar (544 psi)	3.2 bar (1286 inH_2O)	≤ 0.5 %
0 ... 2.5	0 ... 1005	25 bar (363 psi)	37.5 bar (544 psi)	5 bar (2009 H_2O)	≤ 0.5 %
0 ... 4	0 ... 1607	25 bar (363 psi)	37.5 bar (544 psi)	8 bar (3215 inH_2O)	≤ 0.5 %
0 ... 6	0 ... 2411	25 bar (363 psi)	37.5 bar (544 psi)	12 bar (4822 inH_2O)	≤ 0.5 %
0 ... 10	0 ... 4019	50 bar (725 psi)	75 bar (1088 psi)	20 bar (8037 inH_2O)	≤ 0.5 %
0 ... 16	0 ... 6430	50 bar (725 psi)	75 bar (1088 psi)	32 bar (464 psi)	≤ 0.5 %
0 ... 25	0 ... 10046	50 bar (725 psi)	75 bar (1088 psi)	50 bar (725 psi)	≤ 0.5 %

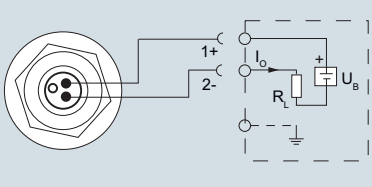
Schematics



Connection with current output 4 ... 20 mA and plug to EN 175301-803-A



Connection with current output 4 ... 20 mA and round connector



Connection with current output 4 ... 20 mA and permanently fixed cable

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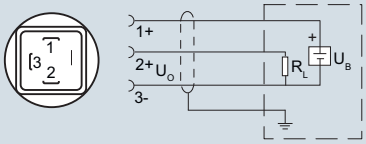
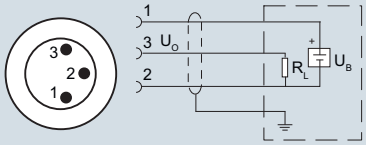


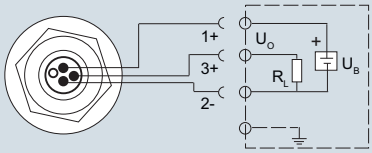
Connection: 1 (+U_B),
2 (-),
3 (+U_0)
U_O Output voltage
R_L Load
U_B Power supply

Connection with voltage output 0 ... 5 V DC (0 ... 10 V DC) and plug to EN 175301-803-A



Connection: 1 (+U_B, brown),
2 (+U_0, green),
3 (-, white)
U_O Output voltage
U_B Power supply
R_L Load

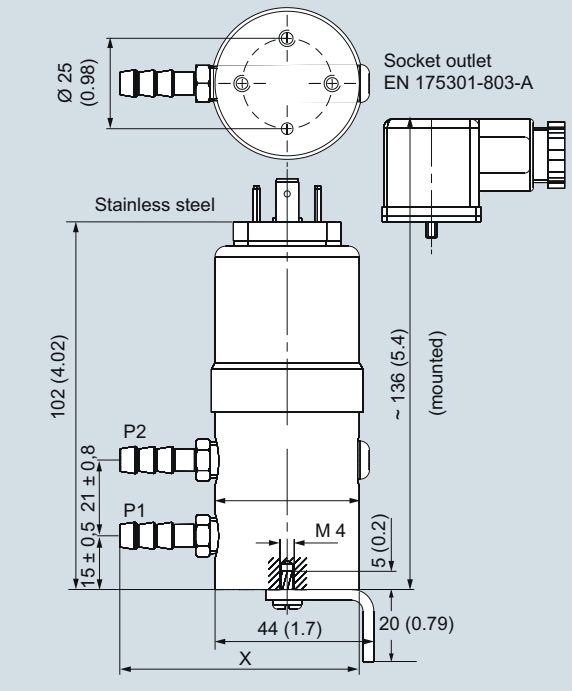
Connection with voltage output 0 ... 5 V DC (0 ... 10 V DC) and round connector



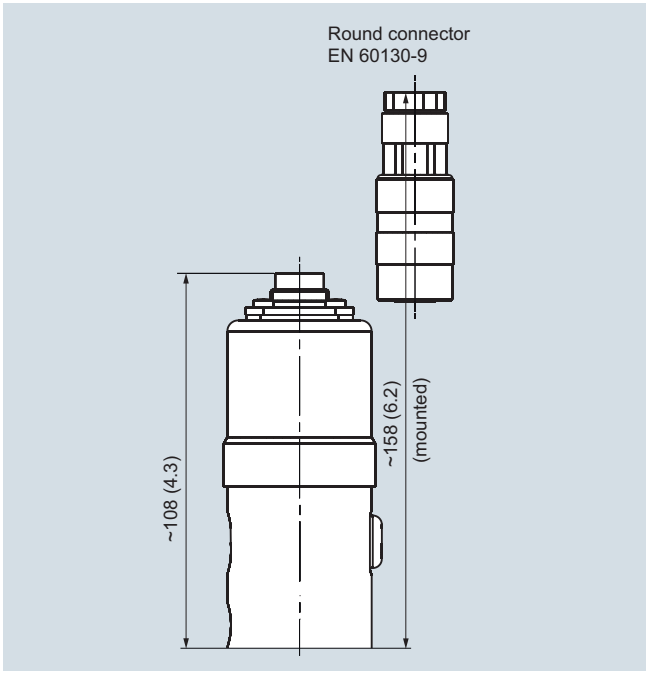
Connection: 1 (+U_B),
2 (-),
3 (+U_0)
U_O Output voltage
U_B Power supply
R_L Load

Connection with voltage output 0 ... 5 V DC (0 ... 10 V DC) and permanently fixed cable

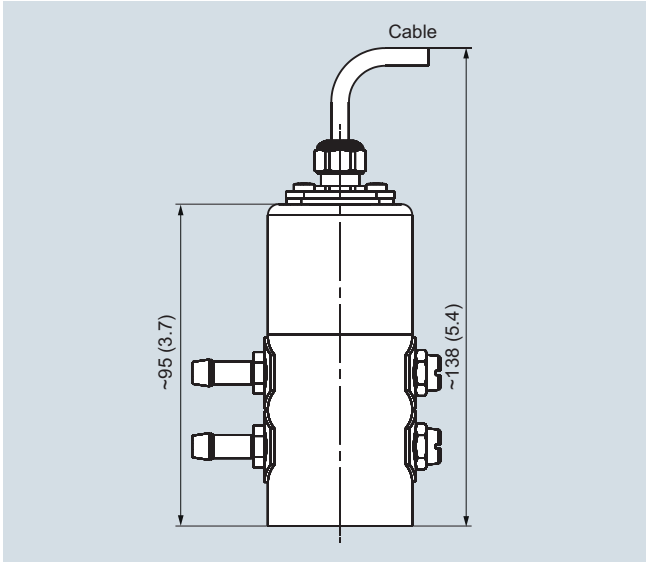
Dimensional drawings



SITRANS P250 differential pressure transmitter with socket outlet to EN 175301-803-A, dimensions in mm (inch)



SITRANS P250 differential pressure transmitter with round connector to EN 60130-9, dimensions in mm (inch)



SITRANS P250 differential pressure transmitter with cable, dimensions in mm (inch)

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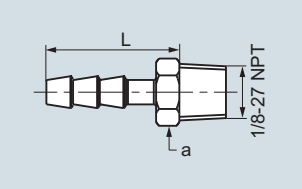
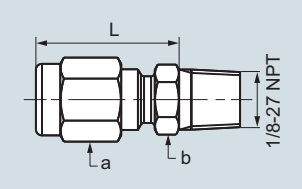
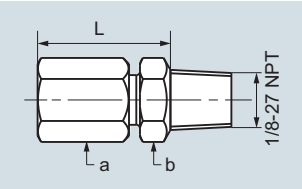
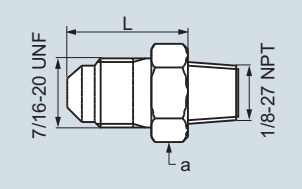
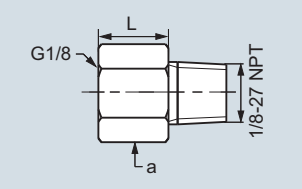
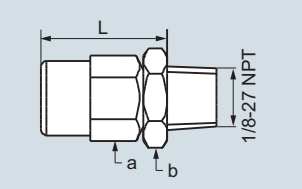
Process connections		Ø		Width across flats	L		X	
		[mm]	[inch]		[mm]	[inch]	[mm]	[inch]
	Hose connection for hose (brass nickel-plated)	4	0.16	a = 10	20	0.79	61	2.40
		6	0.24	a = 10	25	0.99	66	2.60
	Pipe union with screw-in nipple for outer pipe (brass nickel-plated)	6	0.24	a = 10 b = 12	24	0.95	65	2.56
		8	0.32	a = 12 b = 14	25	0.99	66	2.60
	Pipe union with screw-in nipple for outer pipe (stainless steel 1.4305/AISI 303)	6	0.24	a = 10 b = 12	24	0.95	65	2.56
		8	0.32	a = 12 b = 14	26	1	67	2.64
	Male thread 7/16-20 UNF (brass nickel-plated)	-	-	a = 14	18	0.71	59	2.32
	Female thread G1/8 (stainless steel 1.4305/AISI 303)	-	-	a = 14	12	0.47	53	2
	Male thread G1/8 (brass nickel-plated)	-	-	a = 10 b = 12	20	0.79	61	2.40

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SITRANS P250 for differential pressure

Selection and Ordering data		Article No.	Order code
SITRANS P 250 pressure transmitter for differential pressure Accuracy ≤ 1 %, wetted parts ceramic/stainless steel 1.4301, scope of delivery: transmitter, mounting bracket and instruction manual, without explosion protection	↗	**7MF1641-**	**0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring range			
0 ... 0.1 bar (0 ... 40.19 inH_2O)	▶⬟		**3AA**
0 ... 0.2 bar (0 ... 80.37 inH_2O)	▶⬟		**3AC**
0 ... 0.25 bar (0 ... 100.46 inH_2O)	▶⬟		**3AD**
0 ... 0.3 bar (0 ... 120.56 inH_2O)	▶⬟		**3AE**
0 ... 0.4 bar (0 ... 160.74 inH_2O)	▶⬟		**3AF**
0 ... 0.5 bar (0 ... 201.0 inH_2O)	▶⬟		**3AG**
0 ... 0.6 bar (0 ... 241.0 inH_2O)	▶⬟		**3AH**
0 ... 1.0 bar (0 ... 402.0 inH_2O)	▶⬟		**3BA**
0 ... 1.6 bar (0 ... 643.0 inH_2O)	▶⬟		**3BB**
0 ... 2.5 bar (0 ... 1005.0 inH_2O)	▶⬟		**3BD**
0 ... 4.0 bar (0 ... 1607.0 inH_2O)	▶⬟		**3BE**
0 ... 6.0 bar (0 ... 2411.0 inH_2O)	▶⬟		**3BG**
0 ... 10.0 bar (0 ... 4019.0 inH_2O)	▶⬟		**3CA**
0 ... 16.0 bar (0 ... 6430.0 inH_2O)	▶⬟		**3CB**
0 ... 25.0 bar (0 ... 10046 inH_2O)	▶⬟		**3CD**
Other version, add Order code and plain text (Note: smallest possible span 100 mbar (40.19 inH_2O)			**9AA** **H1Y**
Output signal			
4 ... 20 mA	▶⬟		**0**
0 ... 5 V DC			**1**
0 ... 10 V DC			**2**
Electrical connection			
Plug acc. to EN 175 301-803-A (suitable coupling included in scope of delivery)	▶⬟		**1**
Round connector acc. to EN 60139-9			**2**
Cable 1.5 m with cable gland			**3**
Process connection			
Without connections, female thread 1/8-27 NPT	▶⬟		**A**
Hose connection			
• Brass nickel-plated, for hose ∅ 4 mm			**B**
• Brass nickel-plated, for hose ∅ 6 mm			**C**
• PVDF, for hose ∅ 6 mm			**D**
Pipe union			
• Brass nickel-plated, for pipe ∅ 6 mm			**E**
• Stainless steel 1.4304, for pipe ∅ 6 mm			**F**
• Brass nickel-plated, for pipe ∅ 8 mm			**G**
• Stainless steel 1.4304, for pipe ∅ 8 mm			**H**
Male thread, 7/16-20 UNF (Brass nickel-plated)			**L**
Adapter			
• Inner, G1/8 (stainless steel), for pipe ∅ 6 mm			**M**
• Outer, G1/8 (Brass nickel-plated), with union nut, for pipe ∅ 6 mm			**N**
Sealing material			
Fluoro rubber (Viton/FPM)	▶⬟		**A**
Ethylene propylene diene monomer rubber (EPDM)			**B**
Nitrile butadiene rubber (NBR)			**C**
Silicone rubber (MVQ)			**D**
Neoprene (CR)			**E**
Further designs		Order code	
Please add "**-Z**" to Article No. and specify Order code(s).			
Quality inspection certificate (factory calibration) to IEC 60770-2		**C11**	

▶ Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Overview

The pressure transmitter SITRANS LH100 is a submersible sensor for hydrostatic level measurement.

The pressure transmitter measures the liquid levels in tanks, containers, channels and dams. The SITRANS LH100 pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A junction box and a cable hanger are available as accessories for simple installation.

Benefits

- Compact design
- Simple installation
- Small error in measurement (0.3 %)
- Degree of protection IP68

Application

SITRANS LH100 pressure transmitters are used in the following branches, for example:

- Shipbuilding
- Water/waste water supply
- For use in unpressurized/open vessels and wells

Design

The pressure transmitter has a built-in ceramic sensor which is equipped with a Wheatstone resistance bridge.

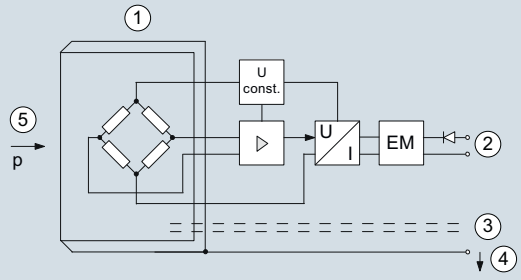
These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel housing. In addition, the connecting cable contains a vent pipe which is equipped with a humidity filter to prevent the build-up of condensation.

The diaphragm is protected against external influences by a protective cap.

The sensor, the electronics and the connecting cable are housed in an enclosure with small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

Function



1 Sensor
2 Connection for auxiliary power supply
3 Vent pipe with humidity filter
4 Protective conductor connection/ Equipotential bonding
5 Diaphragm

SITRANS LH100 pressure transmitter, mode of operation and connection diagram

On one side of the sensor (1), the diaphragm (5) is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe (3) in the connecting cable. The vent pipe is equipped with a humidity filter which prevents the build-up of condenstation in the vent pipe.

The hydrostatic pressure of the liquid column acts on the diaphragm of the sensor and transmits the pressure to the Wheatstone resistance bridge in the sensor.

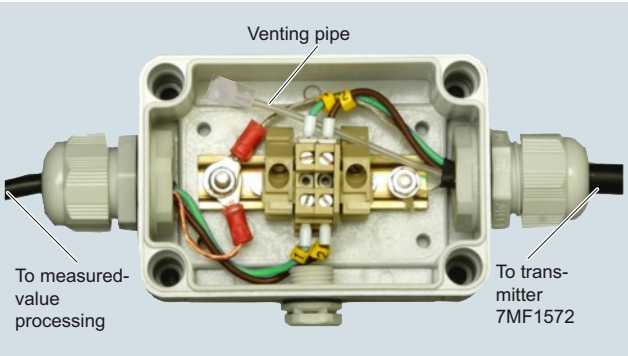
The output voltage of the sensor is applied to the electronic circuit where it is converted into an output current of 4 to 20 mA.

The protective conductor connection/equipotential bonding (4) is connected to the enclosure.

Integration

It is generally recommended that the connecting cable of the SITRANS LH100 transmitter is connected to the junction box, which can be ordered separately, and secured with the cable hanger, also available separately. The junction box has to be installed near the measuring point.

If the medium is anything other than water, it is also necessary to check compatibility with the specified materials of the transmitter.



Junction box 7MF1572-8AA, open, schematic diagram

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SITRANS LH100 Transmitter for hydrostatic level

Measuring point setup, generally with junction box 7MF1572-8AA and 7MF1572-8AB cable hanger

Technical specifications

Pressure transmitter SITRANS LH100 (submersible sensor)	
Mode of operation	
Measuring principle	piezo-resistive
Input	
Measured variable	Hydrostatic level
Measuring range	Max. permissible operating pressure
• 0 ... 4 mH_2O (0 ... 12 ftH_2O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH_2O (45 ftH_2O))
• 0 ... 5 mH_2O (0 ... 15 ftH_2O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH_2O (45 ftH_2O))
• 0 ... 6 mH_2O (0 ... 18 ftH_2O)	• 1.5 bar (21.8 psi) (corresponds to 15 mH_2O (45 ftH_2O))
• 0 ... 10 mH_2O (0 ... 30 ftH_2O)	• 3.0 bar (43.5 psi) (corresponds to 30 mH2O (90 ftH2O))
• 0 ... 20 mH_2O (0 ... 60 ftH_2O)	• 5.0 bar (72.5 psi) (corresponds to 50 mH_2O (150 ftH_2O))
• 0 ... 0.4 bar	• 1.5 bar
• 0 ... 0.5 bar	• 1.5 bar
• 0 ... 0.6 bar	• 1.5 bar
• 0 ... 1 bar	• 3.0 bar
• 0 ... 2 bar	• 5.0 bar
Output	
Output signal	4 ... 20 mA
Measuring accuracy	According to IEC 60770-1
Error in measurement at limit setting including hysteresis and reproducibility	0.3% of full-scale value (typical)
Influence of ambient temperature	
Zero and span	
• 4 ... 6 mH_2O (12 ... 18 ftH_2O or 0.4…0.6 bar)	0.45 %/10 K of full-scale value
• > 6 mH_2O (> 18 ftH_2O or > 0.6 bar)	0.3 %/10 K of full-scale value
Long-term stability	
Zero and span	
• 4 ... 6 mH_2O (12 ... 18 ftH_2O or 0.4…0.6 bar)	0.25% of full-scale value/year
• > 6 mH_2O (> 18 ftH_2O or > 0.6 bar)	0.2 % of full-scale value/year
Rated conditions	
Ambient conditions	
• Process temperature	-10 ... +80 °C (14 ... 176 °F)
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
Degree of protection according to IEC 60529	IP68
Design	
Weight	
• Pressure transmitter	≈ 0.2 kg (≈ 0.44 lb)
• Cable	0.025 kg/m (≈ 0.015 lb/ft)
Electrical connection	Cable with 3 conductors, vent pipe and integrated humidity filter
Material	
• Seal diaphragm	Al_2O_3 ceramic, 96%
• Enclosure	Stainless steel, mat. no. 1.4404/316L
• Gasket	FPM (standard)
	EPDM (optional)
• Connecting cable	PE-HD (standard)
	PE-LD (in the case of versions with EPDM seal, suitable for drinking water)
Auxiliary power	
Terminal voltage on pressure transmitter U_B	10 ... 33 V DC
	10 ... 30 V DC for transmitter with intrinsic safety explosion protection
Certificates and approvals	
Drinking water approval (ACS)	1403525
Drinking water approval (WRAS)	applied for
GOST	applied for
Underwriters Laboratories (UL)	applied for
The transmitter is not subject to the pressure equipment directive (PED 97/23/EC)	
Explosion protection	
• Intrinsic safety "i"	IECEx SEV 14.0003 SEV 14 ATEX 0109
- Marking	II 1 G Ex ia IIC T4 Ga

Junction box	
Application	for connecting the transmitter cable
Design	
Weight	0.2 kg (0.44 lb)
Electrical connection	2 x 3-way (28 to 18 AWG)
Cable entry	2 x Pg 9
Enclosure material	polycarbonate
Vent pipe for atmospheric pressure	
Screw for cable strength cord	
Rated conditions	
Degree of protection according to IEC 60529	IP65

Cable hanger	
Application	for mounting the transmitter
Design	
Weight	0.16 kg (0.35 lb)
Material	Galvanized steel, polyamide

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Selection and ordering data			Article No.	Order code
Pressure transmitter SITRANS LH100 (submersible sensor)		↗	7MF1572-	A
For measurement of the hydrostatic level through submersion, two-wire system, 4…20 mA, enclosure material mat. no. 1.4404 (316L), measuring cell Al_2O_3 ceramic, with permanently mounted PE cable				
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
Measuring range	**Cable length**			
0 ... 4 mH_2O	10 m	►		1D
0 ... 5 mH_2O	10 m	►		1E
0 ... 6 mH_2O	10 m	►		1F
0 ... 10 mH_2O	20 m	►		1H
0 ... 20 mH_2O	30 m	►		1K
0 ... 12 ftH_2O	33 ft			2D
0 ... 15 ftH_2O	33 ft			2E
0 ... 18 ftH_2O	33 ft			2F
0 ... 30 ftH_2O	66 ft			2H
0 ... 60 ftH_2O	98 ft			2K
0 ... 0.4 bar	10 m			3D
0 ... 0.5 bar	10 m			3E
0 ... 0.6 bar	10 m			3F
0 ... 1 bar	20 m			3H
0 ... 2 bar	30 m			3K
Special versions: Measuring ranges for special versions between 0 ... 4 mH_2O and 0 ... 30 mH_2O or 0 ... 12 ftH_2O and 0 ... 90 ftH_2O or 0 ... 0.4 bar and 0 ... 3 bar possible.				
Special cable lenght/Special measuring range Please add „-Z“ to Article No. and specify Order code and plain text. Note: Indication of measuring range Y01 is always necessary.			9A	H . . + Y01
For evaluation of the maximum possible cable length following data have to be regarded: Transmitter: C_i = 0 µF, L_i = 0 µH Cable: C_k = 0.19 nF per meter cable L_k = 1.5 µH per meter cable The maximum permitted data of the transmitter's power supply have to be considered!				
3 m (10 ft)				H1A
5 m (16 ft)				H1B
7 m (23 ft)				H1C
10 m (33 ft)				H1D
15 m (49 ft)				H1E
20 m (66 ft)				H1F
25 m (82 ft)				H1G
30 m (98 ft)				H1H
40 m (131 ft)				H1J
50 m (164 ft)				H1K
Sealing material between sensor and enclosure				
• FPM (Standard)		►		1
• EPDM (for drinking water applications)				2
Explosion protection				
• without		►		0
• With ATEX II1 G Ex ia IIC T4 Ga and IECEx Ex ia IIC T4 Ga		►		1

Additional versions	Order code
Quality inspection certificate (factory calibration) acc. to IEC 60770-2, add "**-Z**" to article no. and add order code.	**C11**
Indication of measuring range (only at special cable lengths) in "... to ... mH_2O" or "... to ... ftH_2O" or "... to ... bar"	**Y01**

Accessories/spare parts		Article No.
Junction box for connecting the transmitter cable	►	**7MF1572-8AA**
Cable hanger for securing the pressure transmitter	►	**7MF1572-8AB**
Protective caps as spare parts (10-pack)	►	**7MF1572-8AD**
Humidity filters as spare parts (10-pack)	►	**7MF1572-8AE**

► Available ex stock

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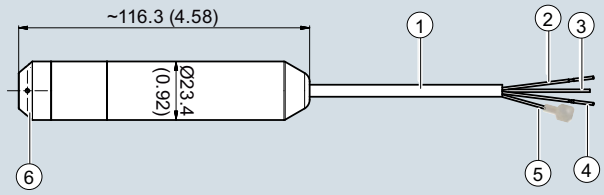
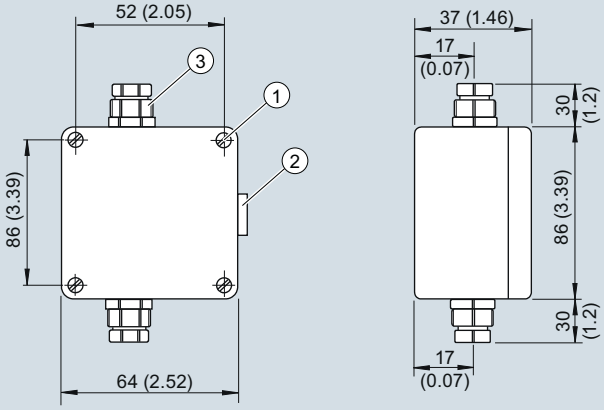
Dimensional drawings



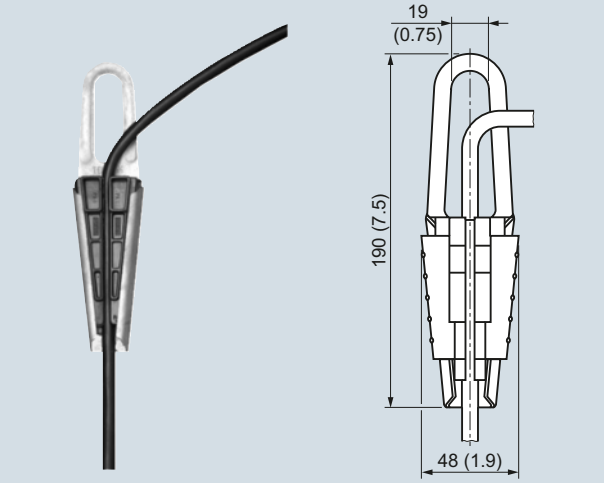
1. Cable, sheat Ø 4.8 (0.19) (black, PE)
2. - (green)
3. + (brown)
4. Protective conductor connection/Equipotential bonding (white)
5. Vent pipe with humidity filter Ø 1 (0.04) (inner diameter)
6. Protective cap with 4 x Ø 2.5 (0.10) holes (black, PPE)

SITRANS LH100 pressure transmitter, dimensions in mm (inch)



1. Fastening hole
2. Vent valve
3. Cable gland Pg 9, cable diameter 4 ... 8 mm (0.16 ... 0.31)

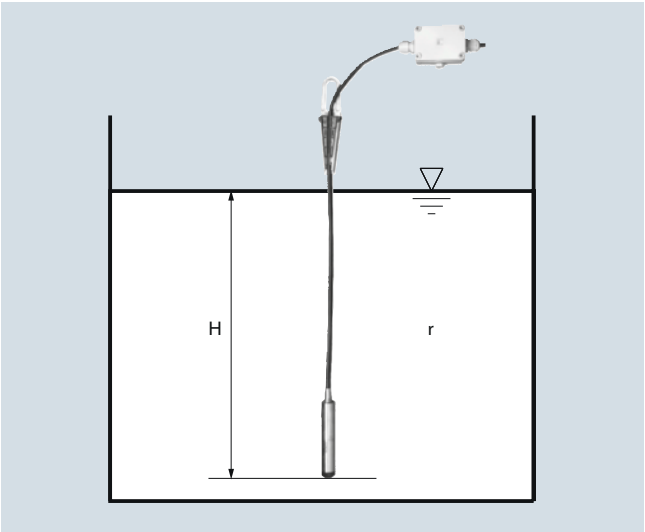
Junction box, dimensions in mm (inch)



Cable hanger, dimensions in mm (inch)

More information

Determination of the measuring range for media with a density of ≠ 1000 kg/m³ (medium ≠ water)



Calculation of the measuring range:

p = ρ x g x H

with:

ρ = density of medium

g = local acceleration due to gravity

H = maximum level

Example:

Medium: Diesel fuel, ρ = 850 kg/m³

Acceleration due to gravity: 9.81 m/s²

Start-of-scale: 0 m

Maximum level: 6.0 m

Cable length: 10 m

Calculation:

p = 850 kg/m³ x 9.81 m/s² x 6.0 m

p = 50 031 N/m²

p = 500 mbar

Transmitter to be ordered:

7MF1572-1FA11

Plus, if required, junction box 7MF1572-8AA and cable hanger 7MF1572-8AB

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Overview

SITRANS P MPS pressure transmitters are submersible sensors for hydrostatic level measurements.

The SITRANS P MPS pressure transmitters are available for various measuring ranges and with explosion protection as an option.

A junction box and a cable hanger are available as accessories for simple installation.

Benefits

- Compact design
- Simple installation
- Small error in measurement (0.3 %)
- Degree of protection IP68

Application

SITRANS P MPS pressure transmitters are used in the following branches for example:

- Oil and gas industries
- Shipbuilding
- Water supply
- For use in pressureless/open tanks and wells

Design

SITRANS P MPS pressure transmitters have a front-flush piezoresistive sensor with stainless steel diaphragm.

These pressure transmitters are equipped with an electronic circuit fitted together with the sensor in a stainless steel housing. The cable also contains a strength cord and vent pipe.

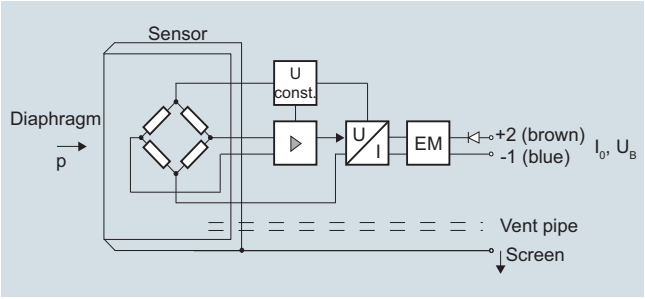
The diaphragm is protected against external influences by a protective cap.

The sensor, electronic circuit and cable are sealed in a common housing of small dimensions.

The pressure transmitter is temperature-compensated for a wide temperature range.

Function

SITRANS P MPS pressure transmitters are for measuring the liquid levels in wells, tanks, channels and dams.



SITRANS P MPS pressure transmitter, mode of operation and wiring diagram

On one side of the sensor, the diaphragm is exposed to the hydrostatic pressure which is proportional to the submersion depth. This pressure is compared with atmospheric pressure. Pressure compensation is carried out using the vent pipe in the connection cable.

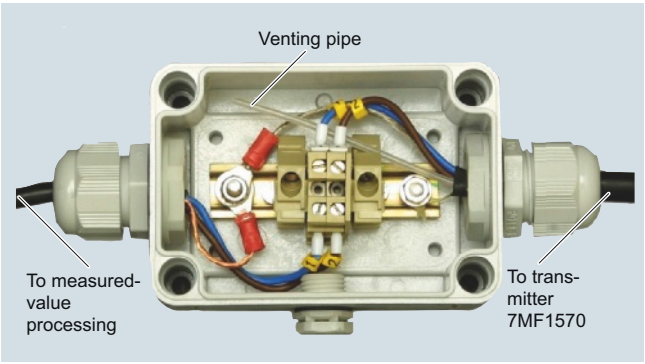
The hydrostatic pressure of the liquid column acts on the sensor diaphragm, and transmits the pressure to the piezo-resistive bridge in the sensor.

The output voltage of the sensor is applied to the electronic circuit where it is converted into an output current of 4 to 20 mA.

The cable of the 7MF1570 transmitter must always be connected in the supplied junction box. The junction box has to be installed near the measuring point.

If the medium is anything other than water, it is also necessary to check compatibility with the specified materials of the transmitter.

Integration



Junction box 7MF1570-8AA, opened

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Measuring point setup, in principle

Technical specifications

SITRANS P MPS pressure measurement transmitter (submersible sensor)	
Mode of operation	
Measuring principle	piezo-resistive
Input	
Measured variable	Hydrostatic level
Measuring range	Maximum operating pressure
• 0 ... 2 mH_2O (0 ... 6 ftH_2O)	• 1.4 bar (20.3 psi) (corresponds to 14 mH_2O (42 ftH_2O))
• 0 ... 4 mH_2O (0 ... 12 ftH_2O)	• 1.4 bar (20.3 psi) (corresponds to 14 mH_2O (42 ftH_2O))
• 0 ... 5 mH_2O (0 ... 15 ftH_2O)	• 1.4 bar (20.3 psi) (corresponds to 14 mH_2O (42 ftH_2O))
• 0 ... 6 mH_2O (0 ... 18 ftH_2O)	• 3.0 bar (43.5 psi) (corresponds to 30 mH_2O (90 ftH_2O))
• 0 ... 10 mH_2O (0 ... 30 ftH_2O)	• 3.0 bar (43.5 psi) (corresponds to 30 mH_2O (90 ftH_2O))
• 0 ... 20 mH_2O (0 ... 60 ftH_2O)	• 6.0 bar (87psi) (corresponds to 50 mH_2O (150 ftH_2O))
Output	
Output signal	4 ... 20 mA
Measuring accuracy	Acc. to IEC 60770-1
Error in measurement at limit setting incl. hysteresis and reproducibility	0.3 % of full-scale value (typical)
Influence of ambient temperature	
Zero and span	
• 1 ... 6 mH_2O (3 ... 18 ftH_2O)	0.45 %/10 K of full-scale value
• ≥ 6 mH_2O (≥ 18 ftH_2O)	0.3 %/10 K of full-scale value
Long-term stability	
Zero and span	
• 1 ... 6 mH_2O (3 ...18 ftH_2O)	0.25 % of full-scale value/year
• ≥ 6 mH_2O (≥ 18 ftH_2O)	0.2 % of full-scale value/year
Rated conditions	
Ambient conditions	
• Process temperature	-10 ... +80 °C (14 ... 176 °F)
• Storage temperature	-40 ... +100 °C (-40 ... +212 °F)
Degree of prot. to DIN EN 60529	IP68
Design	
Weight	
• Pressure transmitter	≈ 0.4 kg (≈ 0.88 lb)
• Cable	0.08 kg/m (≈ 0.054 lb/ft)
Electrical connection	Cable with 2 conductors with screen and vent pipe, strength cord (max. 300 N (67.44 lbf)
Material	
• Seal diaphragm	Stainl. steel, mat. no. 1.4571/316Ti
• Enclosure	Stainl. steel, mat. no. 1.4571/316Ti
• Gasket	Viton
• Connecting cable	Either PE/HFFR sheath (non-halogen) or FEP sheath
Power supply	
Terminal voltage on pressure transmitter U_B	10 ... 36 V DC 0 ... 30 V DC for transmitter with intrinsic safety explosion protection
Certificates and approvals	
Germanischer Lloyd (GL)	GL 75360-09 HH
Bureau Veritas (BV)	BV 27101/A0 BV
Det Norske Veritas (DNV)	DNV A-12553
Drinking water approval (ACS)	ACS 11 ACC NY 014
Drinking water approval (WRAS)	WRAS 1111055
GOST	GOST-R, GOST FR.C.30.004.A/ 42376/1 and PPC 00-04 1505
The transmitter is not subject to the pressure equipment directive (PED 97/23/EC)	
Explosion protection	
• Intrinsic safety "i"	SEV 10 ATEX 0149
- Marking	II 1 G Ex ia IIC T4 Ga
Junction box	
Application	for connecting the transmitter cable
Design	
Weight	0.2 kg (0.44 lb)
Electrical connection	2 x 3-way (28 to 18 AWG)
Cable entry	2 x M20 x 1.5
Enclosure material	polycarbonate
Vent pipe for atmospheric pressure	
Screw for cable strength cord	
Rated conditions	
Degree of prot. to DIN EN 60529	IP65
Cable hanger	
Application	for mounting the transmitter
Design	
Weight	0.16 kg (0.35 lb)
Material	Galvanized steel, polyamide

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Selection and Ordering data			Article No.	Order code
SITRANS P MPS pressure transmitter for gauge pressure (submersible sensor) ↗			7MF1570-	A0
2-wire system				
Note: Junction box and cable hanger included in delivery				
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.				
With PE cable				
Measuring range	**Cable length L**			
0 ... 2 mH_2O	10 m	▶⬟		1C
0 ... 4 mH_2O	10 m	▶⬟		1D
0 ... 5 mH_2O	25 m	▶⬟		1B
0 ... 6 mH_2O	25 m	▶⬟		1E
0 ... 10 mH_2O	25 m	▶⬟		1F
0 ... 20 mH_2O	25 m	▶⬟		1G
0 ... 6 ftH_2O	32 ft			1K
0 ... 12 ftH_2O	32 ft			1L
0 ... 18 ftH_2O	82 ft			1M
0 ... 30 ftH_2O	82 ft			1N
0 ... 60 ftH_2O	82 ft			1P
Special cable lenght/Special measuring range[1] Please add „-Z“ to Article No. and specify Order code and plain text. Note: Indication of measuring range Y01 is always necessary.				9A H.. + Y01
3 m				H1A
5 m				H1B
7 m				H1C
10 m				H1D
15 m				H1E
20 m				H1F
25 m				H1G
30 m				H1H
40 m				H1J
50 m				H1K
60 m				H1L
70 m				H1M
80 m				H1N
90 m				H1P
100 m				H1Q
125 m				H1R
150 m				H1S
175 m				H1T
200 m				H1U
225 m				H1V
250 m				H1W
275 m				H1X
300 m				H2A
350 m				H2B
400 m				H2C
450 m				H2D
500 m				H2E
550 m				H2F
600 m				H2G
650 m				H2H
700 m				H2J
750 m				H2K
800 m				H2L
850 m				H2M
900 m				H2N
950 m				H2P
1000 m				H2Q

Selection and Ordering data			Article No.	Order code
SITRANS P MPS pressure transmitter for gauge pressure (submersible sensor)			7MF1570-	A0
2-wire system				
Note: Junction box and cable hanger included in delivery				
With FEP cable				
Measuring range	**Cable length L**			
0 ... 2 mH_2O	10 m	▶⬟		5C
0 ... 4 mH_2O	10 m	▶⬟		5D
0 ... 5 mH_2O	25 m	▶⬟		5B
0 ... 6 mH_2O	25 m	▶⬟		5E
0 ... 10 mH_2O	25 m	▶⬟		5F
0 ... 20 mH_2O	25 m	▶⬟		5G
0 ... 6 ftH_2O	32 ft			5K
0 ... 12 ftH_2O	32 ft			5L
0 ... 18 ftH_2O	82 ft			5M
0 ... 30 ftH_2O	82 ft			5N
0 ... 60 ftH_2O	82 ft			5P
Special cable lenght/Special measuring range[1] Please add „-Z“ to Article No. and specify Order code and plain text. Note: Indication of measuring range Y01 is always necessary.				9A H.. + Y01
3 m				H5A
5 m				H5B
7 m				H5C
10 m				H5D
15 m				H5E
20 m				H5F
25 m				H5G
30 m				H5H
40 m				H5J
50 m				H5K
60 m				H5L
70 m				H5M
80 m				H5N
90 m				H5P
100 m				H5Q
125 m				H5R
150 m				H5S
175 m				H5T
200 m				H5U
225 m				H5V
250 m				H5W
275 m				H5X
300 m				H6A
350 m				H6B
400 m				H6C
450 m				H6D
500 m				H6E
550 m				H6F
600 m				H6G
650 m				H6H
700 m				H6J
750 m				H2K
800 m				H6L
850 m				H6M
900 m				H6N
950 m				H6P
1000 m				H6Q

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1

SITRANS P MPS Transmitter for hydrostatic level

Selection and Ordering data	Article No.	Order code
SITRANS P MPS pressure transmitter for gauge pressure (submersible sensor)	**7MF1570-** ▪▪	**A0** ▪ ▪▪▪
2-wire system		
Note: Junction box and cable hanger included in delivery		
Explosion protection		
• None ▶⬟		**1**
• with type of protection "intrinsic safety" (Ex II 1 G Ex ia IIC T4) ▶⬟		**2**
Approvals		
• with drinking water approval to WRAS and ACS (with EPDM gasket)		**6**
Further designs	Order code	
Quality inspection certificate (factory calibration) to IEC 60770-2, add „**-Z**" to Article No. and add Order code.	**C11**	
Indication of measuring range (only at special cable lengths) in „... to ... mH_2O" or „... to ... ftH_2O"	**Y01**	
Accessories (as spare part)	Article No.	
Junction box for connecting the transmitter cable	**7MF1570-8AA**	
Cable hanger for attachment of transmitter	**7MF1570-8AB**	

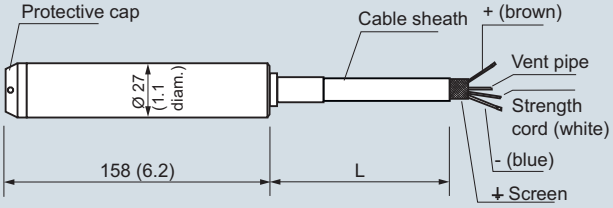
▶ Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Power supply units see Chap. 7 "Supplementary Components".

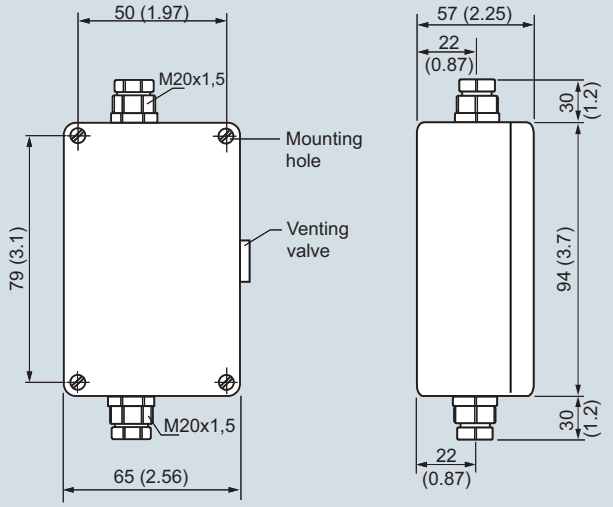
1) Special measuring ranges of between 0 ... 1 mH_2O (0 ... 3 ftH_2O) and 0 ... 200 mH_2O (0 ... 656 ftH_2O) and special cable lengths of up to 1000 m (3281 ft) are possible.
For evaluation of the maximum possible cable length following data have to be regarded:
Transmitter: C_i = 0 µF, L_i = 0 µH
Cable: C_k = 0.19 nF per meter cable, L_k = 1.5 µH per meter cable
The maximum permitted data of the transmitter's power supply have to be considered!
The length of free hanging cable should not exceed 375 m (1230 ft).
Note: Due to mounting reasons it has to be considered that the cable always must be longer than the height of the liquid column to be measured.

Dimensional drawings

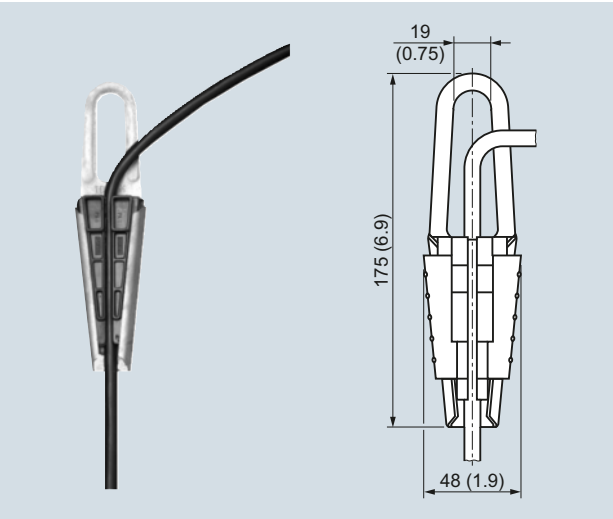


Cable sheath 8.3 (0.33) diam. (black, PE/HFFR)
Flexible cable with 0.5 mm^2 (0.00078 $inch^2$) cross-section
Vent pipe 1 (0.04) diam. (inner diameter)
Protective cap with 4 x 3 diam. (4 x 0.12 diam.) holes (black, PA)

SITRANS P MPS pressure transmitters, dimensions in mm (inch)



Junction box, dimensions in mm (inch)



Cable hanger, dimensions in mm (inch)

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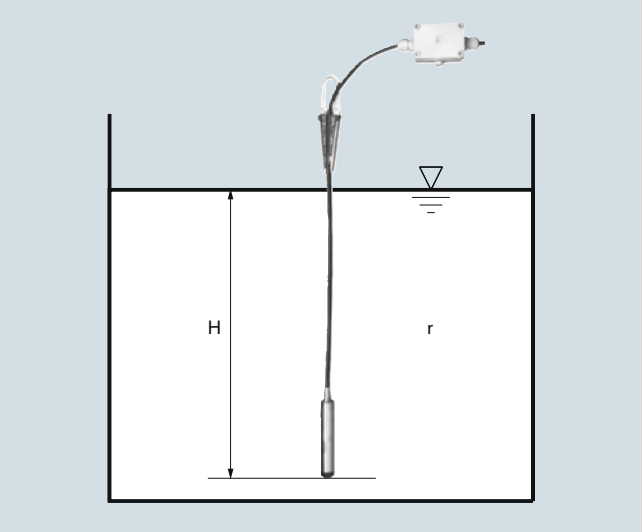
More information

Determination of the measuring range in case of media with a density ≠ 1000 kg/m³ (medium ≠ water)



Calculation of the measuring range:

p = ρ x g x H

with:

ρ = density of medium

g = local acceleration due to gravity

H = maximum level

Example:

Medium: Diesel fuel, ρ = 850 kg/m^3

Acceleration due to gravity: 9.81 m/s^2

Start-of-scale: 0 m

Maximum level: 6.2 m

Cable length: 7 m, FEP cable

Calculation:

p = 850 kg/m^3 x 9.81 m/s^2 x 6.2 m

p = 51698.7 N/m^2

p = 517 mbar

Transmitter to be ordered:

7MF1570-9AA02-Z, H5C + Y01

Y01: 0 ... 517 mbar

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SITRANS P Compact for gauge and absolute pressure

Overview

The SITRANS P Compact pressure transmitter is designed for the special requirements of the food, pharmaceutical and biotechnology industries.

The use of high-grade materials guarantees compliance with hygiene regulations.

Particular value has been placed on a high surface quality. The system can be electropolished in addition.

A further important feature is the hygiene-based design of the process connection by means of various aseptic connections.

The completely welded stainless steel housing can be designed up to degree of protection IP67.

Using appropriate thermal decouplers, the SITRANS P Compact pressure transmitter can be used for process temperatures up to 200 °C (392 °F).

Benefits

- Measuring ranges from 0 to 160 mbar (0 to 2.32 psi) to 0 to 40 bar (0 to 580 psi)
- Linearity error including hysteresis < +0.2 % of full-scale value
- Piezo-resistive measurement system, vacuum-proof and overload-proof
- Hygiene-based design according to EHEDG, FDA and GMP recommendations
- Material and surface quality according to hygiene requirements
- Wetted parts made of stainless steel; completely welded
- Signal output 4 to 20 mA (0 to 20 mA as option)
- Stainless steel housing with degree of protection IP65 (IP67 as option)
- Process temperature up to 200 °C (392 °F)
- Explosion protection II 2G Ex [ib] IIC T6 to ATEX
- Easy and safe to clean

Application

The SITRANS P Compact pressure transmitter is designed for the special requirements of the food, pharmaceutical and biotechnology industries.

The use of high-grade materials guarantees compliance with hygiene regulations.

The SITRANS P Compact pressure transmitter is available in many versions. Exact adaptation of the pressure transmitter to conditions at the place of use is thus possible

Design

The electronics is potted to protect it against moisture, corrosive atmospheres and vibration.

Notes on operating the pressure transmitter

Compensation of internal atmospheric pressure

Compensation of the internal atmospheric pressure of the SITRANS P Compact pressure transmitters is performed as follows:

- in the plug versions by means of the screwed gland (IP65)
- in the field housings by means of an integral sintered filter (IP65) or a vented cable (IP67)
- in versions with cable outlet by means of a vented cable (IP67)

In the absolute pressure range there is no need for compensation with respect to atmospheric pressure.

Note: These degrees of protection are only achieved under the following conditions:

- if the pressure transmitter is installed correctly
- if the screwed glands are securely tightened
- if the cable diameters agree with the nominal diameters of the gaskets in the housing

Note: The integral EMC measures are only effective if the earth connection is made correctly.

CE marking

The CE marking of the pressure transmitter certifies compliance with the guidelines of the European Council (9/336/EC), the EMC law (13.11.1992), as well as the applicable generic standards.

Interference-free operation in systems and plants is achieved only if the specifications for shielding, earthing, cable routing and electrical isolation are observed during installation and assembly.

Hazardous areas

Note: Electrical equipment in hazardous areas must only be installed and operated by trained personnel.

Modifications to units and connections result in cancellation of the explosion protection and guarantee.

With intrinsically-safe circuits, make sure that equipotential bonding exists throughout the complete cabling inside and outside of the hazardous area. The limits specified in the ATEX approval must be observed.

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Function

The process pressure acts on a piezo-resistive semiconductor measuring bridge through a remote seal and a transmission liquid. The pressure transmitter converts the pressure values into a load-independent current.

A compensation network makes the output signal largely independent of the ambient temperature. As a result of a specially adapted remote seal connection with minimized volume, the influence of the process temperature on the output signal is greatly reduced compared to a conventional screw connection.

The pressure transmitters can be powered with a non-regulated DC voltage of 10 to 30 V. Output signals common to measuring technology are available.

Technical specifications

Pressure transmitters for food, pharmaceuticals and biotechnology	
Mode of operation	
Measuring principle	piezo-resistive
Input	
Measured variable	gauge or absolute pressure
Measuring range	0 ... 160 mbar (0 ... 2.32 psi) ... 0 ... 40 bar (0 ... 580 psi)
Output	
Output signal	
• 2-wire system	4 ... 20 mA
• Three-wire system	0 ... 20 mA
Measuring accuracy	Acc. to IEC 60770-1
Error in measurement at limit setting incl. hysteresis and reproducibility	≤ 0.2 % of full-scale value
Adjustment accuracy	≤ ± 0.2 % of full-scale value
Step response time	< 20 ms
Influence of ambient temperature	
On the enclosure	
• Zero point	< 0.2 %/10 K of full-scale value
• Measuring span	< 0.2 %/10 K of full-scale value
On the process connection (remote seals)	Zero error (depends on design)
• Flange remote seal	
- DN 25 / 1"	4.8 mbar/10 K (0.069 psi/10 K)
- DN 32 / 1¼"	2.3 mbar/10 K (0.033 psi/10 K)
- DN 40 / 1½"	1.6 mbar/10 K (0.023 psi/10 K)
- DN 50 / 2"	0.6 mbar/10 K (0.009 psi/10 K)
• Clamp-on seal	
- DN 25 / 1"	9.5 mbar/10 K (0.14 psi/10 K)
- DN 32 / 1¼"	4.1 mbar/10 K (0.06 psi/10 K)
- DN 40 / 1½"	3.9 mbar/10 K (0.05 psi/10 K)
- DN 50 / 2"	3.9 mbar/10 K (0.05 psi/10 K)

The zero error specified for the process connection should be considered as a guideline for a standard design. We will produce a detailed system calculation on request. Systems with reduced remote seal errors are available on request.

Rated conditions	
Installation conditions	
• Mounting position	Any, vertical as standard
Ambient conditions	
• Ambient temperature	-10 ... +70 °C (14 ... 158 °F)
• Storage temperature	-10 ... +90 °C (14 ... 194 °F)
• Process temperature	Max. 200 °C (392 °F), depending on design
• Degree of protection (to EN 60529)	IP65, optional IP67
• Electromagnetic Compatibility	
- Emitted interference	To EN 50081 Part 1, issue 1993 (residential and industrial areas). The unit has no own emissions.
- Noise immunity to	EN 50082 Part 2, issue March 1995 (industrial areas)
Design	
Weight (without remote seal)	
• Field enclosure	≈ 460 G (≈ 1.01 (lb)
• Enclosure with plug	≈ 200 g (≈ 0.44 lb)
Enclosure	
• Designs	• Field housing IP65 or IP67, with screwed gland • Angled plug DIN 43650, IP65 • Cable connection, IP67 • Round plug connector M12, IP65
• Material	Stainless steel, mat. no. 1.4404/316L/1.4305
Material of union nut	Polyamide (with electrical connection using plug or cable)
	Electronics unit potted with silicone
	Internal ventilation for measuring ranges < 16 bar (< 232 psi), through housing thread or connection cable depending on design
Process connection	
• Versions	See ordering data
• Material of coupling	Stainless steel, mat. no. 1.4404/316L
Power supply	
Terminal voltage on transmitter	10 ... 30 V DC
Rated voltage	24 V DC
Certificates and approvals	
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord
Explosion protection	
• Intrinsic safety "i"	TÜV 03 ATEX 2099 X
- Marking	Ex II 2G Ex ib IIC T6

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Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with diaphragm flush at front ↗	**7MF8010-**	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	**1** ■■■■ - ■■■■	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diaphragm seal with quick-release clamp		
Milk pipe union to DIN 11851 with slotted union nut		
• DN 25	**AD**	
• DN 32	**AE**	
• DN 40	**AF**	
• DN 50	**AG**	
• DN 65	**AH**	
Milk pipe union to DIN 11851 with threaded socket		
• DN 25	**BD**	
• DN 32	**BE**	
• DN 40	**BF**	
• DN 50	**BG**	
• DN 65	**BH**	
Clamp connection to DIN 32676		
• DN 25	**CD**	
• DN 40	**CF**	
• DN 50	**CG**	
Clamp connection to ISO 2852		
• 1 inch	**DM**	
• 1½ inch	**DN**	
• 2 inch	**DP**	
• 2½ inch	**DQ**	
IDF standard with slotted union nut		
• 1 inch	**EM**	
• 1½ inch	**EN**	
• 2 inch	**EP**	
IDF standard with threaded socket		
• 1 inch	**FM**	
• 1½ inch	**FN**	
• 2 inch	**FP**	
SMS standard with slotted union nut		
• 1 inch	**GM**	
• 1½ inch	**GN**	
• 2 inch	**GP**	
SMS standard with threaded socket		
• 1 inch	**HM**	
• 1½ inch	**HN**	
• 2 inch	**HP**	
DRD flange, without welding-type flange		
• DN 50, PN 40	**JH**	
Varivent connection (Tuchenhagen)		
• D = 50, for Varivent housing DN 25 and 1 inch	**KF**	
• D = 68, for Varivent housing DN 40 ... DN 125 and 1½ ... 6 inch	**KL**	
Special version (add Order code and plain text)	**ZA**	**J1Y**
Filling liquid		
Food oil, FDA-listed	**3**	
Medicinal white oil	**2**	
Special version (add Order code and plain text)	**9**	**L1Y**
Output signal		
4 ... 20 mA	**1**	
Special version (add Order code and plain text)	**9**	**M1Y**

Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with diaphragm flush at front	**7MF8010-**	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	**1** ■■■■ - ■■■■	■■■
Diaphragm seal with aseptic connection		
Aseptic screwed gland to DIN 11864-1, form A, with slotted union nut		
• 1 inch	**PM**	
• 1½ inch	**PN**	
• 2 inch	**PP**	
• 2½ inch	**PQ**	
Aseptic screwed gland to DIN 11864-1, form A with threaded socket		
• 1 inch	**QM**	
• 1½ inch	**QN**	
• 2 inch	**QP**	
• 2½ inch	**QQ**	
Aseptic screwed NEUMO with slotted union nut[1)]		
• DN 25	**RD**	
• DN 32	**RE**	
• DN 40	**RF**	
• DN 50	**RG**	
Aseptic screwed NEUMO with threaded socket[1)]		
• DN 25	**SD**	
• DN 32	**SE**	
• DN 40	**SF**	
• DN 50	**SG**	
Aseptic screwed NEUMO with clamp connection, form R[1)]		
• DN 25	**TD**	
• DN 32	**TE**	
• DN 40	**TF**	
• DN 50	**TG**	
Aseptic screwed NEUMO with clamp connection, form V[1)]		
• DN 25	**UD**	
• DN 32	**UE**	
• DN 40	**UF**	
• DN 50	**UG**	
Male thread DIN 3852 Form A		
• G½", min. meas. span 1.6 bar (23.2 psi)	**XA**	
• G¾", min. meas. span 1 bar (14.5 psi)	**XB**	
• G1", min. meas. span 0.4 bar (5.8 psi)	**XC**	
• G1½", min. meas. span 0.25 bar (3.63 psi)	**XD**	
• G2", min. meas. span 0.16 bar (2.32 psi)	**XE**	
Special version (add Order code and plain text)	**ZA**	**J1Y**
Filling liquid		
Food oil, FDA-listed	**3**	
Medicinal white oil	**2**	
Special version (add Order code and plain text)	**9**	**L1Y**
Output signal		
4 ... 20 mA	**1**	
Special version (add Order code and plain text)	**9**	**M1Y**

[1)] Please specify as well:
Connections for pipes: R01, R02 or R03, see table "Further designs" on next page

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Selection and Ordering data		Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with diaphragm flush at front		**7MF8010-**	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA		**1** ■■■■ - ■■■■	■■■
Housing design (stainless steel mat. No. 1.4404/316L) / electr. connection			
Housing with angled plug to DIN 43650, IP65		**1**	
Housing with round plug M12, IP65, union nut made of polyamide		**2**	
Housing with round plug M12, IP65, union nut made of stainless steel		**3**	
Stainless steel field housing (small) with cable gland, IP65		**4**	
Stainless steel field housing (small) with cable gland, IP67 Internal ventilation for measuring ranges < 10 bar (< 145 psi)		**5**	
Measured range	**Overload pressure**		
0 ... 160 mbar (0 ... 2.32 psi)	2 bar (29 psi)	**BB**	
0 ... 250 mbar (0 ... 3.63 psi)	2 bar (29 psi)	**BC**	
0 ... 400 mbar (0 ... 5.8 psi)	6 bar (87 psi)	**BD**	
0 ... 600 mbar (0 ... 8.7 psi)	6 bar (87 psi)	**BE**	
0 ... 1 bar (0 ... 14.5 psi)	10 bar (145 psi)	**CA**	
0 ... 1.6 bar (0 ... 23.2 psi)	10 bar (145 psi)	**CB**	
0 ... 2.5 bar (0 ... 36.3 psi)	16 bar (232 psi)	**CC**	
0 ... 4 bar (0 ... 58 psi)	16 bar (232 psi)	**CD**	
0 ... 6 bar (0 ... 87 psi)	30 bar (435 psi)	**CE**	
0 ... 10 bar (0 ... 145 psi)	30 bar (435 psi)	**DA**	
0 ... 16 bar (0 ... 232 psi)	50 bar (725 psi)	**DB**	
0 ... 25 bar (0 ... 363 psi)	50 bar (725 psi)	**DC**	
0 ... 40 bar (0 ... 580 psi)	70 bar (1015 psi)	**DD**	
-160 ... 0 mbar (-2.32 ... 0 psi)	2 bar (29 psi)	**EB**	
-250 ... 0 bar (-3.73 ... 0 psi)	2 bar (29 psi)	**EC**	
-400 ... 0 bar (-5.8 ... 0 psi)	6 bar (87 psi)	**ED**	
-600 ... 0 bar (-8.7 ... 0 psi)	6 bar (87 psi)	**EE**	
-1 ... 0 bar (-14.5 ... 0 psi)	10 bar (145 psi)	**FA**	
-1 ... 0.6 bar (-14.5 ... 8.7 psi)	10 bar (145 psi)	**FB**	
-1 ... 1.5 bar (-14.5 ... 21.8 psi)	16 bar (232 psi)	**FC**	
-1 ... 3 bar (-14.5 ... 43.5 psi)	16 bar (232 psi)	**FD**	
-1 ... 5 bar (-14.5 ... 72.5 psi)	30 bar (435 psi)	**FE**	

Selection and Ordering data		Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with diaphragm flush at front		**7MF8010-**	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA		**1** ■■■■ - ■■■■	■■■
Measured range	**Overload pressure**		
(continued)			
-1 ... +9 bar (-14.5 ... +130.5 psi)	30 bar (435 psi)	**GA**	
-1 ... +15 bar (-14.5 ... +217.6 psi)	50 bar (725 psi)	**GB**	
0 ... 1 bar a (0 ... 14.5 psia)	10 bar a (145 psia)	**HA**	
0 ... 1.6 bar a (0 ... 23.2 psia)	10 bar a (145 psia)	**HB**	
0 ... 2.5 bar a (0 ... 36.3 psia)	16 bar a (232 psia)	**HC**	
0 ... 4 bar a (0 ... 58 psia)	16 bar a (232 psia)	**HD**	
0 ... 6 bar a (0 ... 87 psia)	30 bar a (435 psia)	**HE**	
0 ... 10 bar a (0 ... 145 psia)	30 bar a (435 psia)	**JA**	
Special version (add Order code and plain text)		**ZA**	**P1Y**
Explosion protection			
without		**1**	
with, to ATEX 100a, II 2 G, Ex ib IIC T6		**2**	
Further designs		Order code	
Please add "**-Z**" to Article No. and specify Order code			
Hygiene version Roughness of process connection: Foil R_a < 0.8 µm ($3.15 \cdot 10^{-8}$ inch); Welded seams R_a < 1.5 µm ($5.9 \cdot 10^{-8}$ inch)		**P01**	
Integral cooling element Process temperature max. 200 °C (392 °F) instead of 140 °C (284 °F)		**K01**	
Connections for pipe			
Pipes to DIN 11850		**R01**	
ISO pipes to DIN 2463		**R02**	
Pipes to O. D. Tubing "BS 4825 Part 1"		**R03**	
Certificates			
Quality inspection certificate (Factory calibration) to IEC 60770-2		**C11**	
Inspection certificate to EN 10204-3.1		**C12**	
Use of FDA-listed remote seal filling liquids certified by test report to EN 10204-2.2		**C17**	
Roughness depth measurement R_a certified by test report to EN 10204-3.1		**C18**	
Certification to EHEDG for clamp-on seals with aseptic screwed gland to DIN 11864		**C19**	

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SITRANS P Compact for gauge and absolute pressure

Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with clamp-on remote seal ↗	**7MF8010-**	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	**2**	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Clamp-on remote seal (screwed gland at both ends) with quick-release clamps		
Milk pipe union to DIN 11851 with threaded socket		
• DN 25	**AD**	
• DN 32	**AE**	
• DN 40	**AF**	
• DN 50	**AG**	
• DN 65	**AH**	
Clamp connection to DIN 32676		
• DN 25	**CD**	
• DN 32	**CE**	
• DN 40	**CF**	
• DN 50	**CG**	
• DN 65	**CH**	
Clamp connection to ISO 2852[1]		
• 1 inch	**DM**	
• 1½ inch	**DN**	
• 2 inch	**DP**	
• 2½ inch	**DQ**	
Special version (add Order code and plain text)	**ZA**	**J1Y**
Filling liquid		
Food oil, FDA-listed	**3**	
Medicinal white oil	**2**	
Special version (add Order code and plain text)	**9**	**L1Y**
Output signal		
4 ... 20 mA	**1**	
Special version (add Order code and plain text)	**9**	**M1Y**

[1] Please note the internal diameter of the pipe. Please specify pipe classes (see "Further designs")

Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with clamp-on remote seal	**7MF8010-**	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	**2**	
Clamp-on seal with aseptic connection		
Aseptic screwed gland to DIN 11864-1, form A with threaded socket		
• 1 inch	**QM**	
• 1½ inch	**QN**	
• 2 inch	**QP**	
Aseptic screwed NEUMO with threaded socket[1]		
• DN 25	**SD**	
• DN 32	**SE**	
• DN 40	**SF**	
• DN 50	**SG**	
• DN 65	**SH**	
Aseptic screwed NEUMO with clamp connection, form R[1]		
• DN 25	**TD**	
• DN 32	**TE**	
• DN 40	**TF**	
• DN 50	**TG**	
Aseptic screwed gland SÜDMO with threaded socket W 501		
• 1 inch	**VM**	
• 1½ inch	**VN**	
• 2 inch	**VP**	
Aseptic screwed gland SÜDMO with clamp connection W 601		
• 1 inch	**WM**	
• 1½ inch	**WN**	
• 2 inch	**WP**	
Special version (add Order code and plain text)	**ZA**	**J1Y**
Filling liquid		
Food oil, FDA-listed	**3**	
Medicinal white oil	**2**	
Special version (add Order code and plain text)	**9**	**L1Y**
Output signal		
4 ... 20 mA	**1**	
Special version (add Order code and plain text)	**9**	**M1Y**

[1] Please specify as well:
Connections for pipes: R01, R02 or R03, see table "Further designs" on next page

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Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with clamp-on remote seal	**7MF8010-**	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	**2** -	
Housing design (stainless steel mat. No. 1.4404/316L) / electr. connection		
Housing with angled plug to DIN 43650, IP65, union nut made of polyamide	**1**	
Housing with round plug M12, IP65, union nut made of polyamide	**2**	
Housing with round plug M12, IP65, union nut made of stainless steel	**3**	
Stainless steel field housing (small) with cable gland, IP65	**4**	
Stainless steel field housing (small) with cable gland, IP67 Internal ventilation for measuring ranges < 10 bar (< 145 psi)	**5**	
Measured range / **Overload pressure**		
0 ... 160 mbar (0 ... 2.32 psi) / 2 bar (29 psi)	**BB**	
0 ... 250 mbar (0 ... 3.63 psi) / 2 bar (29 psi)	**BC**	
0 ... 400 mbar (0 ... 5.8 psi) / 6 bar (87 psi)	**BD**	
0 ... 600 mbar (0 ... 8.7 psi) / 6 bar (87 psi)	**BE**	
0 ... 1 bar (0 ... 14.5 psi) / 10 bar (145 psi)	**CA**	
0 ... 1.6 bar (0 ... 23.2 psi) / 10 bar (145 psi)	**CB**	
0 ... 2.5 bar (0 ... 36.3 psi) / 16 bar (232 psi)	**CC**	
0 ... 4 bar (0 ... 58 psi) / 16 bar (232 psi)	**CD**	
0 ... 6 bar (0 ... 87 psi) / 30 bar (435 psi)	**CE**	
0 ... 10 bar (0 ... 145 psi) / 30 bar (435 psi)	**DA**	
0 ... 16 bar (0 ... 232 psi) / 50 bar (725 psi)	**DB**	
0 ... 25 bar (0 ... 363 psi) / 50 bar (725 psi)	**DC**	
0 ... 40 bar (0 ... 580 psi) / 70 bar (1015 psi)	**DD**	
-160 ... 0 mbar (-2.32 ... 0 psi) / 2 bar (29 psi)	**EB**	
-250 ... 0 bar (-3.73 ... 0 psi) / 2 bar (29 psi)	**EC**	
-400 ... 0 bar (-5.8 ... 0 psi) / 6 bar (87 psi)	**ED**	
-600 ... 0 bar (-8.7 ... 0 psi) / 6 bar (87 psi)	**EE**	
-1 ... 0 bar (-14.5 ... 0 psi) / 10 bar (145 psi)	**FA**	
-1 ... 0.6 bar (-14.5 ... 8.7 psi) / 10 bar (145 psi)	**FB**	
-1 ... 1.5 bar (-14.5 ... 21.8 psi) / 16 bar (232 psi)	**FC**	
-1 ... 3 bar (-14.5 ... 43.5 psi) / 16 bar (232 psi)	**FD**	
-1 ... 5 bar (-14.5 ... 72.5 psi) / 30 bar (435 psi)	**FE**	

Selection and Ordering data	Article No.	Ord. code
SITRANS P Compact pressure transmitters for pressure and absolute pressure with clamp-on remote seal	**7MF8010-**	
2-wire system Process temperature up to 140 °C (284 °F) Accuracy: 0.2 % of full-scale value Output 4 ... 20 mA	**2** -	
Measured range / **Overload pressure** (continued)		
-1 ... 9 bar (-14.5 ... 130.5 psi) / 30 bar (435 psi)	**GA**	
-1 ... 15 bar (-14.5 ... 217.6 psi) / 50 bar (725 psi)	**GB**	
0 ... 1 bar a (0 ... 14.5 psia) / 10 bar a (145 psia)	**HA**	
0 ... 1.6 bar a (0 ... 23.2 psia) / 10 bar a (145 psia)	**HB**	
0 ... 2.5 bar a (0 ... 36.3 psia) / 16 bar a (232 psia)	**HC**	
0 ... 4 bar a (0 ... 58 psia) / 16 bar a (232 psia)	**HD**	
0 ... 6 bar a (0 ... 87 psia) / 30 bar a (435 psia)	**HE**	
0 ... 10 bar a (0 ... 145 psia) / 30 bar a (435 psia)	**JA**	
Special version (add Order code and plain text)	**ZA**	**P1Y**
Explosion protection		
without	**1**	
with, to ATEX 100a, II 2 G, Ex ib IIC T6	**2**	
Further designs	Order code	
Please add "**-Z**" to Article No. and specify Order code		
Hygiene version Roughness of process connection: Foil R_a < 0.8 µm ($3.15 \cdot 10^{-8}$ inch); Welded seams R_a < 1.5 µm ($5.9 \cdot 10^{-8}$ inch)	**P01**	
Integral cooling element Process temperature max. 200 °C (392 °F) instead of 140 °C (284 °F)	**K01**	
Connections for pipe		
Pipes to DIN 11850	**R01**	
ISO pipes to ISO 2463	**R02**	
Pipes to O. D. Tubing "BS 4825 Part 1"	**R03**	
Certificates		
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**	
Inspection certificate to EN 10204-3.1	**C12**	
Use of FDA-listed remote seal filling liquids certified by test report to EN 10204-2.2	**C17**	
Roughness depth measurement R_a certified by test report to EN 10204-3.1	**C18**	
Certification to EHEDG for clamp-on seals with aseptic screwed gland to DIN 11864	**C19**	

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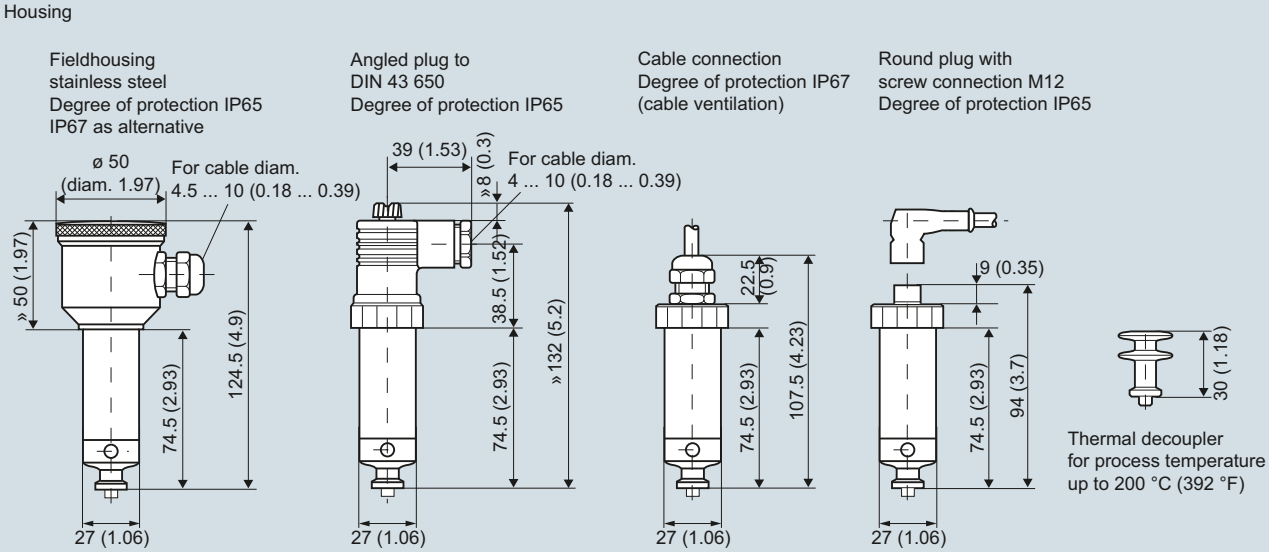
Dimensional drawings

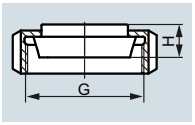


SITRANS P Compact, dimensions in mm (inch)

Process connections

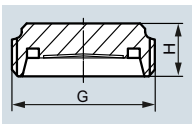
Diaphragm seal with quick-release clamp

Milk pipe union to DIN 11851 with slotted union nut



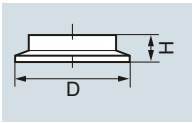
DN	PN	H mm (inch)	G
25	40	24 (0.95)	Rd. 52 x 1/6“
32	40	24 (0.95)	Rd. 58 x 1/6“
40	40	24 (0.95)	Rd. 65 x 1/6“
50	25	25.1 (0.99)	Rd. 78 x 1/6“
65	25	28.6 (1.13)	Rd. 95 x 1/6“

Milk pipe union to DIN 11851 with threaded socket



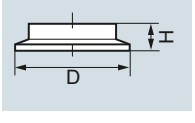
DN	PN	H mm (inch)	G
25	40	-	Rd. 52 x 1/6“
32	40	20 (0.79)	Rd. 58 x 1/6“
40	40	20 (0.79)	Rd. 65 x 1/6“
50	25	20 (0.79)	Rd. 78 x 1/6“
65	25	22 (0.87)	Rd. 95 x 1/6“

Clamp connection to DIN 32676



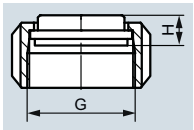
DN	PN	H mm (inch)	D mm (inch)
25	16	14 (0.55)	50.5 (2)
40	16	14 (0.55)	50.5 (2)
50	16	14 (0.55)	64 (2.52)

Clamp connection to ISO 2852



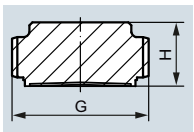
DN	PN	H mm (inch)	D mm (inch)
1“	16	14 (0.55)	50.5 (2)
1½“	16	12 (0.47)	50.5 (2)
2“	16	14 (0.55)	64 (2.52)
2½“	16	14 (0.55)	77.5 (3.05)

IDF standard with slotted union nut



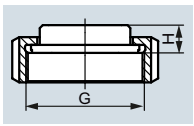
DN	PN	H mm (inch)	G inch (IDF thread)
1“	40	21 (0.83)	1“
1½“	40	13.5 (0.53)	1½“
2“	25	15 (0.59)	2“

IDF standard with threaded socket



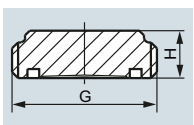
DN	PN	H mm (inch)	G inch (IDF thread)
1“	40	21 (0.83)	1“
1½“	40	13.5 (0.53)	1½“
2“	25	15 (0.59)	2“

SMS standard with slotted union nut



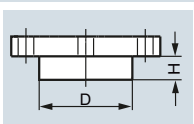
DN	PN	H mm (inch)	G
1“	40	16 (0.63)	Rd 40 x 1.6“
1½“	40	16 (0.63)	Rd 60 x 1.6“
2“	25	16 (0.63)	Rd 70 x 1.6“

SMS standard with threaded socket



DN	PN	H mm (inch)	G
1“	40	16 (0.63)	Rd 40 x 1.6“
1½“	40	20 (0.79)	Rd 60 x 1.6“
2“	25	20 (0.79)	Rd 70 x 1.6“

DRD flange, without welding-type flange



DN	PN	H mm (inch)	D mm (inch)
50	40	16.7 (0.66)	65.5 (2.58)

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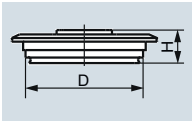
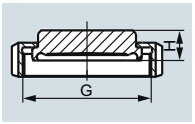
Varivent connection



DN	PN	H mm (inch)	D mm (inch)
25	25	19 (0.75)	50 (1.97)
40 ... 125	25/10	19 (0.75)	68 (2.68)

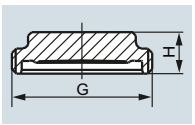
Diaphragm seal with aseptic connection

Aseptic screwed gland to DIN 11864-1, form A, with slotted union nut



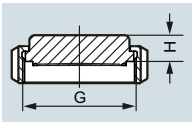
DN	PN	H mm (inch)	G
1“	40	20 (0.79)	Rd 52 x 1/6“
1½“	40	20 (0.79)	Rd 58 x 1/6“
2“	25	20 (0.79)	Rd 65 x 1/6“
2½“	25	20 (0.79)	Rd 78 x 1/6“

Aseptic screwed gland to DIN 11864-1, form A, with threaded socket



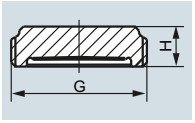
DN	PN	H mm (inch)	G
1“	40	15 (0.59)	Rd 52 x 1/6“
1½“	40	15 (0.59)	Rd 58 x 1/6“
2“	25	15 (0.59)	Rd 65 x 1/6“
2½“	25	15 (0.59)	Rd 78 x 1/6“

Aseptic screwed NEUMO BioConnect with slotted union nut



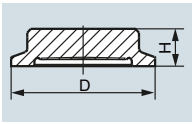
DN	PN	H mm (inch)	G
25	16	15 (0.59)	M 42 x 2
32	16	15 (0.59)	M 52 x 2
40	16	15 (0.59)	M 56 x 2
50	16	15 (0.59)	M 68 x 2

Aseptic screwed NEUMO BioConnect with threaded socket



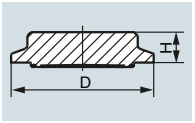
DN	PN	H mm (inch)	G
25	16	20 (0.79)	M 42 x 2
32	16	20 (0.79)	M 52 x 2
40	16	20 (0.79)	M 56 x 2
50	16	20 (0.79)	M 68 x 2

Aseptic screwed NEUMO BioConnect with clamp connection, form R



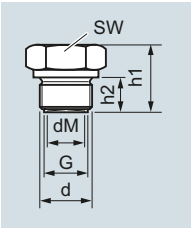
DN	PN	H mm (inch)	D mm (inch)
25	40	20 (0.79)	50.5 (2)
32	40	20 (0.79)	50.5 (2)
40	40	20 (0.79)	64 (2.52)
50	25	20 (0.79)	77.4 (3.05)

Aseptic screwed NEUMO BioConnect with clamp connection, form V



DN	PN	H mm (inch)	D mm (inch)
25	40	15 (0.59)	50.5 (2)
32	40	15 (0.59)	50.5 (2)
40	40	15 (0.59)	64 (2.52)
50	25	15 (0.59)	77.4 (3.05)

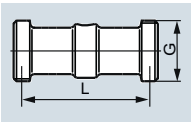
Male thread DIN 3852, form A



G	d mm (inch)	d_M mm (inch)	h_1 mm (inch)	h_2 mm (inch)	SW mm (inch)
G½A	26 (1.02)	17.5 (0.69)	27 (1.06)	14 (0.55)	27 (1.06)
G¾A	32 (1.26)	22.6 (0.89)	31 (1.22)	16 (0.63)	32 (1.26)
G1A	39 (1.54)	27 (1.06)	33 (1.30)	18 (0.71)	51 (2.01)
G1½A	55 (2.17)	40 (1.57)	40 (1.57)	22 (0.87)	55 (2.17)
G2A	68 (2.68)	51 (2.00)	42 (1.65)	24 (0.94)	70 (2.76)

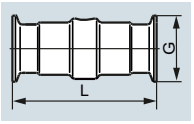
Clamp-on remote seal (screwed gland at both ends) with quick-release clamps

Milk pipe union to DIN 11851 with threaded socket



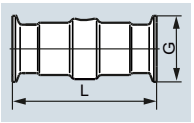
DN	PN	L mm (inch)	G
25	40	110 (4.33)	Rd 52 x 1/6“
32	40	110 (4.33)	Rd 58 x 1/6“
40	40	110 (4.33)	Rd 65 x 1/6“
50	25	110 (4.33)	Rd 78 x 1/6“
65	25	110 (4.33)	Rd 95 x 1/6“

Clamp connection to DIN 32676



DN	PN	L mm (inch)	D mm (inch)
25	16	110 (4.33)	50.5 (2)
32	16	110 (4.33)	50.5 (2)
40	16	110 (4.33)	50.5 (2)
50	16	110 (4.33)	64 (2.52)
65	10	110 (4.33)	91 (3.58)

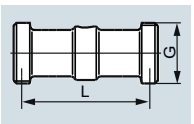
Clamp connection to ISO 2852



DN	PN	L mm (inch)	D mm (inch)
1“	16	110 (4.33)	50.5 (2)
1½“	16	110 (4.33)	50.5 (2)
2“	16	110 (4.33)	64 (2.52)
2½“	16	110 (4.33)	91 (3.58)

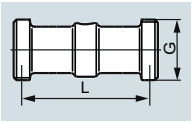
Clamp-on seal with aseptic connection

Aseptic screwed gland to DIN 11864-1, form A, with threaded socket



DN	PN	L mm (inch)	G
1“	40	110 (4.33)	Rd 52 x 1/6“
1½“	40	110 (4.33)	Rd 65 x 1/6“
2“	25	110 (4.33)	Rd 78 x 1/6“

Aseptic screwed NEUMO BioConnect with threaded socket



DN	PN	L mm (inch)	G
25	16	110 (4.33)	M 42 x 2
32	16	110 (4.33)	M 52 x 2
40	16	110 (4.33)	M 56 x 2
50	16	110 (4.33)	M 68 x 2
65	16	110 (4.33)	M 90 x 3

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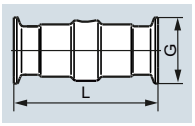
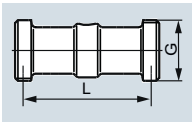
Aseptic screwed NEUMO BioConnect with clamp connection, form R



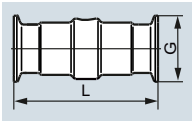
DN	PN	L mm (inch)	D mm (inch)
25	16	110 (4.33)	50.4 (2)
32	16	110 (4.33)	50.4 (2)
40	16	110 (4.33)	64 (2.52)
50	16	110 (4.33)	77.4 (3.05)

Aseptic screwed gland SÜDMO with threaded socket W 501



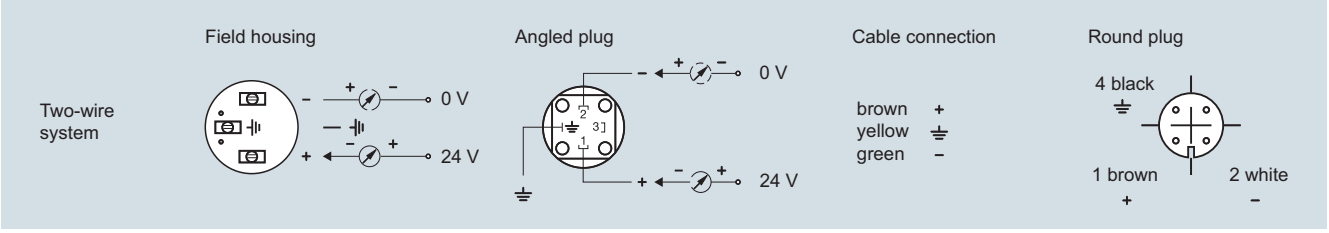
DN	PN	L mm (inch)	G
1“	25	110 (4.33)	Rd 44 x 1/6“
1½“	25	110 (4.33)	Rd 58 x 1/6“
2“	20	110 (4.33)	Rd 78 x 1/6“

Aseptic screwed gland SÜDMO with threaded socket W 601



DN	PN	L mm (inch)	D mm (inch)
1“	16	110 (4.33)	50.5 (2)
1½“	16	110 (4.33)	64 (2.52)
2“	16	110 (4.33)	77.5 (3.05)

Schematics



SITRANS P Compact, connection diagram

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Overview

SITRANS P280 for flexible and cost-effective applications in pressure monitoring

- Supports the WirelessHART standard (HART V 7.1)
- Very high security level for wireless data transmission
- Built-in local user interface (LUI) with 3-button operation
- Optimum display and readability using graphical display (104 x 80 pixels) with integrated backlight
- Stand-by (deep sleep phase) can be activated and deactivated device with push of a button
- Battery power supply
- Battery service live up to 5 years
- Extend battery service life with HART modem interface which can be shut off
- Optimized power consumption through new design, and increase in battery service life.
- Simple configuration thanks to SIMATIC PDM
- Device meets IP65 degree of protection
- Can be used for absolute and gauge pressure measurements

Benefits

The SITRANS P280 is a pressure transmitter that features Wireless HART as the standard communication interface.

Also available is a wired interface to connect a HART modem:

- Flexible pressure measurements
- Save costs on writing for difficult installation conditions. Wireless technology offers cost advantages in cases where extensive wiring cost would normally apply.
- It enables additional hitherto unfeasible measuring points, particularly for monitoring purposes.
- Easy installation on moveable equipment
- Enables cost-effective temporary measurements, for example for process optimizations.
- Optimum solution in addition to wired communication and new possibilities for system solutions in process automation

Application

The SITRANS P280 is a WirelessHART field device for measuring absolute and gauge pressure.

The measuring ranges for absolute and gauge pressure measurements are 0 to 1.6, 10, 50, 200 and 320 bar (0 to 23, 145, 725, 2900 and 4641 psi).

The sensor is integrated into the transmitter housing.

On the wireless communication side, the transmitter supports the WirelessHART standard. A HART modem can be connected to the transmitter particularly for initial comissioning, alternatively the device can be commissioned comfortably by means of the local pushbuttons w/o any additional handset devices.

It can be used in all industries and applications in non-explosive areas.

Design

The SITRANS P280 has a robust aluminum enclosure and is suitable for outside use. It conforms with the IP65 safety class.

The operating temperature range is -40 to +80 °C (-40 to +176 °F). Power supply is provided through an integrated battery, which is available as an accessory. The device is only approved for operation with this battery.

The aerial features a rotatable joint which can be used for directional alignment. Wireless signals can thus be optimally received and transmitted.

A special highlight is the option for direct operation on the device. The operating strategy used in this case seamlessly integrates into the strategy of all new Siemens field devices.

Using the device's control buttons, it is easy to turn the HART modem interface of the device on and off. The device can be put to passive status and reactivated at any time. This helps to extend the service life of the battery.

The SITRANS P280 transmitter features a ceramic measuring cell for gauge and absolute pressure measurements.

Function

The SITRANS P280 can join to a WirelessHART network. It can be parameterized and operated through this network. Measured process values are transported via the network to the SIEMENS IE/WSN-PA link.

Field device data received by the IE/WSN-PA LINK is transmitted to the connected systems, for example the process control system SIMATIC PCS 7. For an introduction of WirelessHART, please see the FI 01 catalogue, section 8 or http://www.siemens.com/wirelesshart.

Detailed information on IE/WSN-PA can be found in the FI 01 catalogue, section 7 or http://www.siemens.com/wirelesshart.

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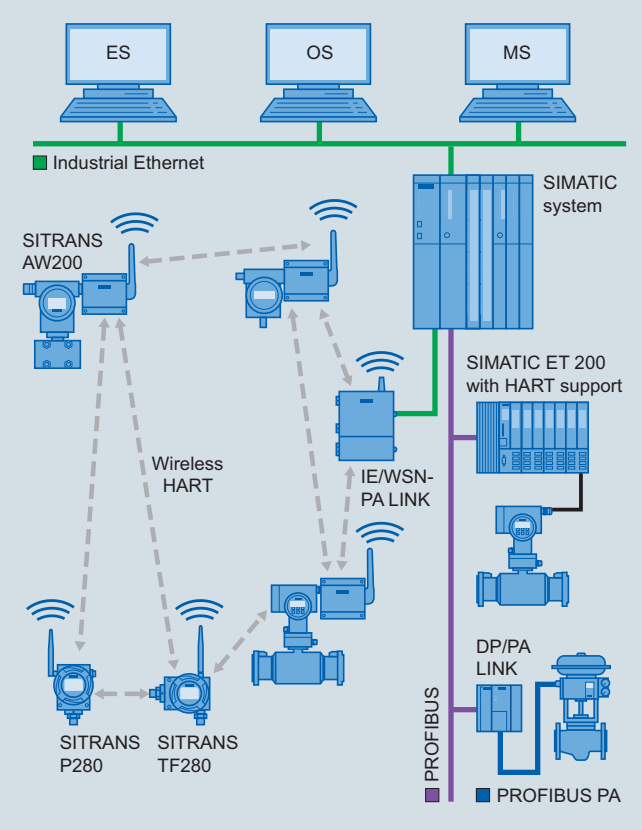
Integration

Connecting to SIMATIC PCS 7

The integration of field devices in SIMATIC PCS 7 and other process control systems can now be done seamlessly and cost-effectively with wireless technology, especially in situations where high wiring costs may be expected. Of particular interest are measuring points which are to be added and for which no MSR wiring is available.

Where larger distances between the IW/WSN-PA LINK and control systems need to be overcome, this connection can also be implemented on a wireless and cost-effective basis using the products of the SCALANCE W family.



Integration of a meshed network in SIMATIC PCS7

Configuration

Configuration of the SITRANS P280 may be carried out as follows:

- Initial comissioning for the SITRANS P280 with SIMATIC PDM is generally carried out via a HART modem or the integrated local user interface, since the network ID and join key must be set up on the device before it can be accepted and integrated into the WirelessHART network.
- Once it is integrated into the network, the device can be conveniently operated with the WirelessHART network, the onsite HART modem or via the local user interface.
- Siemens WirelessHART devices operate with optimum coexistence to SCALANCE W family products.

Technical specifications

SITRANS P280 WirelessHART pressure transmitter	
Mode of operation	
Measuring principle	piezo-resistive
Measured variable	Gauge and absolute pressure
Gauge pressure input	
Measuring range	Overload limit/Bursting pressure
0 ... 1.6 bar (0 ... 23 psi) 0 ... 10 bar (0 ... 145 psi) 0 ... 50 bar (0 ... 725 psi) 0 ... 200 bar (0 ... 2900 psi) 0 ... 320 bar (0 ... 4641 psi)	4 bar (58 psi) 20 bar (290 psi) 100 bar (1450 psi) 400 bar (5801 psi) 640 bar (9282 psi)
Units	mbar, bar, m4H_2O, i4H_2O, atm, Torr, gcm^2, kgcm^2, Pa, kPa, Mpa, psi, mmHG, mmH_2O, ftH_2O, inHG, inH_2O
Absolute pressure input	
Measuring range	Overload limit/Bursting pressure
0 ... 1.6 bar a (0 ... 23 psia) 0 ... 10 bar a (0 ... 145 psia) 0 ... 50 bar a (0 ... 725 psia) 0 ... 200 bar a (0 ... 2900 psia) 0 ... 320 bar a (0 ... 4641 psia)	4 bar a (58 psia) 20 bar a (290 psia) 100 bar a (1450 psia) 400 bar a (5801 psia) 640 bar a (9282 psia)
Units	mbar, bar, m4H_2O, i4H_2O, atm, Torr, gcm^2, kgcm^2, Pa, kPa, MPa, psi, mmHG, mmH_2O, ftH_2O, inHG, inH_2O
Output	
Output signal	2.4 GHz Wireless signal with TSMP (Time Synchronized Mesh Protocol)
Measuring accuracy	as per IEC 60770-1
Error in measurement at limit setting incl. hysteresis and reproducibility	typ. 0.17 % of sensor's span max. 0.25 % of sensor's span
Long-term stability	max. ± 0.25 % of sensor/year span
Influence of ambient temperature	typ. 0.07 %/10K, max. 0.2 %/10 K of sensor's span
Rated conditions	
Ambient conditions	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F) (in ambient temperatures below -20 °C (-4 °F) and above +70 °C (158 °F), readability of the display is limited.)
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
• Relative humidity	< 95 %
Climatic class	4K4H in accordance with EN 60721-3-4(stationary use at locations not protected against weather)
Degree of protection	IP65/NEMA 4
Allowable media temperature	-40 ... 85 °C (-40 ... +185 °F)

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Design	
Enclosure material	low-copper die-cast aluminum, AC-AlSi12(Fe)
Shock resistance	in accordance with DIN EN 60068-2-29 / 03.95
Resistance to vibration	in accordance with DIN EN 60068-2-6/ 12.07
Weight	
• without battery	1.5 kg (3.31 lb)
• With battery	1.6 kg (3.53 lb)
Dimensions (W x H x D)	See Dimensional drawing
Process connection	• G½B male thread as per EN837-1 • ½-14 NPT
Sensor break	Is recognized
Displays and controls	
Display (with illumination)	
• Size of display	104 x 80 pixels
• Number of digits	adjustable
• Number of spaces after comma	adjustable
Setting options	• on site with 3 buttons • with SIMATIC PDM or HART-Communicator
Power supply	
Battery	3.6 V DC
Communication	
Radio	WirelessHART V7.1 conforming
Transmission frequency band	2.4 GHz (ISM-Band)
Transmission range under reference conditions	Up to 250 m (line of sight) in outside areas Up to 50 m (greatly dependent on obstacles) in inside areas
Communication interfaces	• HART communication with HART modem • WirelessHART
Certificates and approvals	
Wireless communication approvals	R&TTE, FCC
General Product Safety	$CSA_{US/C}$, CE, UL
Classification according to pressure equipment directive (PED 97/23/EC)	Gases: Fluid group 1 Liquids: Fluid group 1; meets requirements as per Section 3, Subsection 3 (sound engineering practice)

Selection and Ordering data	Article No.
SITRANS P280 WirelessHART pressure transmitter ↗ ▶	**7MP1120-**
(Required battery not included with delivery, see accessories)	**0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Measuring cell filling	
Dry measuring cell	**0**
Measuring span	
Gauge pressure	
0 ... 1.6 bar (0 ... 23 psi)	**D**
0 ... 10 bar (0 ... 145 psi)	**E**
0 ... 50 bar (0 ... 725 psi)	**F**
0 ... 200 bar (0 ... 2900 psi)	**G**
0 ... 320 bar (0 ... 4641 psi)	**H**
Absolute pressure	
0 ... 1.6 bar a (0 ... 3 psia)	**M**
0 ... 10 bar a (0 ... 145 psia)	**N**
0 ... 50 bar a (0 ... 725 psia)	**P**
0 ... 200 bar a (0 ... 2900 psia)	**Q**
0 ... 320 bar a (0 ... 4641 psia)	**R**
Wetted parts	
Ceramic	**K**
Display	
Display, visible	**1**
Enclosure	
Die-cast aluminum	**1**
Process connection	
G½ as per EN 837-1	**0**
½-14 NPT	**1**
Explosion protection	
Without	**A**
Antenna	
Variable, attached to device	**A**
Further designs	Order code
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Stainless steel tag plate (measuring point description) max. 16 digits entered in plain text Y15:	**Y15**
Measuring point message max. 27 characters entered in plain text: Y16:	**Y16**
Accessories	Article No.
Lithium battery for SITRANS TF280/P280 ▶	**7MP1990-0AA00**
Mounting bracket, steel	**7MF4997-1AC**
Mounting bracket, stainless steel ▶	**7MF4997-1AJ**
Cover, die-cast aluminum, without window	**7MF4997-1BB**
Cover, die-cast aluminum, with window ▶	**7MF4997-1BE**
IE/WSN-PA LINK	**see Sec. 7**
HART modem with USB interface ▶	**7MF4997-1DB**
SIMATIC PDM	**see Sec. 8**

▶ Available ex stock

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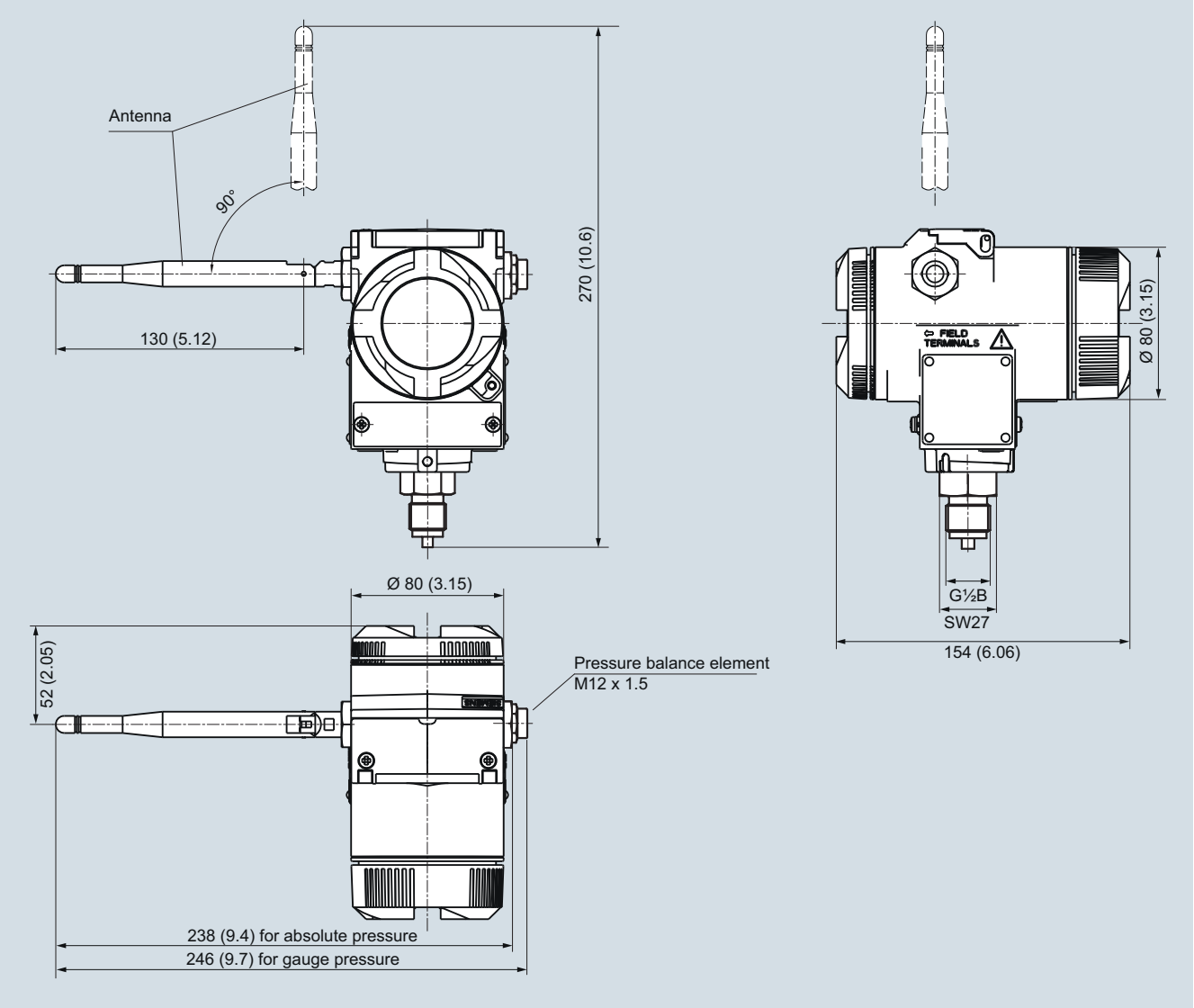
Dimensional drawings



SITRANS P280 WirelessHART pressure transmitter, process connection G½", dimensions in mm (inch)
The dimensional drawing of the mounting bracket see on page 1/171.

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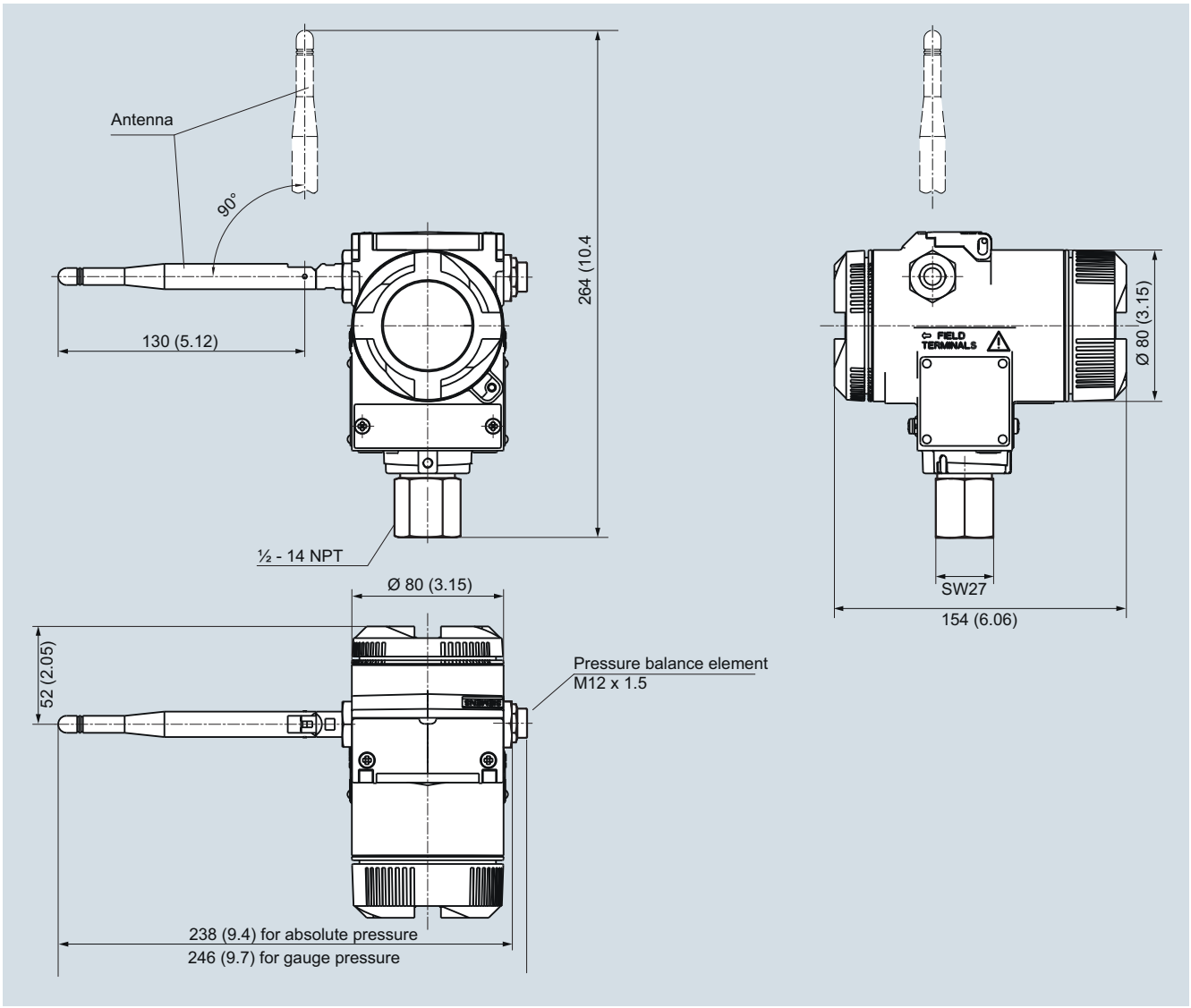

SITRANS P280 WirelessHART pressure transmitter, process connection ½ - 14 NPT, dimensions in mm (inch)
The dimensional drawing of the mounting bracket see on page 1/171.

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SITRANS P300 for gauge and absolute pressure

Overview

The SITRANS P300 is a digital pressure transmitter for relative and absolute pressure. The conventional thread versions are available as process connections, as are flush-mounted versions. A large number of the flush-mounted versions are suitable for food and pharmaceutical applications, and satisfy the EHEDG and 3A hygiene requirements.

The output signal is a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION signal, which is linearly proportional to the input pressure. Communication is via HART protocol or PROFIBUS PA interface. Convenient buttons for easy local operation of the basic settings of the pressure transmitter.

The SITRANS P300 has a single-chamber stainless steel casing. The pressure transmitter is approved with "intrinsically safe" type of protection. It can be used in zone 1 or zone 0.

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- Extensive diagnosis and simulation functions
- Minimum conformity error
- Small long-term drift
- Wetted parts made of high-grade materials (such as stainless steel, Hastelloy)
- Measuring range 0.008 bar to 400 bar (0.1 psi to 5802 psi)
- High measuring accuracy
- Parameterization over control keys and HART or PROFIBUS PA or FOUNDATION Fieldbus

Application

The pressure transmitter is available in versions for gauge pressure and for absolute pressure. The output signal is always a load-independent direct current from 4 to 20 mA or a PROFIBUS PA or FOUNDATION Fieldbussignal, which is linearly proportional to the input pressure. The pressure transmitter measures aggressive, non-aggressive and hazardous gases, as well as vapors and liquids.

It can be used for the following measurement types:

- Gauge pressure
- Absolute pressure

With appropriate parameter settings, it can also be used for the following additional measurement types:

- Level
- Volume
- Mass

The "intrinsically-safe" Ex version of the transmitter can be installed in hazardous areas (zone 1). The transmitters are provided with an EC type examination certificate and comply with the respective harmonized European standards of ATEX.

Gauge pressure

This variant measures aggressive, non-aggressive and hazardous gases, vapors and liquids.

The smallest span is 0.01 bar (0.15 psi), the largest is 400 bar (5802 psi).

Level

With appropriate parameter settings, the gauge pressure variant measures the level of aggressive, non-aggressive and hazardous liquids.

For measuring the level in an open container you require one device; for measuring the level in a closed container, you require two devices and a process control system.

Absolute pressure

This variant measures the absolute pressure of aggressive, non-aggressive and hazardous gases, vapors and liquids.

The smallest span is 0.008 bar a (0.12 psia), the largest is 30 bar a (435 psia).

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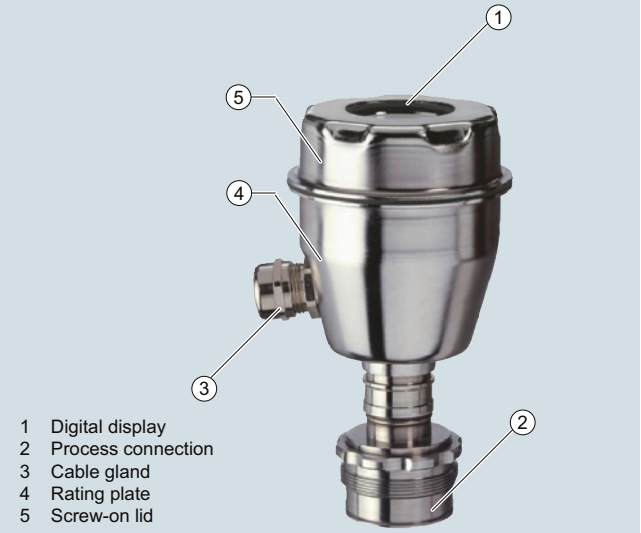
Design

The device comprises:

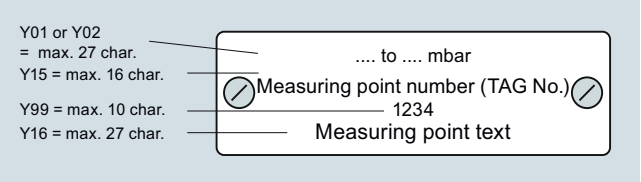
- Electronics
- Housing
- Measuring cell



Perspective view of SITRANS P300

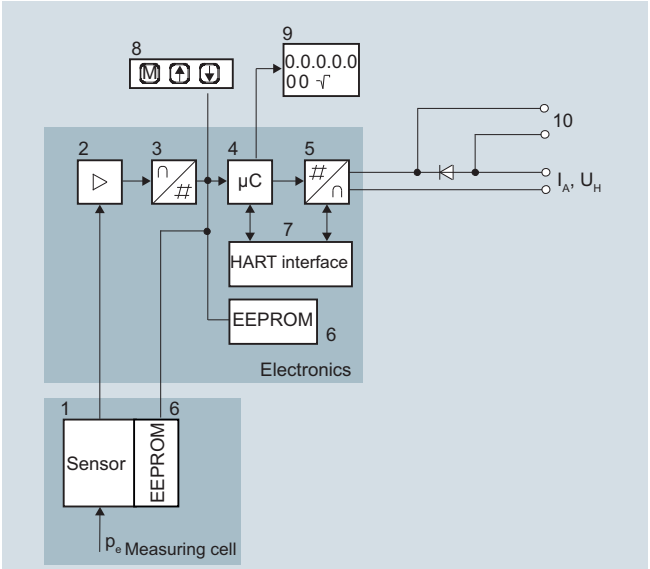
The housing has a screw-on lid (5) and, depending on the version, is with or without an inspection window. The electrical terminal housing, the buttons for operation of the device are located under this lid and, depending on the version, the display. The connections for the auxiliary power U_H and the shield are in the terminal housing. The cable gland is mounted on the side of the housing. The measuring cell with the process connection (2) is located on the bottom of the housing. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device version.

Example of attached measuring points sign



Function

Operation of electronics with HART communication



1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Digital-to-analog converter
6 One non-volatile memory each in the measuring cell and electronics
7 HART interface
8 Three input keys (local operation)
9 Digital display
10 Diode circuit and connection for external ammeter
I_A Output current
U_H Power supply
P_e Input variable

Function diagram of electronics

The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the measuring amplifier (2) and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected according to linearity and thermal characteristics. In a digital-to-analog converter (5) it is then converted into the output current of 4 to 20 mA. A diode circuit provides reverse polarity protection. You can make an uninterrupted current measurement with a low-ohm ammeter at the connection (10). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first memory is linked to the measuring cell, the second to the electronics.

The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a display (9), you can use this to track mode settings and other messages. The basic mode settings can be changed with a computer via the HART modem (7).

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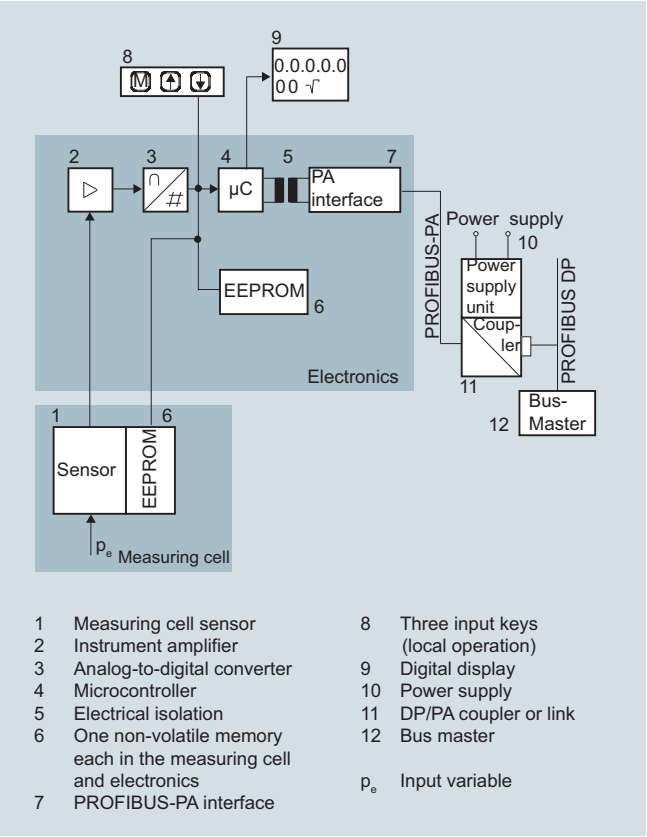
Operation of electronics with PROFIBUS PA communication



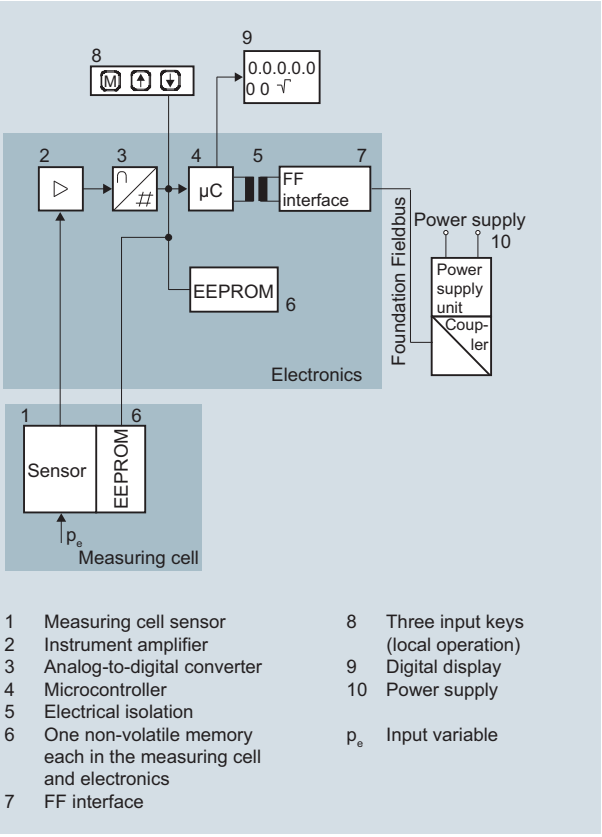
1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Electrical isolation
6 One non-volatile memory each in the measuring cell and electronics
7 PROFIBUS-PA interface
8 Three input keys (local operation)
9 Digital display
10 Power supply
11 DP/PA coupler or link
12 Bus master
p_e Input variable

Function diagram of electronics

The input pressure is converted into an electrical signal by the sensor (1). This signal is amplified by the measuring amplifier (2) and digitalized in an analog-to-digital converter (3). The digital signal is analyzed in a microcontroller (4) and corrected according to linearity and thermal characteristics. It is then made available at the PROFIBUS PA over an electrically isolated PROFIBUS PA interface (7). The data specific to the measuring cell, the electronic data and parameter settings are stored in two non-volatile memories (6). The first memory is linked to the measuring cell, the second to the electronics.

The buttons (8) can be used to call up individual functions, so-called modes. If you have a device with a display (9), you can use this to track mode settings and other messages. The basic mode settings (12) can be changed with a computer over the bus master.

Operation of electronics with FOUNDATION Fieldbus communication



1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Electrical isolation
6 One non-volatile memory each in the measuring cell and electronics
7 FF interface
8 Three input keys (local operation)
9 Digital display
10 Power supply
p_e Input variable

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

Mode of operation of the measuring cells

The process connections available include the following:

- G½
- ½-14 NPT
- Flush-mounted diaphragm:
  - Flanges to EN
  - Flanges to ASME
  - NuG and pharmaceutical connections

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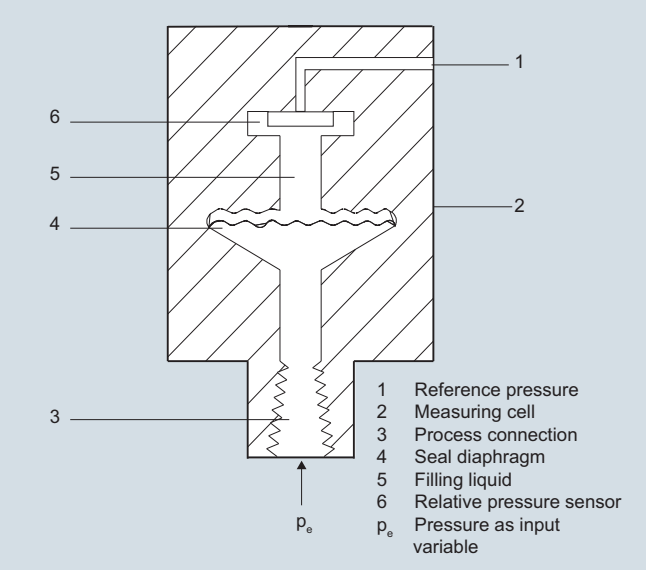
Measuring cell for gauge pressure

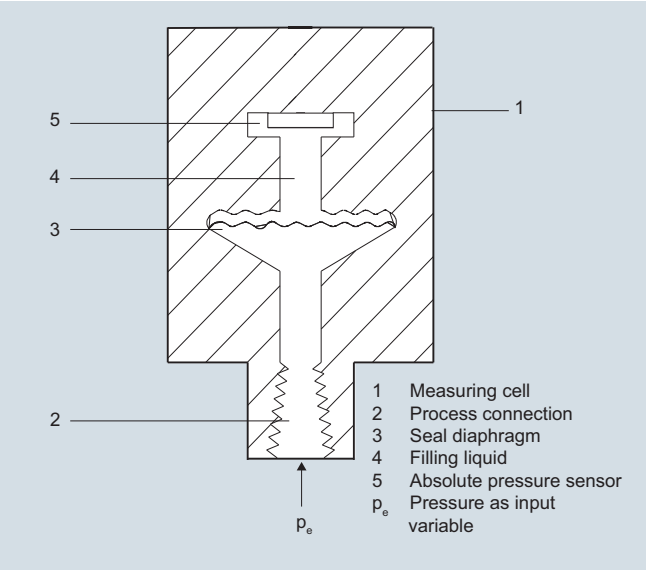


Measuring cell for gauge pressure, function diagram

The input pressure (p_e) is transferred to the gauge pressure sensor (6) via the seal diaphragm (4) and the filling liquid (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with spans ≤ 63 bar (≤ 926.1 psi) measure the input pressure compared to atmospheric, transmitters with spans of ≥ 160 bar (≥ 2352 psi) compared to a vacuum.

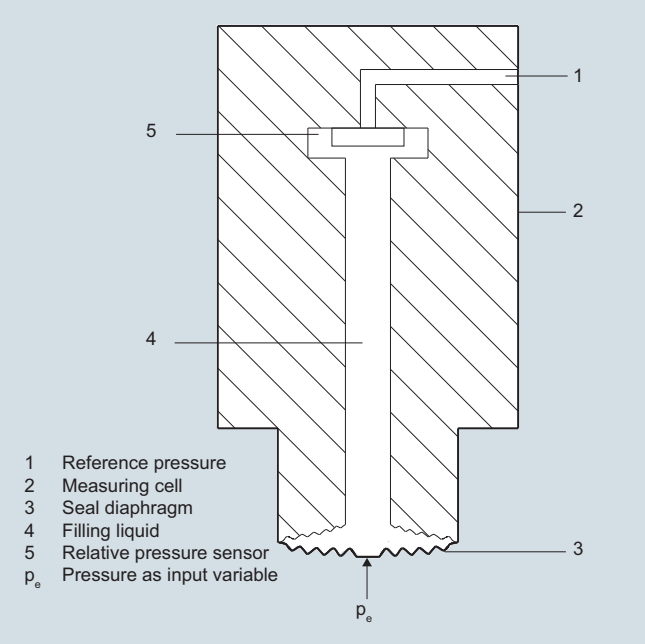
Measuring cell for absolute pressure



Measuring cell for absolute pressure, function diagram

The input pressure (p_e) is transferred to the absolute pressure sensor (5) via the seal diaphragm (3) and the filling liquid (4), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Measuring cell for gauge pressure, front-flush diaphragm

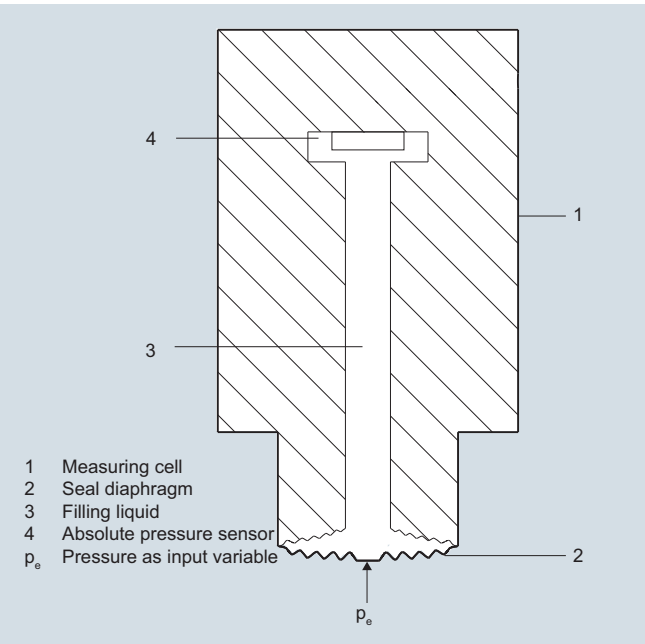


Measuring cell for gauge pressure, front-flush diaphragm, function diagram

The input pressure (p_e) is transferred to the gauge pressure sensor (6) via the seal diaphragm (4) and the filling liquid (5), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Transmitters with spans ≤ 63 bar (≤ 926.1 psi) measure the input pressure compared to atmospheric, transmitters with spans of ≥ 160 bar (≥ 2352 psi) compared to a vacuum.

Measuring cell for absolute pressure, front-flush diaphragm



Measuring cell for absolute pressure, front-flush diaphragm, function diagram

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The input pressure (p_e) is transferred to the absolute pressure sensor (5) via the seal diaphragm (3) and the filling liquid (4), displacing its measuring diaphragm. The displacement changes the resistance value of the four piezo resistors in the measuring diaphragm in a bridge circuit. The change in the resistance causes a bridge output voltage proportional to the input pressure.

Parameterization

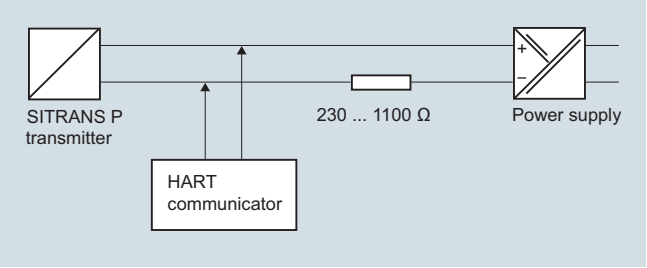
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

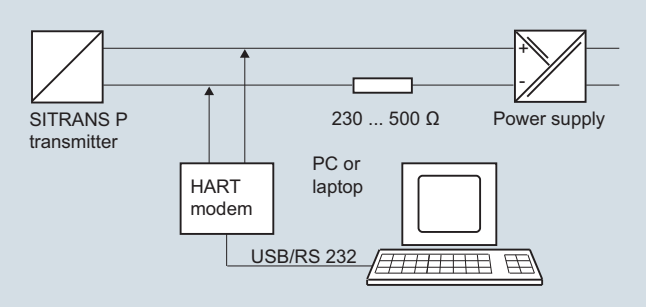
Parameterization using HART communication

Parameterization using HART communication is performed with a HART communicator or a PC.



Communication between a HART communicator and a pressure transmitter

When parameterizing with the HART communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

Adjustable parameters on SITRANS P300 with HART communication

Parameters	Input keys	HART communication
Start of scale	x	x
Full-scale value	x	x
Electrical damping	x	x
Start-of-scale value without application of a pressure ("Blind setting")	x	x
Full-scale value without application of a pressure ("Blind setting")	x	x
Zero adjustment	x	x
current transmitter	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x[1)]
Type of dimension and actual dimension	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

[1)] Cancel apart from write protection

Diagnostic functions for SITRANS P300 with HART communication

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Slave pointer
- Simulation functions
- Maintenance timer

Available physical units of display for SITRANS P300 with HART communication

Table style: Technical specifications 2

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm^2, kg/cm^2, inH_2O, inH_2O (4 °C), mmH_2O, ftH_2O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m^3, dm^3, hl, yd^3, ft^3, in^3, US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

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Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS connects the SITRANS P300 PA to a process control system, e.g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the P300 is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

Adjustable parameters	Input keys	PROFIBUS PA and FOUNDATION Fieldbus interface
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Buttons and/or function disabling	x	x
Source of measured-value display	x	x
Physical dimension of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

Diagnostic functions for SITRANS P300 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- Display of zero correction
- Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Mpa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm^2, kg/cm^2, mmH_2O, mmH_2O (4 °C), inH_2O, in$H_2$0 (4 °C), ftH_2O (20 °C), mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Mass	g, kg, t, lb, Ston, Lton, oz
Volume	m^3, dm^3, hl, yd^3, ft^3, in^3, US gallon, Imp. gallon, bushel, barrel, barrel liquid
volume flow	m^3/s, m^3/min, m^3/h, m^3/d, l/s, l/min, l/h, l/ d, Ml/d, ft^3/s, ft^3/min, ft^3/h, ft^3/d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, /t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d
Total mass flow	t, kg, g, lb, oz, LTon, STon
Temperature	K, °C, °F, °R
Miscellaneous	%

Hygiene version

In the case of the SITRANS P300 with 7MF812.-... front-flush diaphragm, selected connections comply with the requirements of the EHEDG or 3A. You will find further details in the order form. Please note in particular that the seal materials used must comply with the requirements of 3A. Similarly, the filling liquids used must be FDA-compliant.

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Technical specifications

SITRANS P300 for gauge and absolute pressure

	HART		PROFIBUS PA and FOUNDATION Fieldbus	
Gauge pressure input				
Measured variable	Gauge pressure			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	0.01 ... 1 bar (0.15 ... 14.5 psi)	6 bar (87 psi)	1 bar (14.5 psi)	6 bar (87 psi)
	0.04 ... 4 bar (0.58 ... 58 psi)	10 bar (145 psi)	4 bar (58 psi)	10 bar (145 psi)
	0.16 ... 16 bar (2.3 ... 232 psi)	32 bar (464 psi)	16 bar (232 psi)	32 bar (464 psi)
	0.6 ... 63 bar (9.1 ... 914 psi)	100 bar (1450 psi)	63 bar (914 psi)	100 bar (1450 psi)
	1.6 ... 160 bar (23.2 ... 2321 psi)	250 bar (3626 psi)	160 bar (2321 psi)	250 bar (3626 psi)
	4.0 ... 400 bar (58 ... 5802 psi)	600 bar (8700 psi)	400 bar (5802 psi)	600 bar (8700 psi)
	Depending on the process connection, the span may differ from these values		Depending on the process connection, the nominal measuring range may differ from these values	
Lower measuring limit				
• Measuring cell with silicone oil	30 mbar a (0.44 psia)			
Upper measuring limit				
• Measuring cell with silicone oil	100% of max. span		100 % of the max. nominal measuring range	
Absolute pressure input				
Measured variable	Absolute pressure			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	8 ... 250 mbar a (0.12...3.63 psia)	6 bar a (87 psia)	250 mbar a (3.63 psia)	6 bar a (87 psia)
	43 ... 1300 mbar a (0.62...18.9 psia)	10 bar a (145 psia)	1.30 bar a (19 psia)	10 bar a (145 psia)
	0.16 ... 5 bar a (2.3 ... 73 psia)	30 bar a (435 psia)	5 bar a (73 psia)	30 bar a (435 psia)
	1 ... 30 bar a (14.5 ... 435 psia)	100 bar a (1450 psia)	30 bar a (435 psia)	100 bar a (1450 psia)
Lower measuring limit				
• Measuring cell with silicone oil	0 mbar a (0 psia)			
Upper measuring limit				
• Measuring cell with silicone oil	100 % of max. span		100 % of the max. nominal measuring range	
Input of gauge pressure, with front-flush diaphragm				
Measured variable	Gauge pressure, front-flush			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	0.01 ... 1 bar (0.15 ... 14.5 psi)	6 bar (87 psi)	1 bar (14.5 psi)	6 bar (87 psi)
	0.04 ... 4 bar (0.58 ... 58 psi)	10 bar (145 psi)	4 bar (58 psi)	10 bar (145 psi)
	0.16 ... 16 bar (2.32 ... 232 psi)	32 bar (464 psi)	16 bar (232 psi)	32 bar (464 psi)
	0.6 ... 63 bar (9.14 ... 914 psi)	100 bar (1450 psi)	63 bar (914 psi)	100 bar (1450 psi)
Lower measuring limit	100 mbar a (1.45 psia)			
Upper measuring limit				
• Measuring cell with silicone oil	100% of max. span		100 % of the max. nominal measuring range	

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SITRANS P300 for gauge and absolute pressure						
	HART			**PROFIBUS PA and FOUNDATION Fieldbus**		
Input of absolute pressure, with front-flush diaphragm						
Measured variable	Absolute pressure, front-flush					
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure		Nominal measuring range	Max. perm. test pressure	
	43 ... 1300 mbar a (0.62 ... 18.85 psia)	10 bar a (145 psia)		1300 mbar a (18.85 psia)	10 bar a (145 psia)	
	0.16 ... 5 bar a (2.32 ... 72.5 psi a)	30 bar a (435 psia)		5 bar a (72.5 psia)	30 bar a (435 psia)	
	1 ... 30 bar a (14.5 ... 435 psia)	100 bar a (1450 psia)		30 bar a (435 psia)	100 bar a (1450 psia)	
	Depending on the process connection, the span may differ from these values			Depending on the process connection, the nominal measuring range may differ from these values		
Lower measuring limit	0 bar a (0 psia)					
Upper measuring limit						
• Measuring cell with silicone oil	100% of max. span			100 % of the max. nominal measuring range		
Output						
Output signal	4 ... 20 mA			Digital PROFIBUS PA signal		
Physical bus	-			IEC 61158-2		
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.					
Electrical damping T_{63} (step width 0.1 s)	Set to 2 s (0 ... 100 s)					
Measuring accuracy	According to IEC 60770-1					
Reference conditions (All error data refer always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, measuring cell with silicone oil, room temperature 25 °C (77 °F)					
	Span ratio r = max. span/set span			Nominal measuring range ratio r = nominal measuring range/set measuring range)		
Error in measurement at limit setting incl. hysteresis and reproducibility						
	Gauge pressure	Absolute pressure	Absolute pressure, front-flush	Gauge pressure	Absolute pressure	Absolute pressure, front-flush
Linear characteristic						
• r + 10	≤ (0.0029 · r + 0.071) %	≤ 0.1 %	≤ 0.2 %	≤ (0.0029 · r + 0.071) %	≤ 0.1 %	≤ 0.2 %
• 10 < r ≤ 30	≤ (0.0045 · r + 0.071) %	≤ 0.2 %	≤ 0.4 %	≤ (0.0045 · r + 0.071) %	≤ 0.2 %	≤ 0.4 %
• 30 < r ≤ 100	≤ (0.005 · r + 0.05) %	-	-	≤ (0.005 · r + 0.05) %	-	-
Step response time T_{63}	approx. 0.2 s					
Long-term stability at ± 30 °C (± 54 °F)	≤ (0.25 · r) %/5 years	≤ (0.1 · r) %/year		≤ (0.25 · r)/5 years	≤ (0.1 · r) %/year	
Influence of ambient temperature						
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.08· r + 0.1) %[1)]		≤ (0.2 · r + 0 3) %	≤ (0.08· r + 0.1) %[1)]		≤ (0.2 · r + 0 3) %
• at -40 ... -10 °C and +60 ... +85 °C (-40 ... 14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K		≤ (0.2 · r + 0.3) %/10 K	≤ (0.1 · r + 0.15) %/10 K		≤ (0.2 · r + 0.3) %/10 K
Influence of the medium temperature (only with front-flush diaphragm)						
• Temperature difference between medium temperature and ambient temperature	3 mbar/10 K (0.04 psi/10 K)					

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SITRANS P300 for gauge and absolute pressure	HART	PROFIBUS PA and FOUNDATION Fieldbus
Rated conditions		
Installation conditions		
Ambient temperature		Observe the temperature class in areas subject to explosion hazard.
• Measuring cell with silicone oil		-40 ... +85 °C (-40 ... +185 °F)
• Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm)		-10 ... +85 °C (14 ... +185 °F)
• Measuring cell with inert liquid (not with front-flush diaphragm)		-20 ... +85 °C (-4 ... +185 °F)
• Display readable		-30 ... +85 °C (-22 ... +185 °F)
• Storage temperature		-50 ... +85 °C (-58 ... +185 °F) (for Neobee: -20 ... +85 °C (-4 ... +185 °F)) (for temperature oil: -10 ... + 85 °C (14 ... +165 °F))
Climatic class		
Condensation		Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics
Degree of protection acc. to EN 60529		IP65, IP68, NEMA X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F)
Electromagnetic Compatibility		
• Emitted interference and interference immunity		Acc. to IEC 61326 and NAMUR NE 21
Medium conditions		
Temperature of medium		
• Measuring cell with silicone oil		-40 ... +100 °C (-40 ... +212 °F)
• Measuring cell with silicone oil (FDA-compliant, with flush-mounted diaphragm)		-40 ... +150 °C (-40 ... +302 °F)
• Measuring cell with Neobee oil "Measuring cell with Neobee oil (FDA-compliant, with flush-mounted diaphragm)		-10 ... +150 °C (-14 ... +302 °F)
• Measuring cell with silicone oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)		-40 ... +200 °C (-40 ... +392 °F)
• Measuring cell with Neobee oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)		-10 ... +200 °C (14 ... +392 °F)
• Measuring cell with inert liquid		-20 ... +100 °C (-4 ... +212 °F)
• Measuring cell with high-temperature oil (only for gauge pressure version with flush-mounted diaphragm)		-10 ... +250 °C (14 ... 482 °F)
Design (standard version)		
Weight (without options)		Approx. 800 g (1.8 lb)
Enclosure material		Stainless steel, mat. no. 1.4301/304
Material of parts in contact with the medium		
• Connection shank		Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
• Oval flange		Stainless steel, mat. no. 1.4404/316L
• Seal diaphragm		Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819
• Measuring cell filling		•Silicone oil •Inert filling liquid
Process connection		•G½B to EN 837-1 •Female thread ½-14 NPT •Oval flange PN 160 (MAWP 2320 psi) with fastening thread: $-^{7}/_{16}$ -20 UNF to IEC 61518 •M10 as per DIN 19213

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SITRANS P300 for gauge and absolute pressure		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Design (version with front-flush diaphragm)		
Weight (without options)	approx. 1 ... 13 kg (2.2 ... 29 lb)	
Enclosure material	Stainless steel, mat. no. 1.4301/304	
Material of parts in contact with the medium		
• Process connection	Stainless steel, mat. no. 1.4404/316L	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L	
• Measuring cell filling	•Silicone oil •Inert filling liquid •FDA compliant fill fluid (Neobee oil)	
Process connection	•Flanges as per EN and ASME •F&B and pharmaceutical flanges	
Surface quality touched-by-media	R_a-values ≤ 0.8 µm (32 µ-inch)/welds $R_{a)}$ ≤ 1.6 µm (64 µ-inch) (Process connections acc. to 3A; R_a-values ≤ 0.8 µm (32 µ-inch)/welds R_a ≤ 0.8 µm (32 µ-inch)	
Power supply U_H		
Terminal voltage on transmitter	10.5 ... 42 V DC for intrinsically safe operation: 10.5 ... 30 V DC	Supplied through bus
Separate power supply	-	Not necessary
Bus voltage		
• Without Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Max. basic current	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. fault current in the event of a fault	-	15.5 mA
Fault disconnection electronics (FDE)	-	Available
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)	
Water, waste water	In preparation	
Explosion protection		
Intrinsic safety "i"	PTB 05 ATEX 2048	
• Marking	Ex II 1/2 G Ex ia/ib IIB/IIC T4, T5, T6	
• Permissible ambient temperature		
- Temperature class T4	-40 ... +85 °C (-40 ... +185 °F)	
- Temperature class T5	-40 ... +70 °C (-40 ... +158 °F)	
- Temperature class T6	-40 ... +60 °C (-40 ... +140 °F)	
• Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω	To certified intrinsically-safe circuits with peak values: FISCO supply unit: U_i = 17.5 V, I_i = 380 mA, P_i = 5.32 W Linear barrier: U_i = 24 V, I_i = 250 mA, P_i = 1.2 W
• Effective inner capacitance:	C_i = 6 nF	C_i = 1.1 nF
• Effective internal inductance:	L_i = 0.4 mH	L_i ≤ 7 µH
Explosion protection to FM for USA and Canada (cFM_{US})		
• Identification (DIP) or (IS); (NI)	Certificate of Compliance 3025099 CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	
• Identification (DIP) or (IS)	Certificate of Compliance 3025099C CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	

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SITRANS P300 for gauge and absolute pressure		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Dust explosion protection for zone 20/21/22	PTB 05 ATEX 2048	
• Marking	Ex II 1D Ex ia D 20 T 120 °C Ex II 2D Ex ib D 21 T 120 °C Ex II 3D Ex ib D 21 T 120 °C	
• Permissible ambient temperature		
- Temperature class T4	-40 ... +85 °C (-40 ... +185 °F) (in the case of mineral glass windows only -20 ... +85 °C (-4 ... +185 °F))	
- Temperature class T5	-40 ... +70 °C (-40 ... +158 °F) (in the case of mineral glass windows only-20 ... +70 °C (-4 ... +158 °F))	
- Temperature class T6	-40 ... +60 °C (-40 ... +140 °F) (in the case of mineral glass windows only -20 ... +60 °C (-4 ... +140 °F))	
• Connection	To certified intrinsically-safe circuits with peak values:	To certified intrinsically-safe circuits with peak values:
	U_i = 30 V, I_i = 100 mA, P_i = 750 mW	U_i = 24 V, I_i = 380 mA, P_i = 5.32 mW
• Effective inner capacitance:	C_i = 6 nF	C_i = 5 nF
• Effective internal inductance:	L_i = 0.4 µH	L_i = 10 µH
Type of protection Ex nA/nL/ic (Zone 2)	PTB 05 ATEX 2048	
• Marking	II 2/3 G Ex nA T4/T5/T6 II 2/3 G Ex nL IIB/IIC T4/T5/T6	
• Permissible ambient temperature		
- Temperature class T4	-40 ... +85 °C (-40 ... +185 °F) (in the case of mineral glass windows only -20 ... +85 °C (-4 ... +185 °F))	
- Temperature class T5	-40 ... +70 °C (-40 ... +158 °F) (in the case of mineral glass windows only -20 ... +70 °C (-4 ... +158 °F))	
- Temperature class T6	-40 ... +60 °C (-40 ... +140 °F) (in the case of mineral glass windows only -20 ... +60 °C (-4 ... +140 °F))	
• Ex nA/nL connection	To certified intrinsically-safe circuits with peak values:	To certified intrinsically-safe circuits with peak values:
	U_m = 45 V	U_m = 32 V
• Ex ic connection	To certified intrinsically-safe circuits with peak values:	To certified intrinsically-safe circuits with peak values:
	U_i = 45 V	U_i = 32 V
• Effective inner capacitance:	C_i = 6 nF	C_i = 5 nF
• Effective internal inductance:	L_i = 0.4 mH	L_i = 20 µH

[1] Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.064 · r + 0.08) %/28 °C (50 °F).

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HART Communication	
HART communication	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting Address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0.1 or 2 (totalizer mode and reset function for dosing)
• Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping adjustable	0 … 100 s
- Simulation function	Input /Output
- Failure function	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function

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Selection and Ordering data	Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure, single-chamber measuring housing, rating plate inscription in English	
4 ... 20 mA/HART ↗	**7MF8023-**
PROFIBUS PA ↗	**7MF8024-**
FOUNDATION Fieldbus (FF) ↗	**7MF8025-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	

Measuring cell filling	Measuring cell cleaning	
Silicone oil	normal	1
Inert liquid	Cleanliness level 2 to DIN 25410	3
max. span (min. ... max.)		
0.01 ... 1 bar	(0.145 ... 14.5 psi)	B
0.04 ... 4 bar	(0.58 ... 58 psi)	C
0.16 ...16 bar	(2.32 ... 232 psi)	D
0.63 ... 63 bar	(9.14 ... 914 psi)	E
1.6 ... 160 bar	(23.2 ... 2320 psi)	F
4 ... 400 bar	(58 ... 5802 psi)	G
2.5 ... 250 mbar a	(0.04 ... 3.63 psia)	Q
13 ... 1300 mbar a	(0.19 ... 18.86 psia)	S
0.05 ... 5 bar a	(0.7 ... 72.5 psia)	T
0.3 ... 30 bar a	(4.35 ... 435 psia)	U

Wetted parts materials		
Seal diaphragm	Measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Version for diaphragm seal[1) 2) 3) 4) 5)]		Y

Process connection	
• Connection shank G½B to EN 837-1	0
• Female thread ½-14 NPT	1
• Stainless steel oval flange with process connection (Oval flange has no female thread) [6)]	
- Mounting thread $^{7}/_{16}$-20 UNF to EN 61518	2
- Mounting thread M10 to DIN 19213	3
- Mounting thread M12 to DIN 19213	4
• Male thread M20 x 1.5	5
• Male thread ½ -14 NPT	6
Non-wetted parts materials	
• Stainless steel, deep-drawn and electrolytically polished	4
Version	
• Standard versions	1
Explosion protection	
• None	A
• With ATEX, Type of protection:	
- "Intrinsic safety (Ex ia)"	B
• Zone 20/21/22[7)]	C
• Ex nA/nL (Zone 2)[8)]	E
• with FM "intrinsic safety" (cFM$_{US}$)	M
Electrical connection / cable entry	
• Screwed gland M20x1.5 (polyamide)[9)]	A
• Screwed gland M20x1.5 (metal)	B
• Screwed gland M20x1.5 (stainless steel)	C
• M12 connectors (metal), without cable socket)	F
• M12 connectors (stainless steel), without cable	G
• Screwed gland ½-14 NPT metal thread [10)]	H
• Screwed gland ½-14 NPT stainless steel thread	J

Selection and Ordering data	Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure, single-chamber measuring housing, rating plate inscription in English	
4 ... 20 mA/HART	**7MF8023-**
PROFIBUS PA	**7MF8024-**
FOUNDATION Fieldbus (FF)	**7MF8025-**
	-
Display	
• Without display, with keys, closed lid	1
• With display and keys, closed lid[11)]	2
• With display and keys, lid with Makrolon pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units)[11)]	4
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with Makrolon pane[11)]	5
• With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS and FOUNDATION Fieldbus equipment: pressure units)[11)]	6
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane[11)]	7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation

1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

3) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF802.-..Y..-.... and 7MF4900-1...-.B

4) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.

5) Remote seal for direct mounting only available in combination with process connection ½-14 NPT.

6) M10 fastening thread: Max. span 160 bar (2320 psi)
7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)

7) Only available together with electrical connection option A

8) Only available together with electrical connection options B, C or G.

9) Only together with HART electronics.

10) Without cable gland.

11) Display cannot be turned.

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Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure with front-flush membrane, single-chamber measuring housing, rating plate inscription in English		
4 ... 20 mA/HART		↗ **7MF8123-**
PROFIBUS PA		↗ **7MF8124-**
FOUNDATION Fieldbus (FF)		↗ **7MF8125-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		■■■■■-■■■■
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	**1**
Inert liquid	Cleanliness level 2 to DIN 25410[1)]	**3**
FDA compliant fill fluid		
• Neobee oil	normal	**4**
max. span		
0.01 ... 1 bar	(0.15 ... 14.5 psi)	**B**
0.04 ... 4 bar	(0.58 ... 58 psi)	**C**
0.16 ... 16 bar	(2.32 ... 232 psi)	**D**
0.63 ... 63 bar	(9.14 ... 914 psi)	**E**
13 ... 1300 mbar a[2)]	(0.19 ... 18.9 psia)[2)]	**S**
0.05 ... 5 bar a[2)]	(0.7 ... 72.5 psia)[2)]	**T**
0.03 ... 30 bar a[2)]	(4.35 ... 435 psia)[2)]	**U**
Wetted parts materials		
Seal diaphragm	Measuring cell	
Stainless steel	Stainless steel	**A**
Hastelloy[3)]	Stainless steel	**B**
Process connection		
• Flange version with Order code M.., N.., R.. or Q.. (see "Further designs")		**7**
Non-wetted parts materials		
• Stainless steel, deep-drawn and electrolytically polished		**4**
Version		
• Standard versions		**1**
Explosion protection		
• None		**A**
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		**B**
• Zone 20/21/22[4)]		**C**
• Ex nA/nL (Zone 2)[5)]		**E**
• with FM "intrinsic safety" (cFM_{US})		**M**
Electrical connection / cable entry		
• Screwed gland M20x1.5 (polyamide)[6)]		**A**
• Screwed gland M20x1.5 (metal)		**B**
• Screwed gland M20x1.5 (stainless steel)		**C**
• M12 connectors (without cable socket)		**F**
• M12 connectors (stainless steel), without cable socket)		**G**
• Screwed gland ½-14 NPT metal thread [7)]		**H**
• Screwed gland ½-14 NPT stainless steel thread [7)]		**J**

Selection and Ordering data	Article No.
SITRANS P300 pressure transmitters for relative and absolute pressure with front-flush membrane, single-chamber measuring housing, rating plate inscription in English	
4 ... 20 mA/HART	**7MF8123-**
PROFIBUS PA	**7MF8124-**
FOUNDATION Fieldbus (FF)	**7MF8125-**
	■■■■■-■■■■
Display	
• Without display, with keys, closed lid	**1**
• With display and keys, closed lid[8)]	**2**
• With display and keys, lid with Makrolon pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units)[8)]	**4**
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with Makrolon pane[8)]	**5**
• With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units)[8)]	**6**
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass pane[8)]	**7**

Power supply units see Chap. 7 "Supplementary Components"

Included in delivery of the device:
- Brief instruction (Leporello)
- CD-ROM with detailed documentation

1) Not suitable for oxygen applications.

2) Not with temperature decoupler P00 and P10, not for process connections R01, R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.

3) Only available for flanges with options M.., N.. and Q..

4) Only together with electrical connection option A.

5) Only available together with electrical connection options B, C or G.

6) Only together with HART electronics.

7) Without cable gland.

8) Display cannot be turned.

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Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Pressure transmitter with mounting bracket (2 shackles, 4 nuts, 4 U-plates, 1 angle) made of: made completely of stainless steel, for wall or pipe mounting	**A02**	✓	✓	✓
Cable socket for M12 plug				
• Stainless steel	**A51**		✓	✓
Rating plate inscription (instead of English)				
• German	**B10**	✓	✓	✓
• French	**B12**	✓	✓	✓
• Spanish	**B13**	✓	✓	✓
• Italian	**B14**	✓	✓	✓
English rating plate Pressure units in in$H_2$0 and/or psi	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2[1]	**C11**	✓	✓	✓
Inspection certificate[2] Acc. to EN 10204-3.1	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	**C14**	✓	✓	✓
Degree of protection IP65/IP68 (only for M20x1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Degree of protection IP6k9k (only for M20x1.5)	**D46**	✓	✓	✓
Export approval Korea	**E11**	✓	✓	✓
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF8...-.....-.B..)	**E45**	✓	✓	✓
Ex Approval Ex ia/ib NEPSI	**E55**	✓	✓	✓
Only for SITRANS P300 with front-flush diaphragm (7MF81..-...)				
Flange to EN 1092-1, Form B1				
• DN 25, PN 40[3]	**M11**	✓	✓	✓
• DN 25, PN 100[4]	**M21**	✓	✓	✓
• DN 40, PN 40	**M13**	✓	✓	✓
• DN 40, PN 100	**M23**	✓	✓	✓
• DN 50, PN 16	**M04**	✓	✓	✓
• DN 50, PN 40	**M14**	✓	✓	✓
• DN 80, PN 16	**M06**	✓	✓	✓
• DN 80, PN 40	**M16**	✓	✓	✓
Flanges to ASME B16.5				
• 1", class 150[4]	**M40**	✓	✓	✓
• 1½", class 150	**M41**	✓	✓	✓
• 2", class 150	**M42**	✓	✓	✓
• 3", class 150	**M43**	✓	✓	✓
• 4", class 150	**M44**	✓	✓	✓
• 1", class 300[4]	**M45**	✓	✓	✓
• 1½", class 300	**M46**	✓	✓	✓
• 2", class 300	**M47**	✓	✓	✓
• 3", class 300	**M48**	✓	✓	✓
• 4", class 300	**M49**	✓	✓	✓
Threaded connector to DIN 3852-2, form A, thread to ISO 228				
• G ¾"-A, front-flush[4]	**R01**	✓	✓	✓
• G 1"-A, front-flush[4]	**R02**	✓	✓	✓
• G 2"-A, front-flush[4]	**R04**	✓	✓	✓
Tank connection[5] Sealing is included in delivery				
• TG 52/50, PN 40	**R10**	✓	✓	✓
• TG 52/150, PN 40	**R11**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Sanitary process connection according DIN 11851 (Dairy connection with slotted union nut) Certified to 3A[6]				
• DN 50, PN 25	**N04**	✓	✓	✓
• DN 80, PN 25	**N06**	✓	✓	✓
Tri-Clamp connection according DIN 32676/ISO 2852 Certified to 3A[6]				
• DN 50/2", PN 16	**N14**	✓	✓	✓
• DN 65/3", PN 10	**N15**	✓	✓	✓
Varivent connection Certified to 3A and EHEDG[6]				
• Type N = 68 for Varivent housing DN 40 ... 125 and 1½" ... 6", PN 40	**N28**	✓	✓	✓
Temperature decoupler up to 200 °C[7] for front-flush diaphragm version	**P00**	✓	✓	✓
Temperature decoupler up to 250 °C Measuring cell filling: High-temperature oil (Silicone oil)	**P10**	✓	✓	✓
Bio-Control sanitary process connection Certified to 3A and EHEDG[6]				
• DN 50, PN 16	**Q53**	✓	✓	✓
• DN 65, PN 16	**Q54**	✓	✓	✓
Sanitary process connection to DRD				
• DN 50, PN 40	**M32**	✓	✓	✓
SMS socket with union nut				
• 2"	**M67**	✓	✓	✓
• 2½"	**M68**	✓	✓	✓
• 3"	**M69**	✓	✓	✓
SMS threaded socket				
• 2"	**M73**	✓	✓	✓
• 2½"	**M74**	✓	✓	✓
• 3"	**M75**	✓	✓	✓
IDF socket with union nut ISO 2853				
• 2"	**M82**	✓	✓	✓
• 2½"	**M83**	✓	✓	✓
• 3"	**M84**	✓	✓	✓
IDF threaded socket ISO 2853				
• 2"	**M92**	✓	✓	✓
• 2½"	**M93**	✓	✓	✓
• 3"	**M94**	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect screw connection Certified to 3A and EHEDG[6]				
• DN 50, PN 16	**Q05**	✓	✓	✓
• DN 65, PN 16	**Q06**	✓	✓	✓
• DN 80, PN 16	**Q07**	✓	✓	✓
• DN 100, PN 16	**Q08**	✓	✓	✓
• DN 2", PN 16	**Q13**	✓	✓	✓
• DN 2½", PN 16	**Q14**	✓	✓	✓
• DN 3", PN 16	**Q15**	✓	✓	✓
• DN 4", PN 16	**Q16**	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect flange connection Certified to 3A and EHEDG[6]				
• DN 50, PN 16	**Q23**	✓	✓	✓
• DN 65, PN 16	**Q24**	✓	✓	✓
• DN 80, PN 16	**Q25**	✓	✓	✓
• DN 100, PN 16	**Q26**	✓	✓	✓
• DN 2", PN 16	**Q31**	✓	✓	✓
• DN 2½", PN 16	**Q32**	✓	✓	✓
• DN 3", PN 16	**Q33**	✓	✓	✓
• DN 4", PN 16	**Q34**	✓	✓	✓

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Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Sanitary process connection to NEUMO Bio-Connect clamp connection Certified to 3A and EHEDG[6]				
• DN 50, PN 16	**Q39**	✓	✓	✓
• DN 65, PN 10	**Q40**	✓	✓	✓
• DN 80, PN10	**Q41**	✓	✓	✓
• DN 100, PN 10	**Q42**	✓	✓	✓
• DN 2½", PN 16	**Q48**	✓	✓	✓
• DN 3", PN 10	**Q49**	✓	✓	✓
• DN 4", PN 10	**Q50**	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect S flange connection Certified to 3A and EHEDG				
• DN 2", PN 16	**Q72**	✓	✓	✓
Aseptic threaded socket to DIN 11864-1 Form A Certified to 3A and EHEDG				
• DN 50, PN 25	**N33**	✓	✓	✓
• DN 65, PN 25	**N34**	✓	✓	✓
• DN 80, PN 25	**N35**	✓	✓	✓
• DN 100, PN 25	**N36**	✓	✓	✓
Aseptic flange with notch to DIN 11864-2 Form A Certified to 3A and EHEDG				
• DN 50, PN 16	**N43**	✓	✓	✓
• DN 65, PN 16	**N44**	✓	✓	✓
• DN 80, PN 16	**N45**	✓	✓	✓
• DN 100, PN 16	**N46**	✓	✓	✓
Aseptic flange with groove to DIN 11864-2 Form A Certified to 3A and EHEDG				
• DN 50, PN 16	**N43 + P11**	✓	✓	✓
• DN 65, PN 16	**N44 + P11**	✓	✓	✓
• DN 80, PN 16	**N45 + P11**	✓	✓	✓
• DN 100, PN 16	**N46 + P11**	✓	✓	✓
Aseptic clamp with groove to DIN 11864-3 FormA Certified to 3A and EHEDG				
• DN 50, PN 25	**N53**	✓	✓	✓
• DN 65, PN 25	**N54**	✓	✓	✓
• DN 80, PN 16	**N55**	✓	✓	✓
• DN 100, PN 16	**N56**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Additional data				
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**	✓	✓[8]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART TAG Max. 8 characters, specify in plain text: Y17:	**Y17**	✓		
Setting of the display in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H_2O*), inH_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % *) ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of the display in non-pressure units[9] Specify in plain text: Y22: ..... up to ..... l, m³, m, USg, ... (specification of measuring range in pressure units **"Y01"** is essential, unit with max. 5 characters)	**Y22 + Y01**	✓		
Preset bus address (possible between 1 ... 126) Specify in plain text: Y25:	**Y25**		✓	✓

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22 and Y25 can be factory preset

✓ = available

Ordering example

Item line:	7MF8023-1DB24-1AB7-Z
B line:	A02 + Y01 + Y21
C line:	Y01: 1 ... 10 bar (14.5 ... 145 psi)
C line:	Y21: bar (psi)

1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

3) Special seal in Viton included in the scope of delivery

4) Cannot be combined with Order codes P00 and P10. Can only be ordered with silicone oil measuring cell filling.

5) The weldable socket can be ordered under accessories.

6) 3A certification only if used in conjunction with 3A-compliant sealing rings.

7) Certified to 3A and EHEDG. The maximum permissible temperatures of the medium depend on the respective cell fillings (see medium conditions).

8) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

9) Preset values can only be changed over SIMATIC PDM.

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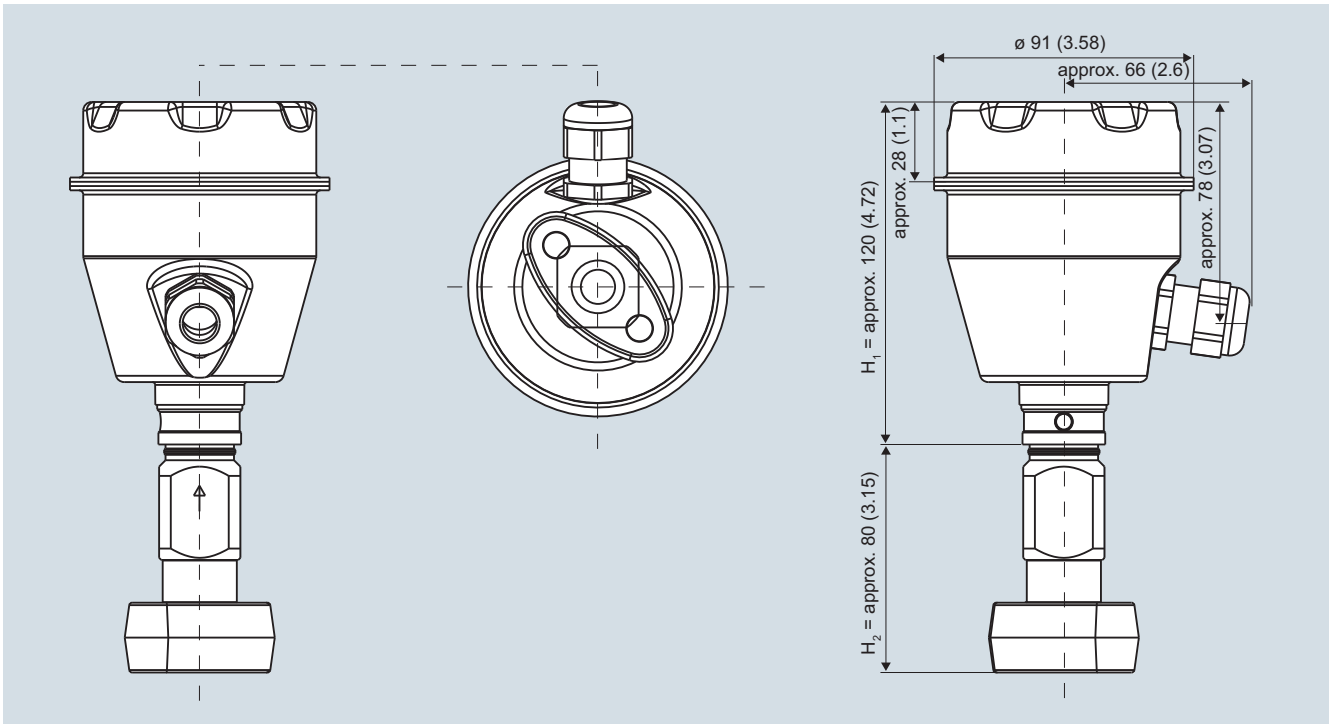
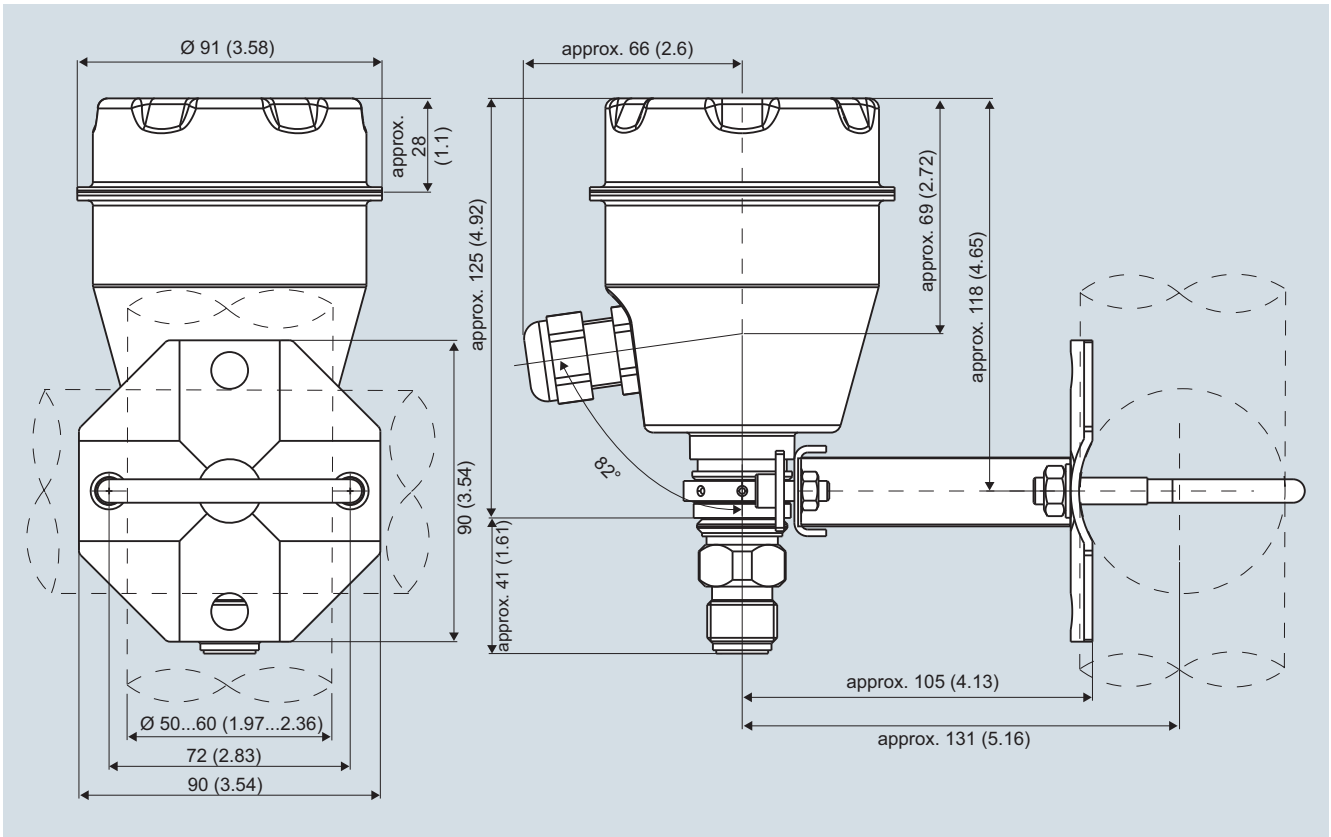
Dimensional drawings



SITRANS P300, with oval flange, dimensions in mm (inch)



SITRANS P300, process connection M20 x 1.5, with mounted mounting bracket, dimensions in mm (inch)

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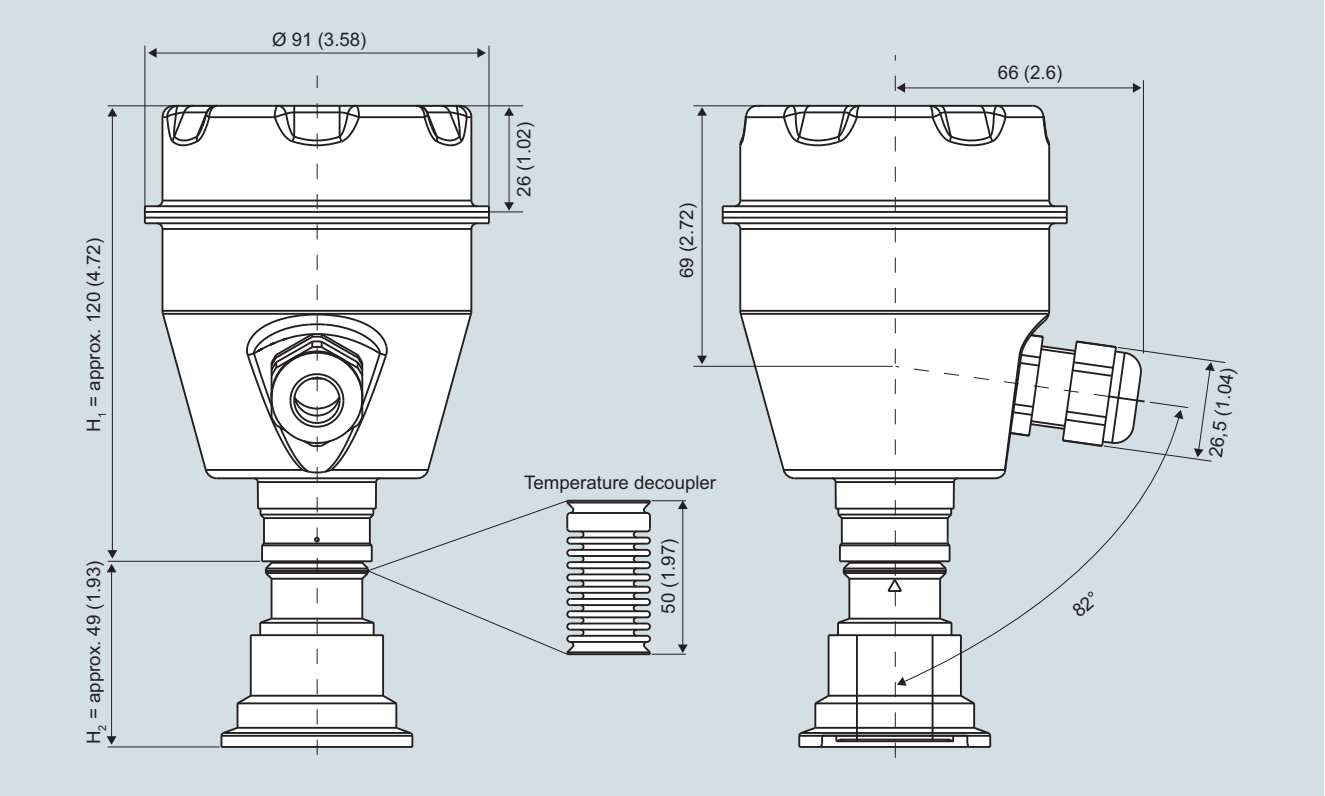

SITRANS P300, front-flush, dimensions in mm (inch)

The diagram shows a SITRANS P300 with an example of a flange. In this drawing the height is subdivided into H_1 and H_2.

H_1 = Height of the SITRANS P300 up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

Only the height H_2 is indicated in the dimensions of the flanges.

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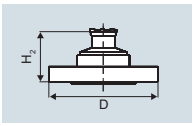
Flanges as per EN and ASME

Flange to EN

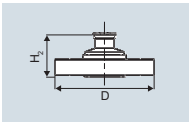
EN 1092-1



Order code	DN	PN	ØD	H_2
M11	25	40	115 mm (4.5“)	Approx. 52 mm (2“)
M21	25	100	140 mm (5.5“)	
M13	40	40	150 mm (5.9“)	
M23	40	100	170 mm (6.7“)	
M04	50	16	165 mm (6.5“)	
M14	50	40	165 mm (6.5“)	
M06	80	16	200 mm (7.9“)	
M16	80	40	200 mm (7.9“)	

Flanges to ASME

ASME B16.5

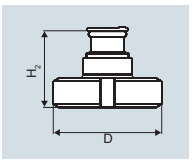


Order code	DN	PN	ØD	H_2
M40	1“	150	110 mm (4.3“)	Approx. 52 mm (2“)
M41	1½“	150	130 mm (5.1“)	
M42	2“	150	150 mm (5.9“)	
M43	3“	150	190 mm (7.5“)	
M44	4“	150	230 mm (9.1“)	
M45	1“	300	125 mm (4.9“)	
M46	1½“	300	155 mm (6.1“)	
M47	2“	300	165 mm (6.5“)	
M48	3“	300	210 mm (8.1“)	
M49	4“	300	255 mm (10.0“)	

NuG and pharmaceutical connections

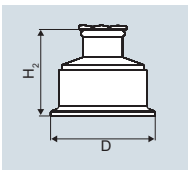
Connections to DIN

DIN 11851 (milk pipe union with slotted union nut)



Order code	DN	PN	ØD	H_2
N04	50	25	92 mm (3.6“)	Approx. 52 mm (2“)
N06	80	25	127 mm (5.0“)	

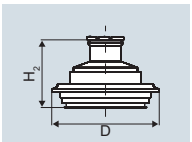
Tri-Clamp nach DIN 32676



Order code	DN	PN	ØD	H_2
N14	50	16	64 mm (2.5“)	Approx. 52 mm (2“)
N15	65	10	91 mm (3.6“)	

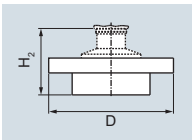
Other connections

Varivent connection



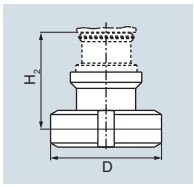
Order code	DN	PN	ØD	H_2
N28	40 ... 125	40	84 mm (3.3“)	Approx. 52 mm (2“)

Sanitary process connection to DRD



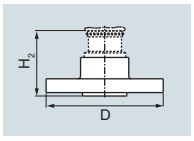
Order code	DN	PN	ØD	H_2
M32	50	40	105 mm (4.1“)	Approx. 52 mm (2“)

Sanitary process screw connection to NEUMO Bio-Connect



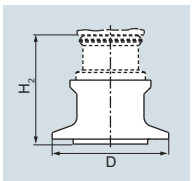
Order code	DN	PN	ØD	H_2
Q05	50	16	82 mm (3.2“)	Approx. 52 mm (2“)
Q06	65	16	105 mm (4.1“)	
Q07	80	16	115 mm (4.5“)	
Q08	100	16	145 mm (5.7“)	
Q13	2“	16	82 mm (3.2“)	
Q14	2½“	16	105 mm (4.1“)	
Q15	3“	16	105 mm (4.1“)	
Q16	4“	16	145 mm (5.7“)	

Sanitary process connection to NEUMO Bio-Connect flange connection



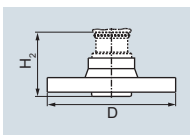
Order code	DN	PN	ØD	H_2
Q23	50	16	110 mm (4.3“)	Approx. 52 mm (2“)
Q24	65	16	140 mm (5.5“)	
Q25	80	16	150 mm (5.9“)	
Q26	100	16	175 mm (6.9“)	
Q31	2“	16	100 mm (3.9“)	
Q32	2½“	16	110 mm (4.3“)	
Q33	3“	16	140 mm (5.5“)	
Q34	4“	16	175 mm (6.9“)	

Sanitary process connection to NEUMO Bio-Connect clamp connection



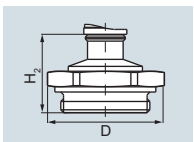
Order code	DN	PN	ØD	H_2
Q39	50	16	77.4 mm (3.0“)	Approx. 52 mm (2“)
Q40	65	10	90.9 mm (3.6“)	
Q41	80	10	106 mm (4.2“)	
Q42	100	10	119 mm (4.7“)	
Q47	2“	16	77.4 mm (3.0“)	
Q48	2½“	16	90.9 mm (3.6“)	
Q49	3“	10	106 mm (4.2“)	
Q50	4“	10	119 mm (4.7“)	

Sanitary process connection to NEUMO Bio-Connect S flange connection



Order code	DN	PN	ØD	H_2
Q72	2“	16	125 mm (4.9“)	Approx. 52 mm (2“)

Threaded connection G¾", G1" and G2" acc. to DIN 3852



Order code	DN	PN	ØD	H_2
R01	¾“	60	37 mm (1.5“)	Approx. 45 mm (1.8“)
R02	1“	60	48 mm (1.9“)	Approx. 47 mm (1.9“)
R04	2“	60	78 mm (3.1“)	Approx. 52 mm (2“)

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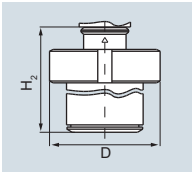
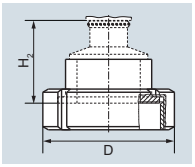
Tank connection TG 52/50 and TG52/150



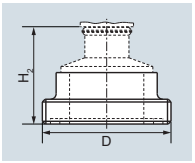
Order code	DN	PN	ØD	H_2
R10	25	40	63 mm (2.5“)	Approx. 63 mm (2.5“)
R11	25	40	63 mm (2.5“)	Approx. 170 mm (6.7“)

SMS socket with union nut



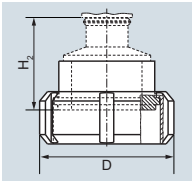
Order code	DN	PN	ØD	H_2
M67	2“	25	84 mm (3.3“)	Approx. 52 mm (2“)
M68	2½“	25	100 mm (3.9“)	
M69	3“	25	114 mm (4.5“)	

SMS threaded socket



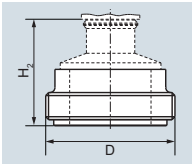
Order code	DN	PN	ØD	H_2
M73	2“	25	70 x 1/6 mm	Approx. 52 mm (2“)
M74	2½“	25	85 x 1/6 mm	
M75	3“	25	98 x 1/6 mm	

IDF socket with union nut



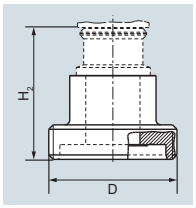
Order code	DN	PN	ØD	H_2
M82	2“	25	77 mm (3“)	Approx. 52 mm (2“)
M83	2½“	25	91 mm (3.6“)	
M84	3“	25	106 mm (4.2“)	

IDF threaded socket



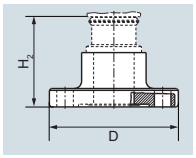
Order code	DN	PN	ØD	H_2
M92	2“	25	64 mm (2.5“)	Approx. 52 mm (2“)
M93	2½“	25	77.5 mm (3.1“)	
M94	3“	25	91 mm (3.6“)	

Aseptic threaded socket to DIN 11864-1 Form A



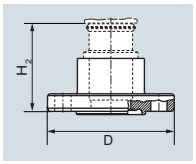
Order code	DN	PN	ØD	H_2
N33	50	25	78 x 1/6“	Approx. 52 mm (2“)
N34	65	25	95 x 1/6“	
N35	80	25	110 x ¼“	
N36	100	25	130 x ¼“	

Aseptic flange with notch to DIN 11864-2 Form A



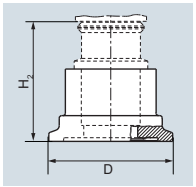
Order code	DN	PN	ØD	H_2
N43	50	16	94	Approx. 52 mm (2“)
N44	65	16	113	
N45	80	16	133	
N46	100	16	159	

Aseptic flange with groove to DIN 11864-2 Form A



Order code	DN	PN	ØD	H_2
N43 + P11	50	16	94	Approx. 52 mm (2“)
N44 + P11	65	16	113	
N45 + P11	80	16	133	
N46 + P11	100	16	159	

Aseptic clamp with groove to DIN 11864-3 Form A



Order code	DN	PN	ØD	H_2
N53	50	25	77.5	Approx. 52 mm (2“)
N54	65	25	91	
N55	80	16	106	
N56	100	16	130	

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Selection and Ordering data	Article No.
Spare parts / Accessories	
Mounting bracket and fastening parts kit made of stainless steel	**7MF8997-1AA**
Lid without window gasket not included	**7MF8997-1BA**
Lid with glass window gasket not included	**7MF8997-1BD**
NBR enclosure sealing	**7MF8997-1BG**
Measuring point label unlabeled	**7MF8997-1CA**
Cable gland	
• metal	**7MF8997-1EA**
• plastic (blue)	**7MF8997-1EB**
Weldable sockets for PMC connection	
• PMC Style Standard: Thread 1½"	**7MF4997-2HA**
• PMC Style Minibolt: front-flush 1"	**7MF4997-2HB**
Gaskets for PMC connection (packing unit = 5 units)	
• PTFE seal for PMC Style Standard: Thread 1½"	**7MF4997-2HC**
• Gasket made of Viton for PMC Style Minibolt: front-flush 1"	**7MF4997-2HD**
Weldable socket for TG 52/50 and TG 52/150 connection	
• TG 52/50 connection	**7MF4997-2HE**
• TG5 2/150 connection	**7MF4997-2HF**
Seals for TG 52/50 and TG 52/150 made of silicone	**7MF4997-2HG**
Seals for flange connection with front-flush diaphragm Material FPM (Viton), 10 units	
• DN 25, PN 40 (M11)	**7MF4997-2HH**
• DN 25, PN 100 (M21)	**7MF4997-2HJ**
• 1", class 150 (M40)	**7MF4997-2HK**
• 1", class 300 (M45)	**7MF4997-2HL**

Selection and Ordering data	Article No.
Operating Instructions[1)]	
• for SITRANS P300 series with HART	
- German	**A5E00359580**
- English	**A5E00359579**
- French	**A5E00359578**
- Spanish	**A5E00359576**
- Italian	**A5E00359577**
- Leporello German/English	**A5E00359581**
• for SITRANS P300 series with PROFIBUS PA	
- German	**A5E00414587**
- English	**A5E00414588**
- French	**A5E00414589**
- Spanish	**A5E00414590**
- Italian	**A5E00414591**
- Leporello German/English	**A5E00414592**
Compact operating instructions	
• English, german, spanish, french, italian, dutch	**A5E03434626**
• English, estonian, latvian, lithuanian, polish, romanian	**A5E03434631**
• English, bulgarian, czech, finnish, slovakian, slovenian	**A5E03434645**
• English, danish, greek, portuguese, swedish, hungarian	**A5E03434656**
• Korean	**A5E03693760**
The compact operating instructions are available in 21 EU languages on the product CD supplied with each transmitter. They can also be downloaded from the SITRANS P web page.	
Brief instructions (Leporello)	
• for SITRANS P300 with HART	
- German/English	**A5E00359581**
• for SITRANS P300 with PROFIBUS PA	
- German/English	**A5E00414592**
• for SITRANS P300 with FOUNDATION Fieldbus	
- German/English	**A5E01176733**
CD with SITRANS P documentation	
• German, English, French, Spanish, Italian including compact operating instructions in 21 EU languages	**A5E00090345**
Certificates (order only via SAP) instead of Internet download	
• hard copy (to order)	**A5E03252406**
• on CD (to order)	**A5E03252407**
HART modem	
with USB interface ▶	**7MF4997-1DB**

▶ Available ex stock

Power supply units see Chap. 7 "Supplementary Components".

[1)] You can download these operating instructions free-of-charge from our Internet site at www.siemens.com/sitransp.

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Overview

The SITRANS P300 transmitter for gauge and absolute pressure can be delivered factory-fitted with the following valve manifolds:

- 7MF9011-4EA and 7MF9011-4FA valve manifolds for gauge pressure and absolute pressure transmitters

Design

The 7MF9011-4EA valve manifolds are sealed with gaskets made of PTFE between transmitter and the valve manifold as standard. Soft iron, stainless steel and copper gaskets are also available for sealing purposes if preferred.

The 7MF9011-4FA valve manifolds are sealed with PTFE sealing tape between the transmitter and the valve manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (87 psi))and is certified leak-proof with a test report to EN 10204 - 2.2.

All valve manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the valve manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of valve manifolds", you will receive a mounting bracket for the valve manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN 10204 when choosing the option "Factory mounting of valve manifolds", a separate certificate is provided for the transmitters and the valve manifolds respectively.

Selection and Ordering data

7MF9011-4FA valve manifold on gauge and absolute pressure transmitters

Add **-Z** to the Article No. of the transmitter and add Order codes	Order code
SITRANS P300 7MF802.-...1.-... With process connection female thread ½-14 NPT in-sealed with PTFE sealing tape Delivery incl. high-pressure test certified by test report to EN 10204-2.2	**T03**
Further designs:	
Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	**A02**
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	**C12**

7MF9011-4EA valve manifold on gauge and absolute pressure transmitters

Add **-Z** to the Article No. of the transmitter and add Order codes	Order code
SITRANS P300 7MF802.-...0.-... with process connection collar G½ A to EN 837-1 with gasket made of PTFE between valve manifold and transmitter	**T02**
Alternative sealing material:	
• Soft iron	**A70**
• Stainless steel, Mat. No. 14571	**A71**
• copper	**A72**
Delivery incl. high-pressure test certified by test report to EN 10204-2.2	
Further designs:	
Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	**A02**
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	**C12**

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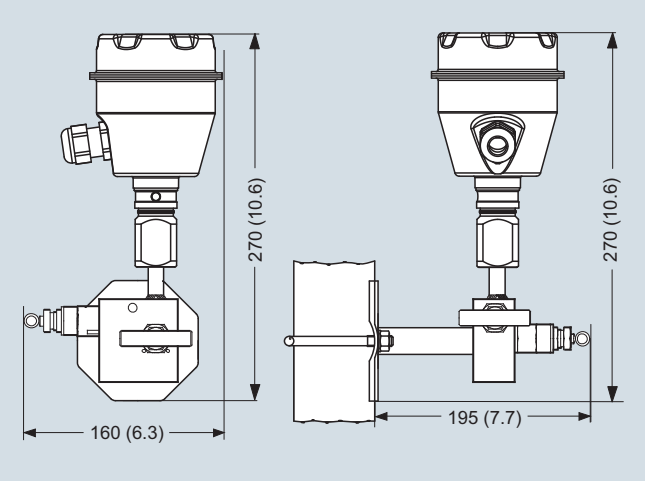
Dimensional drawings

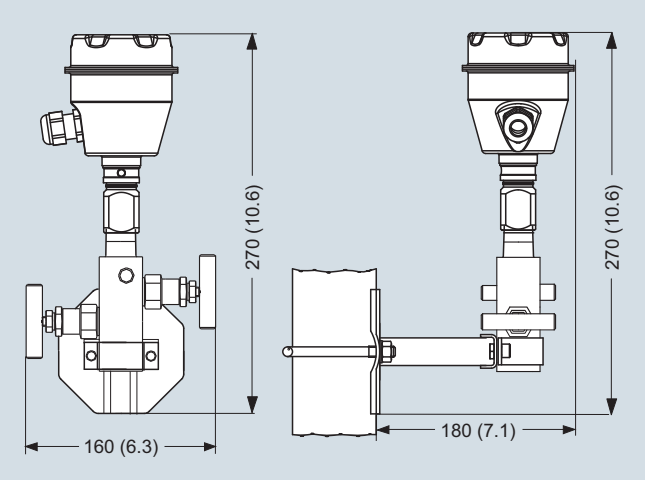
Valve manifolds mounted on SITRANS P300

7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

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Overview

The SITRANS P300 and DS III pressure transmitters have been fitted with special process connections for the paper industry. With the two process connection threads 1½" and 1" flush at the front, the SITRANS P300 and DS III transmitters can be used for all processes in the paper industry.

SITRANS P300 and SITRANS PDS III series pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys via HART, PROFIBUS-PA or FOUNDATION Fieldbus interface.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options.

Transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Various versions of the pressure transmitters are available for measuring:

- Gauge pressure
- Level
- Mass level
- Volume level

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads, e.g. abrasion.
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- Minimum conformity error
- Small long-term drift
- Wetted parts made of Hastelloy
- Infinitely adjustable span from 0.03 bar to 16 bar (0.43 psi to 232 psi) for DS III with HART interface
- Nominal measuring range from 1 bar to 16 bar (14.5 psi to 232 psi) for DS III with PROFIBUS PA and FOUNDATION Fieldbus interface
- Infinitely adjustable span from 0.03 bar to 16 bar (0.43 psi to 232 psi) for SITRANS P300 with HART interface
- Nominal measuring range from 1 bar to 16 bar (14.5 psi to 232 psi) for SITRANS P300 with PROFIBUS PA interface
- High measuring accuracy
- Parameterization over control keys and HART Communication, or over PROFIBUS PA or FOUNDATION Fieldbus interface (DS III only).

Application

The pressure transmitters of the DS III series, can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes the DS III pressure transmitters suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be operated locally over 3 control keys or programmed externally over HART or over PROFIBUS-PA or FOUNDATION Fieldbus interface (only DS III).

SITRANS P, DS III series

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)

For DS III with HART: 0.03 ... 16 bar (0.433 ... 232 psi)

Nominal measuring range

For DS III with PROFIBUS PA or FOUNDATION Fieldbus:
1 ... 16 bar (14.5 ... 232 psi)

SITRANS P300

Span (infinitely adjustable)

For DS III with HART: 0.03 ... 16 bar (0.433 ... 232 psi)

Nominal measuring range

For DS III with PROFIBUS PA or FOUNDATION Fieldbus:
1 ... 16 bar (14.5 ... 232 psi)

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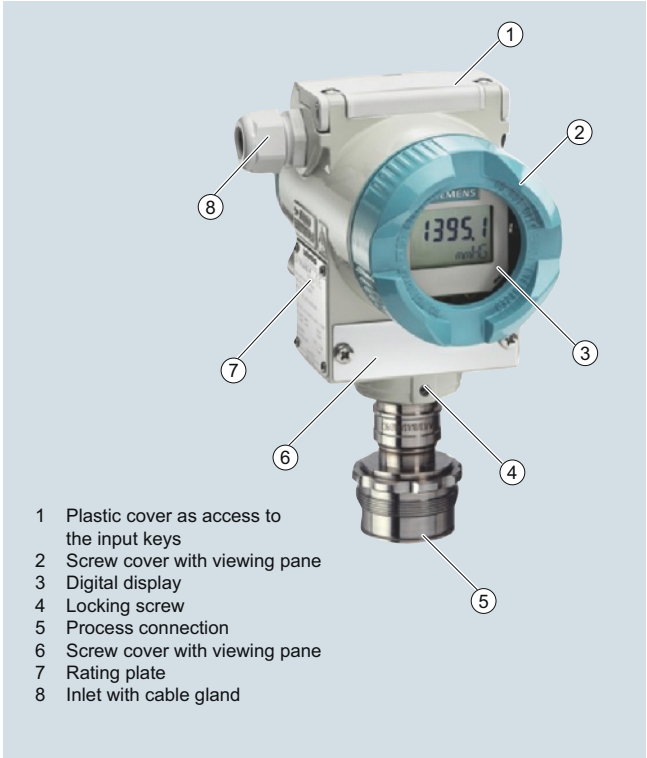
Design

SITRANS P DS III



1 Plastic cover as access to the input keys
2 Screw cover with viewing pane
3 Digital display
4 Locking screw
5 Process connection
6 Screw cover with viewing pane
7 Rating plate
8 Inlet with cable gland

Device front view, SITRANS P DS III

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (7, Figure "Device front view) with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

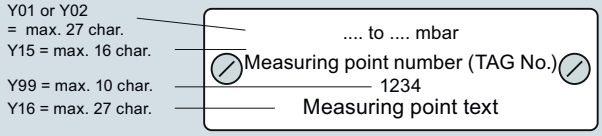
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover is screwed on at the front and rear of the housing. The front cover (2) can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

At the top of the housing is a plastic cover (1), which hides the input keys.

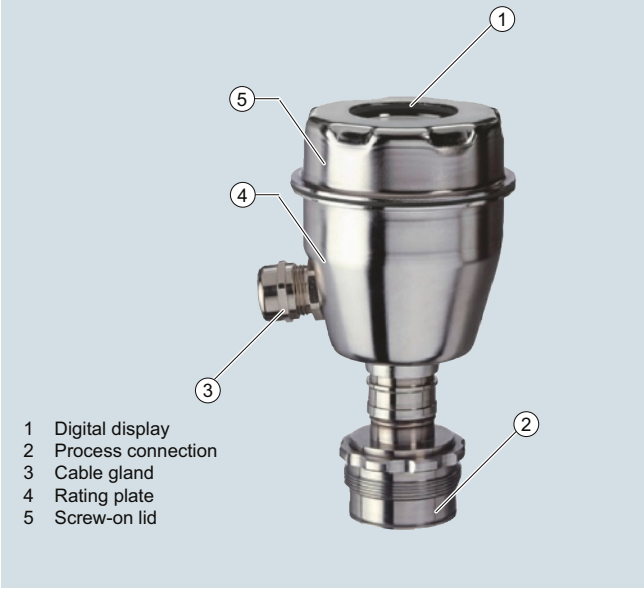
Example for an attached measuring point label



SITRANS P300

The device comprises:

- Electronics
- Housing
- Measuring cell



1 Digital display
2 Process connection
3 Cable gland
4 Rating plate
5 Screw-on lid

Perspective view of the SITRANS P300

The housing has a screw-on lid (5) and, depending on the version, is with or without an inspection window. The electrical terminal housing, the buttons for operation of the device are located under this lid and, depending on the version, the display. The connections for the auxiliary power UH and the shield are in the terminal housing. The cable gland is on the side of the housing. The measuring cell with the process connection (2) is located on the bottom of the housing. The measuring cell with the process connection may differ from the one shown in the diagram, depending on the device version.

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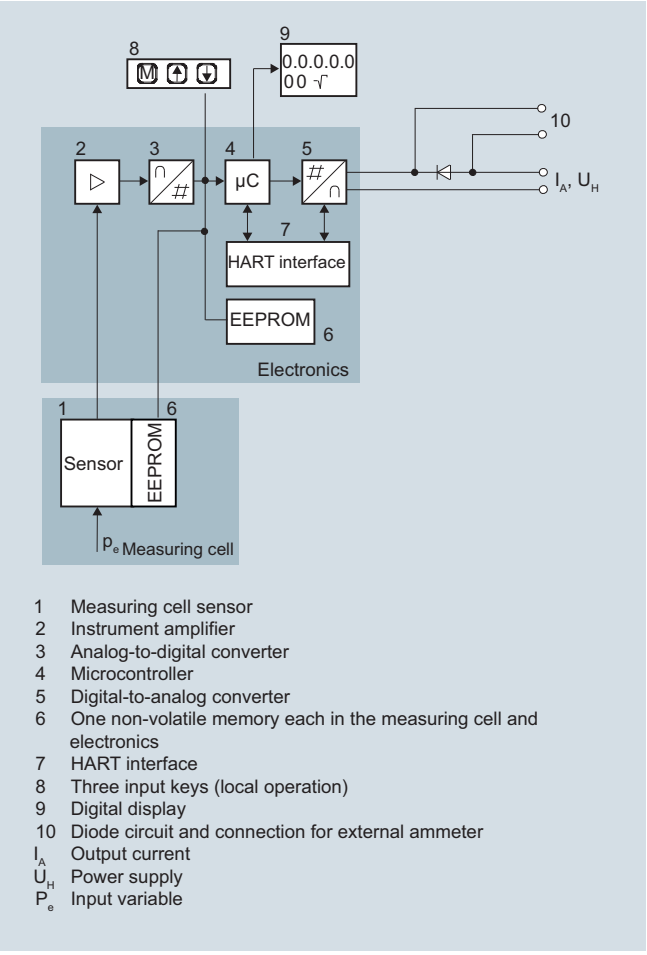
Function

Operation of electronics with HART communication



1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Digital-to-analog converter
6 One non-volatile memory each in the measuring cell and electronics
7 HART interface
8 Three input keys (local operation)
9 Digital display
10 Diode circuit and connection for external ammeter
I_A Output current
U_H Power supply
P_e Input variable

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

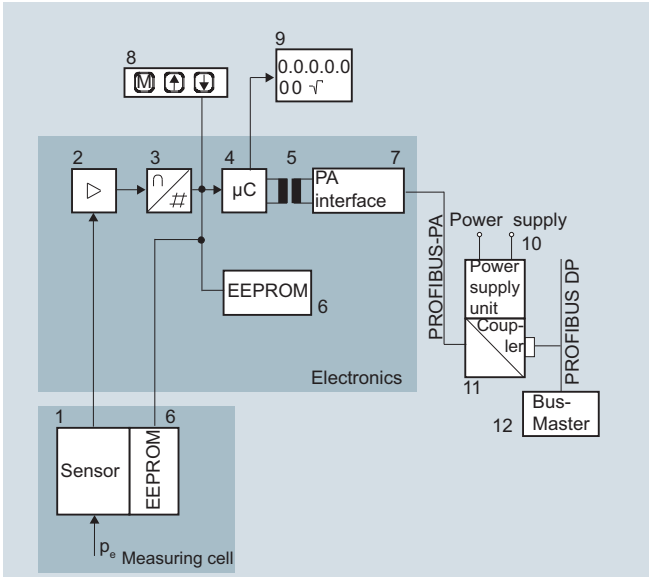
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with spans ≤ 63 bar (914 psi) measure the input pressure compared to atmosphere, the transmitters with spans 160 bar (2320 psi) measure compared to vacuum.

Operation of electronics with PROFIBUS PA communication



1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Electrical isolation
6 One non-volatile memory each in the measuring cell and electronics
7 PROFIBUS-PA interface
8 Three input keys (local operation)
9 Digital display
10 Power supply
11 DP/PA coupler or link
12 Bus master
p_e Input variable

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier(2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the PROFIBUS PA through an electrically isolated PA interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The first memory is linked with the measuring cell, the second with the electronics. This modular design means that the electronics and the measuring cell can be replaced separately from one another.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

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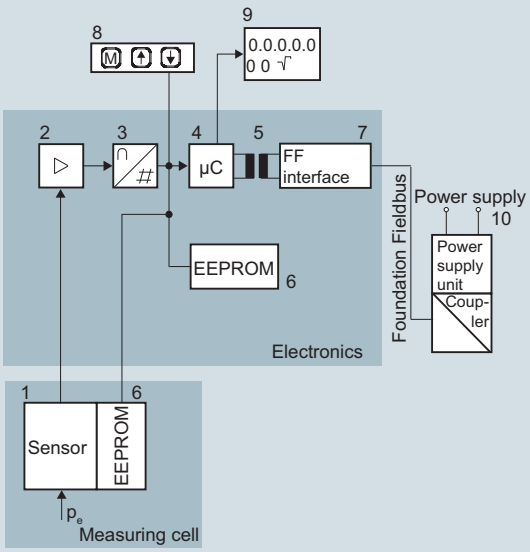
Operation of electronics with FOUNDATION Fieldbus communication



1	Measuring cell sensor	8	Three input keys (local operation)
2	Instrument amplifier	9	Digital display
3	Analog-to-digital converter	10	Power supply
4	Microcontroller		
5	Electrical isolation	p_e	Input variable
6	One non-volatile memory each in the measuring cell and electronics		
7	FF interface		

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

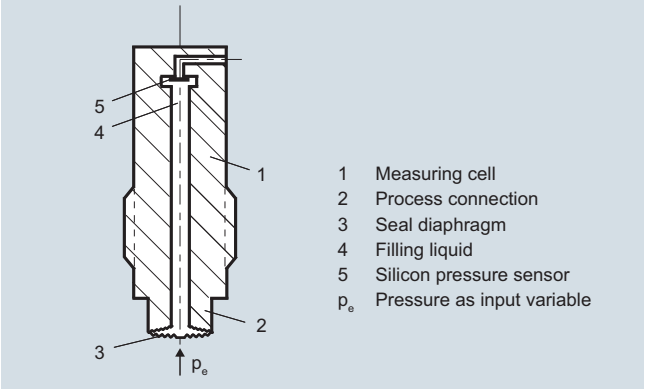
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

Mode of operation of the measuring cell

Measuring cell for gauge pressure with front-flush diaphragm



Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram) to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Parameterization

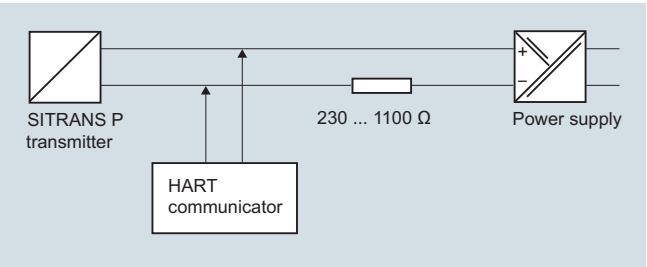
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

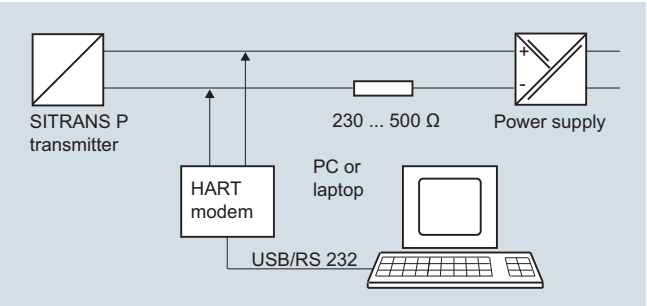
Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

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When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

Adjustable parameter DS III with HART and P300 with HART

Parameters	Input keys	HART communication
Start of scale	x	x
Full-scale value	x	x
Electrical damping	x	x
Start-of-scale value without application of a pressure ("Blind setting")	x	x
Full-scale value without application of a pressure ("Blind setting")	x	x
Zero adjustment	x	x
current transmitter	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x[1)]
Type of dimension and actual dimension	x	x
Characteristic (linear)	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

[1)] Cancel apart from write protection

Diagnostic functions for DS III with HART and P300 with HART

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Slave pointer
- Simulation functions
- Maintenance timer

Available physical units of display for DS III with HART and P300 with HART

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm^2, kg/cm^2, inH_2O, inH_2O (4 °C), mmH_2O, ftH_2O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m^3, dm^3, hl, yd^3, ft^3, in^3, US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. The PROFIBUS connects the DS III PA to a process control system, e.g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the DS III with FOUNDATION Fieldbus is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for DS III with PROFIBUS PA and FOUNDATION Fieldbus, and P300 with PROFIBUS PA and FOUNDATION Fieldbus

Adjustable parameters	Input keys	PROFIBUS PA and FOUNDATION Fieldbus interface
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Buttons and/or function disabling	x	x
Source of measured-value display	x	x
Physical dimension of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

Diagnostic functions for DS III with PROFIBUS PA and FOUNDATION Fieldbus, and P300 with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- Display of zero correction
- Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	MPa, hPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm^2, kg/cm^2, mmH_2O, mmH_2O (4 °C), inH_2O, in$H_2$0 (4 °C), ftH_2O, mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Mass	g, kg, t, lb, Ston, Lton, oz
Volume	m^3, dm^3, hl, yd^3, ft^3, in^3, US gallon, Imp. gallon, bushel, barrel, barrel liquid
Temperature	K, °C, °F, °R
Miscellaneous	%

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Technical specifications

SITRANS P, DS III series for gauge pressure with PMC connection for the paper industry

	HART		PROFIBUS PA and FOUNDATION Fieldbus	
Input				
Measured variable	Gauge pressure			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	0.01 ... 1 bar (0.15 ... 14.5 psi)	6 bar (87 psi)	1 bar (14.5 psi)	6 bar (87 psi)
	0.04 ... 4 bar (0.58 ... 58 psi)	10 bar (145 psi)	4 bar (58 psi)	10 bar (145 psi)
	0.16 ... 16 bar (2.32 ... 232 psi)	32 bar (464 psi)	16 bar (232 psi)	32 bar (464 psi)
Lower measuring limit				
• Measuring cell with silicone oil filling	100 mbar a(1.45 psia)			
Upper measuring limit	100% of max. span			
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		-	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		-	
Load				
• Without HART communication	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V		-	
• With HART communication	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping T_{63} (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)			
	Span ratio r = max. span/set span		Nominal measuring range ratio r = nominal measuring range/set measuring range	
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic				
- r ≤ 10	≤ (0.0029 · r + 0.071) %		≤ (0.0029 · r + 0.071) %	
- 10 < r ≤ 30	≤ (0.0045 · r + 0.071) %		≤ (0.0045 · r + 0.071) %	
- 30 < r ≤ 100	≤ (0.005 · r + 0.05) %		≤ (0.005 · r + 0.05) %	
Long-term stability (temperature change ± 30 °C (± 54 °F))				
1- to 4-bar measuring cell	≤ (0.25 · r) % per 5 years		≤ (0.25 · r) % per 5 years	
16-bar measuring cell	≤ (0.125 · r) % per 5 years		≤ (0.125 · r) % per 5 years	
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.08 · r + 0.1) %[1)]		≤ (0.08 · r + 0.1) %[1)]	
• at -40 ... -10 °C and +60 ... +85 °C (-40 ... +14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K		≤ (0.1 · r + 0.15) %/10 K	
Influence of the medium temperature (only with front-flush diaphragm)				
• Temperature difference between medium temperature and ambient temperature	3 mbar/10 K (1.2 inH_2O/10 K)			
Influence of mounting position	≤ 0.1 mbar (0.04 inH_2O g) per 10° inclination			
Measured Value Resolution	-		$3 \cdot 10^{-5}$ of nominal measuring range	

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SITRANS P, DS III series for gauge pressure with PMC connection for the paper industry	HART	PROFIBUS PA and FOUNDATION Fieldbus
Rated conditions		
Degree of protection to IEC 60529	IP66 (optional IP66/IP68), NEMA 4X	
Temperature of medium	-40 ... +100 °C (-40 ... +212 °F)	
Ambient conditions		
• Ambient temperature	-20 ... +85 °C (-4 ... +185 °F)	
- Transmitter (with 4-wire connection, observe temperature values of supplementary 4-wire electronics)	-40 ... +85 °C (-40 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
• Climatic class		
- Condensation	Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics	
• Electromagnetic Compatibility		
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Design		
Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
• Gasket (standard)	PTFE flat gasket	
• O-ring (minibolt)	FPM (Viton) or optionally: FFPM or NBR	
Measuring cell filling	Silicone oil or inert filling liquid	
Process connection (standard)	Flush-mounted, 1½", PMC Standard design	
Process connection (minibolt)	Flush-mounted, 1", minibolt design	
Power supply U_H		Supplied through bus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)	

[1] Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.064 . r + 0.08) %/28 °C (50 °F).

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SITRANS P DS III with PMC connection

HART communication	
HART communication	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Input /Output
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function

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Selection and Ordering data — Article No.

SITRANS P pressure transmitters for gauge pressure, with PMC connection series DS III with HART ↗ **7MF4133-**

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Measuring cell filling	**Measuring cell-cleaning**	
Silicone oil	normal	1
Inert liquid	grease-free to cleanliness level 2	3
Measuring span (min. ... max.)		
0.01 ... 1 bar[1]	(0.15 ... 14.5 psi)[1]	B
0.04 ... 4 bar	(0.58 ... 58 psi)	C
0.1.6 ... 16 bar	(2.32 ... 232 psi)	D
Wetted parts materials		
Seal diaphragm	Connection shank	
Hastelloy	Stainless steel	B
Process connection		
• PMC Style Standard: Thread 1½"		2
• PMC Style Minibolt: front-flush 1" (not with minimum span: 500 mbar (7.25 psi) - version "B")		3
Non-wetted parts materials		
• Housing made of die-cast aluminium		0
• Housing stainless steel precision casting		3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" [2]		D
- „Ex nA/ic (Zone 2)"[3]		E
• FM + CSA intrinsic safe (is)		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[4]		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)"[3]		N C
Electrical connection / cable entry		
• Female thread M20 x 1.5		B
• Female thread ½-14 NPT		C
• M12 connectors (stainless steel)[5] [6]		F
Display		
• Without display		0
• Without visible display (display concealed, setting: mA)		1
• With visible display (setting: mA)		6
• With customer-specific display (setting as specified, Order code "Y21" required)		7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- sealing ring

1) Only with "PMC Style Standard" process connection
2) Without cable gland, with blanking plug
3) Configurations with M12 connectors are only available in Ex ic.
4) Only in connection with IP65.
5) Only in connection with Ex approval A, B, E or F.
6) M12 delivered without cable socket

Selection and Ordering data — Article No.

SITRANS P pressure transmitter for gauge pressure, with PMC connection

DS III with PROFIBUS PA (PA) ↗ **7MF4134-**

DS III with FOUNDATION Fieldbus (FF) ↗ **7MF4135-**

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Inert liquid	grease-free to cleanliness level 2	3
Nominal measuring range		
1 bar[1]	(14.5 psi)[1]	B
4 bar	(58 psi)	C
16 bar	(232 psi)	D
Wetted parts materials		
Seal diaphragm	Connection shank	
Hastelloy	Stainless steel	B
Process connection[2]		
• PMC Style Standard: Thread 1½"		2
• PMC Style Minibolt: front-flush 1" (minimum span: 500 mbar (7.25 psi), not available with 1-bar-measuring cell (Option B))		3
Non-wetted parts materials		
• Housing made of die-cast aluminium		0
• Housing stainless steel precision casting		3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" [3]		D
- „Ex nA/ic (Zone 2)"[4]		E
• FM + CSA intrinsic safe (is)		F
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)"[3]		N C
Electrical connection / cable entry		
• Female thread M20 x 1.5		B
• Female thread ½-14 NPT		C
• M12 connectors (stainless steel)[5] [6]		F
Display		
• Without display		0
• Without visible display (display concealed, setting: bar)		1
• With visible display (setting: bar)		6
• With customer-specific display (setting as specified, Order code "Y21" required)		7

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- sealing ring

1) Only with "PMC Style Standard"process connection
2) Sealing is included in delivery.
3) Without cable gland, with blanking plug
4) Configurations with M12 connectors are only available in Ex ic.
5) Only in connection with Ex approval A, B, E or F.
6) M12 delivered without cable socket

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Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Plug				
• Angled	**A32**	✓		
• Han 8D (metal, gray)	**A33**	✓		
M12 cable sockets (metal (CuZn))	**A50**	✓	✓	✓
Rating plate inscription (instead of German)				
• English	**B11**	✓	✓	✓
• French	**B12**	✓	✓	✓
• Spanish	**B13**	✓	✓	✓
• Italian	**B14**	✓	✓	✓
• Cyrillic (russian)	**B16**	✓	✓	✓
English rating plate Pressure units in inH_20 and/or psi	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	**C14**	✓	✓	✓
"Functional safety (SIL2)" certificate acc. to IEC 61508	**C20**	✓		
"Functional safety (SIL2/3)" certificate acc. to IEC 61508	**C23**	✓		
Device passport Russia (For price request please contact the technical support www.siemens.com/automation/support-request)	**C99**	✓	✓	✓
Output signal can be set to upper limit of 22.0mA	**D05**	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Export approval Korea	**E11**	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-.B..)	**E55**[1]	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-.D..)	**E56**[1]	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.E..)	**E57**[1]	✓	✓	✓
Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.R..)	**E58**[1]	✓	✓	✓
Mounting				
• Weldable sockets for standard 1½" threaded connection	**P01**	✓	✓	✓
• Weldable socket for minibolt connection 1" (incl. screw 5/16-18 UNC-2B and washer)	**P02**	✓	✓	✓

[1] Option does not include ATEX approval, but instead includes only the country-specific approval.

Selection and Ordering data	Order code	HART	PA	FF
Additional data				
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**	✓	✓[1]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	**Y17**	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H_2O*), inH_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % *) ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of pressure indication in non-pressure units[2] Specify in plain text: Y22: ..... up to ..... l, m³, m, USg, ... (specification of measuring range in pressure units **"Y01"** is essential, unit with max. 5 characters)	**Y22 + Y01**	✓		
Preset bus address possible between 1 and 126 Max. 8 characters, specify in plain text: Y25:	**Y25**		✓	✓

Only "Y01" and "Y21" can be factory preset

✓ = available

ordering example

Item line:	7MF4133-1DB20-1AB7-Z
B line:	C11 + Y01 + Y21
C line:	Y01: 1 ... 10 bar (14.5 ... 145 psi)
C line:	Y21: bar (psi)

[1] Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

[2] Preset values can only be changed over SIMATIC PDM.

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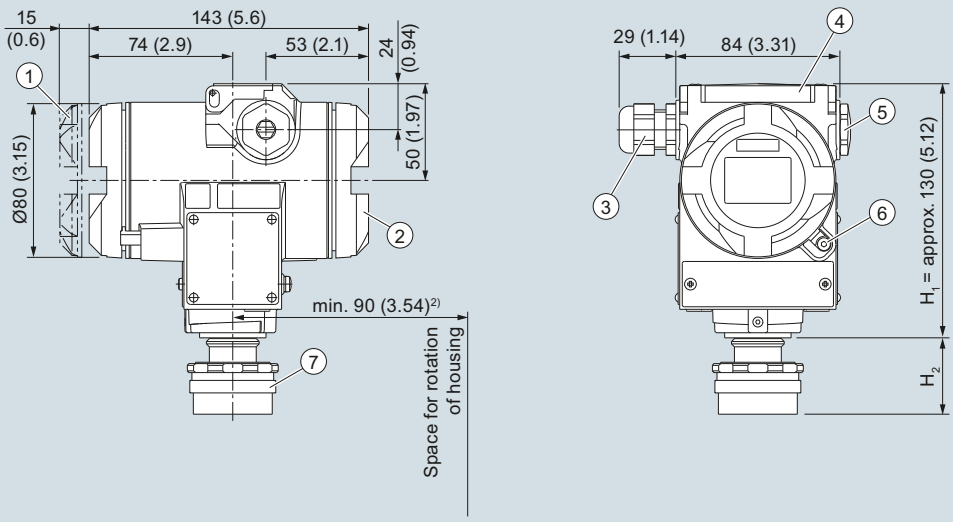
Dimensional drawings



1. Electronic side, digital display (longer overall length for cover with window)[1]
2. Terminal side[1]
3. Electrical connection: Screwed gland M20 x 1,5 or screwed gland ½-14 NPT or M12 conector
4. Protective cover over keys
5. Blanking plug
6. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
7. Process connection: PMC standard

[1] Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
[2] 92 mm (3.6 inch) for minimum distance to permit rotation with indicator

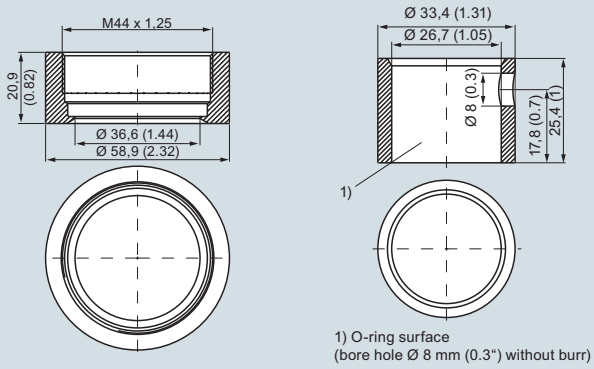
SITRANS P DS III pressure transmitters for gauge pressure, with PMC connection, dimensions in mm (inch)

The diagram shows a SITRANS P DS III with an example of a flange. In this drawing the height is subdivided into H_1 and H_2.

H_1 = Height of the SITRANS P DS III up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

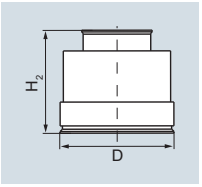
Only the height H_2 is indicated in the dimensions of the flanges.



PMC Style Standard (left) and PMC Style Minibolt (right) weldable sockets, dimensions in mm (inch)

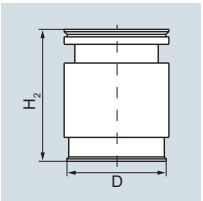
Material: Stainless steel, Mat. No. 1.4404/316L

PMC Style standard



DN	PN	ØD	H_2
		40.9 mm (1.6")	approx. 36.8 mm (1.4")

PMC Style minibolt



DN	PN	ØD	H_2
		26.3 mm (1.0")	approx. 33.1 mm (1.3")

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Technical specifications

SITRANS P300 for gauge pressure with PMC connection for the paper industry

	HART		PROFIBUS PA and FOUNDATION Fieldbus	
Input				
Measured variable	Gauge pressure (front-flush)			
Spans (infinitely adjustable) or nominal measuring range and max. pemissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	0.01 ... 1 bar (0.15 ... 14.5 psi)	6 bar (87 psi)	1 bar (14.5 psi)	6 bar (87 psi)
	0.04 ... 4 bar (0.58 ... 58 psi)	10 bar (145 psi)	4 bar (58 psi)	10 bar (145 psi)
	0.16 ... 16 bar (2.3 ... 232 psi)	32 bar (464 psi)	16 bar (232 psi)	32 bar (464 psi)
	Depending on the process connection, the span may differ from these values		Depending on the process connection, the nominal measuring range may differ from these values	
Lower measuring limit				
• Measuring cell with silicone oil	100 mbar a (1.45 psia)			
Upper measuring limit				
• Measuring cell with silicone oil	100 % of max. span		100 % of the max. nominal measuring range	
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA signal	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data always refer to the set span)	RIncreasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, measuring cell with silicone oil, room temperature 25 °C (77 °F)			
	Span ratio r = max. span/set span		Nominal measuring range ratio r = nominal measuring range/set measuring range	
Error in measurement at limit setting incl. hysteresis and reproducibility				
Linear characteristic				
• r + 10	≤ (0.0029 · r + 0.071) %		≤ (0.0029 · r + 0.071) %	
• 10 < r ≤ 30	≤ (0.0045 · r + 0.071) %		≤ (0.0045 · r + 0.071) %	
• 30 < r ≤ 100	≤ (0.005 · r + 0.05) %		≤ (0.005 · r + 0.05) %	
Step response time T_{63}	approx. 2 s			
Long-term stability at ± 30 °C (± 54 °F)	≤ (0.25 · r) %/5 years		≤ (0.25 · r) %/5 years	
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.1 · r + 0.2) %[1)]		≤ (0.1 · r + 0.2) %[1)]	
• at -40 ... -10 °C and 60 ... 85 °C (-40 ... 14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K		≤ (0.1 · r + 0.15) %/10 K	
Influence of the medium temperature (only with front-flush diaphragm)				
• Temperature difference between medium temperature and ambient temperature	3 mbar/10 K (1.2 inH_2O/10 K)			
Rated conditions				
Installation conditions				
Ambient temperature	Observe the temperature class in areas subject to explosion hazard.			
• Measuring cell with silicone oil	-40 ... +85 °C (-40 ... +185 °F)			
• Display readable	-30 ... +85 °C (-22 ... +185 °F)			
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)			
Climatic class				
Condensation	Relative humidity 0 ... 100 %. Condensation permissible, suitable for use in the tropics			
Degree of protection acc. to EN 60529	IP65, IP68, NEMA 4X, enclosure cleaning, resistant to lyes, steam to 150 °C (302 °F)			
Electromagnetic Compatibility				
• Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21			

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SITRANS P300 for gauge pressure with PMC connection for the paper industry		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Medium conditions		
Temperature of medium		
• Measuring cell with silicone oil	-40 ... +100 °C (-40 ... +212 °F)	
Design		
Weight (without options)	Approx. 1 kg (2.2 lb)	
Enclosure material	Stainless steel, mat. no. 1.4301/304	
Material of parts in contact with the medium		
• Seal diaphragm	Hastelloy C276, mat. no. 2.4819	
• Measuring cell filling	Silicone oil	
Surface quality touched-by-media	Ra-values ≤ 0.8 µm (32 µ inch)/welds Ra ≤ 1.6 µm (64 µ inch)	
Power supply U_H		
Terminal voltage on transmitter	10.5 ... 42 V DC for intrinsically safe operation: 10.5 ... 30 V DC	Supplied through bus
Separate power supply	-	Not necessary
Bus voltage		
• Without Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Max. basic current	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. fault current in the event of a fault	-	15.5 mA
Fault disconnection electronics (FDE)	-	Available
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of Article 3, paragraph 3 (sound engineering practice)	
Explosion protection		
Intrinsic safety "i"	PTB 05 ATEX 2048	
Marking	Ex II 1/2 G Ex ia/ib IIB/IIC T4, T5, T6	
Permissible ambient temperature		
• Temperature class T4	-40 ... +85 °C (-40 ... +185 °F)	
• Temperature class T5	-40 ... +70 °C (-40 ... +158 °F)	
• Temperature class T6	-40 ... +60 °C (-40 ... +140 °F)	
Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω	To certified intrinsically-safe circuits with peak values: FISCO supply unit: U_i = 17.5 V, I_i = 380 mA, P_i = 5.32 W Linear barrier: U_i = 24 V, I_i = 250 mA, P_i = 1.2 W
Effective inner capacitance:	C_i = 6 nF	C_i = 1.1 nF
Effective internal inductance:	L_i = 0.4 mH	L_i ≤ 7 µH
Explosion protection to FM for USA and Canada (cFM_{US})		
• Identification (DIP) or (IS); (NI)	Certificate of Compliance 3025099 CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	
• Identification (DIP) or (IS)	Certificate of Compliance 3025099C CL I, DIV 1, GP ABCD T4 ... T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC 4 ... T6; CL I, DIV 2, GP ABCD T4 ... T6; CL II, DIV 2, GP FG; CL III	

1) Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.08 . r + 0.16) % / 28 °C (50 °F).

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SITRANS P300 with PMC connection

HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool Local operation (standard setting Address 126)
Cyclic data usage	
• Output byte	One measured value: 5 bytes Two measured values: 10 bytes
• Input byte	Register operating mode: 1 bytes Reset function due to metering. 1 bytes
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Linearly rising or falling characteristic
- Electrical damping	0 ... 100 s adjustable
- Simulation function	Input /Output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset and preset Optional direction of counting Simulation function of the register output
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 31 nodes
- Characteristic curve	Linear
- Simulation function	Available
• Transducer block "Electronic temperature"	
Simulation function	Available

FOUNDATION Fieldbus communication	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function

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Selection and Ordering data		Article No.
SITRANS P300 pressure transmitters with PMC connection, single-chamber measuring housing, rating plate inscription in English		
with 4 ... 20 mA / HART	↗	**7MF8123-**
with PROFIBUS PA	↗	**7MF8124-**
with FOUNDATION Fieldbus (FF)	↗	**7MF8125-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Inert liquid	Cleanliness level 2 to DIN 25410	3
Measuring span		
1 bar[1]	(14.5 psi)	B
4 bar	(58 psi)	C
16 bar	(232 psi)	D
Wetted parts materials		
Seal diaphragm	Measuring cell	
Hastelloy	Stainless steel	B
Process connection		
• PMC Style Standard: Thread 1½"		2
• PMC Style Minibolt: front-flush 1" (minimum span: 500 mbar (7.25 psi), not available with 1-bar-measuring cell (Option B))		3
Non-wetted parts materials		
• Stainless steel, deep-drawn and electrolytically polished		4
Version		
• Standard versions		1
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
• Zone 20/21/22[2]		C
• Ex nA/nL (Zone 2)[3]		E
• With FM + CSA, Type of protection:		
- "Intrinsic Safe (is)" (planned)		M
Electrical connection/cable entry		
• Screwed gland M20 x .5 (polyamide)[4]		A
• Screwed gland M20 x 1.5 (metal)		B
• Screwed gland M20 x 1.5 (stainless steel)		C
• M12 connectors (without cable socket)		F
• M12 connectors (stainless steel), without cable socket)		G
• ½-14 NPT metal thread[5]		H
• ½-14 NPT stainless steel thread[5]		J

Selection and Ordering data	Article No.
SITRANS P300 pressure transmitters with PMC connection, single-chamber measuring housing, rating plate inscription in English	
with 4 ... 20 mA / HART	**7MF8123-**
with PROFIBUS PA	**7MF8124-**
with FOUNDATION Fieldbus (FF)	**7MF8125-**
Display	
• Without display, with keys, closed lid	1
• With display and keys, closed lid [6]	2
• With display and keys, lid with Makrolon pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure units)[6]	4
• With display and keys (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with Makrolon pane[6]	5
• With display and keys, lid with glass pane (setting on HART devices: mA, with PROFIBUS PA and FOUNDATION Fieldbus equipment: pressure unit)[6]	6
• With display (setting acc. to specifications, Order code "Y21" or "Y22" required), lid with glass panel[6]	7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- sealing ring

1) Only with "Standard" process connection
2) Not in conjunction with electrical connection option A.
3) Only available together with electrical connection options B, C or G.
4) Only together with HART electronics.
5) Without cable gland.
6) Display cannot be turned.

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SITRANS P300 with PMC connection

Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Cable socket for M12 plug				
• Stainless steel	**A51**		✓	✓
Rating plate inscription (instead of English)				
• German	**B10**	✓	✓	✓
• French	**B12**	✓	✓	✓
• Spanish	**B13**	✓	✓	✓
• Italian	**B14**	✓	✓	✓
English rating plate Pressure units in inH_20 and/or psi	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	**C14**	✓	✓	✓
Set output signal to upper limit of 22.0mA	**D05**	✓	✓	✓
Degree of protection IP65/IP68 (only for M20x1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Mounting				
• Weldable sockets for standard 1½" threaded connection	**P01**	✓	✓	✓
• Weldable socket for minibolt connection 1" (incl. screw 5/16-18 UNC-2B and washer)	**P02**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Additional data				
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**	✓	✓[1]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 char., specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 char., specify in plain text: Y17:	**Y17**	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm $H_2O^{*)}$, in$H_2O^{*)}$, ft$H_2O^{*)}$, mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % *) ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of pressure indication in non-pressure units[2] Specify in plain text: Y22: ..... up to ..... l, m³, m, USg, ... (specification of measuring range in pressure units "**Y01**" is essential, unit with max. 5 characters)	**Y22 + Y01**	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	**Y25**		✓	✓

Only "Y01" and "Y21" can be factory preset

✓ = available

[1] Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

[2] Preset values can only be changed over SIMATIC PDM.

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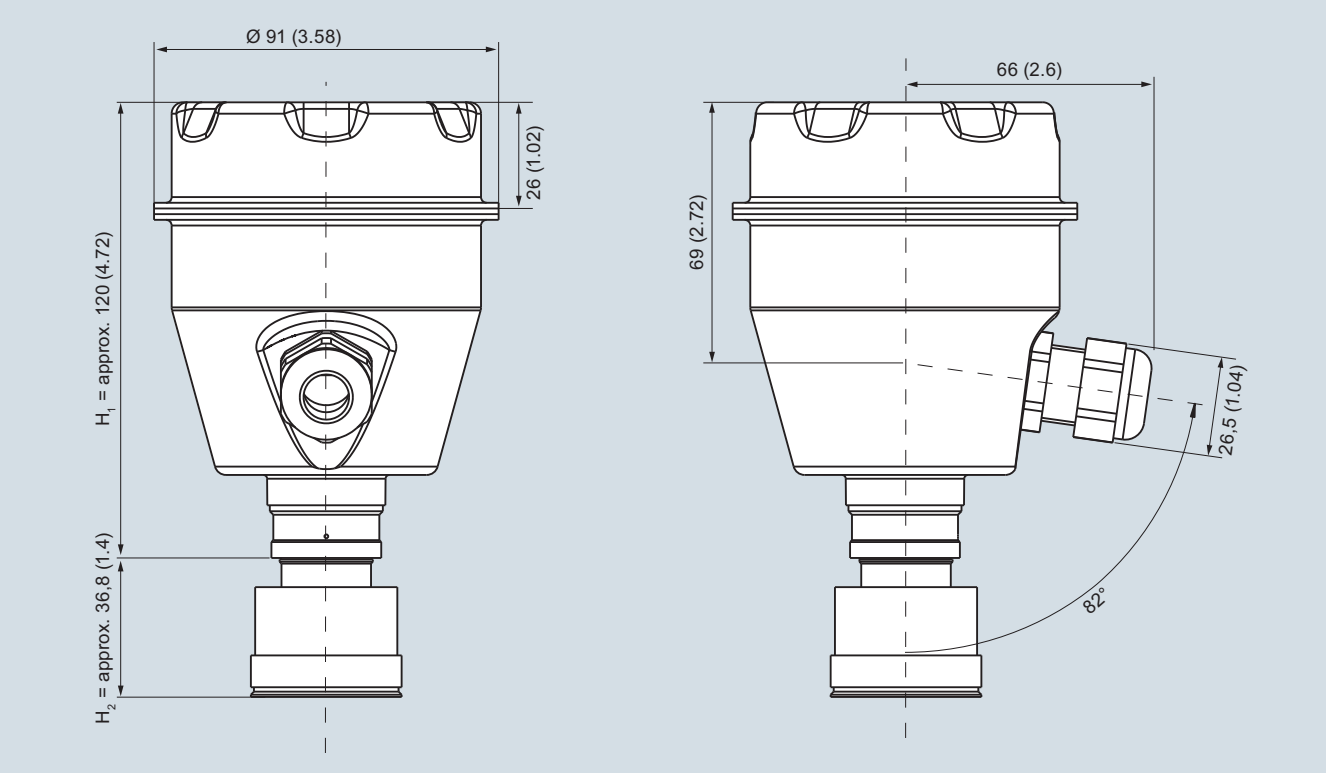
Dimensional drawings



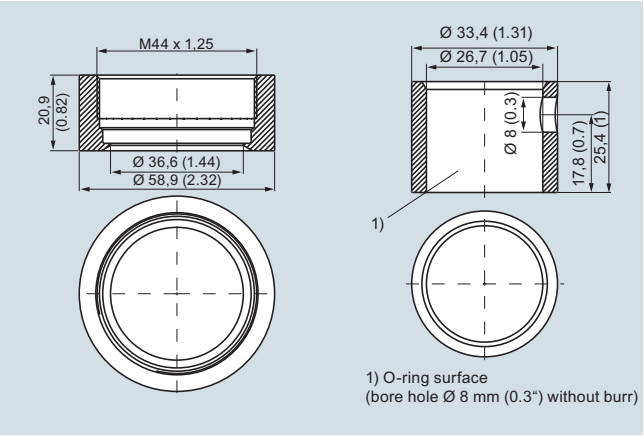
SITRANS P300 pressure transmitters for gauge pressure, with PMC connection, dimensions in mm (inch)

The diagram shows a SITRANS P300 with an example of a flange. In this drawing the height is subdivided into H_1 and H_2.

H_1 = Height of the SITRANS P300 up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

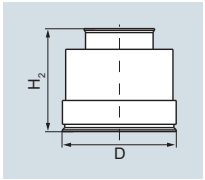
Only the height H_2 is indicated in the dimensions of the flanges.



PMC Style Standard (left) and PMC Style Minibolt (right) weldable sockets, dimensions in mm (inch)

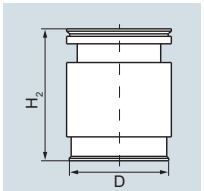
Material: Stainless steel, mat. No. 1.4404 / 316L

PMC Style Standard



DN	PN	ØD	H_2
		40.4 mm (1.6")	Approx. 36.8 mm (1.4")

PMC Style Mini bolt



DN	PN	ØD	H_2
		26.3 mm (1.0")	Approx. 33.1 mm (1.3")

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Overview

SITRANS P DS III pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and high accuracy. The parameterization is performed using control keys or via HART, PROFIBUS-PA or FOUNDATION Fieldbus interface.

Extensive functionality enables the pressure transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options.

Transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

Various versions of the DS III pressure transmitters are available for measuring:

- Gauge pressure
- Absolute pressure
- Differential pressure
- Level
- Volume level
- Mass level
- Volume flow
- Mass flow

Benefits

- High quality and service life
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions
- Separate replacement of measuring cell and electronics without recalibration
- Minimum conformity error
- Good long-term stability
- Wetted parts made of high-grade materials (e.g. stainless steel, Hastelloy, gold, Monel, tantalum)
- Infinitely adjustable span from 0.01 bar to 700 bar (0.15 psi to 10153 psi) for DS III with HART interface
- Nominal measuring range from 1 bar to 700 bar (14.5 psi to 10153 psi) for DS III with PROFIBUS PA and FOUNDATION Fieldbus interface
- High measuring accuracy
- Parameterization over control keys and HART or PROFIBUS PA, or FOUNDATION Fieldbus interface.

Application

The pressure transmitters of the DS III series, can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes the DS III pressure transmitters suitable for locations with high electromagnetic emissions.

Pressure transmitters with type of protection "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitters are provided with an EC type examination certificate and comply with the corresponding harmonized European standards (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous substances.

The pressure transmitter can be programmed locally using the 3 control buttons or externally via HART or PROFIBUS PA or FOUNDATION Fieldbus interface.

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Pressure transmitter for gauge pressure

Measured variable: Gauge pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)
for DS III with HART: 0.01 bar to 700 bar (0.15 psi to 10153 psi)

Nominal measuring range
for DS III with PROFIBUS PA and FOUNDATION Fieldbus:
1 bar to 700 bar (14.5 psi to 10153 psi)

Pressure transmitters for absolute pressure

Measured variable: Absolute pressure of aggressive and non-aggressive gases, vapors and liquids.

Span (infinitely adjustable)
for DS III with HART: 8.3 mbar a ... 100 bar a (0.12 ... 1450 psia)

Nominal measuring range
for DS III with PROFIBUS PA and FOUNDATION Fieldbus:
250 mbar a ... 100 bar a (3.6 ... 1450 psia)

There are two series:

- Gauge pressure series
- Differential pressure series

Pressure transmitters for differential pressure and flow

Measured variables:

- Differential pressure
- Small positive or negative pressure
- Flow $q \sim \sqrt{\Delta p}$ (together with a primary differential pressure device (see Chapter "Flow Meters"))

Span (infinitely adjustable)
for DS III with HART: 1 mbar ... 30 bar (0.0145 ... 435 psi)

Nominal measuring range
for DS III with PROFIBUS PA and FOUNDATION Fieldbus:
20 mbar ... 30 bar (0.29 ... 435 psi)

Pressure transmitters for level

Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.

Span (infinitely adjustable)
for DS III with HART: 25 mbar ... 5 bar (0.363 ... 72.5 psi)

Nominal measuring range
for DS III with PROFIBUS PA and FOUNDATION Fieldbus:
250 mbar ... 5 bar (3.63 ... 72.5 psi)

Nominal diameter of the mounting flange

- DN 80 or DN 100
- 3 inch or 4 inch

In the case of level measurements in open containers, the low-pressure connection of the measuring cell remains open (measurement "compared to atmospheric").

In the case of measurements in closed containers, the lower-pressure connection has to be connected to the container in order to compensate the static pressure.

The wetted parts are made from a variety of materials, depending on the degree of corrosion resistance required.

Design

Front view

The transmitter consists of various components depending on the order. The possible versions are listed in the ordering information. The components described below are the same for all transmitters.

The rating plate (7, Figure "Front view") with the Article No. is located on the side of the housing. The specified number together with the ordering information provide details on the optional design details and on the possible measuring range (physical properties of built-in sensor element).

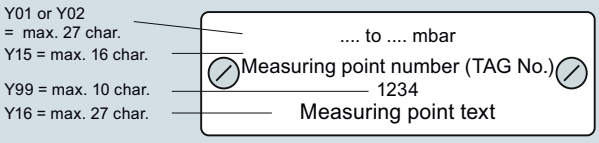
The approval label is located on the opposite side.

The housing is made of die-cast aluminium or stainless steel precision casting. A round cover (6) is screwed on at the front and rear of the housing. The front cover can be fitted with a viewing pane so that the measured values can be read directly on the display. The inlet (8) for the electrical connection is located either on the left or right side. The unused opening on the opposite side is sealed by a blanking plug. The protective earth connection is located on the rear of the housing.

The electrical connections for the power supply and screen are accessible by unscrewing the rear cover. The bottom part of the housing contains the measuring cell with process connection (5). The measuring cell is prevented from rotating by a locking screw (4). As the result of this modular design, the measuring cell and the electronics can be replaced separately from each other. The set parameter data are retained.

At the top of the housing is a plastic cover (1), which hides the input keys.

Example for an attached measuring point label



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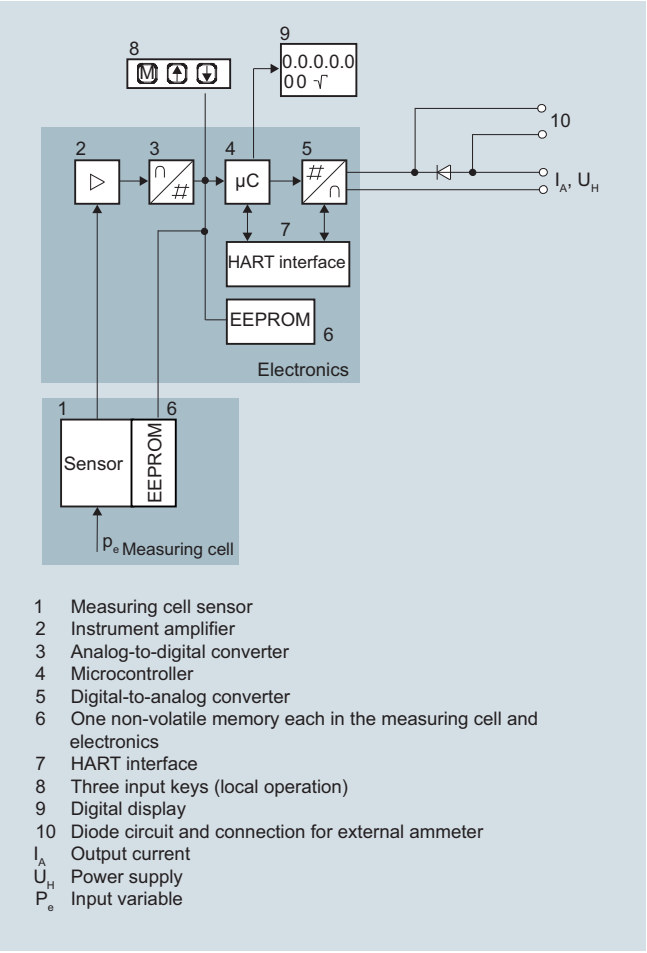
Function

Operation of electronics with HART communication



1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Digital-to-analog converter
6 One non-volatile memory each in the measuring cell and electronics
7 HART interface
8 Three input keys (local operation)
9 Digital display
10 Diode circuit and connection for external ammeter
I_A Output current
U_H Power supply
P_e Input variable

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in a microcontroller, its linearity and temperature response corrected, and converted in a digital-to-analog converter (5) into an output current of 4 to 20 mA.

The diode circuit (10) protects against incorrect polarity.

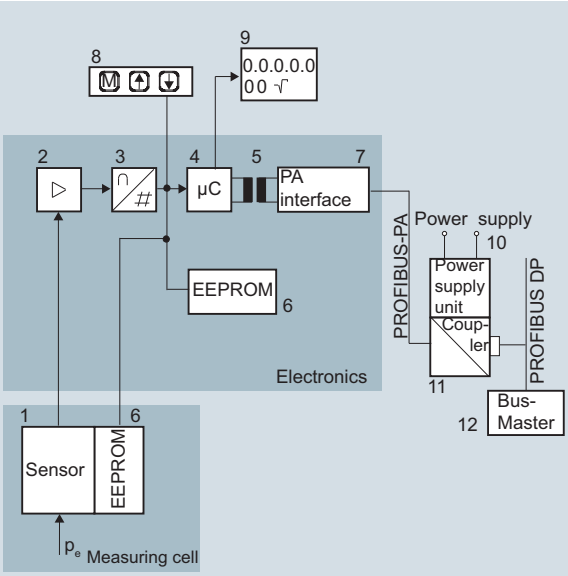
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the 3 input keys (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The HART modem (7) permits parameterization using a protocol according to the HART specification.

The pressure transmitters with spans ≤ 63 bar measure the input pressure compared to atmosphere, transmitters with spans ≥ 160 bar compared to vacuum.

Operation of electronics with PROFIBUS PA communication



1 Measuring cell sensor
2 Instrument amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Electrical isolation
6 One non-volatile memory each in the measuring cell and electronics
7 PROFIBUS-PA interface
8 Three input keys (local operation)
9 Digital display
10 Power supply
11 DP/PA coupler or link
12 Bus master
p_e Input variable

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of the electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the PROFIBUS PA through an electrically isolated PA interface (7).

The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the PROFIBUS PA. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as SIMATIC PDM is required for this.

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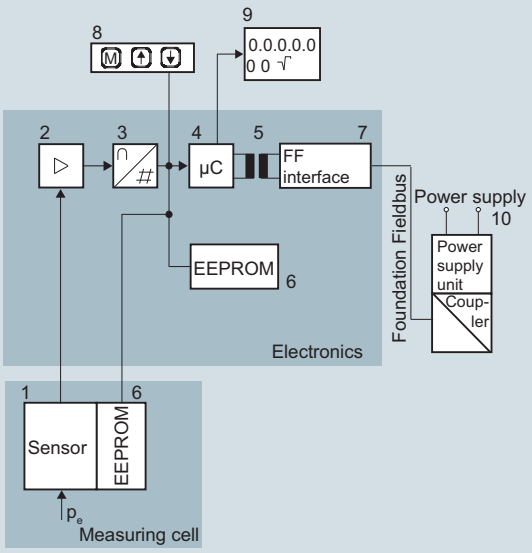
Operation of electronics with FOUNDATION Fieldbus communication



1	Measuring cell sensor	8	Three input keys (local operation)
2	Instrument amplifier	9	Digital display
3	Analog-to-digital converter	10	Power supply
4	Microcontroller		
5	Electrical isolation	p_e	Input variable
6	One non-volatile memory each in the measuring cell and electronics		
7	FF interface		

Function diagram of electronics

The bridge output voltage created by the sensor (1, Figure "Function diagram of electronics") is amplified by the measuring amplifier (2) and digitized in the analog-to-digital converter (3). The digital information is evaluated in the microcontroller, its linearity and temperature response corrected, and provided on the FOUNDATION Fieldbus through an electrically isolated FOUNDATION Fieldbus interface (7).

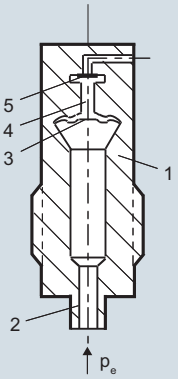
The data specific to the measuring cell, the electronics data, and the parameter data are stored in the two non-volatile memories (6). The one memory is coupled to the measuring cell, the other to the electronics. As the result of this modular design, the electronics and the measuring cell can be replaced separately from each other.

Using the three input buttons (8) you can parameterize the pressure transmitter directly at the measuring point. The input buttons can also be used to control the view of the results, the error messages and the operating modes on the display (9).

The results with status values and diagnostic values are transferred by cyclic data transmission on the FOUNDATION Fieldbus. Parameterization data and error messages are transferred by acyclic data transmission. Special software such as National Instruments Configurator is required for this.

Mode of operation of the measuring cells

Measuring cell for gauge pressure

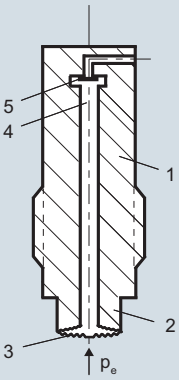


1	Measuring cell
2	Process connection
3	Seal diaphragm
4	Filling liquid
5	Silicon pressure sensor
p_e	Pressure as input variable

Measuring cell for gauge pressure, function diagram

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, function diagram) to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Measuring cell for gauge pressure with front-flush diaphragm



1	Measuring cell
2	Process connection
3	Seal diaphragm
4	Filling liquid
5	Silicon pressure sensor
p_e	Pressure as input variable

Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram

The pressure p_e is applied through the process connection (2, Figure "Measuring cell for gauge pressure, with front-flush diaphragm for paper industry, function diagram") to the measuring cell (1). This pressure is subsequently transmitted further through the seal diaphragm (3) and the filling liquid (4) to the silicon pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

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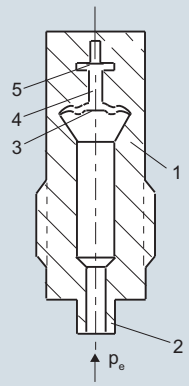
Measuring cell for absolute pressure from gauge pressure series

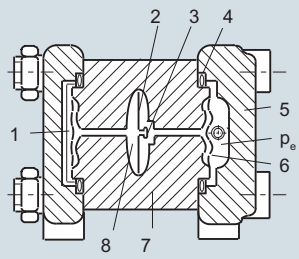


1 Measuring cell
2 Process connection
3 Seal diaphragm
4 Filling liquid
5 Silicon absolute pressure sensor
p_e Absolute pressure as input variable

Measuring cell for absolute pressure from the pressure series, function diagram

The absolute pressure p_e is transmitted through the seal diaphragm (3, Figure "Measuring cell for absolute pressure from pressure series, gauge pressure, function diagram ") and the filling liquid (4) to the silicon absolute pressure sensor (5) whose measuring diaphragm is then flexed. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

Measuring cell for absolute pressure from differential pressure series



1 Reference vacuum
2 Overload diaphragm
3 Silicon pressure sensor
4 O-ring
5 Process flange
6 Seal diaphragm
7 Body of measuring cell
8 Filling liquid
p_e Absolute pressure as input variable

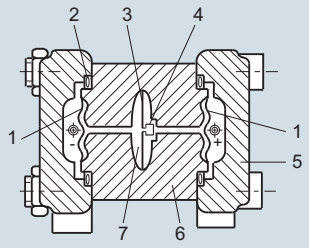
Measuring cell for absolute pressure from differential pressure series, function diagram

The input pressure p_e is transmitted through the seal diaphragm (6, Figure "Measuring cell for absolute pressure from differential pressure series, function diagram") and the filling liquid (8) to the silicon pressure sensor (3).

The difference in pressure between the input pressure p_e and the reference vacuum (1) on the low-pressure side of the measuring cell flexes the measuring diaphragm. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (2) is flexed until the seal diaphragm rests on the body of the measuring cell (7), thus protecting the silicon pressure sensor from overloads.

Measuring cell for differential pressure and flow



1 Seal diaphragm
2 O-ring
3 Overload diaphragm
4 Silicon pressure sensor
5 Process flange
6 Body of measuring cell
7 Filling liquid

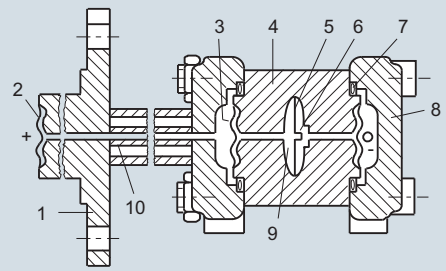
Measuring cell for differential pressure and flow, function diagram

The differential pressure is transmitted through the seal diaphragms (1, Figure "Measuring cell for differential pressure and flow, function diagram") and the filling liquid (7) to the silicon pressure sensor (4).

The measuring diaphragm is flexed by the applied differential pressure. This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit. This change in resistance results in a bridge output voltage proportional to the absolute pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (3) is flexed until the seal diaphragm rests on the body of the measuring cell (6), thus protecting the silicon pressure sensor from overloads.

Measuring cell for level



1 Flange with tube
2 Seal diaphragm on mounting flange
3 Seal diaphragm
4 Body of measuring cell
5 Overload diaphragm
6 Silicon pressure sensor
7 O-ring
8 Process flange
9 Filling liquid
10 Capillary with filling liquid of mounting flange

Measuring cell for level, function diagram

The input pressure (hydrostatic pressure) acts hydraulically on the measuring cell through the seal diaphragm on the mounting flange (2, Figure "Measuring cell for level, function diagram"). This differential pressure is subsequently transmitted further through the measuring cell (3) and the filling liquid (9) to the silicon pressure sensor (6) whose measuring diaphragm is then flexed.

This changes the resistance of the four piezo-resistors fitted in the diaphragm in a bridge circuit.

This change in resistance results in a bridge output voltage proportional to the differential pressure.

An overload diaphragm is installed to provide protection from overloads. If the measuring limits are exceeded, the overload diaphragm (5) is flexed until the seal diaphragm rests on the body of the measuring cell (4), thus protecting the silicon pressure sensor from overloads.

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Parameterization DS III

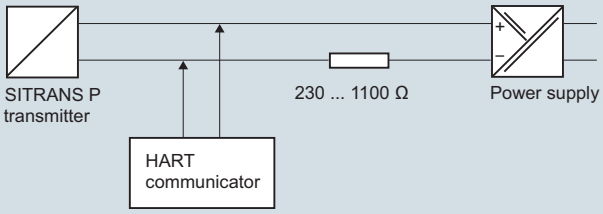
Depending on the version, there are a range of options for parameterizing the pressure transmitter and for setting or scanning the parameters.

Parameterization using the input buttons (local operation)

With the input buttons you can easily set the most important parameters without any additional equipment.

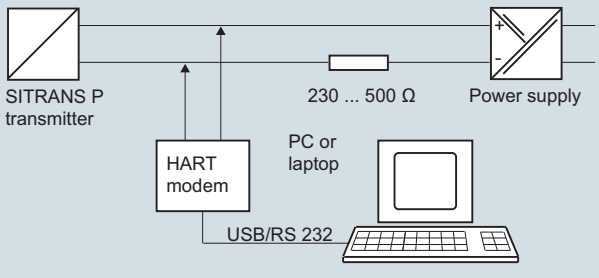
Parameterization using HART

Parameterization using HART is performed with a HART Communicator or a PC.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

When parameterizing with a PC, the connection is made through a HART modem.

The signals needed for communication in conformity with the HART 5.x or 6.x protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

Adjustable parameters, DS III with HART

Parameters	Input keys (DS III HART)	HART communication
Start of scale	x	x
Full-scale value	x	x
Electrical damping	x	x
Start-of-scale value without application of a pressure ("Blind setting")	x	x
Full-scale value without application of a pressure ("Blind setting")	x	x
Zero adjustment	x	x
current transmitter	x	x
Fault current	x	x
Disabling of buttons, write protection	x	x[1)]
Type of dimension and actual dimension	x	x
Characteristic (linear / square-rooted)	x[2)]	x[2)]
Input of characteristic		x
Freely-programmable LCD		x
Diagnostic functions		x

1) Cancel apart from write protection
2) Only differential pressure

Diagnostic functions for DS III with HART

- Zero correction display
- Event counter
- Limit transmitter
- Saturation alarm
- Slave pointer
- Simulation functions
- Maintenance timer

Available physical units of display for DS III with HART

Table style: Technical specifications 2

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm^2, kg/cm^2, inH_2O, inH_2O (4 °C), mmH_2O, ftH_2O (20 °C), inHg, mmHg
Level (height data)	m, cm, mm, ft, in
Volume	m^3, dm^3, hl, yd^3, ft^3, in^3, US gallon, Imp. gallon, bushel, barrel, barrel liquid
Mass	g, kg, t, lb, Ston, Lton, oz
volume flow	m^3/d, m^3/h, m^3/s, l/min, l/s, ft^3/d, ft^3/min, ft^3/s, US gallon/min, US gallon/s
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/d, g/h, g/min, g/s, lb/d, lb/h, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

Parameterization through PROFIBUS PA interface

Fully digital communication through PROFIBUS PA, profile 3.0, is particularly user-friendly. Through the PROFIBUS the DS III with PROFIBUS PA is connected to a process control system, e. g. SIMATIC PSC 7. Communication is possible even in a potentially explosive environment.

For parameterization through PROFIBUS you need suitable software, e.g. SIMATIC PDM (Process Device Manager).

Parameterization through FOUNDATION Fieldbus interface

Fully digital communication through FOUNDATION Fieldbus is particularly user-friendly. Through the FOUNDATION Fieldbus the DS III with FOUNDATION Fieldbus is connected to a process control system. Communication is possible even in a potentially explosive environment.

For parameterization through the FOUNDATION Fieldbus you need suitable software, e.g. National Instruments Configurator.

Adjustable parameters for DS III with PROFIBUS PA and FOUNDATION Fieldbus

Parameters	Input keys	PROFIBUS PA and FOUNDATION Fieldbus interface
Electrical damping	x	x
Zero adjustment (correction of position)	x	x
Buttons and/or function disabling	x	x
Source of measured-value display	x	x
Physical dimension of display	x	x
Position of decimal point	x	x
Bus address	x	x
Adjustment of characteristic	x	x
Input of characteristic		x
Freely-programmable LCD		x
Diagnostics functions		x

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Diagnostic functions for DS III with PROFIBUS PA and FOUNDATION Fieldbus

- Event counter
- Slave pointer
- Maintenance timer
- Simulation functions
- Display of zero correction
- Limit transmitter
- Saturation alarm

Physical dimensions available for the display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	MPa, kPa, Pa, bar, mbar, torr, atm, psi, g/cm^2, kg/cm^2, mmH_2O, mmH_2O (4 °C), inH_2O, in$H_2$0 (4 °C), ftH_2O (20 °C), mmHg, inHg
Level (height data)	m, cm, mm, ft, in, yd
Volume	m^3, dm^3, hl, yd^3, ft^3, in^3, US gallon, Imp. gallon, bushel, barrel, barrel liquid
volume flow	m^3/s, m^3/min, m^3/h, m^3/d, l/s, l/min, l/h, l/d, Ml/d, ft^3/s, ft^3/min, ft^3/h, ft^3/d, US gallon/s, US gallon/min, US gallon/h, US gallon/d, bbl/s, bbl/min, bbl/h, bbl/d
Mass flow	g/s, g/min, g/h, g/d, kg/s, kg/min, kg/h, kg/d, t/s, t/min, t/h, /t/d, lb/s, lb/min, lb/h, lb/d, STon/s, STon/min, STon/h, STon/d, LTon/s, LTon/min, LTon/h, LTon/d
Total mass flow	t, kg, g, lb, oz, LTon, STon
Temperature	K, °C, °F, °R
Miscellaneous	%

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Technical specifications

SITRANS P, DS III series for gauge pressure

	HART		PROFIBUS PA and FOUNDATION Fieldbus	
Input				
Measured variable	Gauge pressure			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	0.01 ... 1 bar (0.15 ... 14.5 psi)	6 bar (87 psi)	1 bar (14.5 psi)	6 bar (87 psi)
	0.04 ... 4 bar (0.58 ... 58 psi)	10 bar (145 psi)	4 bar (58 psi)	10 bar (145 psi)
	0.16 ... 16 bar (2.32 ... 232 psi)	32 bar (464 psi)	16 bar (232 psi)	32 bar (464 psi)
	0.6 ... 63 bar (9.14 ... 914 psi)	100 bar (1450 psi)	63 bar (914 psi)	100 bar (1450 psi)
	1.6 ... 160 bar (23.2 ... 2320 psi)	250 bar (3626 psi)	160 bar (2320 psi)	250 bar (3626 psi)
	4.0 ... 400 bar (58 ... 5802 psi)	600 bar (8700 psi)	400 bar (5802 psi)	600 bar (8700 psi)
	7.0 ... 700 bar (102 ... 10153 psi)	800 bar (11603 psi)	700 bar (10153 psi)	800 bar (11603 psi)
Lower measuring limit				
• Measuring cell with silicone oil filling	30 mbar a (0.44 psia)			
• Measuring cell with inert filling liquid	30 mbar a (0.44 psia)			
Upper measuring limit	100 % of max. span (for oxygen version and inert filling liquid; max. 120 bar (1740 psi))			
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		-	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		-	
Load				
• Without HART	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V		-	
• With HART	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)			
	Span ratio r = max. span/set span		Nominal measuring range ratio r = nominal measuring range/set measuring range	
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic				
- r ≤ 10	≤ (0.0029 · r + 0.071) %		≤ (0.0029 · r + 0.071) %	
- 10 < r ≤ 30	≤ (0.0045 · r + 0.071) %		≤ (0.0045 · r + 0.071) %	
- 30 < r ≤ 100	≤ (0.005 · r + 0.05) %		≤ (0.005 · r + 0.05) %	
Long-term stability (temp.erature change ± 30 °C (± 54 °F))				
• 1 ... 4-bar measuring cell	≤ (0.25 · r) % per 5 years		≤ (0.25 · r) % per 5 years	
• 16 ... 700-bar measuring cell	≤ (0.125 · r) % per 5 years		≤ (0.125 · r) % per 5 years	
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.08 · r + 0.1) %[1] (at 700 bar: ≤ (0.1 · r + 0.2) %[2])		≤ (0.08 · r + 0.1) %[1] (at 700 bar: ≤ (0.1 · r + 0.2) %[2])	
• at -40 ... -10 °C and +60 ... +85 °C (-40 ... +14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K		≤ (0.1 · r + 0.15) %/10 K	
Measured Value Resolution	-		$3 \cdot 10^{-5}$ of nominal measuring range	

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SITRANS P, DS III series for gauge pressure	HART	PROFIBUS PA and FOUNDATION Fieldbus
Rated conditions		
Degree of protection (to EN 60529)	IP66 (optional IP66/IP68), NEMA 4X	
Temperature of medium		
• Measuring cell with silicone oil filling	-40 ... +100 °C (-40 ... +212 °F)	
• Measuring cell with inert filling liquid	-20 ... +100 °C (-4 ... +212 °F)	
• In conjunction with dust explosion protection	-20 ... +60 °C (-4 ... +140 °F)	
Ambient conditions		
• Ambient temperature		
- Transmitter (with 4-wire connection, observe temperature values of supplementary 4-wire electronics)	-40 ... +85 °C (-40 ... +185 °F)	
- Display readable	-30 ... +85 °C (-22 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
• Climatic class		
- Condensation	Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics	
• Electromagnetic Compatibility		
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Design		
Weight (without options)	Die-cast aluminum: ≈ 2.0 kg (≈ 4.4 lb) Stainless steel precision casting: ≈ 4.6 kg (≈ 10.1 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
• Connection shank	Stainless steel, mat. no. 1.4404/316L or Hastelloy C4, mat. no. 2.4610	
• Oval flange	Stainless steel, mat. no. 1.4404/316L	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819	
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))	
Process connection	Connection shank G½B to DIN EN 837-1, female thread ½ -14 NPT or oval flange (PN 160 (MAWP 2320 psi)) to DIN 19213 with mounting thread M10 or $^{7}/_{16}$-20 UNF to EN 61518	
Material of mounting bracket		
Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated	
Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS 304)	
Power supply U_H		Supplied through bus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

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SITRANS P, DS III series for gauge pressure	**HART**	**PROFIBUS PA and FOUNDATION Fieldbus**
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)	
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 174 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC	To circuits with values: U_H = 9 ... 32 V DC
• Dust explosion protection for zone 20	PTB 01 ATEX 2055	
- Marking	Ex II 1 D IP65 T 120 °C Ex II 1/2 D IP65 T 120 °C	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Dust explosion protection for zone 21/22	PTB 01 ATEX 2055	
- Marking	Ex II 2 D IP65 T 120 °C	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 W	To circuits with values: U_H = 9 ... 32 V DC; P_{max} = 1 W
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Connection (Ex nA)	U_m = 45 V	U_m = 32 V
- Connections (Ex ic)	To circuits with values: U_i = 45 V	FISCO supply unit ic: U_o = 17.5 V, I_o = 570 mA Linear barrier: U_o = 32 V, I_o = 132 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion protection acc. to FM	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	
• Explosion protection to CSA	Certificate of Compliance 1153651	
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	

1) Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.064 . r + 0.08) % / 28 °C (50 °F).

2) Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.08 . r + 0.16) % / 28 °C (50 °F).

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HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Input /Output
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function

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Selection and Ordering data			Article No.
Pressure transmitter for gauge pressure, SITRANS P DS III with HART		↗	7MF4033 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	**Measuring cell cleaning**		
Silicone oil	normal	▶⬟	1
Inert liquid[1]	grease-free to cleanliness level 2		3
Measuring span (min. ... max.)			
0.01 ... 1 bar	(0.15 ... 14.5 psi)	▶⬟	B
0.04 ... 4 bar	(0.58 ... 58 psi)	▶⬟	C
0.16 ... 16 bar	(2.32 ... 232 psi)	▶⬟	D
0.63 ... 63 bar	(9.14 ... 914 psi)	▶⬟	E
1.6 ... 160 bar	(23.2 ... 2320 psi)	▶⬟	F
4.0 ... 400 bar	(58.0 ... 5802 psi)	▶⬟	G
7.0 ... 700 bar	(102.0 ...10153 psi)	▶	J
Wetted parts materials			
Seal diaphragm	Process connection		
Stainless steel	Stainless steel	▶⬟	A
Hastelloy	Stainless steel		B
Hastelloy	Hastelloy		C
Version as diaphragm seal [2) 3) 4) 5)]			Y
Process connection			
• Connection shank G½B to EN 837-1		▶⬟	0
• Female thread ½-14 NPT		⬟	1
• Stainless steel oval flange with process connection (Oval flange has no female thread)			
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518			2
- Mounting thread M10 to DIN 19213			3
- Mounting thread M12 to DIN 19213			4
• Male thread M20 x 1.5			5
• Male thread ½ -14 NPT			6
Non-wetted parts materials			
• Housing made of die-cast aluminium		▶⬟	0
• Housing stainless steel precision casting[6)]			3
Version			
• Standard versions		⬟	1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		▶⬟	2
Explosion protection			
• None		⬟	A
• With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"		⬟	B
- "Explosion-proof (Ex d)"[7)]		⬟	D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[8)]		⬟	P
- "Ex nA/ic (Zone 2)"[9)]		⬟	E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"[8)10)]		▶⬟	R
• FM + CSA intrinsic safe (is)			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[10)]			S
• With FM + CSA, Type of protection:			
- "Intrinsic Safe and Explosion Proof (is + xp)"[7)]		⬟	N C
Electrical connection / cable entry			
• Screwed gland Pg 13.5 (adapter)[11)]			A
• Screwed gland M20 x1 .5		▶⬟	B
• Screwed gland ½-14 NPT		⬟	C
• Han 7D plug (plastic housing) incl. mating connector[11)]			D
• M12 connectors (stainless steel)[11)12)]			F

Selection and Ordering data		Article No.
Pressure transmitter for gauge pressure, SITRANS P DS III with HART		7MF4033 -
Display		
• Without display	⬟	0
• Without visible display (display concealed, setting: mA)	▶⬟	1
• With visible display (setting: mA)	⬟	6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	⬟	7

▶ Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation

1) For oxygen application, add Order code E10.

2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

3) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403.-..Y..-.... and 7MF4900-1...-.B

5) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.

6) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".

7) Without cable gland, with blanking plug

8) With enclosed cable gland Ex ia and blanking plug

9) Configurations with HAN and M12 connectors are only available in Ex ic.

10) Only in connection with IP65.

11) Only in connection with Ex approval A, B or E.

12) M12 delivered without cable socket

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Selection and Ordering data		Article No.
Pressure transmitter for gauge pressure		
SITRANS P DS III with PROFIBUS PA (PA)	↗	**7MF4034 -**
SITRANS P DS III with FOUNDATION Fieldbus (FF)	↗	**7MF4035 -**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		■■■■ - ■■■■
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	**1**
Inert liquid[1]	grease-free to cleanliness level 2	**3**
Nominal measuring range		
1 bar	(14.5 psi)	**B**
4 bar	(58 psi)	**C**
16 bar	(232 psi)	**D**
63 bar	(914 psi)	**E**
160 bar	(2320 psi)	**F**
400 bar	(5802 psi)	**G**
700 bar	(10153 psi)	**J**
Wetted parts materials		
Seal diaphragm	Process connection	
Stainless steel	Stainless steel	**A**
Hastelloy	Stainless steel	**B**
Hastelloy	Hastelloy	**C**
Version as diaphragm seal [2) 3) 4) 5)]		**Y**
Process connection		
• Connection shank G½B to EN 837-1		**0**
• Female thread ½-14 NPT		**1**
• Stainless steel oval flange with process connection (Oval flange has no female thread) [6)]		
- Mounting thread $^{7}/_{16}$-20 UNF to IEC 61518		**2**
- Mounting thread M10 to DIN 19213		**3**
- Mounting thread M12 to DIN 19213		**4**
• Male thread M20 x 1.5		**5**
• Male thread ½ -14 NPT		**6**
Non-wetted parts materials		
• Housing made of die-cast aluminium		**0**
• Housing stainless steel precision casting		**3**
Version		
• Standard versions		**1**
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		**2**
Explosion protection		
• None		**A**
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		**B**
- "Explosion-proof (Ex d)"[7)]		**D**
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[8)]		**P**
- "Ex nA/ic (Zone 2)"[9)]		**E**
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"[8) 10)] (not for DS III FF)		**R**
• FM + CSA intrinsic safe (is)		**F**
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[10)]		**S**
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)"[7)]		**NC**
Electrical connection/cable entry		
• Screwed gland M20 x 1.5		**B**
• Screwed gland ½-14 NPT		**C**
• M12 connectors (stainless steel)[11) 12)]		**F**

Selection and Ordering data	Article No.
Pressure transmitter for gauge pressure	
SITRANS P DS III with PROFIBUS PA (PA)	**7MF4034 -**
SITRANS P DS III with FOUNDATION Fieldbus (FF)	**7MF4035 -**
	■■■■ - ■■■■
Display	
• Without display	**0**
• Without visible display (display concealed, setting: bar)	**1**
• With visible display (setting: bar)	**6**
• with customer-specific display (setting as specified, Order code "Y21" required)	**7**

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation

1) For oxygen application, add Order code E10.

2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

3) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) The diaphragm seal is to be specified with a separate order number and must be included with the transmitter order number, for example 7MF403.-..Y..-.... and 7MF4900-1...-.B

5) The standard measuring cell filling of configurations with remote seals (Y) is silicone oil.

6) M10 fastening thread: Max. span 160 bar (2320 psi)
7/16-20 UNF and M12 fastening thread: Max. span 400 bar (5802 psi)

7) Without cable gland, with blanking plug.

8) With enclosed cable gland Ex ia and blanking plug.

9) Configurations with HAN and M12 connectors are only available in Ex ic.

10) Only in connection with IP65.

11) M12 delivered without cable socket.

12) Only in connection with Ex approval A, B, E or F.

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Selection and Ordering data		Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.					
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:					
• Steel	⬟	**A01**	✓	✓	✓
• Stainless steel	⬟	**A02**	✓	✓	✓
Plug					
• Han 7D (metal)		**A30**	✓		
• Han 8D (instead of Han 7D)		**A31**	✓		
• Angled		**A32**	✓		
• Han 8D (metal)		**A33**	✓		
Cable sockets for M12 connectors (metal (CuZn))		**A50**	✓	✓	✓
Rating plate inscription (instead of German)					
• English	⬟	**B11**	✓	✓	✓
• French	⬟	**B12**	✓	✓	✓
• Spanish	⬟	**B13**	✓	✓	✓
• Italian	⬟	**B14**	✓	✓	✓
• Cyrillic (russian)	⬟	**B16**	✓	✓	✓
English rating plate Pressure units in in$H_2$0 and/or psi	⬟	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2[1]	⬟	**C11**	✓	✓	✓
Inspection certificate[2] Acc. to EN 10204-3.1	⬟	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	⬟	**C14**	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C20**	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol		**C21**[3]		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C23**	✓		
Device passport Russia (For price request please contact the technical support www.siemens.com/automation/support-request)		**C99**	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA		**D05**	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)		**D07**	✓	✓	✓
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)		**D12**	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange		**D37**	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included		**D59**	✓	✓	✓
Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-.B.. Ex ia)" and IP65)		**E01**	✓	✓	✓
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))		**E10**	✓	✓	✓
Export approval Korea		**E11**	✓	✓	✓
CRN approval Canada (Canadian Registration Number)		**E22**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Dual seal	**E24**	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.B..)	**E25**[4]	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.D..)	**E26**[4]	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.P..)	**E28**[4]	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-.B..)	**E45**[4]	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-.D..)	**E46**[4]	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-.B..)	**E55**[4]	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-.D..)	**E56**[4]	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.E..)	**E57**[4]	✓	✓	✓
Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.R..)	**E58**[4]	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-.[B, D]..-Z + E11)	**E70**[4]	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	**G10**	✓	✓	✓
Transient protector 6 kV (lightning protection)	**J01**	✓	✓	✓
Oval flange NAM (ASTAVA)	**J06**	✓	✓	✓

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

3) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

4) Option does not include ATEX approval, but instead includes only the country-specific approval.

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Selection and Ordering data		Order code	HART	PA	FF
Additional data Please add "**-Z**" to Article No. and specify Order code(s) and plain text.					
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	⬟	**Y01**	✓	✓[1]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	⬟	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	⬟	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	⬟	**Y17**	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H_2O*), inH_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM or % *) ref. temperature 20 °C	⬟	**Y21**	✓	✓	✓
Setting of pressure indication in non-pressure units[2] Specify in plain text: Y22: ..... up to ..... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	⬟	**Y22 + Y01**	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:		**Y25**		✓	✓
Damping adjustment in seconds (0 ... 100 s)		**Y30**	✓	✓	✓

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

Ordering example

Item line:	7MF4033-1EA00-1AA7-Z
B line:	A01 + Y01 + Y21
C line:	Y01: 10 ... 20 bar (145 ... 290 psi)
C line:	Y21: bar (psi)

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
2) Preset values can only be changed over SIMATIC PDM.

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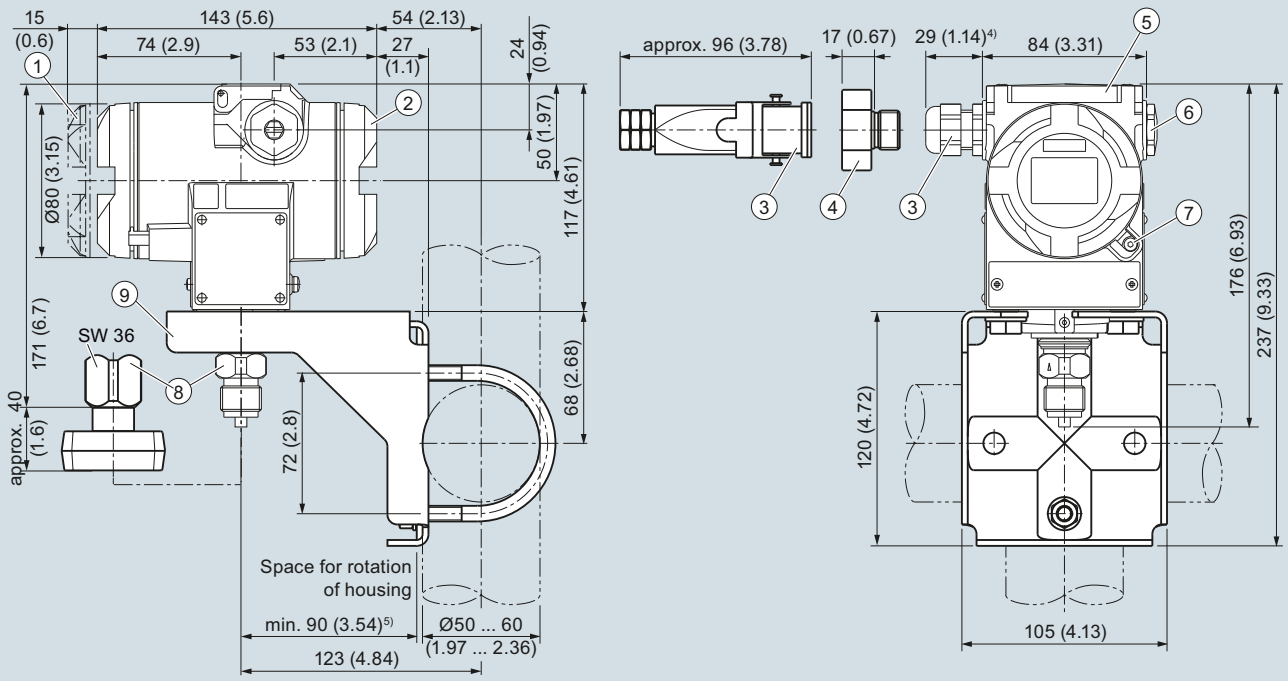
Dimensional drawings



1. Electronic side, digital display (longer overall length for cover with window)[1]
2. Terminal side[1]
3. Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)[2] [3], Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/Han 8D[2] [3] plug
4. Harting adapter
5. Protective cover over keys
6. Blanking plug
7. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
8. Process connection: Connection shank G½B or Oval flange
9. Mounting bracket (option)

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA" [IS + XP]"
4) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
5) Minimum distance for rotating

SITRANS P DS III pressure transmitters for gauge pressure, dimensions in mm (inch)

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Technical specifications

SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm

	HART		PROFIBUS PA and FOUNDATION Fieldbus	
Input of gauge pressure, with front-flush diaphragm				
Measured variable	Gauge pressure, front-flush			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	0.01 ... 1 bar (0.15 ... 14.5 psi)	6 bar (87 psi)	1 bar (14.5 psi)	6 bar (87 psi)
	0.04 ... 4 bar (0.58 ... 58 psi)	10 bar (145 psi)	4 bar (58 psi)	10 bar (145 psi)
	0.16 ... 16 bar (2.32 ... 232 psi)	32 bar (464 psi)	16 bar (232 psi)	32 bar (464 psi)
	0.6 ... 63 bar (9.14 ... 914 psi)	100 bar (1450 psi)	63 bar (914 psi)	100 bar (1450 psi)
Lower measuring limit	100 mbar a (1.45 psia)			
Upper measuring limit	100 % of max. span		100 % of the max. nominal measuring range	
Input of absolute pressure, with front-flush diaphragm				
Measured variable	Absolute pressure, front-flush			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	43 ... 1300 mbar a (0.62 ... 18.85 psia)	10 bar a (145 psia)	1300 mbar a (18.85 psia)	10 bar a (145 psia)
	0.16 ... 5 bar a (2.32 ... 72.5 psia)	30 bar a (435 psia)	5 bar a (72.5 psia)	30 bar a (435 psia)
	1 ... 30 bar a (14.5 ... 435 psia)	100 bar a (1450 psia)	30 bar a (435 psia)	100 bar a (1450 psia)
Lower measuring limit	0 bar a (0 psia)			
Upper measuring limit	100 % of max. span		100 % of the max. nominal measuring range	
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		-	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		-	
Load				
• Without HART	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V		-	
• With HART	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)			
	Span ratio r = max. span/set span		Nominal measuring range ratio r = nominal measuring range/set measuring range	
Error in measurement at limit setting incl. hysteresis and reproducibility				
	Gauge pressure, front-flush	Absolute pressure, front-flush	Gauge pressure, front-flush	Absolute pressure, front-flush
• Linear characteristic				
- r ≤ 10	≤ (0.0029 · r + 0.071) %	≤ 0.2 %	≤ (0.0029 · r + 0.071) %	≤ 0.2 %
- 10 < r ≤ 30	≤ (0.0045 · r + 0.071) %	≤ 0.4 %	≤ (0.0045 · r + 0.071) %	≤ 0.4 %
- 30 < r ≤ 100	≤ (0.005 · r + 0.05) %	-	≤ (0.005 · r + 0.05) %	-
Long-term stability (temperature change ± 30 °C (± 54 °F))	≤ (0.25 · r) % per 5 years		≤ (0.25 · r) % per 5 years	

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SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm				
	HART		**PROFIBUS PA and FOUNDATION Fieldbus**	
	Gauge pressure, front-flush	Absolute pressure, front-flush	Gauge pressure, front-flush	Absolute pressure, front-flush
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.1 · r + 0.2) %[1)]	≤ (0.2 · r + 0.3) %	≤ (0.1 · r + 0.2) %[1)]	≤ (0.2 · r + 0.3) %
• at -40 ... -10 °C and 60 ... 85 °C (-40 ... +14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K	≤ (0.2 · r + 0.3) %/10 K	≤ (0.1 · r + 0.15) %/10 K	≤ (0.2 · r + 0.3) %/10 K
Influence of mounting position	0.1 mbar (0.04 inH_2O) per 10° inclination			
Measured Value Resolution	-		$3 \cdot 10^{-5}$ of nominal measuring range	
Influence of the medium temperature				
• Temperature difference between medium temperature and ambient temperature	3 mbar/10 K (0.04 psi/10 K)			
Rated conditions				
Installation conditions				
Ambient temperature	Observe the temperature class in areas subject to explosion hazard.			
• Measuring cell with silicone oil	-40 ... +85 °C (-40 ... +185 °F)			
• Measuring cell with Neobee oil (with front-flush diaphragm)	-10 ... +85 °C (14 ... +185 °F)			
• Measuring cell with inert liquid (not with front-flush diaphragm)	-20 ... +85 °C (-4 ... +185 °F)			
• Transmitter (with 4-wire connection, observe temperature values of supplementary 4-wire electronics)	-40 ... +85 °C (-40 ... +185 °F)			
• Display readable	-30 ... +85 °C (-22 ... +185 °F)			
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F) (in the case of Neobee: -20 ... +85 °C (-4 ... +185/°F)) (for high temperature oil: -10 ... + 85 °C (14 ... 185 °F))			
• Climatic class				
- Condensation	Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics			
Degree of protection (to IEC 60529)	IP66 (optional IP66/IP68), NEMA 4X			
• Electromagnetic Compatibility				
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21			
Medium conditions	The max. medium temperature of the front-flush process connections is to be taken into account in accordance with the relevant connection standards (e. g. DIN 32676, DIN 11851 etc.).			
Temperature of medium				
• Measuring cell with silicone oil	-40 ... +100 °C (-40 ... +212 °F)			
• Measuring cell with silicone oil (with front-flush diaphragm)	-40 ... +150 °C (-40 ... +302 °F)			
• Measuring cell with Neobee oil (with front-flush diaphragm)	-10 ... +150 °C (14 ... 302 °F)			
• Measuring cell with silicone oil, with temperature decoupler (only for gauge pressure version with front-flush diaphragm)	-40 ... +200 °C (-40 ... +392 °F)			
• Measuring cell with Neobee oil, with temperature decoupler (only for gauge pressure version with flush-mounted diaphragm)	-10 ... +200 °C (14 ... 392 °F)			
• Measuring cell with inert filling liquid	-20 ... +100 °C (-4 ... +212 °F)			
• Measuring cell with high-temperature oil (only for gauge pressure version with front-flush diaphragm)	-10 ... +250 °C (14 ... 482 °F)			
Design				
Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)			
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408			
Wetted parts materials	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819			
Measuring cell filling	Silicone oil or inert filling liquid			
Process connection	• Flanges as per EN and ASME • F&B and pharmaceutical flanges			
Surface quality touched-by-media	R_a-values ≤ 0.8 µm (32 µ-inch)/welds $R_{a)}$ ≤ 1.6 µm (64 µ-inch) (Process connections acc. to 3A; R_a-values ≤ 0.8 µm (32 µ-inch)/welds R_a) ≤ 0.8 µm (32 µ-inch)			

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SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Power supply U_H		Supplied through bus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)	
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1.2 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC	To circuits with values: U_H = 9 ... 32 V DC
• Dust explosion protection for zone 20	PTB 01 ATEX 2055	
- Marking	Ex II 1 D IP65 T 120 °C Ex II 1/2 D IP65 T 120 °C	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Dust explosion protection for zone 21/22	PTB 01 ATEX 2055	
- Marking	Ex II 2 D IP65 T 120 °C	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 W	To circuits with values: U_H = 9 ... 32 V DC; P_{max} = 1 W
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Connection (Ex nA)	U_m = 45 V	U_m = 32 V
- Connections (Ex ic)	To circuits with values: U_i = 45 V	FISCO supply unit ic: U_o = 17.5 V, I_o = 570 mA Linear barrier: U_o = 32 V, I_o = 132 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF

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SITRANS P DS III series for gauge and absolute pressure, with front-flush diaphragm		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Certificates and approvals (continued)		
• Explosion protection acc. to FM	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	
• Explosion protection to CSA	Certificate of Compliance 1153651	
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	

[1] Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.064 . r + 0.08) % / 28 °C (50 °F).

Hygiene version

In the case of SITRANS P DSIII with 7MF413x front-flush diaphragm, selected connections comply with the requirements of EHEDG.

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HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Input /Output
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function

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Selection and Ordering data		Article No.
Pressure transmitter for gauge and absolute pressure, front-flush diaphragm, SITRANS P DS III HART		7MF4133-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Inert liquid	grease-free to cleanliness level 2	3
FDA compliant fill fluid		
• Neobee oil	normal	4
Measuring span (min. ... max.)		
0.01 ... 1 bar	(0.15 ... 14.5 psi)	B
0.04 ... 4 bar	(0.58 ... 58 psi)	C
0.16 ... 16 bar	(2.32 ... 232 psi)	D
0.63 ... 63 bar	(9.14 ... 914 psi)	E
43 ... 1300 mbar a[1]	(0.62 ... 18.85 psia)[1]	S
0.16 ... 5 bar a[1]	(0.7 ... 72.5 psia)[1]	T
1 ... 30 bar a[1]	(4.35 ... 435 psia)[1]	U
Wetted parts materials		
Seal diaphragm	Connection shank	
Stainless steel	Stainless steel	A
Hastelloy[2]	Stainless steel	B
Process connection		
• Flange version with Order code M.., N.., R.. or Q..		7
Non-wetted parts materials		
• Housing made of die-cast aluminium		0
• Housing stainless steel precision casting		3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" [3]		D
- „Ex nA/ic (Zone 2)“[4]		E
• FM + CSA intrinsic safe (is)		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[5]		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)"[3]		N C
Electrical connection/cable entry		
• Inner thread M20 x 1.5		B
• Female thread ½-14 NPT		C
• Han 7D plug (plastic housing) incl. mating connector[6]		D
• M12 connectors (stainless steel)[7] [8]		F
Display		
• Without display		0
• Without visible display (display concealed, setting: mA)		1
• With visible display (setting: mA)		6
• With customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation

1) Not with temperature decoupler P00 and P10, not for process connections R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.
2) Only available for flanges with options M.., N.. and Q..
3) Without cable gland, with blanking plug
4) Configurations with HAN and M12 connectors are only available in Ex ic.
5) Only in connection with IP65.
6) Only in connection with Ex approval A, B or E.
7) Only in connection with Ex approval A, B, E or F.
8) M12 delivered without cable socket

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Selection and Ordering data		Article No.
Pressure transmitter P for gauge and absolute pressure, front-flush diaphragm:		
SITRANS P DS III with PROFIBUS PA (PA) ↗		**7MF4134-**
SITRANS P DS III with FOUNDATION Fieldbus (FF) ↗		**7MF4135-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		■■■■■-■■■■
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	**1**
Inert liquid	grease-free to cleanliness level 2	**3**
FDA compliant fill fluid		
• Neobee oil	normal	**4**
Nominal measuring range		
1 bar	(14.5 psi)	**B**
4 bar	(58 psi)	**C**
16 bar	(232 psi)	**D**
63 bar	(914 psi)	**E**
1300 mbar a[1]	(18.85 psia)[1]	**S**
5 bar a[1]	(72.5 psia)[1]	**T**
30 bar a[1]	(435 psia)[1]	**U**
Wetted parts materials		
Seal diaphragm	Connection shank	
Stainless steel	Stainless steel	**A**
Hastelloy[2]	Stainless steel	**B**
Process connection		
• Flange version with Order code M.., N.., R.. or Q..		**7**
Non-wetted parts materials		
• Housing made of die-cast aluminium		**0**
• Housing stainless steel precision casting		**3**
Version		
• Standard versions		**1**
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		**2**
Explosion protection		
• None		**A**
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		**B**
- "Explosion-proof (Ex d)"[3]		**D**
- „Ex nA/ic (Zone 2)"[4]		**E**
• FM + CSA intrinsic safe (is)		**F**
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[5]		**S**
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)"[3] (Available soon)		**NC**
Electrical connection/cable entry		
• Screwed gland M20 x 1.5		**B**
• Screwed gland ½-14 NPT		**C**
• M12 connectors (stainless steel)[6] [7]		**F**

Selection and Ordering data	Article No.
Pressure transmitter P for gauge and absolute pressure, front-flush diaphragm:	
SITRANS P DS III with PROFIBUS PA (PA)	**7MF4134-**
SITRANS P DS III with FOUNDATION Fieldbus (FF)	**7MF4135-**
	■■■■■-■■■■
Display	
• Without display	**0**
• Without visible display (display concealed, setting: bar)	**1**
• With visible display (setting: bar)	**6**
• With customer-specific display (setting as specified, Order code "Y21" required)	**7**

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation

1) Not with temperature decoupler P00 and P10, not for process connections R01, R02, R04, R10 and R11, and can only be ordered in conjunction with silicone oil.
2) Only available for flanges with options M.., N.. and Q..
3) Without cable gland, with blanking plug
4) Configurations with HAN and M12 connectors are only available in Ex ic.
5) Only in connection with IP65.
6) Only in connection with Ex approval A, B, E or F.
7) M12 delivered without cable socket

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Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Plug				
• Han 7D (metal)	**A30**	✓		
• Han 8D (instead of Han 7D)	**A31**	✓		
• Angled	**A32**	✓		
• Han 8D (metal)	**A33**	✓		
Cable sockets for M12 connectors (metal (CuZn))	**A50**	✓	✓	✓
Rating plate inscription (instead of German)				
• English	**B11**	✓	✓	✓
• French	**B12**	✓	✓	✓
• Spanish	**B13**	✓	✓	✓
• Italian	**B14**	✓	✓	✓
• Cyrillic (russian)	**B16**	✓	✓	✓
English rating plate Pressure units in inH_20 and/or psi	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	**C14**	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	**C20**	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	**C21**[1]		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	**C23**	✓		
Device passport Russia (For price request please contact the technical support www.siemens.com/automation/support-request.)	**C99**	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA	**D05**	✓		
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	**D59**	✓	✓	✓
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))	**E10**	✓	✓	✓
Export approval Korea	**E11**	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	**E22**	✓	✓	✓
Dual seal	**E24**	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.B..)	**E25**[2]	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.D..)	**E26**[2]	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.P..)	**E28**[2]	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-.B..)	**E45**[2]	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-.D..)	**E46**[2]	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-.B..)	**E55**[2]	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-.D..)	**E56**[2]	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.E..)	**E57**[2]	✓	✓	✓
Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.R..)	**E58**[2]	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-.[B, D]..-Z + E11)	**E70**[2]	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	**G10**	✓	✓	✓
Transient protector 6 kV (lightning protection)	**J01**	✓	✓	✓
Flanges to EN 1092-1, Form B1				
• DN 25, PN 40[3]	**M11**	✓	✓	✓
• DN 25, PN 100[3]	**M21**	✓	✓	✓
• DN 40, PN 40	**M13**	✓	✓	✓
• DN 40, PN 100	**M23**	✓	✓	✓
• DN 50, PN 16	**M04**	✓	✓	✓
• DN 50, PN 40	**M14**	✓	✓	✓
• DN 80, PN 16	**M06**	✓	✓	✓
• DN 80, PN 40	**M16**	✓	✓	✓
Flanges to ASME B16.5				
• Stainless steel flange 1" class 150[3]	**M40**	✓	✓	✓
• Stainless steel flange 1½" class 150	**M41**	✓	✓	✓
• Stainless steel flange 2" class 150	**M42**	✓	✓	✓
• Stainless steel flange 3" class 150	**M43**	✓	✓	✓
• Stainless steel flange 4" class 150	**M44**	✓	✓	✓
• Stainless steel flange 1" class 300[3]	**M45**	✓	✓	✓
• Stainless steel flange 1½" class 300	**M46**	✓	✓	✓
• Stainless steel flange 2" class 300	**M47**	✓	✓	✓
• Stainless steel flange 3" class 300	**M48**	✓	✓	✓
• Stainless steel flange 4" class 300	**M49**	✓	✓	✓
Threaded connector to DIN 3852-2, form A, thread to ISO 228[4]				
• G ¾"-A, front-flush	**R01**	✓	✓	✓
• G 1"-A, front-flush	**R02**	✓	✓	✓
• G 2"-A, front-flush	**R04**	✓	✓	✓
Tank connection[5] Sealing is included in delivery				
• TG 52/50, PN 40	**R10**	✓	✓	✓
• TG 52/150, PN 40	**R11**	✓	✓	✓
Sanitary process connection according DIN 11851 (Dairy connection with slotted union nut)				
• DN 50, PN 25	**N04**	✓	✓	✓
• DN 80, PN 25	**N06**	✓	✓	✓
Tri-Clamp connection according DIN 32676/ISO 2852				
• DN 50/2", PN 16	**N14**	✓	✓	✓
• DN 65/3", PN 10	**N15**	✓	✓	✓
Varivent connection Certified to EHEDG				
• Type N = 68 for Varivent housing DN 40 ... 125 and 1½" ... 6", PN 40	**N28**	✓	✓	✓

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SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Temperature decoupler up to 200 °C[6] for version with front-flush diaphragm	**P00**	✓	✓	✓
Temperature decoupler up to 250 °C Measuring cell filling: High-temperature oil, only in conjunction with measuring cell filling silicone oil	**P10**	✓	✓	✓
Sanitary process connection to DRD				
• DN 50, PN 40	**M32**	✓	✓	✓
SMS socket with union nut				
• 2"	**M67**	✓	✓	✓
• 2½"	**M68**	✓	✓	✓
• 3"	**M69**	✓	✓	✓
SMS threaded socket				
• 2"	**M73**	✓	✓	✓
• 2½"	**M74**	✓	✓	✓
• 3"	**M75**	✓	✓	✓
IDF socket with union nut ISO 2853				
• 2"	**M82**	✓	✓	✓
• 2½"	**M83**	✓	✓	✓
• 3"	**M84**	✓	✓	✓
IDF threaded socket ISO 2853				
• 2"	**M92**	✓	✓	✓
• 2½"	**M93**	✓	✓	✓
• 3"	**M94**	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect screw connection Certified to EHEDG				
• DN 50, PN 16	**Q05**	✓	✓	✓
• DN 65, PN 16	**Q06**	✓	✓	✓
• DN 80, PN 16	**Q07**	✓	✓	✓
• DN 100, PN 16	**Q08**	✓	✓	✓
• DN 2", PN 16	**Q13**	✓	✓	✓
• DN 2½", PN 16	**Q14**	✓	✓	✓
• DN 3", PN 16	**Q15**	✓	✓	✓
• DN 4", PN 16	**Q16**	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect flange connection Certified to EHEDG				
• DN 50, PN 16	**Q23**	✓	✓	✓
• DN 65, PN 16	**Q24**	✓	✓	✓
• DN 80, PN 16	**Q25**	✓	✓	✓
• DN 100, PN 16	**Q26**	✓	✓	✓
• DN 2", PN 16	**Q31**	✓	✓	✓
• DN 2½", PN 16	**Q32**	✓	✓	✓
• DN 3", PN 16	**Q33**	✓	✓	✓
• DN 4", PN 16	**Q34**	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect clamp connection Certified to EHEDG				
• DN 50, PN 16	**Q39**	✓	✓	✓
• DN 65, PN 10	**Q40**	✓	✓	✓
• DN 80, PN 10	**Q41**	✓	✓	✓
• DN 100, PN 10	**Q42**	✓	✓	✓
• DN 2½", PN 16	**Q48**	✓	✓	✓
• DN 3", PN 10	**Q49**	✓	✓	✓
• DN 4", PN 10	**Q50**	✓	✓	✓
Sanitary process connection to NEUMO Bio-Connect S flange connection Certified to EHEDG				
• DN 2", PN 16	**Q72**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Aseptic threaded socket to DIN 11864-1 Form A approved according to EHEDG				
• DN 50, PN 25	**N33**	✓	✓	✓
• DN 65, PN 25	**N34**	✓	✓	✓
• DN 80, PN 25	**N35**	✓	✓	✓
• DN 100, PN 25	**N36**	✓	✓	✓
Aseptic flange with notch to DIN 11864-2 Form A approved according to EHEDG				
• DN 50, PN 16	**N43**	✓	✓	✓
• DN 65, PN 16	**N44**	✓	✓	✓
• DN 80, PN 16	**N45**	✓	✓	✓
• DN 100, PN 16	**N46**	✓	✓	✓
Aseptic flange with groove to DIN 11864-2 Form A approved according to EHEDG				
• DN 50, PN 16	**N43 + P11**	✓	✓	✓
• DN 65, PN 16	**N44 + P11**	✓	✓	✓
• DN 80, PN 16	**N45 + P11**	✓	✓	✓
• DN 100, PN 16	**N46 + P11**	✓	✓	✓
Aseptic clamp with groove to DIN 11864-3 FormA approved according to EHEDG				
• DN 50, PN 25	**N53**	✓	✓	✓
• DN 65, PN 25	**N54**	✓	✓	✓
• DN 80, PN 16	**N55**	✓	✓	✓
• DN 100, PN 16	**N56**	✓	✓	✓

1) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H.

2) Option does not include ATEX approval, but instead includes only the country-specific approval.

3) Special seal in Viton included in the scope of delivery

4) Lower measuring limit -100 mbar (1.45 psi).

5) The weldable socket can be ordered under accessories.

6) Certified to 3A and EHEDG. The maximum permissible temperatures of the medium depend on the respective cell fillings (see medium conditions).

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Selection and Ordering data	Order code			
Additional data		**HART**	**PA**	**FF**
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**	✓	✓[1]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	**Y17**	✓		
Setting of pressure indicator in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H_2O[*], inH_2O[*], ftH_2O[*], mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM or % [*] ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of pressure indication in non-pressure units[2] Specify in plain text: Y22: ..... up to ..... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units **"Y01"** is essential, unit with max. 5 characters)	**Y22 + Y01**	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	**Y25**		✓	✓
Damping adjustment in seconds (0 ... 100 s)	**Y30**	✓	✓	✓

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

ordering example

Item line:	7MF4133-1DB20-1AB7-Z
B line:	A22 + Y01 + Y21
C line:	Y01: 1 ... 10 bar (14.5 ... 145 psi)
C line:	Y21: bar (psi)

[1] Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

[2] Preset values can only be changed over SIMATIC PDM.

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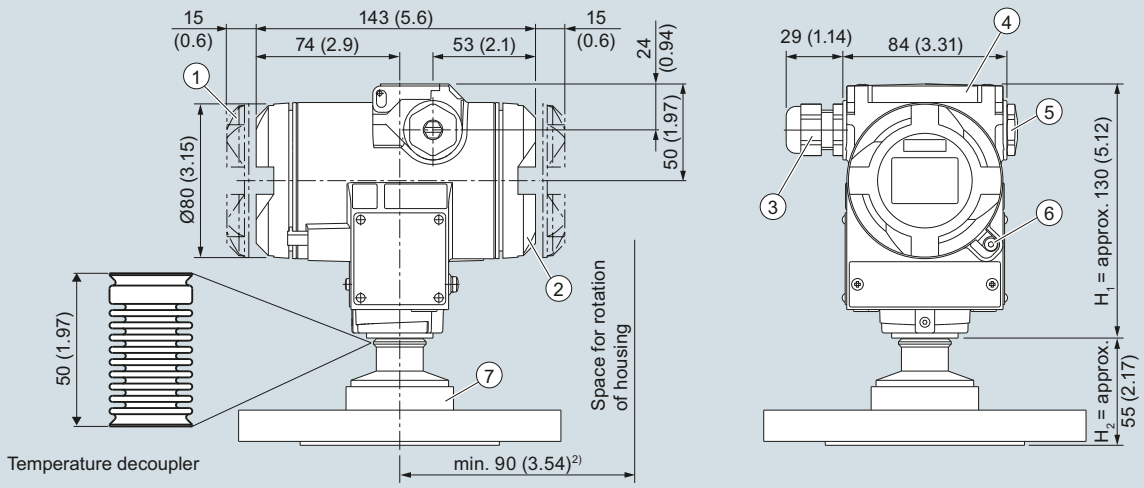
Dimensional drawings



1. Electronic side, digital display (longer overall length for cover with window)[1)]
2. Terminal side[1)]
3. Electrical connection: Screwed gland M20 x 1,5 or screwed gland ½-14 NPT or M12 conector
4. Protective cover over keys
5. Blanking plug
6. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
7. Process connection: see flange tables

1)
2) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
92 mm (3.6 inch) for minimum distance to permit rotation with indicator

SITRANS P pressure transmitters, DS III series for gauge pressure, with front-flush diaphragm, dimensions in mm (inch)

The diagram shows a SITRANS P DS III with an example of a flange. In this drawing the height is subdivided into H_1 and H_2.

H_1 = Height of the SITRANS P300 up to a defined cross-section

H_2 = Height of the flange up to this defined cross-section

Only the height H_2 is indicated in the dimensions of the flanges.

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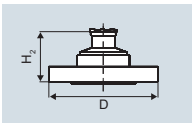
Flanges as per EN and ASME

Flange to EN

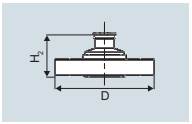
EN 1092-1



Order code	DN	PN	ØD	H_2
M11	25	40	115 mm (4.5“)	Approx. 52 mm (2“)
M21	25	100	140 mm (5.5“)	
M13	40	40	150 mm (5.9“)	
M23	40	100	170 mm (6.7“)	
M04	50	16	165 mm (6.5“)	
M14	50	40	165 mm (6.5“)	
M06	80	16	200 mm (7.9“)	
M16	80	40	200 mm (7.9“)	

Flanges to ASME

ASME B16.5

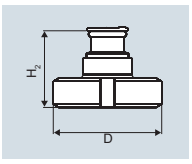


Order code	DN	PN	ØD	H_2
M40	1“	150	110 mm (4.3“)	Approx. 52 mm (2“)
M41	1½“	150	130 mm (5.1“)	
M42	2“	150	150 mm (5.9“)	
M43	3“	150	190 mm (7.5“)	
M44	4“	150	230 mm (9.1“)	
M45	1“	300	125 mm (4.9“)	
M46	1½“	300	155 mm (6.1“)	
M47	2“	300	165 mm (6.5“)	
M48	3“	300	210 mm (8.1“)	
M49	4“	300	255 mm (10.0“)	

NuG and pharmaceutical connections

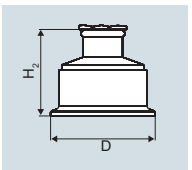
Connections to DIN

DIN 11851 (milk pipe union with slotted union nut)



Order code	DN	PN	ØD	H_2
N04	50	25	92 mm (3.6“)	Approx. 52 mm (2“)
N06	80	25	127 mm (5.0“)	

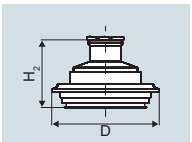
Tri-Clamp nach DIN 32676



Order code	DN	PN	ØD	H_2
N14	50	16	64 mm (2.5“)	Approx. 52 mm (2“)
N15	65	10	91 mm (3.6“)	

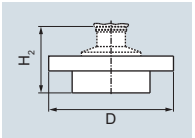
Other connections

Varivent connection



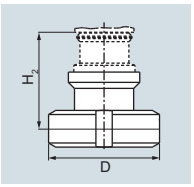
Order code	DN	PN	ØD	H_2
N28	40 ... 125	40	84 mm (3.3“)	Approx. 52 mm (2“)

Sanitary process connection to DRD



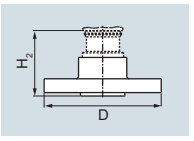
Order code	DN	PN	ØD	H_2
M32	50	40	105 mm (4.1“)	Approx. 52 mm (2“)

Sanitary process screw connection to NEUMO Bio-Connect



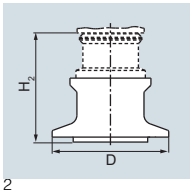
Order code	DN	PN	ØD	H_2
Q05	50	16	82 mm (3.2“)	Approx. 52 mm (2“)
Q06	65	16	105 mm (4.1“)	
Q07	80	16	115 mm (4.5“)	
Q08	100	16	145 mm (5.7“)	
Q13	2“	16	82 mm (3.2“)	
Q14	2½“	16	105 mm (4.1“)	
Q15	3“	16	105 mm (4.1“)	
Q16	4“	16	145 mm (5.7“)	

Sanitary process connection to NEUMO Bio-Connect flange connection



Order code	DN	PN	ØD	H_2
Q23	50	16	110 mm (4.3“)	Approx. 52 mm (2“)
Q24	65	16	140 mm (5.5“)	
Q25	80	16	150 mm (5.9“)	
Q26	100	16	175 mm (6.9“)	
Q31	2“	16	100 mm (3.9“)	
Q32	2½“	16	110 mm (4.3“)	
Q33	3“	16	140 mm (5.5“)	
Q34	4“	16	175 mm (6.9“)	

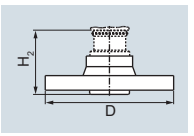
Sanitary process connection to NEUMO Bio-Connect clamp connection



2

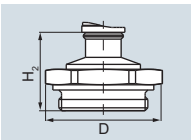
Order code	DN	PN	ØD	H_2
Q39	50	16	77.4 mm (3.0“)	Approx. 52 mm (2“)
Q40	65	10	90.9 mm (3.6“)	
Q41	80	10	106 mm (4.2“)	
Q42	100	10	119 mm (4.7“)	
Q47	2“	16	77.4 mm (3.0“)	
Q48	2½“	16	90.9 mm (3.6“)	
Q49	3“	10	106 mm (4.2“)	
Q50	4“	10	119 mm (4.7“)	

Sanitary process connection to NEUMO Bio-Connect S flange connection



Order code	DN	PN	ØD	H_2
Q72	2“	16	125 mm (4.9“)	Approx. 52 mm (2“)

Threaded connection G¾", G1" and G2" acc. to DIN 3852



Order code	DN	PN	ØD	H_2
R01	¾“	60	37 mm (1.5“)	Approx. 45 mm (1.8“)
R02	1“	60	48 mm (1.9“)	Approx. 47 mm (1.9“)
R04	2“	60	78 mm (3.1“)	Approx. 52 mm (2“)

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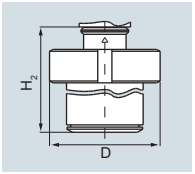
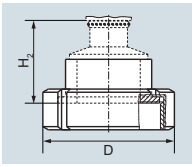
SITRANS P DS III for gauge/absolute pressure, with front-flush diaphragm

Tank connection TG 52/50 and TG52/150



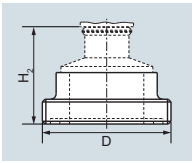
Order code	DN	PN	ØD	H_2
R10	25	40	63 mm (2.5“)	Approx. 63 mm (2.5“)
R11	25	40	63 mm (2.5“)	Approx. 170 mm (6.7“)

SMS socket with union nut



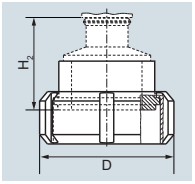
Order code	DN	PN	ØD	H_2
M67	2“	25	84 mm (3.3“)	Approx. 52 mm (2“)
M68	2½“	25	100 mm (3.9“)	
M69	3“	25	114 mm (4.5“)	

SMS threaded socket



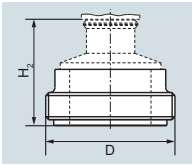
Order code	DN	PN	ØD	H_2
M73	2“	25	70 x 1/6 mm	Approx. 52 mm (2“)
M74	2½“	25	85 x 1/6 mm	
M75	3“	25	98 x 1/6 mm	

IDF socket with union nut



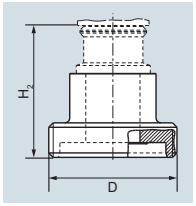
Order code	DN	PN	ØD	H_2
M82	2“	25	77 mm (3“)	Approx. 52 mm (2“)
M83	2½“	25	91 mm (3.6“)	
M84	3“	25	106 mm (4.2“)	

IDF threaded socket



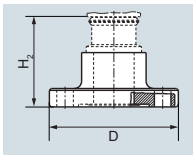
Order code	DN	PN	ØD	H_2
M92	2“	25	64 mm (2.5“)	Approx. 52 mm (2“)
M93	2½“	25	77.5 mm (3.1“)	
M94	3“	25	91 mm (3.6“)	

Aseptic threaded socket to DIN 11864-1 Form A



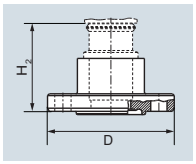
Order code	DN	PN	ØD	H_2
N33	50	25	78 x 1/6“	Approx. 52 mm (2“)
N34	65	25	95 x 1/6“	
N35	80	25	110 x ¼“	
N36	100	25	130 x ¼“	

Aseptic flange with notch to DIN 11864-2 Form A



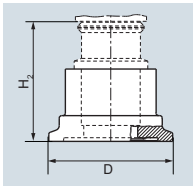
Order code	DN	PN	ØD	H_2
N43	50	16	94	Approx. 52 mm (2“)
N44	65	16	113	
N45	80	16	133	
N46	100	16	159	

Aseptic flange with groove to DIN 11864-2 Form A



Order code	DN	PN	ØD	H_2
N43 + P11	50	16	94	Approx. 52 mm (2“)
N44 + P11	65	16	113	
N45 + P11	80	16	133	
N46 + P11	100	16	159	

Aseptic clamp with groove to DIN 11864-3 Form A



Order code	DN	PN	ØD	H_2
N53	50	25	77.5	Approx. 52 mm (2“)
N54	65	25	91	
N55	80	16	106	
N56	100	16	130	

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Technical specifications

SITRANS P DS III series for absolute pressure (from the gauge pressure series)

	HART		PROFIBUS PA and FOUNDATION Fieldbus	
Input				
Measured variable	Absolute pressure			
Spans (infinitely adjustable) or nominal measuring range and max. permissible test pressure	Span (min. ... max.)	Max. perm. test pressure	Nominal measuring range	Max. perm. test pressure
	8.3 ... 250 mbar a (0.12 ... 3.62 psia)	6 bar a (87 psia)	250 mbar a (3.6 psia)	6 bar a (87 psia)
	43 ... 1300 mbar a (0.62 ... 18.85 psi a)	10 bar a (145 psia)	1300 mbar a (18.9 psi a)	10 bar a (145 psia)
	160 ... 5000 mbar a (2.32 ... 72.5 psia)	30 bar a (435 psia)	5 bar a (72.5 psia)	30 bar a (435 psia)
	1 ... 30 bar a (14.5 ... 435 psia)	100 bar a (1450 psia)	30 bar a (435 psia)	100 bar a (1450 psia)
Lower measuring limit				
• Measuring cell with silicone oil filling	0 mbar a (0 psia)			
Upper measuring limit	100 % of max. span			
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		-	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		-	
Load				
• Without HART	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V		-	
• With HART	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)			
	Span ratio r = max. span/set span		Nominal measuring range ratio r = nominal measuring range/set measuring range	
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic				
- r ≤ 10	≤ 0.1 %		≤ 0.1 %	
- 10 < r ≤ 30	≤ 0.2 %		≤ 0.2 %	
Long-term stability (temperature change ± 30 °C (± 54 °F))	≤ (0.1 · r) %/year		≤ (0.1 · r) %/year	
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.1 · r + 0.2) %[1)]		≤ (0.1 · r + 0.2) %[1)]	
• at -40 ... -10 °C and 60 ... 85 °C (-40 ... +14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K		≤ (0.1 · r + 0.15) %/10 K	
Measured Value Resolution	-		$3 \cdot 10^{-5}$ of nominal measuring range	

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SITRANS P DS III series for absolute pressure (from the gauge pressure series)	HART	PROFIBUS PA and FOUNDATION Fieldbus
Rated conditions		
Degree of protection (to IEC 60529)	IP66 (optional IP66/IP68), NEMA 4X	
Temperature of medium		
• Measuring cell with silicone oil filling	-40 ... +100 °C (-40 ... +212 °F) -20 ... +100 °C (-4 ... +212 °F) with 30 bar a measuring cell	
• Measuring cell with inert filling liquid	-20 ... +100 °C (-4 ... +212 °F)	
• In conjunction with dust explosion protection	-20 ... +60 °C (-4 ... +140 °F)	
Ambient conditions		
• Ambient temperature		
- Transmitter (with 4-wire connection, observe temperature values of supplementary 4-wire electronics)	-40 ... +85 °C (-40 ... +185 °F)	
- Display readable	-30 ... +85 °C (-22 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
• Climatic class		
- Condensation	Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics	
• Electromagnetic Compatibility		
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Design		
Weight (without options)	≈ 1.5 kg (≈ 3.3 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AlSi 12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
• Connection shank	Stainless steel, mat. no. 1.4404/316L or Hastelloy C4, mat. no. 2.4610	
• Oval flange	Stainless steel, mat. no. 1.4404/316L	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819	
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))	
Process connection	Connection shank G½B to EN 837-1, female thread ½ -14 NPT or oval flange (PN 160 (MAWP 2320 psia)) to DIN 19213 with mounting thread M10 or $^{7}/_{16}$-20 UNF to IEC 61518	
Material of mounting bracket		
• Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated	
• Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS 304)	
Power supply U_H		Supplied through bus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

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SITRANS P DS III series for absolute pressure (from the gauge pressure series)		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)	
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1.2 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC	To circuits with values: U_H = 9 ... 32 V DC
• Dust explosion protection for zone 20	PTB 01 ATEX 2055	
- Marking	Ex II 1 D IP65 T 120 °C Ex II 1/2 D IP65 T 120 °C	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1.2 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Dust explosion protection for zone 21/22	PTB 01 ATEX 2055	
- Marking	Ex II 2 D IP65 T 120 °C	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 W	To circuits with values: U_H = 9 ... 32 V DC; P_{max} = 1 W
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Connection (Ex nA)	U_m = 45 V	U_m = 32 V
- Connection (Ex ic)	To circuits with values: U_i = 45 V	FISCO supply unit ic: U_o = 17.5 V, I_o = 570 mA Linear barrier: U_o = 32 V, I_o = 132 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion protection acc. to FM	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	
• Explosion protection to CSA	Certificate of Compliance 1153651	
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	

[1] Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.08. r + 0.16) % / 28 °C (50 °F).

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HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 to 100 s
- Simulation function	Input /Output
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function

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Selection and Ordering data			Article No.
Pressure transmitters for absolute pressure from gauge pressure series SITRANS P DS III with HART		↗	**7MF4233-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	**Measuring cell cleaning**		
Silicone oil	normal	⬟	1
Inert liquid[1]	grease-free to cleanliness level 2		3
Measuring span (min. ... max.)			
8.3 ... 250 mbar a	(0.12 ... 3.62 psia)	⬟	D
43 ... 1300 mbar a	(0.62 ... 18.85 psia)	⬟	F
0.16 ... 5 bar a	(2.32 ... 72.5 psia)	⬟	G
1 ... 30 bar a	(14.5 ... 435 psia)	⬟	H
Wetted parts materials			
Seal diaphragm	Process connection		
Stainless steel	Stainless steel	⬟	A
Hastelloy	Stainless steel		B
Hastelloy	Hastelloy		C
Version for diaphragm seal[2) 3) 4) 5) 6)]			Y
Process connection			
• Connection shank G½B to EN 837-1		⬟	0
• Female thread ½-14 NPT		⬟	1
• Stainless steel oval flange with process connection (Oval flange has no female thread)			
- Mounting thread $^{7}/_{16}$-20 UNF to EN 61518			2
- Mounting thread M10 to DIN 19213			3
- Mounting thread M12 to DIN 19213			4
• Male thread M20 x 1.5			5
• Male thread ½ -14 NPT			6
Non-wetted parts materials			
• Housing made of die-cast aluminium		⬟	0
• Housing stainless steel precision casting[7)]			3
Version			
• Standard versions		⬟	1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		⬟	2
Explosion protection			
• None		⬟	A
• With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"		⬟	B
- "Explosion-proof (Ex d)"[8)]		⬟	D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[9)]		⬟	P
- "Ex nA/ic (Zone 2)"[10)]		⬟	E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"[9)11)]		⬟	R
• FM + CSA intrinsic safe (is)			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[11)]			S
• With FM + CSA, Type of protection:			
- "Intrinsic Safe and Explosion Proof (is + xp)"[8)]		⬟	N C
Electrical connection/cable entry			
• Screwed gland Pg 13.5[12)]			A
• Screwed gland M20x1.5		⬟	B
• Screwed gland ½-14 NPT		⬟	C
• Han 7D plug (plastic housing) incl. mating connector[12)]			D
• M12 connectors (stainless steel) [13) 14)]			F

Selection and Ordering data		Article No.
Pressure transmitters for absolute pressure from gauge pressure series SITRANS P DS III with HART		**7MF4233-**
Display		
• Without display	⬟	0
• Without visible display (display concealed, setting: mA)	⬟	1
• With visible display (setting: mA)	⬟	6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	⬟	7

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation

1) For oxygen application, add Order code E10.

2) Version 7MF4233-1DY... only up to max. span 200 mbar a (80 inH_2O a).

3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

5) The diaphragm seal is to be specified with a separate order number and must be included wiht the tranmitter order number, for example 7MF423.-..Y..-.... and 7MF4900-1...-.B

6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.

7) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".

8) Without cable gland, with blanking plug.

9) With enclosed cable gland Ex ia and blanking plug.

10) Configurations with HAN and M12 connectors are only available in Ex ic.

11) Only in connection with IP65.

12) Only in connection with Ex apporval A, B or E.

13) Only in connection with Ex apporval A, B, E or F.

14) M12 delivered without cable socket

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Selection and Ordering data		Article No.
Pressure transmitters for absolute pressure from gauge pressure series		
SITRANS P DS III with PROFIBUS PA (PA) ↗		**7MF4234-**
SITRANS P DS III with FOUNDATION Fieldbus (FF) ↗		**7MF4235-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		☐☐☐☐☐-☐☐☐☐
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	**1**
Inert liquid[1]	grease-free to cleanliness level 2	**3**
Nominal measuring range		
250 mbar a	(3.62 psia)	**D**
1300 mbar a	(18.85 psia)	**F**
5 bar a	(72.5 psia)	**G**
30 bar a	(435 psia)	**H**
Wetted parts materials		
Seal diaphragm	Process connection	
Stainless steel	Stainless steel	**A**
Hastelloy	Stainless steel	**B**
Hastelloy	Hastelloy	**C**
Version as diaphragm seal [2) 3) 4) 5) 6)]		**Y**
Process connection		
• Connection shank G½B to EN 837-1		**0**
• Female thread ½-14 NPT		**1**
• Stainless steel oval flange with process connection (Oval flange has no female thread)		
- Mounting thread $^{7}/_{16}$-20 UNF to IEC 61518		**2**
- Mounting thread M10 to DIN 19213		**3**
- Mounting thread M12 to DIN 19213		**4**
• Male thread M20 x 1.5		**5**
• Male thread ½ -14 NPT		**6**
Non-wetted parts materials		
• Housing made of die-cast aluminium		**0**
• Housing stainless steel precision casting		**3**
Version		
• Standard versions		**1**
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		**2**
Explosion protection		
• None		**A**
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		**B**
- "Explosion-proof (Ex d)"[7)]		**D**
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[8)]		**P**
- "Ex nA/ic (Zone 2)" [9)]		**E**
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"[8) 10)] (not for DS III FF)		**R**
• FM + CSA intrinsic safe (is)		**F**
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[10)]		**S**
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)"[7)]		**NC**
Electrical connection/cable entry		
• Screwed gland M20 x 1.5		**B**
• Screwed gland ½-14 NPT		**C**
• M12 connectors (stainless steel) [11) 12)]		**F**

Selection and Ordering data	Article No.
Pressure transmitters for absolute pressure from gauge pressure series	
SITRANS P DS III with PROFIBUS PA (PA)	**7MF4234-**
SITRANS P DS III with FOUNDATION Fieldbus (FF)	**7MF4235-**
	☐☐☐☐☐-☐☐☐☐
Display	
• Without display	**0**
• Without visible display (display concealed, setting: bar)	**1**
• With visible display (setting: bar)	**6**
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	**7**

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation

1) For oxygen application, add Order code E10.

2) Version 7MF4233-1DY... only up to max. span 200 mbar a (2.9 psia).

3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

4) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

5) The diaphragm seal is to be specified with a separate order number and must be included wiht the tranmitter order number, for example 7MF423.-..Y..-.... and 7MF4900-1...-.B

6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.

7) Without cable gland, with blanking plug.

8) With enclosed cable gland Ex ia and blanking plug.

9) Configurations with HAN and M12 connectors are only available in Ex ic.

10) Only in connection with IP65.

11) Only in connection with Ex approval A, B, E or F.

12) M12 delivered without cable socket.

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Selection and Ordering data		Order code	HART	PA	FF
Further designs					
Add "**-Z**" to Article No. and specify Order code.					
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:					
• Steel	⬟	**A01**	✓	✓	✓
• Stainless steel	⬟	**A02**	✓	✓	✓
Plug					
• Han 7D (metal)		**A30**	✓		
• Han 8D (instead of Han 7D)		**A31**	✓		
• Angled		**A32**	✓		
• Han 8D (metal)		**A33**	✓		
Cable sockets for M12 connectors (metal (CuZn))		**A50**	✓	✓	✓
Rating plate inscription (instead of German)					
• English	⬟	**B11**	✓	✓	✓
• French	⬟	**B12**	✓	✓	✓
• Spanish	⬟	**B13**	✓	✓	✓
• Italian	⬟	**B14**	✓	✓	✓
• Cyrillic (russian)	⬟	**B16**	✓	✓	✓
English rating plate Pressure units in in$H_2$0 and/or psi	⬟	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2[1]	⬟	**C11**	✓	✓	✓
Inspection certificate[2] Acc. to EN 10204-3.1	⬟	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	⬟	**C14**	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C20**	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol		**C21**[3]		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C23**	✓		
Device passport Russia (For price request please contact the technical support www.siemens.com/automation/support-request)		**C99**	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA		**D05**	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009)		**D07**	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)		**D12**	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of oval flange		**D37**	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included		**D59**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-.B.. Ex ia)" and IP65)	**E01**	✓	✓	✓
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))	**E10**	✓	✓	✓
Export approval Korea	**E11**	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	**E22**	✓	✓	✓
Dual seal	**E24**	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.B..)	**E25**[4]	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.D..)	**E26**[4]	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.P..)	**E28**[4]	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-.B..)	**E45**[4]	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-.D..)	**E46**[4]	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-.B..)	**E55**[4]	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-.D..)	**E56**[4]	✓	✓	✓
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.E..)	**E57**[4]	✓	✓	✓
Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.R..)	**E58**[4]	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-.[B, D]..-Z + E11)	**E70**[4]	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	**G10**	✓	✓	✓
Transient protector 6 kV (lightning protection)	**J01**	✓	✓	✓
Oval flange NAM (ASTAVA)	**J06**	✓	✓	✓

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) If the acceptance test certificate 3.1 is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

3) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

4) Option does not include ATEX approval, but instead includes only the country-specific approval.

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Selection and Ordering data		Order code	HART	PA	FF
Additional data					
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.					
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ...: mbar a, bar a, kPa_{abs}, MPa_{abs}, psia[2]	⬟	**Y01**	✓	✓[1]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	⬟	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	⬟	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	⬟	**Y17**	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H_2O*), inH_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM or % *) ref. temperature 20 °C	⬟	**Y21**	✓	✓	✓
Setting of pressure indication in non-pressure units[3] Specify in plain text: Y22: ..... up to ..... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units **"Y01"** is essential, unit with max. 5 characters)	⬟	**Y22 + Y01**	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:		**Y25**		✓	✓
Damping adjustment in seconds (0 ... 100 s)		**Y30**	✓	✓	✓

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

2) Only absolute pressure units selectable. Negative pressure values not permitted.

3) Preset values can only be changed over SIMATIC PDM.

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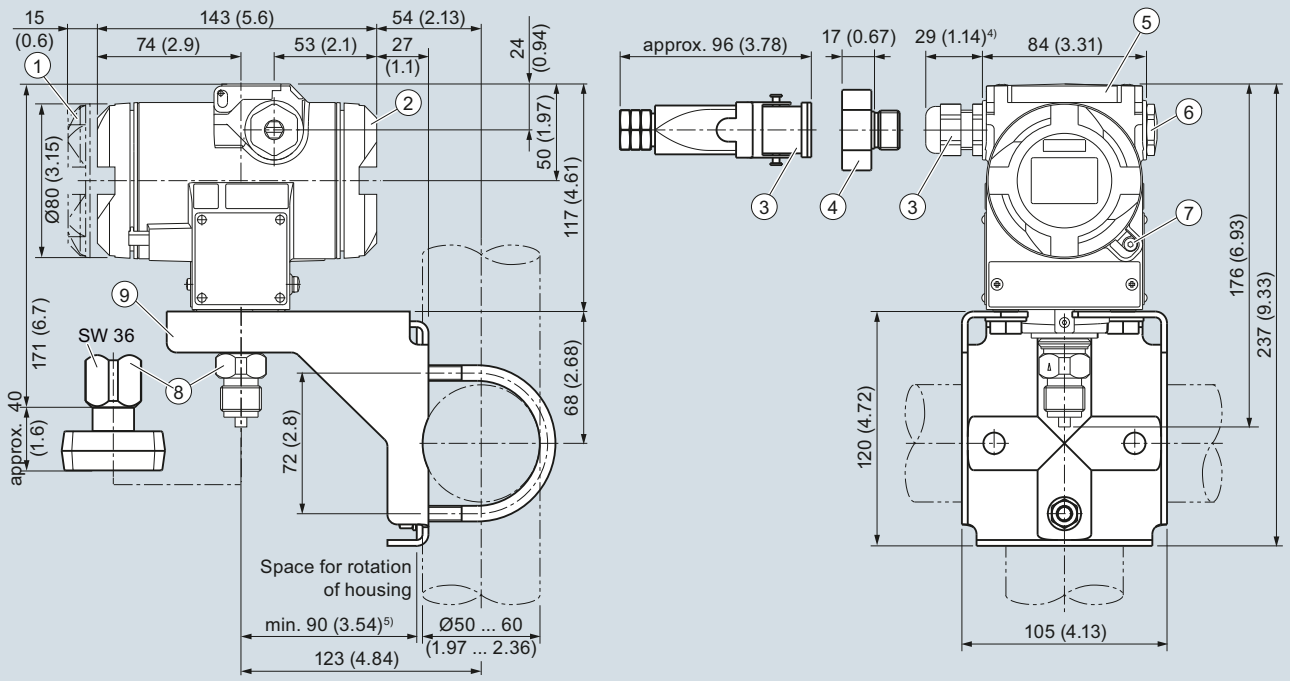
Dimensional drawings



1. Electronic side, digital display (longer overall length for cover with window)[1]
2. Terminal side[1]
3. Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)[2] [3], Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/Han 8D[2] [3] plug
4. Harting adapter
5. Protective cover over keys
6. Blanking plug
7. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
8. Process connection: Connection shank G½B or Oval flange
9. Mounting bracket (option)

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA" [IS + XP]"
4) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
5) Minimum distance for rotating

SITRANS P DS III pressure transmitters for absolute pressure, from the pressure series, dimensions in mm (inch)

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Technical specifications

SITRANS P, DS III for absolute pressure (from the differential pressure series)

	HART		PROFIBUS PA and FOUNDATION Fieldbus	
Input				
Measured variable	Absolute pressure			
Spans (infinitely adjustable) or nominal measuring range and max. permissible operating pressure	Span (min. ... max.)	Maximum operating pressure	Nominal measuring range	Maximum operating pressure
	8.3 ... 250 mbar a (0.12 ... 3.62 psia)	32 bar a (464 psia)	250 mbar a (3.62 psia)	32 bar a (464 psia)
	43 ... 1300 mbar a (0.62 ... 18.85 psia)	32 bar a (464 psia)	1300 bar a (18.85 psia)	32 bar a (464 psia)
	160 ... 5000 mbar a (2.32 ... 72.52 psia)	32 bar a (464 psia)	5 bar a (72.5 psia)	32 bar a (464 psia)
	1 ... 30 bar a (14.5 ... 435 psia)	160 bar a (2320 psia)	30 bar a (435 psia)	160 bar a (2320 psia)
	5.3 ... 100 bar a (76.9 ... 1450 psia)	160 bar a (2320 psia) (for connection thread M10 and 7/16-20 UNF in the process flanges)	100 bar a (1450 psia)	160 bar a (2320 psia) (for connection thread M10 and 7/16-20 UNF in the process flanges)
Lower measuring limit				
• Measuring cell with silicone oil filling	0 mbar a (0 psia)			
Upper measuring limit	100 % of max. span			
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		-	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		-	
Load				
• Without HART	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V		-	
• With HART	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)			
	Span ratio r = max. span/set span		Nominal measuring range ratio r = nominal measuring range/set measuring range	
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic				
- r ≤ 10	≤ 0.1 %		≤ 0.1 %	
- 10 < r ≤ 30	≤ 0.2 %		≤ 0.2 %	
Long-term stability (temperature change ± 30 °C (± 54 °F))	≤ (0.1 · r) %/year		≤ (0.1 · r) %/year	
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.1 · r + 0.2) %[1)]		≤ (0.1 · r + 0.2) %[1)]	
• at -40 ... -10 °C and 60 ... 85 °C (-40 ... +14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K		≤ (0.1 · r + 0.15) %/10 K	
Measured Value Resolution	-		$3 \cdot 10^{-5}$ of nominal measuring range	

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SITRANS P, DS III for absolute pressure (from the differential pressure series)		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Rated conditions		
Degree of protection (to IEC 60529)	IP66 (optional IP66/IP68), NEMA 4X	
Temperature of medium		
• Measuring cell with silicone oil filling	-40 ... +100 °C (-40 ... +212 °F)	
• Measuring cell with inert filling liquid	-20 ... +100 °C (-4 ... +212 °F)	
• In conjunction with dust explosion protection	-20 ... +60 °C (-4 ... +140 °F)	
Ambient conditions		
• Ambient temperature		
- Transmitter (with 4-wire connection, observe temperature values of supplementary 4-wire electronics)	-40 ... +85 °C (-40 ... +185 °F)	
- Display readable	-30 ... +85 °C (-22 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
• Climatic class		
- Condensation	Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics	
• Electromagnetic Compatibility		
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Design		
Weight (without options)	≈ 4.5 kg (≈ 9.9 (lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold	
• Process flanges and sealing screw	Stainless steel, mat. no. 1.4408, Hastelloy C4, mat. no. 2.4610 or Monel, mat. no. 2.4360	
• O-Ring	FPM (Viton) or optionally: PTFE, FEP, FEPM and NBR	
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxigen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))	
Process connection	¼-18 NPT and flange connection with mounting thread M10 to DIN 19213 or $^{7}/_{16}$-20 UNF to IEC 61518	
Material of mounting bracket		
• Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated	
• Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS 304)	
Power supply U_H		Supplied through bus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

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SITRANS P, DS III for absolute pressure (from the differential pressure series)	HART	PROFIBUS PA and FOUNDATION Fieldbus
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)	
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1.2 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC	To circuits with values: U_H = 9 ... 32 V DC
• Dust explosion protection for zone 20	PTB 01 ATEX 2055	
- Marking	Ex II 1 D IP65 T 120 °C Ex II 1/2 D IP65 T 120 °C	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1.2 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Dust explosion protection for zone 21/22	PTB 01 ATEX 2055	
- Marking	Ex II 2 D IP65 T 120 °C	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 W	To circuits with values: U_H = 9 ... 32 V DC; P_{max} = 1 W
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Connection (Ex nA)	U_m = 45 V	U_m = 32 V
- Connection (Ex ic)	To circuits with values: U_i = 45 V	FISCO supply unit ic: U_o = 17.5 V, I_o = 570 mA Linear barrier: U_o = 32 V, I_o = 132 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion protection acc. to FM	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	
• Explosion protection to CSA	Certificate of Compliance 1153651	
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	

[1] Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.08. r + 0.16) % / 28 °C (50 °F).

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HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Input /Output
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 to 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function

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Selection and Ordering data		Article No.
Pressure transmitters for absolute pressure from differential pressure series, SITRANS P DS III with HART		7MF4333-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Inert liquid[1]	grease-free to cleanliness level 2	3
Measuring span (min. ... max.)		
8.3 ... 250 mbar a	(0.12 ... 3.62 psia)	D
43 ... 1300 mbar a	(0.62 ... 18.85 psia)	F
0.16 ... 5 bar a	(2.32 ... 72.5 psia)	G
1 ... 30 bar a	(14.5 ... 435 psia)	H
5.3 ... 100 bar a	(76.9 ... 1450 psia)	K E
Wetted parts materials		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Tantalum	Tantalum	E
Monel	Monel	H
Gold	Gold	L
Version for diaphragm seal[2) 3) 4) 5) 6)]		Y
Process connection		
Female thread ¼-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread $^{7}/_{16}$-20 UNF to EN 61518		2
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		0
• Vent on side of process flange [7)]		
- Mounting thread $^{7}/_{16}$-20 UNF to EN 61518		6
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		4
Non-wetted parts materials		
process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting[8)]	3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)"[9)]		D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)" [10)]		P
- "Ex nA/ic (Zone 2)"[11)]		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"[10)12)]		R
• FM + CSA intrinsic safe (is)		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[12)]		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)" [9)]		N C
Electrical connection/cable entry		
• Screwed gland Pg 13.5[13)]		A
• Screwed gland M20 x 1.5		B
• Screwed gland ½-14 NPT		C
• Han 7D plug (plastic housing) incl. mating connector[13)]		D
• M12 connectors (stainless steel) [14) 15)]		F

Selection and Ordering data	Article No.
Pressure transmitters for absolute pressure from differential pressure series, SITRANS P DS III with HART	7MF4333-
Display	
• Without display	0
• Without visible display (display concealed, setting: mA)	1
• With visible display (setting: mA)	6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	7

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) For oxygen applications, add Order code E10.

2) Version 7MF4333-1DY... only up to max. span 200 mbar a (2.9 psia).

3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

4) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

5) The diaphragm seal is to be specified with a separate order number and must be included wiht the tranmitter order number, for example 7MF433.-..Y..-.... and 7MF4900-1...-.B

6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.

7) Not for span "5.3 ... 100 bar a (76.9 ... 1450 psia)". Position of the top vent valve in the process flange (see dimensional drawing).

8) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".

9) Without cable gland, with blanking plug

10) With enclosed cable gland Ex ia and blanking plug

11) Configurations with HAN and M12 connectors are only available in Ex ic.

12) Only in connection with IP65.

13) Only in connection with Ex approval A, B or E.

14) Only in connection with Ex approval A, B, E or F.

15) M12 delivered without cable socket.

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Selection and Ordering data		Article No.									
Pressure transmitter for absolute pressure from differential pressure series											
SITRANS P DS III with PROFIBUS PA (PA) ↗		**7MF4334-**									
SITRANS P DS III with FOUNDATION Fieldbus (FF) ↗		**7MF4335-**									
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.							-				
Measuring cell filling	**Measuring cell cleaning**										
Silicone oil	normal	1									
Inert liquid[1]	grease-free to cleanliness level 2	3									
Nominal measuring range											
250 mbar a	(3.62 psia)		D								
1300 mbar a	(18.85 psia)		F								
5 bar a	(72.5 psia)		G								
30 bar a	(435 psia)		H								
100 bar a	(1450 psia)		K	E							
Wetted parts materials											
Seal diaphragm	Parts of measuring cell										
Stainless steel	Stainless steel			A							
Hastelloy	Stainless steel			B							
Hastelloy	Hastelloy			C							
Tantalum	Tantalum			E							
Monel	Monel			H							
Gold	Gold			L							
Version as diaphragm seal [2) 3) 4) 5) 6)]				Y							
Process connection											
Female thread ¼-18 NPT with flange connection											
• Sealing screw opposite process connection											
- Mounting thread $^{7}/_{16}$-20 UNF to IEC 61518					2						
- Mounting thread M10 to DIN 19213 (only for replacement requirement)					0						
• Vent on side of process flange [7)]											
- Mounting thread $^{7}/_{16}$-20 UNF to IEC 61518					6						
- Mounting thread M10 to DIN 19213 (only for replacement requirement)					4						
Non-wetted parts materials											
process flange screws	Electronics housing										
Stainless steel	Die-cast aluminum					2					
Stainless steel	Stainless steel precision casting					3					
Version											
• Standard versions							1				
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)							2				
Explosion protection											
• None								A			
• With ATEX, Type of protection:											
- "Intrinsic safety (Ex ia)"								B			
- "Explosion-proof (Ex d)"[8)]								D			
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)" [9)]								P			
- "Ex nA/ic (Zone 2)"[10)]								E			
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"[9) 11)] (not for DS III FF)								R			
• FM + CSA intrinsic safe (is)								F			
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[11)]								S			
• With FM + CSA, Type of protection:											
- "Intrinsic Safe and Explosion Proof (is + xp)" [8)]								N	C		
Electrical connection/cable entry											
• Screwed gland M20 x 1.5									B		
• Screwed gland ½-14 NPT									C		
• M12 connectors (stainless steel)[12)13)]									F		

Selection and Ordering data	Article No.		
Pressure transmitter for absolute pressure from differential pressure series			
SITRANS P DS III with PROFIBUS PA (PA)	**7MF4334-**		
SITRANS P DS III with FOUNDATION Fieldbus (FF)	**7MF4335-**		
	-		
Display			
• Without display		0	
• Without visible display (display concealed, setting: bar)		1	
• With visible display (setting: bar)		6	
• With customer-specific display (setting as specified, Order code "Y21" required)		7	

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) For oxygen application, add Order code E10.

2) Version 7MF4334-1DY... only up to max. span 200 mbar a (80 inH_2O a).

3) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

4) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

5) The diaphragm seal is to be specified with a separate order number and must be included wiht the tranmitter order number, for example 7MF433.-..Y..-.... and 7MF4900-1...-.B

6) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.

7) Not for nominal measuring range 100 bar a (1450 psia). Position of the top vent valve in the process flange (see dimensional drawing).

8) Without cable gland, with blanking plug

9) With enclosed cable gland Ex ia and blanking plug

10) Configurations with HAN and M12 connectors are only available in Ex ic.

11) Only in connection with IP65.

12) Only in connection with Ex approval A, B, E or F.

13) M12 delivered without cable socket

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SITRANS P DS III for absolute pressure (from differential pressure series)

Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:				
• Steel	**A01**	✓	✓	✓
• Stainless steel	**A02**	✓	✓	✓
O-rings for process flanges (instead of FPM (Viton))				
• PTFE (Teflon)	**A20**	✓	✓	✓
• FEP (with silicone core, approved for food)	**A21**	✓	✓	✓
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F))	**A22**	✓	✓	✓
• NBR (Buna N)	**A23**	✓	✓	✓
Plug				
• Han 7D (metal)	**A30**	✓		
• Han 8D (instead of Han 7D)	**A31**	✓		
• Angled	**A32**	✓		
• Han 8D (metal)	**A33**	✓		
Sealing screw ¼-18 NPT, with valve in mat. of process flanges	**A40**	✓	✓	✓
Cable sockets for M12 connectors (metal (CuZn))	**A50**	✓	✓	✓
Rating plate inscription (instead of German)				
• English	**B11**	✓	✓	✓
• French	**B12**	✓	✓	✓
• Spanish	**B13**	✓	✓	✓
• Italian	**B14**	✓	✓	✓
• Cyrillic (russian)	**B16**	✓	✓	✓
English rating plate Pressure units in inH_20 and/or psi	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2[1]	**C11**	✓	✓	✓
Inspection certificate[2] Acc. to EN 10204-3.1	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	**C14**	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	**C20**	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	**C21**[3]		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	**C23**	✓		
Device passport Russia (For price request please contact the technical support www.siemens.com/automation/support-request)	**C99**	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA	**D05**	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	**D07**	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of process flange	**D37**	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	**D59**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-.B.. Ex ia)" and IP65)	**E01**	✓	✓	✓
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))	**E10**	✓	✓	✓
Export approval Korea	**E11**	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	**E22**	✓	✓	✓
Dual seal	**E24**	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.B..)	**E25**[4]	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.D..)	**E26**[4]	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.P..)	**E28**[4]	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-.B..)	**E45**[4]	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-.D..)	**E46**[4]	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-.B..)	**E55**[4]	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-.D..)	**E56**[4]	✓	✓	✓
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.E..)	**E57**[4]	✓	✓	✓
Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.R..)	**E58**[4]	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-.[B, D]..-Z + E11)	**E70**[4]	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	**G10**	✓	✓	✓
Interchanging of process connection side	**H01**	✓	✓	✓
Vent on side for gas measurements	**H02**	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines (not together with K01, K02 and K04)[5]	**H03**	✓	✓	✓
Transient protector 6 kV (lightning protection)	**J01**	✓	✓	✓
Chambered graphite gasket for process flange	**J02**	✓	✓	✓
Chambered PTFE graphite gasket	**J03**	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)	**J05**	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)[6]	**J08**	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)[6]	**J09**	✓	✓	✓

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Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Process flange				
• Hastelloy	**K01**	✓	✓	✓
• Monel	**K02**	✓	✓	✓
• Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi), max. temperature of medium 90 °C (194 °F) For ½-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible	**K04**	✓	✓	✓

1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

3) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

4) Option does not include ATEX approval, but instead includes only the country-specific approval.

5) Not suitable for connection of remote seals.

6) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Selection and Ordering data	Order code	HART	PA	FF
Additional data Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar a, bar a, kPa_{abs}, MPa_{abs}, psia[2]	**Y01**	✓	✓[1]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	**Y17**	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H_2O*), inH_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM or % *) ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of pressure indication in non-pressure units[3] Specify in plain text: Y22: ..... up to ..... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units "**Y01**" is essential, unit with max. 5 characters)	**Y22 + Y01**	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	**Y25**		✓	✓
Damping adjustment in seconds (0 ... 100 s)	**Y30**	✓	✓	✓

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
2) Only absolute pressure units selectable. Negative pressure values not permitted.
3) Preset values can only be changed over SIMATIC PDM.

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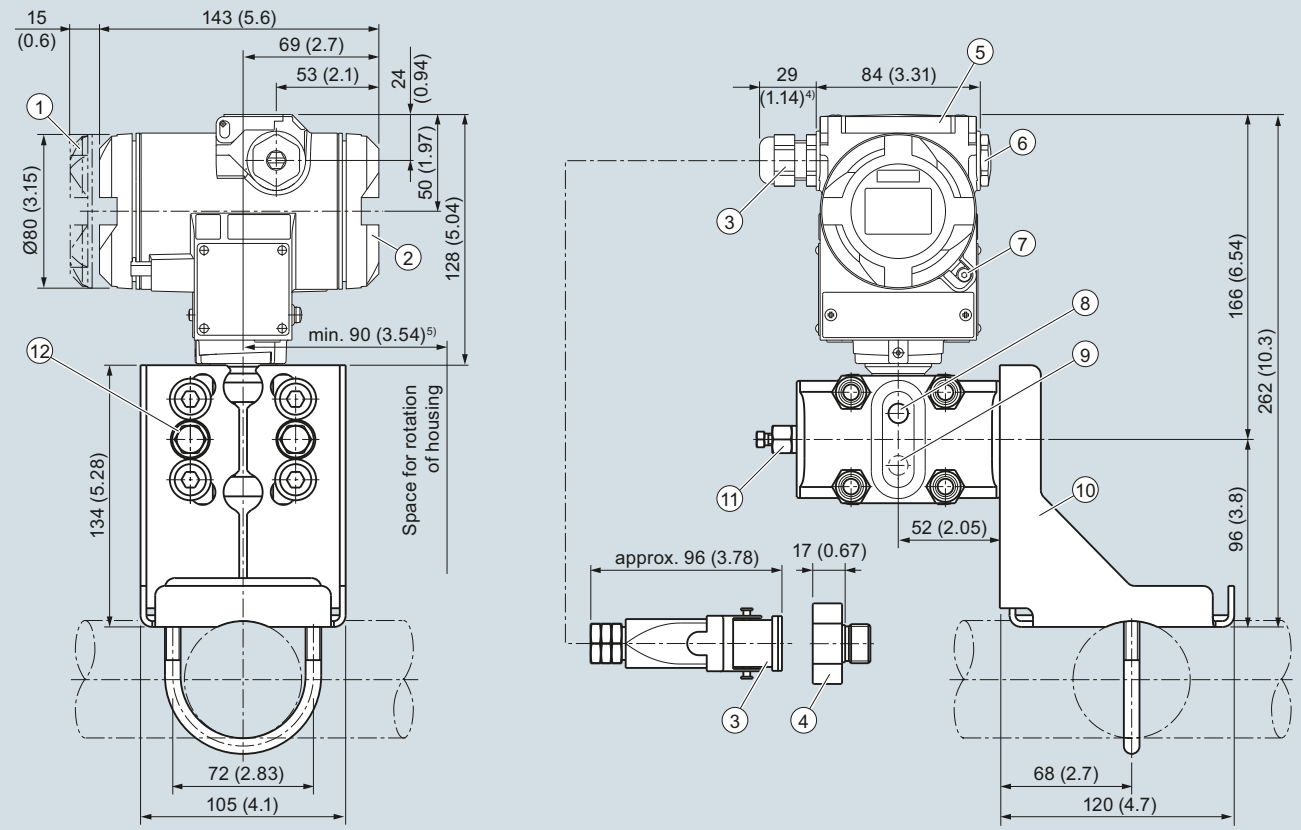
Dimensional drawings



1. Electronic side, digital display (longer overall length for cover with window)[1)]
2. Terminal side[1)]
3. Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)[2) 3)], Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D[2) 3)] plug
4. Harting adapter
5. Protective cover over keys
6. Blanking plug
7. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
8. Lateral venting for liquid measurement (Standard)
9. Lateral venting for gas measurement (suffix H02)
10. Mounting bracket (option)
11. Sealing screw with valve (option)
12. Process connection: ¼-18 NPT (IEC 61518)

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA" [IS + XP]"
4) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
5) 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

SITRANS P DS III pressure transmitters for absolute pressure, from the differential pressure series, dimensions in mm (inch)

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Technical specifications

SITRANS P, DS III for differential pressure and flow				
	HART		**PROFIBUS PA and FOUNDATION Fieldbus**	
Input				
Measured variable	Differential pressure and flow			
Spans (infinitely adjustable) or nominal measuring range and max. permissible operating pressure	Span (min. ... max.)	Maximum operating pressure	Nominal measuring range	Maximum operating pressure
	1 ... 20 mbar (0.4 ... 8 inH_2O)	32 bar (464 psi)	20 mbar (8 inH_2O)	32 bar (464 psi)
	1 ... 60 mbar (0.4 ... 24 inH_2O)	160 bar (2320 psi)	60 mbar (24 inH_2O)	160 bar (2320 psi)
	2.5 ... 250 mbar (1 ... 100 inH_2O)		250 mbar (100 inH_2O)	
	6 ... 600 mbar (2.4 ... 240 inH_2O)		600 mbar (240 inH_2O)	
	16 ... 1600 mbar (6.4 ... 642 inH_2O)		1600 mbar (642 inH_2O)	
	50 ... 5000 mbar (20 ... 2000 inH_2O)		5 bar (2000 inH_2O)	
	0.3 ... 30 bar (4.35 ... 435 psi)		30 bar (435 psi)	
	2.5 ... 250 mbar (1 ... 100 inH_2O)	420 bar (6091 psi)	250 mbar (100 inH_2O)	420 bar (6091 psi)
	6 ... 600 mbar (2.4 ... 240 inH_2O)		600 mbar (240 inH_2O)	
	16 ... 1600 mbar (6.4 ... 642 inH_2O)		1600 mbar (642 inH_2O)	
	50 ... 5000 mbar (20 ... 2000 inH_2O)		5 bar (2000 inH_2O)	
	0.3 ... 30 bar (4.35 ... 435 psi)		30 bar (435 psi)	
Lower measuring limit				
• Measuring cell with silicone oil filling	-100 % of max. span or 30 mbar a (0.44 psia) (-33 % with 30 bar (435 psi) measuring cell)			
Upper measuring limit	100 % of max. span (for oxygen version and inert filling liquid; max. 120 bar (1740 psi))			
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		-	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		-	
Load				
• Without HART	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V		-	
• With HART	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)			
	Span ratio r = max. span/set span		Nominal measuring range ratio r = nominal measuring range/set measuring range	
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic				
- r ≤ 10	≤ (0.0029 · r + 0.071) %		≤ (0.0029 · r + 0.071) %	
- 10 < r ≤ 30	≤ (0.0045 · r + 0.071) %		≤ (0.0045 · r + 0.071) %	
- 30 < r ≤ 100	≤ (0.005 · r + 0.05) %		≤ (0.005 · r + 0.05) %	
• Square-rooted characteristic (flow > 50 %)				
- r ≤ 10	≤ 0.1 %		≤ 0.1 %	
- 10 < r ≤ 30	≤ 0.2 %		≤ 0.2 %	
• Square-rooted characteristic (flow > 25 ... 50 %)				
- r ≤ 10	≤ 0.2 %		≤ 0.2 %	
- 10 < r ≤ 30	≤ 0.4 %		≤ 0.4 %	

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SITRANS P, DS III for differential pressure and flow	HART	PROFIBUS PA and FOUNDATION Fieldbus
Long-term stability (temperature change ± 30 °C (± 54 °F))		
• 250, 600, 1600 and 5000 mbar (0.29, 0.87, 2.32 and 7.25 psi)-measuring cell	≤ (0.125 · r) per 5 years	≤ (0.125 · r) per 5 years
• 20 mbar (8 inH_2O)-measuring cell	≤ (0.2 · r) per year	≤ (0.2 · r) per year
• 60 mbar (24 inH_2O)-measuring cell	≤ (0.25 · r) % per 5 years	≤ (0.25 · r) % per 5 years
• 30 bar (435 psi)-measuring cell	≤ (0.25 · r) % per 5 years	≤ (0.25 · r) % per 5 years
Influence of ambient temperature (Twice the value with 20 mbar (8 inH_2O)-measuring cell		
• at -10 ... +60 °C (14 ... 140 °F)	≤ (0.08 · r + 0.1) %[1)]	≤ (0.08 · r + 0.1) %[1)]
• at -40 ... -10 °C and 60 ... 85 °C (-40 ... +14 °F and 140 ... 185 °F)	≤ (0.1 · r + 0.15) %/10 K	≤ (0.1 · r + 0.15) %/10 K
Influence of static pressure		
• on the zero point (PKN)	≤ (0.14 · r) % per 70 bar (1015 psi)	≤ (0.14 · r) % per 70 bar (1015 psi)
- 20 mbar (0.29 psi)-measuring cell	≤ (0.15 · r) % per 32 bar (464 psi)	≤ (0.15 · r) % per 32 bar (464 psi)
• on the span (PKS)	≤ 0.14 % per 70 bar (1015 psi)	≤ 0.14 % per 70 bar (1015 psi)
- 20 mbar (0.29 psi)-measuring cell	≤ 0.2 % per 32 bar (464 psi)	≤ 0.2 % per 32 bar (464 psi)
Measured Value Resolution	-	$3 \cdot 10^{-5}$ of nominal measuring range
Rated conditions		
Degree of protection (to EN 60529)	IP66 (optional IP66/IP68), NEMA 4X	
Temperature of medium		
• Measuring cell with silicone oil filling	-40 ... +100 °C (-40 ... +212 °F) -20 ... +100 °C (-4 ... +212 °F) with 30 bar measuring cell	
• Measuring cell with inert filling liquid	-20 ... +100 °C (-4 ... +212 °F)	
• In conjunction with dust explosion protection	-20 ... +60 °C (-4 ... +140 °F)	
Ambient conditions		
• Ambient temperature		
- Transmitter (with 4-wire connection, observe temperature values of supplementary 4-wire electronics)	-40 ... +85 °C (-40 ... +185 °F)	
- Display readable	-30 ... +85 °C (-22 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
• Climatic class		
- Condensation	Relative humidity 0 ... 100 % Condensation permissible, suitable for use in the tropics	
• Electromagnetic Compatibility		
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Design		
Weight (without options)	Die-cast aluminum: ≈ 4.5 kg (≈ 9.9 lb) Stainless steel precision casting: ≈ 7.1 kg (≈ 15.6 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L or Hastelloy C276, mat. no. 2.4819, Monel, mat. no. 2.4360, tantalum or gold	
Measuring cell filling	Silicone oil or inert filling liquid (maximum value with oxygen measurement pressure 100 bar (1450 psi) at 60 °C (140 °F))	
Process connection	Female thread ¼-18 NPT and flange connection with mounting thread M10 to DIN 19213 or $^{7}/_{16}$-20 UNF to IEC 61518	
Material of mounting bracket		
• Steel	Sheet-steel, Mat. No. 1.0330, chrome-plated	
• Stainless steel	Sheet stainless steel, mat. no. 1.4301 (SS 304)	

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SITRANS P, DS III for differential pressure and flow		
	HART	**PROFIBUS PA and FOUNDATION Fieldbus**
Power supply U_H		Supplied through bus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes
Certificates and approvals		
Classification according to PED 97/23/EC		
PN 32/160 (MAWP 464/2320 psi)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)	
PN 420 (MAWP 6092 psi)	For gases of fluid group 1 and liquids of fluid group 1; complies with basic safety requirements of Article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord.	
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1.2 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC	To circuits with values: U_H = 9 ... 32 V DC
• Dust explosion protection for zone 20	PTB 01 ATEX 2055	
- Marking	Ex II 1 D IP65 T 120 °C Ex II 1/2 D IP65 T 120 °C	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Dust explosion protection for zone 21/22	PTB 01 ATEX 2055	
- Marking	Ex II 2 D IP65 T 120 °C	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 W	To circuits with values: U_H = 9 ... 32 V DC; P_{max} = 1 W

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SITRANS P, DS III for differential pressure and flow	HART	PROFIBUS PA and FOUNDATION Fieldbus
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	
- Marking	Ex II 2/3 G Ex nA IIC T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Connection (Ex nA)	U_m = 45 V	U_m = 32 V
- Connection (Ex ic)	To circuits with values: U_i = 45 V	FISCO supply unit ic: U_o = 17.5 V, I_o = 570 mA Linear barrier: U_o = 32 V, I_o = 132 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion protection acc. to FM	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	
• Explosion protection to CSA	Certificate of Compliance 1153651	
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	

[1] Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.064 . r + 0.08) % / 28 °C (50 °F).

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HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for PC	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Input /Output
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function

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Selection and Ordering data			Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 32/160 (MAWP 464/2320 psi)		↗	7MF4433 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Measuring cell filling	**Measuring cell cleaning**		
Silicone oil	normal	▶⬟	1
Inert liquid[1]	grease-free to cleanliness level 2		3
Measuring span (min. ... max.)			
PN 32 (MAWP 464 psi)			
1 ... 20 mbar[2]	(0.4015 ... 8.03 inH_2O)	▶⬟	B
PN 160 (MAWP 2320 psi)			
1 ... 60 mbar	(0.4015 ... 24.09 inH_2O)	▶⬟	C
2.5 ... 250 mbar	(1.004 ... 100.4 inH_2O)	▶⬟	D
6 ... 600 mbar	(2.409 ... 240.9 inH_2O)	▶⬟	E
16 ... 1600 mbar	(6.424 ... 642.4 inH_2O)	▶⬟	F
50 ... 5000 mbar	(20.08 ... 2008 inH_2O)	▶⬟	G
0.3 ... 30 bar	(4.35 ... 435 psi)	▶⬟	H
Wetted parts materials			
(stainless steel process flanges)			
Seal diaphragm	Parts of measuring cell		
Stainless steel	Stainless steel	▶⬟	A
Hastelloy	Stainless steel		B
Hastelloy	Hastelloy		C
Tantalum[3]	Tantalum		E
Monel[3]	Monel		H
Gold[3]	Gold		L
Version for diaphragm seal[4] [5] [6] [7]			Y
Process connection			
Female thread ¼-18 NPT with flange connection			
• Sealing screw opposite process connection			
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		▶⬟	2
- Mounting thread M10 to DIN 19213 (only for replacement requirement)		⬟	0
• Vent on side of process flange[2]			
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518			6
- Mounting thread M10 to DIN 19213 (only for replacement requirement)			4
Non-wetted parts materials			
process flange screws	Electronics housing		
Stainless steel	Die-cast aluminum	▶⬟	2
Stainless steel	Stainless steel precision casting[8]		3
Version			
• Standard versions		⬟	1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		▶⬟	2
Explosion protection			
• None		⬟	A
• With ATEX, Type of protection:			
- "Intrinsic safety (Ex ia)"		⬟	B
- "Explosion-proof (Ex d)"[9]		⬟	D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[10]		⬟	P
- "Ex nA/ic (Zone 2)"[11]		⬟	E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"[10] [12]		▶⬟	R
• FM + CSA intrinsic safe (is)			F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[12]			S
• With FM + CSA, Type of protection:			
- "Intrinsic Safe and Explosion Proof (is + xp)"[9]		⬟	NC

Selection and Ordering data		Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 32/160 (MAWP 464/2320 psi)		7MF4433 -
Electrical connection/cable entry		
• Screwed gland Pg 13.5[13]		A
• Screwed gland M20 x 1.5	▶⬟	B
• Screwed gland ½-14 NPT	⬟	C
• Han 7D plug (plastic housing) incl. mating connector[13] [14]		D
• M12 connectors (stainless steel)[15] [16]		F
Display		
• Without display	⬟	0
• Without visible display (display concealed, setting: mA)	▶⬟	1
• With visible display (setting: mA)	⬟	6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	⬟	7

▶ Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) For oxygen application, add Order code E10.

2) Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).

3) Not in conjunction with max. span 20 and 60 mbar (8.03 and 24.09 inH_2O))

4) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

5) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

6) The diaphragm seal is to be specified with a separate order number and must be included wiht the tranmitter order number, for example 7MF443.-..Y..-.... and 7MF4900-1...-.B

7) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.

8) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".

9) Without cable gland, with blanking plug

10) With enclosed cable gland Ex ia and blanking plug

11) Configurations with HAN and M12 connectors are only available in Ex ic.

12) Only in connection with IP65.

13) Only in connection with Ex approval A, B or E.

14) Permissible only for crimp-contact of conductor cross-section 1 mm^2

15) Only in connection with Ex approval A, B, E or F.

16) M12 delivered without cable socket.

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Selection and Ordering data		Article No.										
Pressure transmitters for differential pressure and flow PN 32/160 (MAWP 464/2320 psi)												
SITRANS P DS III with PROFIBUS PA (PA) ↗		**7MF4434-**										
SITRANS P DS III with FOUNDATION Fieldbus (FF) ↗		**7MF4435-**										
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.							-					
Measuring cell filling	**Measuring cell cleaning**											
Silicone oil	normal	1										
Inert liquid[1]	grease-free to cleanliness level 2	3										
Nominal measuring range												
PN 32 (MAWP 464 psi)												
20 mbar [2]	(8.03 inH_2O)		B									
PN 160 (MAWP 2320 psi)												
60 mbar	(24.09 inH_2O)		C									
250 mbar	(100.4 inH_2O)		D									
600 mbar	(240.9 inH_2O)		E									
1600 mbar	(642.4 inH_2O)		F									
5 bar	(2008 inH_2O)		G									
30 bar	(435 psi)		H									
Wetted parts materials												
(stainless steel process flanges)												
Seal diaphragm	Parts of measuring cell											
Stainless steel	Stainless steel			A								
Hastelloy	Stainless steel			B								
Hastelloy	Hastelloy			C								
Tantalum [3]	Tantalum			E								
Monel[3]	Monel			H								
Gold [3]	Gold			L								
Version as diaphragm seal [4] [5] [6] [7]				Y								
Process connection												
Female thread ¼-18 NPT with flange connection												
• Sealing screw opposite process connection												
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518					2							
- Mounting thread M10 to DIN 19213 (only for replacement requirement)					0							
• Venting on side of process flanges[2]												
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518					6							
- Mounting thread M10 to DIN 19213 (only for replacement requirement)					4							
Non-wetted parts materials												
process flange screws	Electronics housing											
Stainless steel	Die-cast aluminum				2							
Stainless steel	Stainless steel precision casting				3							
Version												
• Standard versions						1						
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)						2						
Explosion protection												
• None							A					
• With ATEX, Type of protection:												
- "Intrinsic safety (Ex ia)"							B					
- "Explosion-proof (Ex d)"[8]							D					
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[9]							P					
- "Ex nA/ic (Zone 2)" [10]							E					
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"[9] [11] (not for DS III FF)							R					
• FM + CSA intrinsic safe (is)							F					
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[11]							S					
• With FM + CSA, Type of protection:												
- "Intrinsic Safe and Explosion Proof (is + xp)"[8]							N	C				

Selection and Ordering data	Article No.										
Pressure transmitters for differential pressure and flow PN 32/160 (MAWP 464/2320 psi)											
SITRANS P DS III with PROFIBUS PA (PA)	**7MF4434-**										
SITRANS P DS III with FOUNDATION Fieldbus (FF)	**7MF4435-**										
					-						
Electrical connection/cable entry											
• Screwed gland M20 x 1.5						B					
• Screwed gland ½-14 NPT						C					
• M12 connectors (stainless steel)[12] [13]						F					
Display											
• Without display							0				
• Without visible display (display concealed, setting: bar)							1				
• With visible display (setting: bar)							6				
• With customer-specific display (setting as specified, Order code "Y21" required)							7				

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

[1] For oxygen application, add Order code E10.

[2] Not suitable for connection of remote seal. Position of the top vent valve in the process flange (see dimensional drawing).

[3] Not in conjunction with max. span 20 and 60 mbar (8.03 and 24.09 inH_2O))

[4] When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

[5] If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

[6] The diaphragm seal is to be specified with a separate order number and must be included wiht the tranmitter order number, for example 7MF443.-..Y..-.... and 7MF4900-1...-.B

[7] The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.

[8] Without cable gland, with blanking plug.

[9] With enclosed cable gland Ex ia and blanking plug.

[10] Configurations with HAN and M12 connectors are only available in Ex ic.

[11] Only in connection with IP65.

[12] Only in connection with Ex approval A, B, E or F.

[13] M12 delivered without cable socket

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Selection and Ordering data		Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.					
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:					
• Steel	⬟	**A01**	✓	✓	✓
• Stainless steel	⬟	**A02**	✓	✓	✓
O-rings for process flanges (instead of FPM (Viton))					
• PTFE (Teflon)	⬟	**A20**	✓	✓	✓
• FEP (with silicone core, approved for food)		**A21**	✓	✓	✓
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)		**A22**	✓	✓	✓
• NBR (Buna N)		**A23**	✓	✓	✓
plug					
• Han 7D (metal)		**A30**	✓		
• Han 8D (instead of Han 7D)		**A31**	✓		
• Angled		**A32**	✓		
• Han 8D (metal)		**A33**	✓		
Sealing screws (2 units) ¼-18 NPT, with valve in mat. of process flanges	⬟	**A40**	✓	✓	✓
Cable sockets for M12 connectors (metal (CuZn))		**A50**	✓	✓	✓
Rating plate inscription (instead of German)					
• English	⬟	**B11**	✓	✓	✓
• French	⬟	**B12**	✓	✓	✓
• Spanish	⬟	**B13**	✓	✓	✓
• Italian	⬟	**B14**	✓	✓	✓
• Cyrillic (russian)	⬟	**B16**	✓	✓	✓
English rating plate Pressure units in inH_2O and/or psi	⬟	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2[1]	⬟	**C11**	✓	✓	✓
Inspection certificate[2] to EN 10204-3.1	⬟	**C12**	✓	✓	✓
Factory certificate to EN 10204-2.2	⬟	**C14**	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C20**	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol		**C21**[3]		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	⬟	**C23**	✓		
Device passport Russia (For price request please contact the technical support www.siemens.com/automation/support-request)		**C99**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Setting of upper limit of output signal to 22.0 mA	**D05**	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	**D07**	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Process flange screws made of Monel (max. nominal pressure PN20)	**D34**	✓	✓	✓
Supplied with oval flange set (2 items), PTFE packings and screws in thread of process flanges	**D37**	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	**D59**	✓	✓	✓
Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-.B.. Ex ia)"and IP65)	**E01**	✓	✓	✓
Overfilling safety device for flammable and non-flammable liquids (max. PN 32 (MAWP 464 psi), basic device with type of protection "Intrinsic safety (Ex ia)", to WHG and VbF, not together with measuring cell filling "inert liquid")	**E08**	✓		
Oxygen application (In the case of oxygen measurement and inert liquid max. 100 bar (1450 psi) at 60°C (140 °F))	**E10**	✓	✓	✓
Export approval Korea	**E11**	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	**E22**	✓	✓	✓
Dual seal	**E24**	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.B..)	**E25**[4]	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.D..)	**E26**[4]	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.P..)	**E28**[4]	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-.B..)	**E45**[4]	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-.D..)	**E46**[4]	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-.B..)	**E55**[4]	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-.D..)	**E56**[4]	✓	✓	✓
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.E..)	**E57**[4]	✓	✓	✓
Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.R..)	**E58**[4]	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-.[B, D]..-Z + E11)	**E70**[4]	✓	✓	✓

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Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Two coats of lacquer on casing and cover (PU on epoxy)	**G10**	✓	✓	✓
Interchanging of process connection side	**H01**	✓	✓	✓
Vent on side for gas measurements	**H02**	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines (not together with K01, K02 and K04)[5]	**H03**	✓	✓	✓
Transient protector 6 kV (lightning protection)	**J01**	✓	✓	✓
Chambered graphite gasket for process flange	**J02**	✓	✓	✓
Chambered PTFE graphite gasket	**J03**	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)	**J05**	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)[6]	**J08**	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)[6]	**J09**	✓	✓	✓
Process flange				
• Hastelloy	**K01**	✓	✓	✓
• Monel	**K02**	✓	✓	✓
• Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi), max. temperature of medium 90 °C (194 °F) For ½-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible	**K04**	✓	✓	✓

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Factory mounting of valve manifolds, see accessories.

Supplementary electronics for 4-wire connection, see accessories.

✓ = available

1) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

2) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

3) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H

4) Option does not include ATEX approval, but instead includes only the country-specific approval.

5) Not suitable for connection of remote seal.

6) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

Selection and Ordering data	Order code	HART	PA	FF
Additional data Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text:				
• in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi ⬟	**Y01**	✓	✓[1]	
• in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi ⬟	**Y02**	✓		
Stainless steel tag plate and entry in device variable (measuring point description) ⬟ Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) ⬟ Max. 27 char., specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART address (TAG) ⬟ Max. 8 char., specify in plain text: Y17:	**Y17**	✓		
Setting of pressure indicator in pressure units ⬟ Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H_2O*), inH_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm², kg/cm², Torr, ATM or % *) ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of pressure indicator in non-pressure units[2] ⬟ Specify in plain text: Y22: ..... up to ..... l/min, m³/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	**Y22[3] + Y01** *or* **Y02**	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	**Y25**		✓	✓
Damping adjustment in seconds (0 ... 100 s)	**Y30**	✓	✓	✓

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.

2) Preset values can only be changed over SIMATIC PDM.

3) Not in conjunction with over-filling safety device for flammable and non-flammable liquids (Order code "E08")

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Selection and Ordering data		Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)		7MF4533 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Measuring span (min. ... max.)		
2.5 ... 250 mbar	(1.004 ... 100.4 inH_2O)	D
6 ... 600 mbar	(2.409 ... 240.9 inH_2O)	E
16 ... 1600 mbar	(6.424 ... 642.4 inH_2O)	F
50 ... 5000 mbar	(20.08 ... 2008 inH_2O)	G
0.3 ... 30 bar	(4.35 ... 435 psi)	H
Wetted parts materials		
(stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Gold[1]	Gold	L
Version for diaphragm seal [2) 3) 4) 5)]		Y
Process connection		
Female thread ¼-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		3
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		1
• Venting on side of process flanges, location of vent valve at top of process flanges (see dimensional drawing)		
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		7
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		5
Non-wetted parts materials		
process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting[6)]	3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)"[7)]		D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[8)]		P
- "Ex nA/ic (Zone 2)"[9)]		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"[8)10)]		R
• FM + CSA intrinsic safe (is)		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[10)]		S
• With FM + CSA, Type of protection:		
- "Intrinsic safety and explosion-proof (is + xp)" [7)], max PN 360		N C
Electrical connection/cable entry		
• Screwed gland Pg 13.5[11)]		A
• Screwed gland M20x1.5		B
• Screwed gland ½-14 NPT		C
• Han 7D plug (plastic housing) incl. mating connector[11)12)]		D
• M12 connectors (stainless steel)[13) 14)]		F

Selection and Ordering data	Article No.
SITRANS P DS III with HART pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)	7MF4533 -
Display	
• Without display	0
• Without visible display (display concealed, setting: mA)	1
• With visible display (setting: mA)	6
• with customer-specific display (setting as specified, Order code "Y21" or "Y22" required)	7

Power supply units see Chap. 7 "Supplementary Components".

Scope of delivery: Pressure transmitter as ordered (Instruction Manual is extra ordering item)

1) Not in conjunction with max. span 600 mbar (240.9 inH_2O)

2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

3) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) The diaphragm seal is to be specified with a separate order number and must be included wiht the tranmitter order number, for example 7MF453.-..Y..-.... and 7MF4900-1....-.B

5) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.

6) Not in conjunction with Electrical connection "Screwed gland Pg 13.5" and "Han7D plug".

7) Without cable gland, with blanking plug

8) With enclosed cable gland Ex ia and blanking plug

9) Configurations with HAN and M12 connectors are only available in Ex ic.

10) Only in connection with IP65.

11) Only in connection with Ex approval A, B or E.

12) Permissible only for crimp-contact of conductor cross-section 1 mm^2

13) Only in connection with Ex approval A, B, E or F.

14) M12 delivered without cable socket.

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Selection and Ordering data		Article No.
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)		
SITRANS P DS III with PROFIBUS PA (PA) ↗		7MF4534-
SITRANS P DS III with FOUNDATION Fieldbus (FF) ↗		7MF4535-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		1 ■■■■-■■■■
Nominal measuring range		
250 mbar	(100.4 inH_2O)	D
600 mbar	(240.9 inH_2O)	E
1600 mbar	(642.4 inH_2O)	F
5 bar	(2008 inH_2O)	G
30 bar	(435 psi)	H
Wetted parts materials		
(stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Gold [1]	Gold	L
Version for diaphragm seal [2] [3] [4] [5]		Y
Process connection		
Female thread ¼-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		3
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		1
• Venting on side of process flanges, location of vent valve at top of process flanges (see dimensional drawing).		
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		7
- Mounting thread M12 to DIN 19213 (only for replacement requirement)		5
Non-wetted parts materials		
Process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting	3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)" [6]		D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)" [7]		P
- "Ex nA/ic (Zone 2)" [8]		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)" [7] [9] (not for DS III FF)		R
• FM + CSA intrinsic safe (is)		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX) [9]		S
• With FM + CSA, Type of protection:		
- "Intrinsic safety and explosion-proof (is + xp)" [6], max PN 360		N C
Electrical connection/cable entry		
• Screwed gland M20 x 1.5		B
• Screwed gland ½-14 NPT		C
• M12 connectors (stainless steel) [10] [11]		F

Selection and Ordering data	Article No.
Pressure transmitters for differential pressure and flow, PN 420 (MAWP 6092 psi)	
SITRANS P DS III with PROFIBUS PA (PA)	7MF4534-
SITRANS P DS III with FOUNDATION Fieldbus (FF)	7MF4535-
	1 ■■■■-■■■■
Display	
• Without (display hidden)	0
• Without visible display (display concealed, setting: bar)	1
• With visible display (setting: bar)	6
• With customer-specific display (setting as specified, Order code "Y21" required)	7

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) Not in conjunction with max. span 600 mbar (240.9 inH_2O)

2) When the manufacture's certificate (calibration certificate) has to be ordered for transmitters with diaphragm seals according to IEC 60770-2, it is recommended only to order this certificate exclusively with the diaphragm seals. The measuring accuracy of the total combination is certified here.

3) If the acceptance test certificate 3.1.is ordered for the transmitter with mounted diaphragm seals this certificate must also be ordered with the respective remote seals.

4) The diaphragm seal is to be specified with a separate order number and must be included wiht the tranmitter order number, for example 7MF453.-..Y..-.... and 7MF4900-1....-.B

5) The standard measuring cell filling for configurations with remote seals (Y) is silicone oil.

6) Without cable gland, with blanking plug.

7) With enclosed cable gland Ex ia and blanking plug.

8) Configurations with HAN and M12 connectors are only available in Ex ic.

9) Only in connection with IP65.

10) Only in connection with Ex approval A, B, E or F.

11) M12 delivered without cable socket

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Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Pressure transmitter with mounting bracket (1x fixing angle, 2 x nut, 2 x U-washer or 1 x bracket, 2 x nut, 2 x U-washer) made of:				
• Steel	**A01**	✓	✓	✓
• Stainless steel	**A02**	✓	✓	✓
O-rings for process flanges (instead of FPM (Viton))				
• PTFE (Teflon)	**A20**	✓	✓	✓
• FEP (with silicone core, approved for food)	**A21**	✓	✓	✓
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	**A22**	✓	✓	✓
• NBR (Buna N)	**A23**	✓	✓	✓
Plug				
• Han 7D (metal)	**A30**	✓		
• Han 8D (instead of Han 7D)	**A31**	✓		
• Angled	**A32**	✓		
• Han 8D (metal)	**A33**	✓		
Sealing screws (2 units) ¼-18 NPT, with valve in mat. of process flanges	**A40**	✓	✓	✓
Cable sockets for M12 connection (metal (CuZn))	**A50**	✓	✓	✓
Rating plate inscription (instead of German)				
• English	**B11**	✓	✓	✓
• French	**B12**	✓	✓	✓
• Spanish	**B13**	✓	✓	✓
• Italian	**B14**	✓	✓	✓
• Cyrillic (russian)	**B16**	✓	✓	✓
English rating plate Pressure units in inH_2O and/or psi	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	**C14**	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	**C20**	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	**C21**[1]		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	**C23**	✓		
Device passport Russia (For price request please contact the technical support www.siemens.com/automation/support-request)	**C99**	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA	**D05**	✓		
Manufacturer's declaration acc. to NACE (MR 0103-2012 and MR 0175-2009) (only together with seal diaphragm made of Hastelloy and stainless steel)	**D07**	✓	✓	✓
Degree of protection IP66/IP68 (only for M20 x 1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Nom. press. rating PN 500 (MAWP 7250 psi) (Only for measuring cell 600 mbar ... 30 bar (240 inH_2O ... 435 psi), SIL- and Ex-options not possible))[2]	**D56**	✓		
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	**D59**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Further designs Add "**-Z**" to Article No. and specify Order code.				
Use in or on zone 1D/2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-.B.. Ex ia)"and IP65)	**E01**	✓	✓	✓
Export approval Korea	**E11**	✓	✓	✓
Dual seal	**E24**	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.B..)	**E25**[3]	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.D..)	**E26**[3]	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.P..)	**E28**[3]	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-.B..)	**E45**[3]	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-.D..)	**E46**[3]	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-.B..)	**E55**[3]	✓	✓	✓
Ex prot. "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-.D..)	**E56**[3]	✓	✓	✓
Explosion-proof "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.E..)	**E57**[3]	✓	✓	✓
Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.R..)	**E58**[3]	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-.[B, D]..-Z + E11)	**E70**[3]	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	**G10**	✓	✓	✓
Interchanging of process connection side	**H01**	✓	✓	✓
Stainless steel process flanges for vertical differential pressure lines	**H03**	✓	✓	✓
Transient protector 6 kV (lightning protection)	**J01**	✓	✓	✓
Chambered graphite gasket for process flange	**J02**	✓	✓	✓
EPDM O-rings for process flange with approval (WRC/WRAS)	**J05**	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)[4]	**J08**	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)[4]	**J09**	✓	✓	✓

1) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H
2) Tested according to IEC 61010. Only for measuring materials of the group of fluids 2 in accordance with PED permissible. Not for use with dangerous media suitable.
3) Option does not include ATEX approval, but instead includes only the country-specific approval.
4) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

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Selection and Ordering data	Order code	HART	PA	FF
Additional data				
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text:				
• in the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**	✓	✓[1]	
• in the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	**Y02**	✓		
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 char., specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 char., specify in plain text: Y17:	**Y17**	✓		
Setting of pressure indication in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H_2O[*], inH_2O[*], ftH_2O[*], mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM or % *) ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of pressure indication in non-pressure units[2] Specify in plain text: Y22: ..... up to ..... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" or "Y02" is essential, unit with max. 5 characters)	**Y22 +** **Y01** *or* **Y02**	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	**Y25**		✓	✓
Damping adjustment in seconds (0 ... 100 s)	**Y30**	✓	✓	✓

Factory mounting of valve manifolds, see accessories.

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset.

✓ = available

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
2) Preset values can only be changed over SIMATIC PDM.

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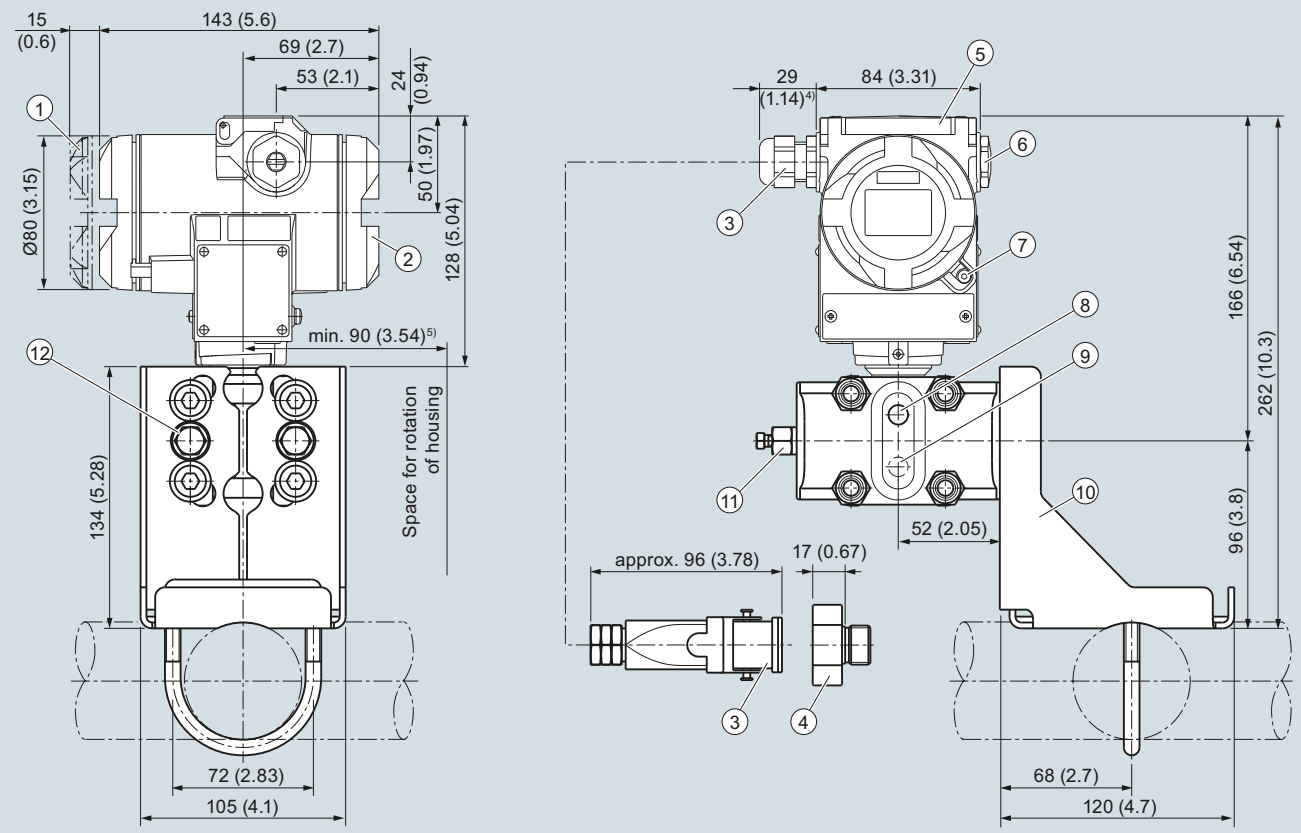
Dimensional drawings



1. Electronic side, digital display (longer overall length for cover with window)[1)]
2. Terminal side[1)]
3. Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)[2) 3)], Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D[2) 3)] plug
4. Harting adapter
5. Protective cover over keys
6. Blanking plug
7. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
8. Lateral venting for liquid measurement (Standard)
9. Lateral venting for gas measurement (suffix H02)
10. Mounting bracket (option)
11. Sealing screw with valve (option)
12. Process connection: ¼-18 NPT (IEC 61518)

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA" [IS + XP]"
4) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)
5) 92 mm (3.62 inch) for minimum distance to permit rotation with indicator

SITRANS P DS III pressure transmitters for differential pressure and flow, dimensions in mm (inch)

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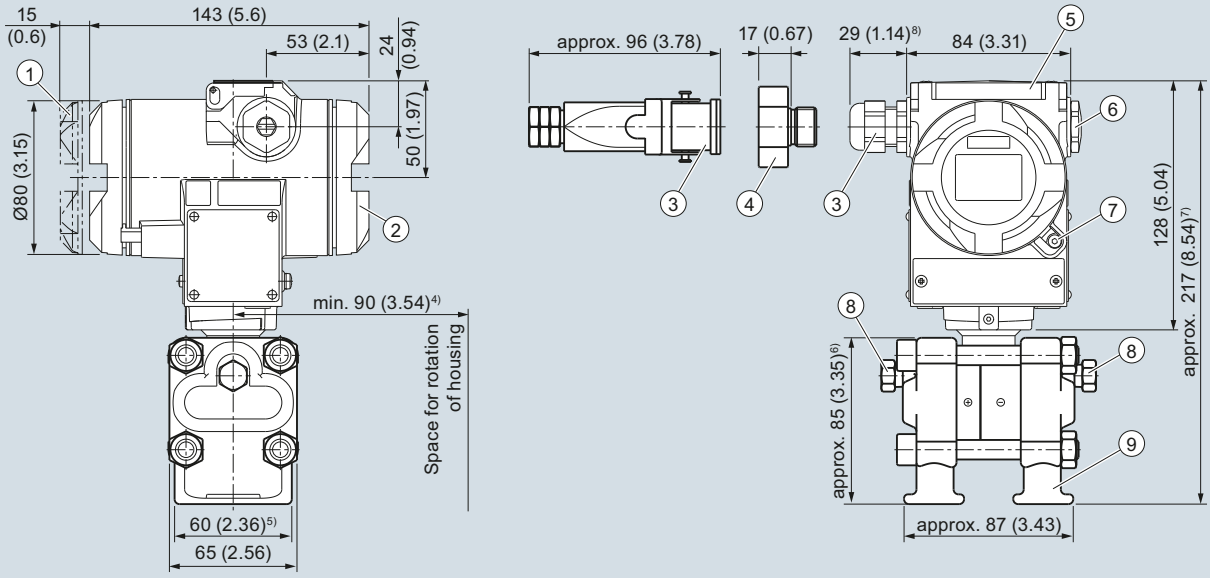
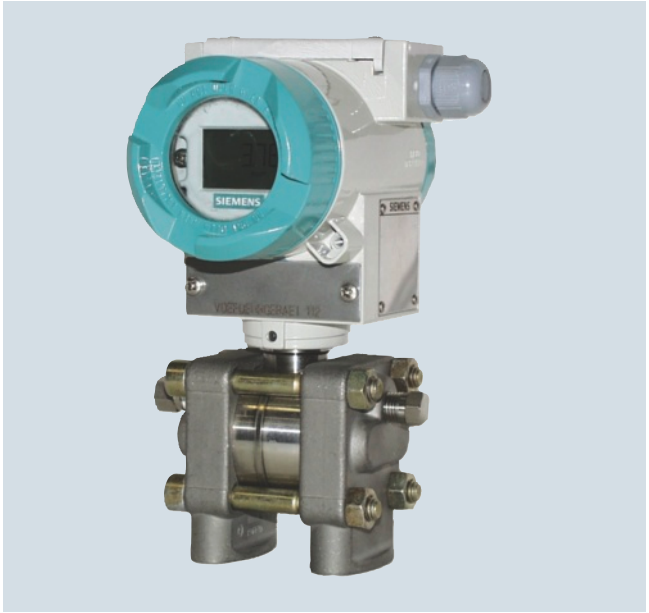


1. Electronic side, digital display (longer overall length for cover with window)[1]
2. Terminal side[1]
3. Electrical connection: Screwed gland Pg 13,5 (adapter)(Adapter)[2] [3], Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or Han 7D/ Han 8D[2] [3] plug
4. Harting adapter
5. Protective cover over keys
6. Blanking plug
7. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
8. Sealing screw with valve (option)
9. Process connection: ¼-18 NPT (IEC 61518)

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA" [IS + XP]"
4) 92 mm (3.6 inch) for minimum distance to permit rotation with indicator
5) 74 mm (2.9 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
6) 91 mm (3.6 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
7) 219 mm (8.62 inch) for PN ≥ 420 (MAWP ≥ 6092 psi)
8) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)

SITRANS P DS III pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines, optional "H03" , dimensional drawing, dimensions in mm (inch)



SITRANS P DS III pressure transmitters for differential pressure and flow, with process covers for vertical differential pressure lines

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Technical specifications

SITRANS P DS III for level				
	HART		**PROFIBUS PA or FOUNDATION Fieldbus**	
Input				
Measured variable	Level			
Spans (infinitely adjustable) or nominal measuring range and max. permissible operating pressure	Span (min. ... max.)	Maximum operating pressure	Nominal measuring range	Maximum operating pressure
	25 ... 250 mbar (10 ... 100 inH_2O)	See "Mounting flange"	250 mbar (100 inH_2O)	See "Mounting flange"
	25 ... 600 mbar (10 ... 240 inH_2O)	See "Mounting flange"	600 mbar (240 inH_2O)	See "Mounting flange"
	53 ... 1600 mbar (21 ... 642 inH_2O)	See "Mounting flange"	1600 mbar (642 inH_2O)	See "Mounting flange"
	160 ... 5000 mbar (64 ... 2000 inH_2O)	See "Mounting flange"	5 bar (2000 inH_2O)	See "Mounting flange"
Lower measuring limit • Measuring cell with silicone oil filling	-100 % of max. span or 500 mbar a (7.25 psia) Also available as vacuum-resistant remote seal: 30 mbar a (0.44 psi a)			
Upper measuring limit	100 % of max. span		100 % of the max. nominal measuring range	
Output				
Output signal	4 ... 20 mA		Digital PROFIBUS PA and FOUNDATION Fieldbus signal	
• Lower limit (infinitely adjustable)	3.55 mA, factory preset to 3.84 mA		-	
• Upper limit (infinitely adjustable)	23 mA, factory preset to 20.5 mA or optionally set to 22.0 mA		-	
Load				
• Without HART	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H: Power supply in V		-	
• With HART	R_B = 230 ... 500 Ω (SIMATIC PDM) or R_B = 230 ... 1100 Ω (HART Communicator)		-	
Physical bus	-		IEC 61158-2	
Protection against polarity reversal	Protected against short-circuit and polarity reversal. Each connection against the other with max. supply voltage.			
Electrical damping (step width 0.1 s)	Set to 2 s (0 ... 100 s)			
Measuring accuracy	Acc. to IEC 60770-1			
Reference conditions (All error data refer always refer to the set span)	Increasing characteristic, start-of-scale value 0 bar, stainless steel seal diaphragm, silicone oil filling, room temperature 25 °C (77 °F)			
	Span ratio r = max. span/set span)		Nominal measuring range ratio r = nominal measuring range/set measuring range	
Error in measurement at limit setting incl. hysteresis and reproducibility				
• Linear characteristic				
- r ≤ 10	≤ 0.15 %		≤ 0.15 %	
- 10 < r ≤ 30	≤ 0.3 %		≤ 0.3 %	
- 30 < r ≤ 100	≤ (0.0075 · r + 0.075) %		≤ (0.0075 · r + 0.075) %	
Long-term stability (temperature change ± 30 °C (± 54 °F))	≤ (0.25 · r)% every 5 years static pressure max. 70 bar (1015 psi)		≤ (0.25 · r)% every 5 years static pressure max. 70 bar (1015 psi)	
Influence of ambient temperature				
• at -10 ... +60 °C (14 ... 140 °F)				
- 250 mbar- (100 inH_2O)-measuring cell	≤ (0.5 · r + 0.2) %[1) 4)]		≤ (0.5 · r + 0.2) %[1) 4)]	
- 600 mbar- (240 inH_2O)-measuring cell	≤ (0.3 · r + 0.2) %[2) 4)]		≤ (0.3 · r + 0.2) %[2) 4)]	
- 1600 and 5000 mbar- (642 and 2000 inH_2O)-measuring cell	≤ (0.25 · r + 0.2) %[3) 4)]		≤ (0.25 · r + 0.2) %[3) 4)]	
• at -40 ... -10 °C and 60 ... 85 °C (-40 ... +14 °F and 140 ... 185 °F)				
- 250 mbar- (100 inH_2O)-measuring cell	≤ (0.25 · r + 0.15) %/10 K doubled values at 10 < r ≤ 30		≤ (0.25 · r + 0.15) %/10 K doubled values at 10 < r ≤ 30	
- 600 mbar- (240 inH_2O)-measuring cell	≤ (0.15 · r + 0.15) %/10 K doubled values at 10 < r ≤ 30		≤ (0.15 · r + 0.15) %/10 K doubled values at 10 < r ≤ 30	
- 1600 and 5000 mbar- (642 and 2000 inH_2O)-measuring cell	≤ (0.12 · r + 0.15) %/10 K double values at 10 < r ≤ 30		≤ (0.12 · r + 0.15) %/10 K double values at 10 < r ≤ 30	

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SITRANS P DS III for level	**HART**	**PROFIBUS PA or FOUNDATION Fieldbus**
Influence of static pressure		
• on the zero point		
- 250 mbar- (100 inH_2O)-measuring cell	≤ (0.3 · r) % per nominal pressure	≤ (0.3 · r) % per nominal pressure
- 600 mbar- (240 inH_2O)-measuring cell	≤ (0.15 · r) % per nominal pressure	≤ (0.15 · r) % per nominal pressure
- 1600 and 5000 mbar- (642 and 2000 inH_2O)-measuring cell	≤ (0.1 · r) % per nominal pressure	≤ (0.1 · r) % per nominal pressure
• on the span	≤ (0.1 · r) % per nominal pressure	≤ (0.1 · r) % per nominal pressure
Measured Value Resolution	-	3 · 10^{-5} of nominal measuring range
Rated conditions		
Degree of protection to IEC 60529	IP66 (optional IP66/IP68), NEMA 4X	
Temperature of medium	**Note:** Always take into account assignment of max. permissible operating temperature to max. permissible operating pressure of the respective flange connection!	
• Measuring cell with silicone oil filling	-40 ... +100[5] °C (-40 ... +212[5] °F)	
- High-pressure side	p_{abs} ≥ 1 bar: -40 ... +175 °C (-40 ... +347 °F) p_{abs} < 1 bar: -40 ... +80 °C (-40 ... +176 °F)	
- Low-pressure side	-40 ... +100 °C (-40 ... +212 °F) -20 ... +60 °C (-4 ... +140 °F) in conjunction with dust explosion protection	
Ambient conditions		
• Ambient temperature		
- Transmitter (with 4-wire connection, observe temperature values of supplementary 4-wire electronics)	-40 ... +85 °C (-40 ... +185 °F)	
- -Display readable	-30 ... +85 °C (-22 ... +185 °F)	
• Storage temperature	-50 ... +85 °C (-58 ... +185 °F)	
• Climatic class		
- Condensation	Relative humidity 0 ... 100 %, condensation permissible, suitable for use in the tropics	
• Electromagnetic Compatibility		
- Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Design		
Weight (without options)		
• To EN (pressure transmitter with mounting flange, without tube)	≈ 11 ... 13 kg (≈ 24.2 ... 28.7 (lb)	
• To ASME (pressure transmitter with mounting flange, without tube)	≈ 11 ... 18 kg (≈ 24.2 ... 39.7 lb)	
Enclosure material	Low-copper die-cast aluminum, GD-AlSi12 or stainless steel precision casting, mat. no. 1.4408	
Wetted parts materials		
High-pressure side		
• Seal diaphragm of mounting flange	Stainless steel, mat. no. 1.4404/316L, Monel, mat. no. 2.4360, Hastelloy B2, mat. no. 2.4617, Hastelloy C276, mat. no. 2.4819, Hastelloy C4, mat. no. 2.4610, tantalum, PTFE, ETCFE, stainless steel Duplex, mat. no. 1.4462	
Measuring cell filling	Silicone oil	
Process connection		
• High-pressure side	Flange to EN and ASME	
• Low-pressure side	Female thread ¼-18 NPT and flange connection with mounting thread M10 to DIN 19213 or $^{7}/_{16}$-20 UNF to EN 61518	
Power supply U_H		Supplied through bus
Terminal voltage on transmitter	10.5 ... 45 V DC 10.5 ... 30 V DC in intrinsically-safe mode	-
Separate 24 V power supply necessary	-	No
Bus voltage		
• Not Ex	-	9 ... 32 V
• With intrinsically-safe operation	-	9 ... 24 V
Current consumption		
• Basic current (max.)	-	12.5 mA
• Start-up current ≤ basic current	-	Yes
• Max. current in event of fault	-	15.5 mA
Fault disconnection electronics (FDE) available	-	Yes

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SITRANS P DS III for level	HART	PROFIBUS PA or FOUNDATION Fieldbus
Certificates and approvals		
Classification according to PED 97/23/EC	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)	
Explosion protection		
• Intrinsic safety "i"	PTB 13 ATEX 2007 X	
- Marking	Ex II 1/2 G Ex ia/ib IIC T4/T5/T6 Ga/Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +70 °C (-40 ... +158 °F) temperature class T5; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1.2 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion-proof "d"	PTB 99 ATEX 1160	
- Marking	Ex II 1/2 G Ex d IIC T4/T6 Gb	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC	To circuits with values: U_H = 9 ... 32 V DC
• Dust explosion protection for zone 20	PTB 01 ATEX 2055	
- Marking	Ex II 1 D IP65 T 120 °C Ex II 1/2 D IP65 T 120 °C	
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)	
- Max. surface temperature	120 °C (248 °F)	
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω	FISCO supply unit: U_o = 17.5 V, I_o = 380 mA, P_o = 5.32 W Linear barrier: U_o = 24 V, I_o = 250 mA, P_o = 1.2 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Dust explosion protection for zone 21/22	PTB 01 ATEX 2055	
- Marking	Ex II 2 D IP65 T 120 °C	
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 W	To circuits with values: U_H = 9 ... 32 V DC; P_{max} = 1 W
• Type of protection "n" (zone 2)	PTB 13 ATEX 2007 X	
- Marking	Ex II 2/3 G Ex nA II T4/T5/T6 Gc Ex II 2/3 G Ex ic IIC T4/T5/T6 Gc	
- Connection (Ex nA)	U_m = 45 V	U_m = 32 V
- Connection (Ex ic)	To circuits with values: U_i = 45 V	FISCO supply unit ic: U_o = 17.5 V, I_o = 570 mA Linear barrier: U_o = 32 V, I_o = 132 mA, P_o = 1 W
- Effective internal inductance/capacitance	L_i = 0.4 mH, C_i = 6 nF	L_i = 7 µH, C_i = 1.1 nF
• Explosion protection acc. to FM	Certificate of Compliance 3008490	
- Identification (XP/DIP) or (IS); (NI)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; CL I, ZN 0/1 AEx ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	
• Explosion protection to CSA	Certificate of Compliance 1153651	
- Identification (XP/DIP) or (IS)	CL I, DIV 1, GP ABCD T4...T6; CL II, DIV 1, GP EFG; CL III; Ex ia IIC T4...T6; CL I, DIV 2, GP ABCD T4...T6; CL II, DIV 2, GP FG; CL III	

1) Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.4 · r + 0.16) % / 28 °C (50 °F).
2) Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.24 · r + 0.16) % / 28 °C (50 °F).
3) Conversion of temperature error per 28 °C. Valid for temperature range -3 ... +53 °C < (0.2 · r + 0.16) % / 28 °C (50 °F).
4) 0.32 instead of 0.16 at 10 < r < 30
5) This value may be increased if the process connection is sufficiently insulated.

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HART communication	
HART	230 ... 1100 Ω
Protocol	HART Version 5.x
Software for computer	SIMATIC PDM
PROFIBUS PA communication	
Simultaneous communication with master class 2 (max.)	4
The address can be set using	Configuration tool or local operation (standard setting address 126)
Cyclic data usage	
• Output byte	5 (one measured value) or 10 (two measured values)
• Input byte	0, 1, or 2 (register operating mode and reset function for metering)
Internal preprocessing	
Device profile	PROFIBUS PA Profile for Process Control Devices Version 3.0, class B
Function blocks	2
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Input/Output
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
• Register (totalizer)	Can be reset, preset, optional direction of counting, simulation function of register output
- Failure mode	parameterizable (summation with last good value, continuous summation, summation with incorrect value)
- Limit monitoring	One upper and lower warning limit and one alarm limit respectively
• Physical block	1
Transducer blocks	2
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Specification of a container characteristic with	Max. 30 nodes
- Square-rooted characteristic for flow measurement	Yes
- Gradual volume suppression and implementation point of square-root extraction	Parameterizable
- Simulation function for measured pressure value and sensor temperature	Constant value or over parameterizable ramp function

FOUNDATION Fieldbus communication	
Function blocks	3 function blocks analog input, 1 function block PID
• Analog input	
- Adaptation to customer-specific process variables	Yes, linearly rising or falling characteristic
- Electrical damping, adjustable	0 ... 100 s
- Simulation function	Output/input (can be locked within the device with a bridge)
- Failure mode	parameterizable (last good value, substitute value, incorrect value)
- Limit monitoring	Yes, one upper and lower warning limit and one alarm limit respectively
- Square-rooted characteristic for flow measurement	Yes
• PID	Standard FOUNDATION Fieldbus function block
• Physical block	1 resource block
Transducer blocks	1 transducer block Pressure with calibration, 1 transducer block LCD
• Pressure transducer block	
- Can be calibrated by applying two pressures	Yes
- Monitoring of sensor limits	Yes
- Simulation function: Measured pressure value, sensor temperature and electronics temperature	Constant value or over parameterizable ramp function
Mounting flange	
Nominal diameter	Nominal pressure
• Acc. to EN 1092-1	
- DN 80	PN 40
- DN100	PN16, PN40
• To ASME B16.5	
- 3 inch	class 150, class 300
- 4 inch	class 150, class 300

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Selection and Ordering data		Article No.
Pressure transmitter for level, SITRANS P DS III with HART		7MF4633-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Measuring span (min. ... max.)		
25 ... 250 mbar	(10 ... 100 inH_2O)	D
25 ... 600 mbar	(10 ... 240 inH_2O)	E
53 ... 1600 mbar	(21 ... 642 inH_2O)	F
0.16 ... 5 bar	(64.3 ... 2000 inH_2O)	G
Process connection of low-pressure side		
Female thread ¼-18 NPT with flange connection		
• Mounting thread $^7/_{16}$-20 UNF to IEC 61518		2
• Mounting thread M10 to DIN 19213 (only for replacement requirement)		0
Non-wetted parts materials		
process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting[1]	3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)"[2]		D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[3]		P
- "Ex nA/ic (Zone 2)" [4]		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia+ Ex d + Zone 1D/2D)"[3][5]		R
• FM + CSA intrinsic safe (is)		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[5]		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)"[1]		NC
Electrical connection/cable entry		
• Screwed gland Pg 13.5[6]		A
• Screwed gland M20x1.5		B
• Screwed gland ½-14 NPT		C
• Han 7D plug (plastic housing) incl. mating connector[6]		D
• M12 connectors (stainless steel) [7] [8]		F
Display		
• Without display		0
• Without visible display (display concealed, setting: mA)		1
• With visible display (setting mA)		6
• With customer-specific display (setting as specified, Order code "Y21" or "Y22" required)		7

Ordering information

1st order item: Pressure transmitter 7MF4633-...
2nd order item: Mounting flange 7MF4912-3...

ordering example

Item line 1:	7MF4633-1EY20-1AA1-Z
B line:	Y01
C line:	Y01: 80 to 143 mbar (1.16 to 2.1 psi)
Item line 2:	7MF4912-3GE01

Power supply units see Chap. 7 "Supplementary Components".

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) Not in conjunction with electrical connection "Screwed gland Pg 13.5" and "Han7D plug".
2) Without cable gland, with blanking plug.
3) With enclosed cable gland Ex ia and blanking plug.
4) Configurations with HAN and M12 connectors are only available in Ex ic.
5) Only in connection with IP65.
6) Only in connection with Ex approval A, B or E.
7) M12 delivered without cable socket
8) Only in connection with Ex approval A, B, E or F.

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Selection and Ordering data		Article No.
Pressure transmitters for level		
SITRANS P DS III with PROFIBUS PA (PA) ↗		7MF4634-
SITRANS P DS III with FOUNDATION Fieldbus (FF) ↗		7MF4635-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		1 ■ Y ■■ - ■■■■
Nominal measuring range		
250 mbar	(100 inH_2O)	D
600 mbar	(240 inH_2O)	E
1600 mbar	(642 inH_2O)	F
5 bar	(2000 inH_2O)	G
Process connection of low-pressure side		
Female thread ¼-18 NPT with flange connection		
• Mounting thread $^7/_{16}$-20 UNF to IEC 61518		2
• Mounting thread M10 to DIN 19213 (only for replacement requirement)		0
Non-wetted parts materials		
process flange screws	Electronics housing	
Stainless steel	Die-cast aluminum	2
Stainless steel	Stainless steel precision casting	3
Version		
• Standard versions		1
• International version, English label inscriptions, documentation in 5 languages on CD (no Order code selectable)		2
Explosion protection		
• None		A
• With ATEX, Type of protection:		
- "Intrinsic safety (Ex ia)"		B
- "Explosion-proof (Ex d)"[1)]		D
- "Intrinsic safety and flameproof enclosure" (Ex ia + Ex d)"[2)]		P
- "Ex nA/ic (Zone 2)" [3)]		E
- "Intrinsic safety, explosion-proof enclosure and dust explosion protection (Ex ia + Ex d + Zone 1D/2D)"[2)4)] (not for DS III FF)		R
• FM + CSA intrinsic safe (is)		F
• FM + CSA (is + ep) + Ex ia + Ex d (ATEX)[4)]		S
• With FM + CSA, Type of protection:		
- "Intrinsic Safe and Explosion Proof (is + xp)"[1)]		N C
Electrical connection/cable entry		
• Screwed gland M20 x 1.5		B
• Screwed gland ½-14 NPT		C
• M12 connectors (stainless steel)[5) 6)]		F
Display		
• Without display		0
• Without visible display (display concealed, setting: bar)		1
• With visible display (setting: bar)		6
• With customer-specific display (setting as specified, Order code "Y21" required)		7

Ordering information

1st order item: Pressure transmitter 7MF4634-...
2nd order item: Mounting flange 7MF4912-...

ordering example

Item line 1: 7MF4634-1EY20-1AA1
Item line 2: 7MF4912-3GE01

Included in delivery of the device:
- Brief instructions (Leporello)
- CD-ROM with detailed documentation
- Sealing plug(s) or sealing screw(s) for the process flanges(s)

1) Without cable gland, with blanking plug.
2) With enclosed cable gland Ex ia and blanking plug.
3) Configurations with HAN and M12 connectors are only available in Ex ic.
4) Only in connection with IP65.
5) M12 delivered without cable socket
6) Only in connection with Ex approval A, B, E or F.

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Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
O-rings for process flanges on low-pressure side (instead of FPM (Viton))				
• PTFE (Teflon)	**A20**	✓	✓	✓
• FEP (with silicone core, approved for food)	**A21**	✓	✓	✓
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)	**A22**	✓	✓	✓
• NBR (Buna N)	**A23**	✓	✓	✓
Plug				
• Han 7D (metal)	**A30**	✓		
• Han 8D (instead of Han 7D)	**A31**	✓		
• Angled	**A32**	✓		
• Han 8D (metal)	**A33**	✓		
Sealing screw ¼-18 NPT, with valve in mat. of process flanges	**A40**	✓	✓	✓
Cable sockets for M12 connectors (metal (CuZn))	**A50**	✓	✓	✓
Rating plate inscription (instead of German)				
• English	**B11**	✓	✓	✓
• French	**B12**	✓	✓	✓
• Spanish	**B13**	✓	✓	✓
• Italian	**B14**	✓	✓	✓
• Cyrillic (russian)	**B16**	✓	✓	✓
English rating plate Pressure units in inH_20 and/or psi	**B21**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	**C12**	✓	✓	✓
Factory certificate Acc. to EN 10204-2.2	**C14**	✓	✓	✓
Functional safety (SIL2) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	**C20**	✓		
Functional safety (PROFIsafe) Certificate and PROFIsafe protocol	**C21**[1]		✓	
Functional safety (SIL2/3) Devices suitable for use according to IEC 61508 and IEC 61511. Includes SIL conformity declaration	**C23**	✓		
Device passport Russia (For price request please contact the technical support www.siemens.com/automation/support-request)	**C99**	✓	✓	✓
Setting of upper limit of output signal to 22.0 mA	**D05**	✓		
Degree of protection IP66/IP68 (only for M20x1.5 and ½-14 NPT)	**D12**	✓	✓	✓
Supplied with oval flange (1 item), PTFE packing and screws in thread of process flange	**D37**	✓	✓	✓
Capri cable gland 4F CrNi and clamping device (848699 + 810634) included	**D59**	✓	✓	✓

Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Use on zone 1D / 2D (only together with type of protection "Intrinsic safety" (transmitter 7MF4...-.....-.B.. Ex ia)"and IP65)	**E01**	✓	✓	✓
Overfilling safety device for flammable and non-flammable liquids (max. PN 32 (MAWP 464 psi), basic device with type of protection "Intrinsic safety (Ex ia)", to WHG and VbF, not together with measuring cell filling "inert liquid")	**E08**	✓		
Export approval Korea	**E11**	✓	✓	✓
CRN approval Canada (Canadian Registration Number)	**E22**	✓	✓	✓
Dual seal	**E24**	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.B..)	**E25**[2]	✓	✓	✓
"Flameproof" explosion protection according to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.D..)	**E26**[2]	✓	✓	✓
Explosion-proof "Intrinsic safety" (Ex ia + Ex d) to INMETRO (Brazil) (only for transmitter 7MF4...-.....-.P..)	**E28**[2]	✓	✓	
Ex Approval IEC Ex (Ex ia) (only for transmitter 7MF4...-.....-.B..)	**E45**[2]	✓	✓	✓
Ex Approval IEC Ex (Ex d) (only for transmitter 7MF4...-.....-.D..)	**E46**[2]	✓	✓	✓
Explosion-proof "Intrinsic safety" to NEPSI (China) (only for transmitter 7MF4...-.....-.B..)	**E55**[2]	✓	✓	✓
Explosion protection "Explosion-proof" to NEPSI (China) (only for transmitter 7MF4...-.....-.D..)	**E56**[2]	✓	✓	✓
Ex protection "Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.E..)	**E57**[2]	✓	✓	✓
Ex protection „Ex ia", „Ex d" and „Zone 2" to NEPSI (China) (only for transmitter 7MF4...-.....-.R..)	**E58**[2]	✓	✓	✓
"Intrinsic safety" and "Explosion-proof" explosion protection acc. to Kosha (Korea) (only for transmitter 7MF4...-.....-.[B, D]..-Z + E11)	**E70**[2]	✓	✓	✓
Two coats of lacquer on casing and cover (PU on epoxy)	**G10**	✓	✓	✓
Replacement of process connection side	**H01**	✓	✓	✓
Transient protector 6 kV (lightning protection)	**J01**	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on right when viewing the display)[3]	**J08**	✓	✓	✓
Vent valve or blanking plug of process flange welded-in (orientation: on left when viewing the display)[3]	**J09**	✓	✓	✓

1) Profisafe transmitters can only be operated with the S7 F Systems V6.1 configuration software in combination with S7-400H
2) Option beinhaltet keine ATEX-Zulassung, sondern nur die landesspezifische Zulassung.
3) Blanking plug is standard configuration. Order option A40 if a vent valve is required instead of a blanking plug.

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Selection and Ordering data	Order code	HART	PA	FF
Additional data Please add "**-Z**" to Article No. and specify Order code(s) and plain text.				
Measuring range to be set Specify in plain text (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**	✓	✓[1]	
Stainless steel tag plate and entry in device variable (measuring point description) Max. 16 characters, specify in plain text: Y15:	**Y15**	✓	✓	✓
Measuring point text (entry in device variable) Max. 27 characters, specify in plain text: Y16:	**Y16**	✓	✓	✓
Entry of HART address (TAG) Max. 8 characters, specify in plain text: Y17:	**Y17**	✓		
Setting of pressure indicator in pressure units Specify in plain text (standard setting: bar): Y21: mbar, bar, kPa, MPa, psi, ... Note: The following pressure units can be selected: bar, mbar, mm H_2O[*], inH_2O[*], ftH_2O[*], mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM or % [*] ref. temperature 20 °C	**Y21**	✓	✓	✓
Setting of pressure indicator in non-pressure units[2] Specify in plain text: Y22: ..... up to ..... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units "**Y01**" is essential, unit with max. 5 characters)	**Y22[3] + Y01**	✓		
Preset bus address possible between 1 and 126 Specify in plain text: Y25:	**Y25**		✓	✓
Damping adjustment in seconds (0 ... 100 s)	**Y30**	✓	✓	✓

Only Y01, Y15, Y16, Y17, Y21, Y22, Y25 and D05 can be factory preset

✓ = available

1) Measuring accuracies for PROFIBUS PA transmitters with Option Y01 are calculated in the same way as for HART devices.
2) Preset values can only be changed over SIMATIC PDM.
3) Not in conjunction with over-filling safety device for flammable and non-flammable liquids (Order code "E08")

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Selection and Ordering data		Article No. Ord. code
Mounting flange		↗ 7 M F 4 9 1 2 -
Directly mounted on the SITRANS P pressure transmitter (converter part) for level, for DS III series		3
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Connection to EN 1092-1		
Nominal diameter	**Nominal pressure**	
DN 50	PN 10/16/25/40	A
	PN 100	B
DN 80	PN 10/16/25/40	D
DN 100	PN 10/16	G
	PN 25/40	H
Connection to ASME B16.5		
Nominal diameter	**Nominal pressure**	
2 inch	class 150	L
	class 300	M
	class 400/600	N
	class 900/1500	P
3 inch	class 150	Q
	class 300	R
4 inch	class 150	T
	class 300	U
Other version, add Order code and plain text: Nominal diameter: ...; Nominal press.: ...		Z J 1 Y
Wetted parts materials		
• Stainless steel 316L		A
- Coated with PFA		D
- Coated with PTFE		E 0
• Coated with ECTFE[1]		F
• Monel 400, mat. no. 2.4360		G
• Hastelloy C276, mat. no. 2.4819		J
• Hastelloy C4, mat. no. 2.4610		U
• Tantalum		K
• Duplex 2205, mat. no. 1.4462		Q
• Duplex 2205, mat. no. 1.4462, incl. main body		R
• Stainless steel 316L, gold plated, thickness approx. 25 µm		S 0
Tube length		
• None		0
• 50 mm	(1.97 inch)	1
• 100 mm	(3.94 inch)	2
• 150 mm	(5.90 inch)	3
• 200 mm	(7.87 inch)	4
Other version: add Order code and plain text: material of parts in contact with medium: ....., tubus length:		Z 8 K 1 Y
Filling liquid		
• Silicone oil M5		1
• Silicone oil M50		2
• High-temperature oil		3
• Halocarbon oil (for O_2-measurement)		4
• Food oil (FDA-listed)		7
Other version, add Order code and plain text: filling liquid: ...		9 M 1 Y

[1] For vacuum on request

Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Spark arrester For mounting on zone 0 (incl. documentation)	**A01**	✓	✓	✓
Remote seal nameplate attached out of stainless steel, contains Article No. and order number of the remote seal supplier	**B20**	✓	✓	✓
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	**C10**	✓	✓	✓
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**	✓	✓	✓
Inspection certificate Acc. to EN 10204-3.1	**C12**	✓	✓	✓
2.2 Certificate of FDA approval of fill oil Only in conjunction with filling liquid "Food oil" (FDA listed)"	**C17**	✓	✓	✓
"Functional safety (SIL2)" certificate to IEC 61508 (only for conjunction with the Order code "C20" in the case of SITRANS P DS III transmitter)	**C20**	✓	✓	
"Functional safety (SIL2/3)" certificate to IEC 61508 (only for conjunction with the Order code "C23" in the case of SITRANS P DS III transmitter)	**C23**	✓	✓	
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 acc. to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D07**	✓	✓	✓
Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 acc. to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D08**	✓	✓	✓
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	**E10**	✓	✓	✓
Epoxy painting Not possible with vacuum-proof design Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40.. and 7MF42.., only possible with process connection G½B according to EN837-1.	**E15**	✓	✓	✓
Sealing surface B1 or ASME B16.5 RF 125 ... 250 AA instead of sealing surface B2 or RFSF (only for wetted parts made of Hastelloy C276 (2.4819), tantalum and Duplex 2205 (1.4462) and for nominal sizes 2", 3", DN 50 and DN 80)	**J12**	✓	✓	✓
Sealing surface groove, EN 1092-1, form D instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)	**J14**	✓	✓	✓
Sealing surface RJF (groove) ASME B16.5 instead of sealing surface ASME B16.5 RF 125 ... 250 AA (only for wetted parts made of stainless steel 316L)	**J24**	✓	✓	✓

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Selection and Ordering data	Order code	HART	PA	FF
Further designs				
Add "**-Z**" to Article No. and specify Order code.				
Elongated pipe, 150 mm instead of 100 mm, max. medium temperature 250 °C, observe the maximum permissible media temperature of the filling liquid.	**R15**	✓	✓	✓
Elongated pipe, 200 mm instead of 100 mm, max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	**R20**	✓	✓	✓
Vacuum-proof design (for use in low-pressure range) Note: suffix "Y01" required with press. transm.	**V04**	✓	✓	✓

✓ = available

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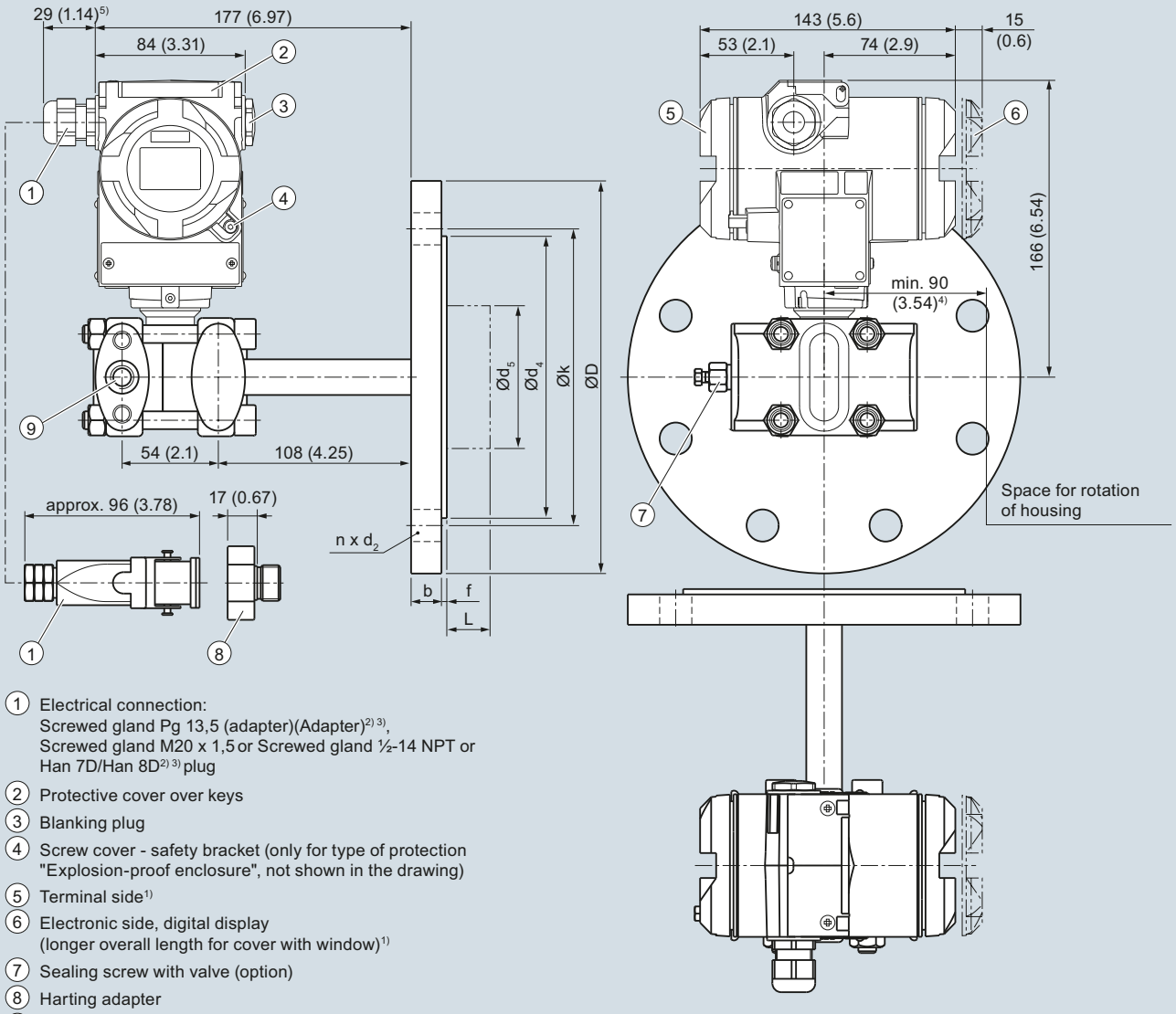
Dimensional drawings



1. Electrical connection:
   Screwed gland Pg 13,5 (adapter)(Adapter)[2) 3)],
   Screwed gland M20 x 1,5 or Screwed gland ½-14 NPT or
   Han 7D/Han 8D[2) 3)] plug
2. Protective cover over keys
3. Blanking plug
4. Screw cover - safety bracket (only for type of protection "Explosion-proof enclosure", not shown in the drawing)
5. Terminal side[1)]
6. Electronic side, digital display
   (longer overall length for cover with window)[1)]
7. Sealing screw with valve (option)
8. Harting adapter
9. Process connection of low pressure side ¼-18 NPT (IEC 61518)

1) Allow approx. 20 mm (0.79 inch) thread length to permit unscrewing
2) Not with type of protection "Explosion-proof enclosure"
3) Not with type of protection "FM + CSA" [IS + XP]"
4) 92 mm (3.62 inch) for minimum distance to permit rotation with indicator
5) For Pg 13,5 with adapter approx. 45 mm (1.77 inch)

SITRANS P DS III with HART pressure transmitters for level, including mounting flange, dimensions in mm (inch)

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Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d	d_2	d_4	d_5	d_M	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
DN 50	PN 10/16/ 25/40	20	165	90	18	102	48.3	45[1]	2	125	8	0, 50, 100, 150 or 200
	PN 100	28	195	90	26	102	48.3	45[1]	2	145	8	
DN 80	PN 10/16/ 25/40	24	200	90	18	138	76	72[2]	2	160	8	
	PN 100	32	230	90	26	138	76	72[2]	2	180	8	
DN 100	PN 10/16	20	220	115	18	158	94	89	2	180	8	
	PN 25/40	24	235	115	22	162	94	89	2	190	8	

Connection to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d_2	d_4	d_5	d_M	f	k	n	L
	lb./sq.in	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)		inch (mm)
2 inch	150	0.77 (19.5)	5.91 (150)	0.79 (20)	3.62 (92)	1.9 (48.3)	1.77[1] (45)	0.08 (2)	4.74 (120.5)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	300	0.89 (22.7)	6.5 (165)	0.79 (20)	3.62 (92)	1.9 (48.3)	1.77[1] (45)	0.08 (2)	5 (127)	8	
	400/600	1.28 (32.4)	6.5 (165)	0.79 (20)	3.62 (92)	1.9 (48.3)	1.77[1] (45)	0.28 (7)	5 (127)	8	
	900/1500	1.78 (45.1)	8.46 (215)	1.02 (26)	5 (127)	1.9 (48.3)	1.77[1] (45)	0.28 (7)	6.5 (165)	8	
3 inch	150	0.96 (24.3)	7.48 (190)	0.79 (20)	5 (127)	3 (76)	2.83[2] (72)	0.08 (2)	6 (152.5)	4	
	300	1.14 (29)	8.27 (210)	0.87 (22)	5 (127)	3 (76)	2.83[2] (72)	0.08 (2)	6.63 (168.5)	8	
	600	1.53 (38.8)	8.27 (210)	0.87 (22)	5 (127)	3 (76)	2.83[2] (72)	0.28 (7)	6.63 (168.5)	8	
4 inch	150	0.96 (24.3)	9.06 (230)	0.79 (20)	6.22 (158)	3.69 (94)	3.5 (89)	0.08 (2)	7.5 (190.5)	8	
	300	1.27 (32.2)	10.04 (255)	0.87 (22)	6.22 (158)	3.69 (94)	3.5 (89)	0.08 (2)	7.87 (200)	8	
	400	1.65 (42)	10.04 (255)	1.02 (26)	6.22 (158)	3.69 (94)	3.5 (89)	0.28 (7)	7.87 (200)	8	

d: Internal diameter of gasket to DIN 2690
d_M: Effective diaphragm diameter

[1] 59 mm = 2.32 inch with tube length L=0.

[2] 89 mm = 3½ inch with tube length L=0.

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SITRANS P DS III Supplementary electronics for 4-wire connection

Overview

Direct connection of the supplementary electronics to a SITRANS P DS III pressure transmitter with HART produces a transmitter for 4-wire connection.

The supplementary electronics cannot be attached to explosion-protected pressure transmitters. The supplementary electronics is fitted in a light metal housing which is mounted on the left side of the pressure transmitter.

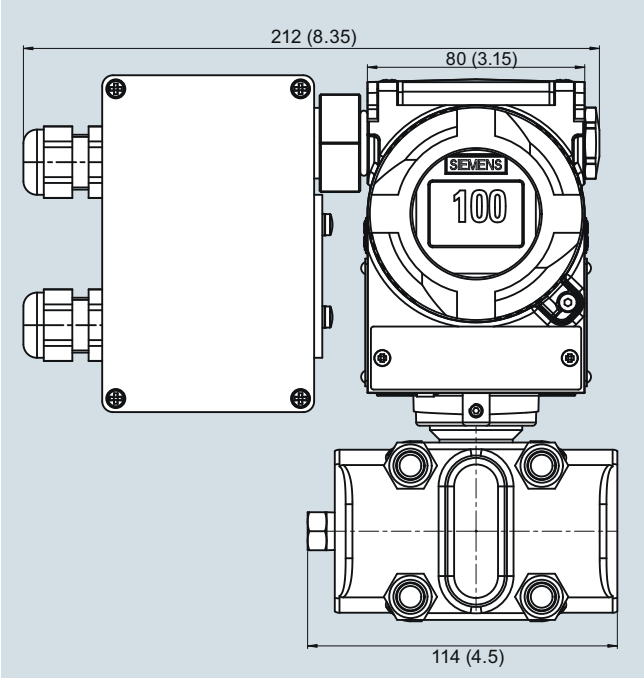
Note on ordering:

The supplementary electronics can only be ordered as an **optional accessory** for the corresponding pressure transmitter.

Technical specifications

SITRANS P, supplementary electronics for 4-wire connection	
Output	
Output signal	0 ... 20 mA or 4 ... 20 mA
Load	Max. 750 Ω
Voltage measurement	Linear (square-rooting in transmitter if necessary)
Electrical isolation	Between power supply and input/ output
Measuring accuracy	acc. to IEC 60770-1
Measurement deviation (in addition to transmitter)	≤ 0.15 % of set span
Influence of ambient temperature	≤ 0.1 % per 10 K
Power supply effect	≤ 0.1 % per 10 % change in voltage or frequency
Load effect	≤ 0.1 % per 100 % change
Rated conditions	
Ambient temperature	
• 24 V version	-20 ... +80 °C (-4 ... +176 °F)
• 230 V version	-20 ... +60 °C (-4 ... +140 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Degree of protection	IP54 to IEC 60529
Electromagnetic compatibility (EMC)	IEC 61236
Condensation	Relative humidity 0 ... 95 % condensation permissible
Structural design	
Dimensions (W x H x D) in mm (inch)	80 x 120 x 60 (3.15 x 4.72 x 2.36)
Electrical connection	Screw terminals (Pg 13.5 cable inlet) or Han 7D / Han 8D plug
Power supply	
Supply voltage	230 V AC (-10 ... +6 %, 47 ... 63 Hz, approx. 6 VA) or 24 V AC/DC (24 V AC ± 10 %, 47 ... 63 Hz, approx. 3 VA)
Permissible ripple (within the specified limits)	Approx. 2.5 V_{pp}

Dimensional drawings



SITRANS P pressure transmitters with supplementary electronics for four-wire connection, dimension drawing, dimensions in mm

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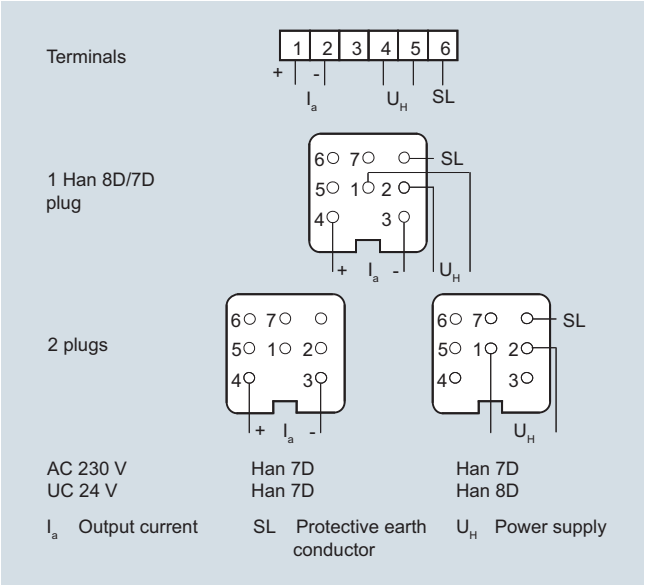
Schematics



Supplementary electronics for 4-wire connection, connection diagram

Selection and Ordering data		Order code
Supplementary electronics for 4-wire connection		**V** ■ ■
Article No. of the transmitter **7MF4.33-.....-.AB.** add **"-Z"** and Order code.		
Power supply	**Electrical connection**	
24 V AC/DC	Terminals; 2 Pg screwed glands, to left	**1**
	2 Han 7D/Han 8D plugs incl. mating connector, to left	**3**
	1 Han 7D plug incl. mating connector, angled	**5**
	Terminals; 1 Pg screwed gland, downwards	**6**
	1 Han 8D plug incl. mating connector, downwards (observe arrangement of plug and differential pressure line)	**9**
230 V AC	Terminals; 2 Pg screwed glands, to left	**7**
	2 Han 7D plugs incl. mating connector, to left	**8**
Output current		
0 ... 20 mA		**0**
4 ... 20 mA		**1**
Accessories		Article No.
Instruction Manual German/English		**A5E00322799**

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Selection and Ordering data		Article No.
Replacement measuring cell for pressure for SITRANS P DS III		↗ 7MF4990-
		■■■■0-0DB0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	Normal	1
Inert liquid	grease-free to cleanliness level 2	3
Measured span (min. ... max.)		
0.01 ... 1 bar	(0.15 ... 14.5 psi)	B
0.04 ... 4 bar	(0.6 ... 58 psi)	C
0.16 ... 16 bar	(2.32 ... 232 psi)	D
0.63 ... 63 bar	(9.14 ... 914 psi)	E
1.6 ... 160 bar	(23.2 ... 2320 psi)	F
4.0 ... 400 bar	(58.0 ... 5802 psi)	G
7.0 ... 700 bar	(102.0 ... 10153 psi)	J
Wetted parts materials		
Seal diaphragm	Process connection	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Process connection		
• Connection shank G½B to EN 837-1		0
• Female thread ½-14 NPT		1
• Oval flange made of stainless steel, max. span 160 bar (2320 psi)		
- Mounting thread $^{7}/_{16}$-20 UNF to IEC 61518		2
- Mounting thread M10 to DIN 19213		3
Further designs		Order code
Please add "**-Z**" to Article No. and specify Order code.		
Inspection certificate to EN 10204-3.1		**C12**

Selection and Ordering data		Article No.
Replacement measuring cell for absolute pressure for SITRANS P DS III (from the pressure series)		↗ 7MF4992-
		■■■■0-0DB0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	Normal	1
Inert liquid	grease-free to cleanliness level 2	3
Measured span (min. ... max.)		
8.3 ... 250 mbar a	(0.12 ... 3.62 psia)	D
43 ... 1300 mbar a	(0.62 ... 18.85 psia)	F
0.16 ... 5 bar a	(2.32 ... 72.5 psia)	G
1 ... 30 bar a	(14.5 ... 435 psia)	H
Wetted parts materials		
Seal diaphragm	Process connection	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Process connection		
• Connection shank G½B to EN 837-1		0
• Female thread ½-14 NPT		1
• Oval flange made of stainless steel, max. span 160 bar (2320 psi)		
- Mounting thread $^{7}/_{16}$-20 UNF to IEC 61518		2
- Mounting thread M10 to DIN 19213		3
Further designs		Order code
Please add "**-Z**" to Article No. and specify Order code.		
Inspection certificate to EN 10204-3.1		**C12**

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Selection and Ordering data		Article No.
Replacement measuring cell for absolute pressure (from the differential pressure series) for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus series ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		7MF4993 - ■■■■■ - 0DC0
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	Normal	1
Inert liquid	grease-free to cleanliness level 2	3
Measured span (min. ... max.)		
8.3 ... 250 mbar a	(0.12 ... 3.62 psia)	D
43 ... 1300 mbar a	(0.62 ... 18.85 psia)	F
0.16 ... 5 bar a	(2.32 ... 72.5 psia)	G
1 ... 30 bar a	(14.5 ... 435 psia)	H
5.3 ... 100 bar a	(76.9 ... 1450 psia)	K E
Wetted parts materials		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Tantalum	Tantalum	E
Monel	Monel	H
Gold	Gold	L
Process connection		
Female thread ¼-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread M10 to DIN 19213		0
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		2
• Vent on side of process flange[1]		
- Mounting thread M10 to DIN 19213		4
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		6
Non-wetted parts materials		
• Stainless steel process flange screws		2
Further designs Please add "**-Z**" to Article No. and specify Order code.		Order code
O-rings for process flanges (instead of FPM (Viton))		
• PTFE (Teflon)		**A20**
• FEP (with silicone core, approved for food)		**A21**
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)		**A22**
• NBR (Buna N)		**A23**
Inspection certificate to EN 10204-3.1		**C12**
Process connection G½B		**D16**
Remote seal flanges (not together with K01, K02 and K04)		**D20**
Vent on side for gas measurements		**H02**
Process flanges		
• without		**K00**
• with process flange made of		
- Hastelloy		**K01**
- Monel		**K02**
- Stainless steel with PVDF insert max. PN 10 (MAWP 145 psi) max.temperature of medium 90 °C (194 °F) For ½-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible		**K04**

[1] Not for span 5.3 ... 100 bar (76.9 ... 1450 psi)

Selection and Ordering data		Article No.
Replacement measuring cell for differential pressure and PN 32/160 (MAWP 464/2320 psi) for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus series ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		7MF4994 - ■■■■■ - 0DC0
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	Normal	1
Inert liquid	grease-free to cleanliness level 2	3
Measured span (min. ... max.)		
PN 32 (MAWP 464 psi)		
1 ... 20 mbar[1]	(0.4 ... 8 inH_2O)	B
PN 160 (MAWP 2320 psi)		
1 ... 60 mbar	(0.4 ... 24 inH_2O)	C
2.5 ... 250 mbar	(1 ... 100 inH_2O)	D
6 ... 600 mbar	(2.4 ... 240 inH_2O)	E
16 ... 1600 mbar	(6.4 ... 642 inH_2O)	F
50 ... 5000 mbar	(20 ... 2000 inH_2O)	G
0.3 ... 30 bar	(4.35 ... 435 psi)	H
Wetted parts materials (stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	A
Hastelloy	Stainless steel	B
Hastelloy	Hastelloy	C
Tantalum[2]	Tantalum	E
Monel[2]	Monel	H
Gold[2]	Gold	L
Process connection		
Female thread ¼-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread M10 to DIN 19213		0
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		2
• Vent on side of process flange		
- Mounting thread M10 to DIN 19213		4
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		6
Non-wetted parts materials		
Stainless steel process flange screws		2
Further designs Please add "**-Z**" to Article No. and specify Order code.		Order code
O-rings for process flanges (instead of FPM (Viton))		
• PTFE (Teflon)		**A20**
• FEP (with silicone core, approved for food)		**A21**
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)		**A22**
• NBR (Buna N)		**A23**
Inspection certificate to EN 10204-3.1		**C12**
Remote seal flanges (not together with K01, K02 and K04)		**D20**
Vent on side for gas measurements		**H02**
Stainless steel process flanges for vertical differential pressure lines (not together with K01, K02 and K04)		**H03**
Process flanges		
• without		**K00**
• with process flange made of		
- Hastelloy		**K01**
- Monel		**K02**
- Stainless steel with PVDF insert, max. PN 10 (MAWP 145 psi), max. temperature of medium 90 °C (194 °F). For ½-14 NPT inner process connection on the side in the middle of the process flange, vent valve not possible		**K04**

[1] Not suitable for connection of remote seal
[2] Only together with max. spans 250, 1600, 5000 and 30000 mbar (100 inH_2O, 642 inH_2O, 2000 inH_2O and 435 psi).

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Selection and Ordering data		Article No.
Replacement measuring cell for differential pressure and PN 420 (MAWP 6092 psi) for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus series ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		↗ **7MF4995-** ■■■■■ **-0DC0**
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	Normal	**1**
Measured span (min. ... max.)		
2.5 ... 250 mbar	(1 ... 100 inH_2O)	**D**
6 ... 600 mbar	(2.4 ... 240 inH_2O)	**E**
16 ... 1600 mbar	(6.4 ... 642 inH_2O)	**F**
50 ... 5000 mbar	(20 ... 2000 inH_2O)	**G**
0.3 ... 30 bar	(4.35 ... 435 psi)	**H**
Wetted parts materials (stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel	Stainless steel	**A**
Hastelloy	Stainless steel	**B**
Gold[1)]	Gold	**L**
Process connection		
Female thread ¼-18 NPT with flange connection		
• Sealing screw opposite process connection		
- Mounting thread M12 to DIN 19213		**1**
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		**3**
• Vent on side of process flange		
- Mounting thread M12 to DIN 19213		**5**
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		**7**
Non-wetted parts materials		
• Stainless steel process flange screws		**2**
Further designs		Order code
Please add "**-Z**" to Article No. and specify Order code.		
O-rings for process flanges (instead of FPM (Viton))		
• PTFE (Teflon)		**A20**
• FEP (with silicone core, approved for food)		**A21**
• FFPM (Kalrez, compound 4079), for measured medium temperatures -15 ... 100 °C (5 ... 212 °F)		**A22**
• NBR (Buna N)		**A23**
Inspection certificate to EN 10204-3.1		**C12**
Stainless steel process flanges for vertical differential pressure lines		**H03**
without process flanges		**K00**

[1)] Not together with max. span 600 mbar (240.9 inH_2O)

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Selection and Ordering data	Article No.
Spare parts/Accessories	
Mounting bracket and fastening parts for pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF403.-.....-..C.) For absolute pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF423.-.....-..C.)	
• made of steel	**7MF4997-1AB**
• made of stainless steel	**7MF4997-1AH**
Mounting bracket and fastening parts for pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF403-.....-..A., -..B., ..D. and ..F.) For absolute pressure transmitters SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus 7MF423-.....-..A., -..B., ..D. and ..F.)	
• made of steel	**7MF4997-1AC**
▶ • made of stainless steel	**7MF4997-1AJ**
Mounting and fastening brackets For differential pressure transmitters with flange thread M10 SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF433.-... and 7MF443.-...)	
• made of steel	**7MF4997-1AD**
▶ • made of stainless steel	**7MF4997-1AK**
Mounting and fastening brackets For differential pressure transmitters with flange thread M12 SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF453.-...)	
• made of steel	**7MF4997-1AE**
• made of stainless steel	**7MF4997-1AL**
Mounting and fastening brackets For differential and absolute pressure transmitters with flange thread 7/16 -20 UNF SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus (7MF433.-..., 7MF443.-... and 7MF453.-...)	
• made of steel	**7MF4997-1AF**
• made of stainless steel	**7MF4997-1AM**
Cover made of die-cast aluminum, including gasket, for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus	
• without window	**7MF4997-1BB**
▶ • with window	**7MF4997-1BE**
Cover made of stainless steel, including gasket, for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus	
• without window	**7MF4997-1BC**
• with window	**7MF4997-1BF**
Digital indicator Including mounting material for SITRANS P DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus	**7MF4997-1BR**
Measuring point label	
• without inscription (5 units)	**7MF4997-1CA**
• Printed (1 unit) Data according to Y01 or Y02, Y15, Y16 and Y99 (see "Pressure transmitters")	**7MF4997-1CB-Z Y..: .....**

Selection and Ordering data	Article No.
Mounting screws For measuring point label, grounding and connection terminals or for display (50 units)	**7MF4997-1CD**
Sealing screws (1 set = 2 units) for process flange	
• made of stainless steel	**7MF4997-1CG**
• made of Hastelloy	**7MF4997-1CH**
Sealing screws with vent valve Complete (1 set = 2 units)	
▶ • made of stainless steel	**7MF4997-1CP**
• made of Hastelloy	**7MF4997-1CQ**
Application electronics	
• for SITRANS P DS III with HART	**7MF4997-1DK**
• for SITRANS P DS III with PROFIBUS PA	**7MF4997-1DL**
• for SITRANS P DS III with FOUNDATION Fieldbus	**7MF4997-1DM**
Connection board	
• for SITRANS P DS III	**7MF4997-1DN**
• for SITRANS P DS III PROFIBUS PA and FOUNDATION Fieldbus	**7MF4997-1DP**
O-rings for process flanges made of:	
• FPM (Viton)	**7MF4997-2DA**
• PTFE (Teflon)	**7MF4997-2DB**
• FEP (with silicone core, approved for food)	**7MF4997-2DC**
• FFPM (Kalrez, compound 4079)	**7MF4997-2DD**
• NBR (Buna N)	**7MF4997-2DE**
Sealing ring for process connection	**see "Fittings"**
Weldable sockets for PMC connection	
• PMC Style Standard: Thread 1½"	**7MF4997-2HA**
• PMC Style Minibolt: front-flush 1"	**7MF4997-2HB**
Gaskets for PMC connection (packing unit = 5 units)	
• PTFE seal for PMC Style Standard: Thread 1½"	**7MF4997-2HC**
• Gasket made of Viton for PMC Style Minibolt: front-flush 1"	**7MF4997-2HD**
Weldable socket for TG52/50 and TG52/150 connection	
• TG52/50 connection	**7MF4997-2HE**
• TG52/150 connection	**7MF4997-2HF**
Seals for TG 52/50 and TG 52/150 made of silicone (FDA compliant)	**7MF4997-2HG**
Seals for flange connection with front-flush diaphragm Material FPM (Viton), 10 units	
• DN 25, PN 40 (M11)	**7MF4997-2HH**
• DN 25, PN 100 (M21)	**7MF4997-2HJ**
• 1", class 150 (M40)	**7MF4997-2HK**
• 1", class 300 (M45)	**7MF4997-2HL**

▶ Available ex stock

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Selection and Ordering data	Article No.
Operating Instructions[1]	
• for SITRANS DS III with HART	
- German	**A5E00047090**
- English	**A5E00047092**
- French	**A5E00053218**
- Spanish	**A5E00053219**
- Italian	**A5E00053220**
• for SITRANS DS III with PROFIBUS PA	
- German	**A5E00053275**
- English	**A5E00053276**
- French	**A5E00053277**
- Spanish	**A5E00053278**
- Italian	**A5E00053279**
• for SITRANS DS III with FOUNDATION Fieldbus	
- German	**A5E00279629**
- English	**A5E00279627**
Compact operating instructions	
• English, german, spanish, french, italian, dutch	**A5E03434626**
• English, estonian, latvian, lithuanian, polish, romanian	**A5E03434631**
• English, bulgarian, czech, finnish, slovakian, slovenian	**A5E03434645**
• English, danish, greek, portuguese, swedish, hungarian	**A5E03434656**
• Korean	**A5E03693760**
The compact operating instructions are available in 21 EU languages on the product CD supplied with each transmitter. They can also be downloaded from the SITRANS P web page.	
Brief instruction (Leporello)	
German, English	
• for SITRANS DS III with HART	**A5E00047093**
- German, English	
• for SITRANS DS III with PROFIBUS PA	**A5E00053274**
- German, English	
• for SITRANS DS III with FOUNDATION Fieldbus	**A5E00282355**
- German, English	
CD with SITRANS P documentation	**A5E00090345**
German, English, French, Spanish, Italian incl. compact operating instructions in 21 EU languages	
Certificates (order only via SAP)	
instead of Internet download	
• hard copy (to order)	**A5E03252406**
• on CD (to order)	**A5E03252407**
Operating Instructions for replacement of electronics, measuring cell and connection board (only available from the Internet)[1]	**A5E00078060**
HART modem	
with USB interface ▶	**7MF4997-1DB**
Supplementary electronics for 4-wire connection	**See page 1/164**

▶ Available ex stock

Power supply units see Chap. 7 "Supplementary Components".

[1] You can download these operating instructions free-of-charge from our Internet site at www.siemens.com/sitransp.

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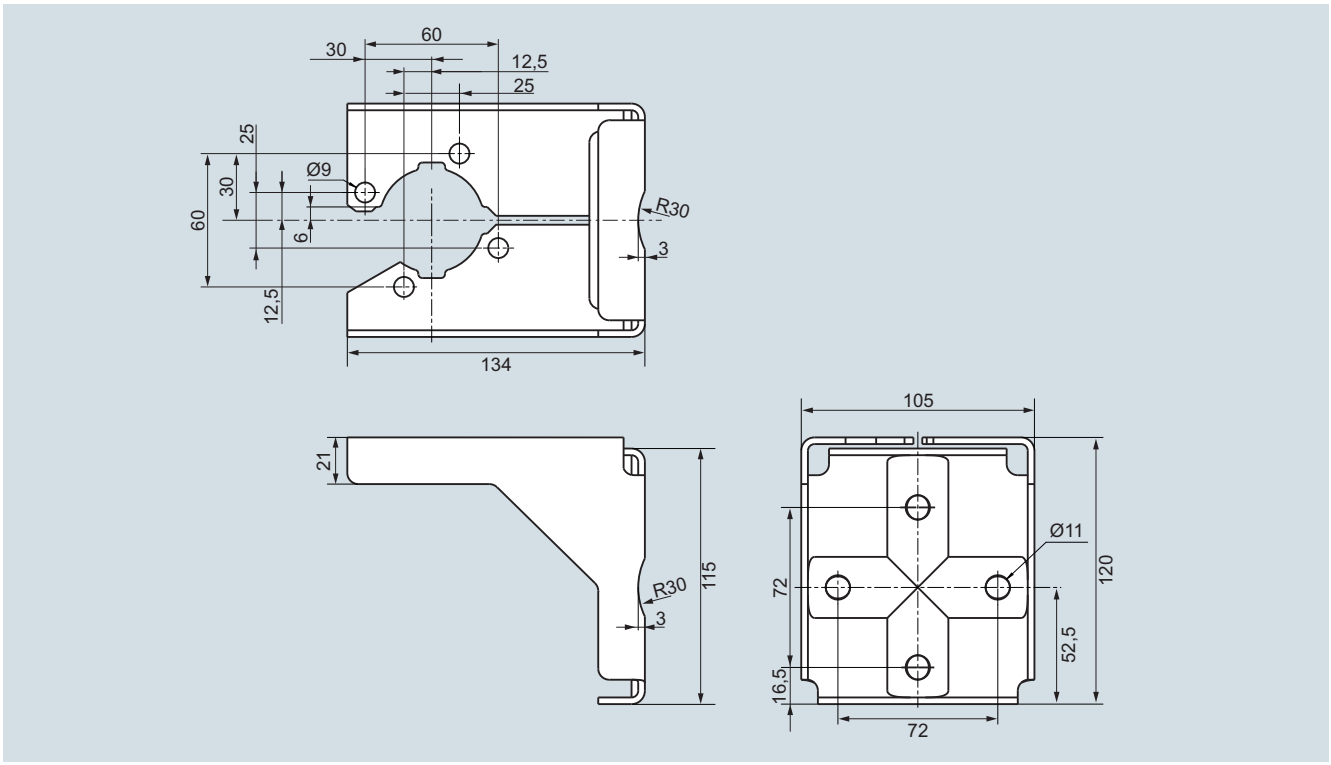
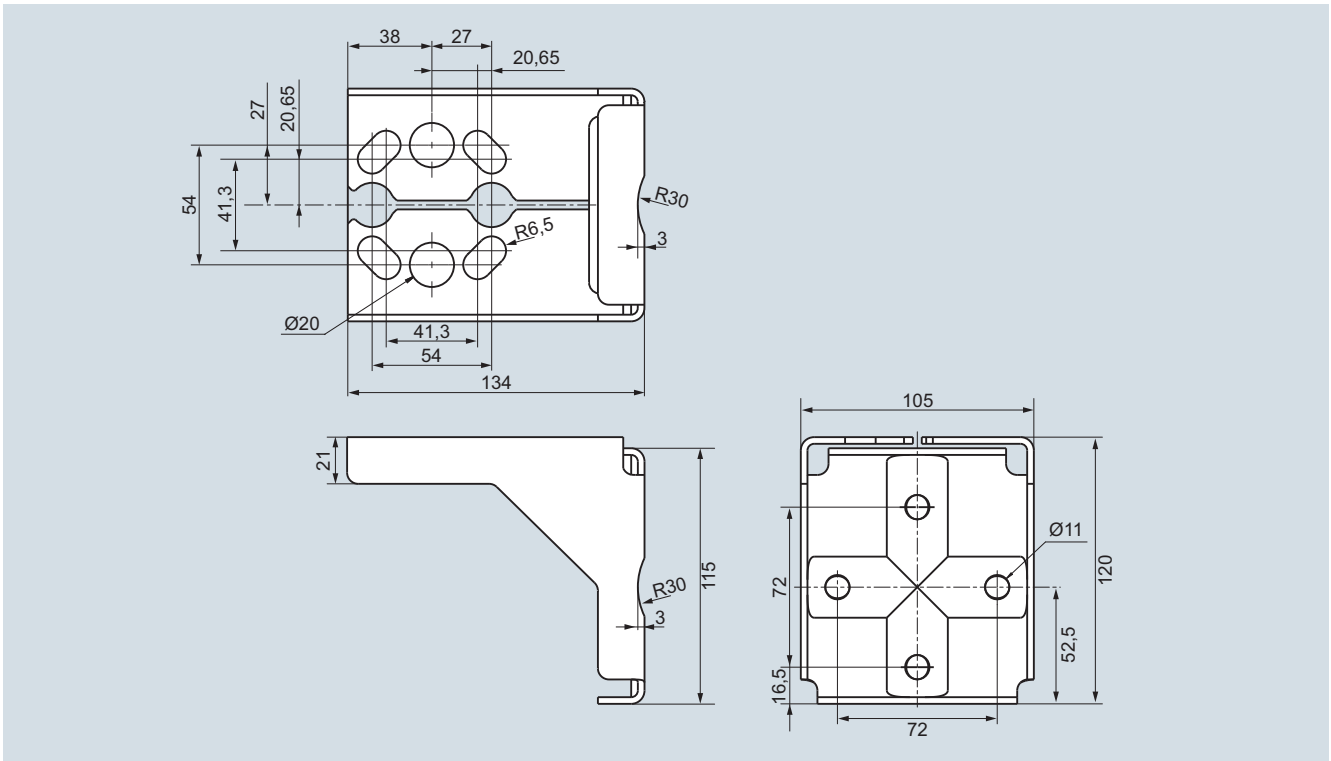
Dimensional drawings



Mounting bracket for SITRANS P DS III and SITRANS P280 gauge and absolute pressure-transmitters, dimensions in mm
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)



Mounting bracket for SITRANS P DS III differential pressure transmitter, dimensions in mm
mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

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SITRANS P DS III - Factory-mounting of valve manifolds on transmitters

Overview

SITRANS P transmitters

- DS III for relative and absolute pressure (both designs) and
- DS III for differential pressure

can be delivered factory-fitted with the following valve manifolds:

- 7MF9011-4EA and 7MF9011-4FA valve manifolds for gauge pressure and absolute pressure transmitters
- 7MF9411-5BA and 7MF9411-5CA valve manifolds for absolute pressure and differential pressure transmitters

Design

The 7MF9011-4EA valve manifolds are sealed with gaskets made of PTFE between transmitter and the valve manifold as standard. Soft iron, stainless steel and copper gaskets are also available for sealing purposes if preferred.

The 7MF9011-4FA valve manifolds are sealed with PTFE sealing tape between the transmitter and the valve manifold.

The 7MF9411-5BA and 7MF9411-5CA valve manifolds are sealed with PTFE sealing rings between the transmitter and the valve manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (87 psi)) and is certified leak-proof with a test report to EN 10204 - 2.2.

All valve manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the valve manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of valve manifolds", you will receive a mounting bracket for the valve manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN10204 when choosing the option "Factory mounting of valve manifolds", a separate certificate is provided for the transmitters and the valve manifolds respectively.

Selection and Ordering data

7MF9411-5AA
valve manifold for relative and absolute pressure transmitters

Add „**-Z**“ to the Article No. of the transmitter and add order codes.	Order code
SITRANS P DSIII 7MF403.-...2.-..., 7MF423.-...2.-... , 7MF403.-...3.-..., 7MF423.-...3.-... , 7MF403.-...4.-..., 7MF423.-...4.-... With process connection oval flange with PTFE gasket and **steel** mounting screws. Delivery including high-presure test certified by factory certificate according to EN 10204-2.2	**T05**
Additional versions:	
Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	**A02**
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	**C12**
With manufacturer declaration according to NACE, MR-0175	**D07**

7MF9411-5AA
valve manifold for relative and absolute pressure transmitters

Add „**-Z**“ to the Article No. of the transmitter and add order codes.	Order code
SITRANS P DSIII 7MF403.-...2.-..., 7MF423.-...2.-... , 7MF403.-...3.-..., 7MF423.-...3.-... , 7MF403.-...4.-..., 7MF423.-...4.-... With process connection oval flange with PTFE gasket and **stainless steel** mounting screws. Delivery including high-presure test certified by factory certificate according to EN 10204-2.2	**T06**
Additional versions:	
Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	**A02**
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	**C12**
With manufacturer declaration according to NACE, MR-0175	**D07**

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7MF9011-4FA
valve manifold on relative and absolute pressure transmitters

Add **-Z** to the Article No. of the transmitter and add Order codes	Order code
SITRANS P DSIII 7MF403.-...1.-..., 7MF423.-...1.-... With process connection female thread ½-14 NPT in-sealed with PTFE sealing tape Delivery incl. high-pressure test certified by test report to EN10204-2.2	**T03**
Further designs: Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	**A02**
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	**C12**
With manufacturer declaration according to NACE, MR-0175	**D07**

7MF9011-4EA
valve manifold on relative and absolute pressure transmitters

Add **-Z** to the Article No. of the transmitter and add Order codes	Order code
SITRANS P DSIII 7MF403.-...0.-..., 7MF423.-...0.-... with process connection collar G1/2 A to EN 837-1 with gasket made of PTFE between valve manifold and transmitter	**T02**
Alternative sealing material: • Soft iron • Stainless steel, Mat. No. 14571 • copper Delivery incl. high-pressure test certified by test report to EN 10204-2.2	**A70** **A71** **A72**
Further designs: Delivery includes mounting brackets and mounting clips made of stainless steel (instead of the mounting bracket supplied with the transmitter)	**A02**
Supplied acceptance test certificate to EN 10204- 3.1 for transmitters and mounted valve manifold	**C12**
With manufacturer declaration according to NACE, MR-0175	**D07**

7MF9411-5BA
valve manifold on absolute and differential pressure transmitters

Add **-Z** to the Article No. of the transmitter and add Order codes	Order code
SITRANS P DSIII 7MF433.-…, 7MF443.-… and 7MF453.-… [1] mounted with gaskets made of PTFE and screws made of	
• chromized steel	**U01**
• made of stainless steel	**U02**
Delivery incl. high-pressure test certified by test report to EN 10204-2.2	
Further designs: Delivery includes mounting bracket and mounting clips made of	
• Steel	**A01**
• Stainless steel	**A02**
(instead of the mounting bracket supplied with the transmitter)	
Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold	**C12**
With manufacturer declaration according to NACE, MR-0175	**D07**

7MF9411-5CA
valve manifold on differential pressure transmitters

Add **-Z** to the Article No. of the transmitter and add Order codes	Order code
SITRANS P DSIII 7MF443.-... and 7MF453.-…1 [1] mounted with gaskets made of PTFE and screws made of	
• chromized steel	**U03**
• Stainless steel	**U04**
Delivery incl. high-pressure test certified by test report to EN 10204-2.2	
Further designs: Delivery includes mounting bracket and mounting clips made of	
• Steel	**A01**
• Stainless steel	**A02**
(instead of the mounting bracket supplied with the transmitter)	
Supplied acceptance test certificate to EN 10204-3.1 for transmitters and mounted valve manifold	**C12**
With manufacturer declaration according to NACE, MR-0175	**D07**

[1] For 7MF453.-... transmitters, you require a 7/10-20 UNF connection thread in the process flange

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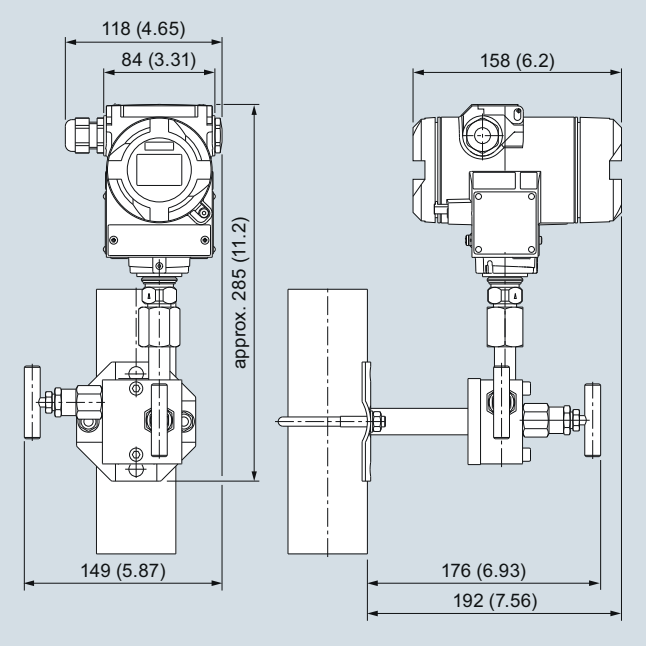
Dimensional drawings

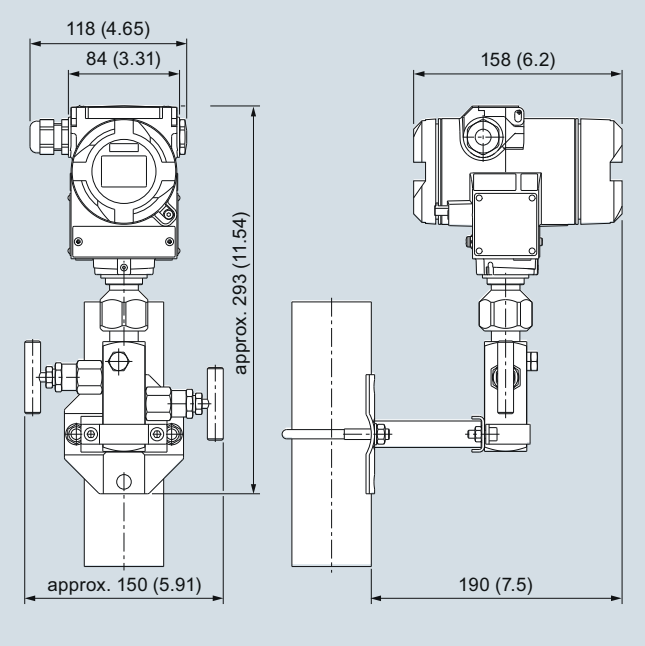
Valve manifolds mounted on SITRANS P DS III

7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters

7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters



7MF9011-4EA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)



7MF9011-4FA valve manifold with mounted gauge pressure and absolute pressure transmitters, dimensions in mm (inch)

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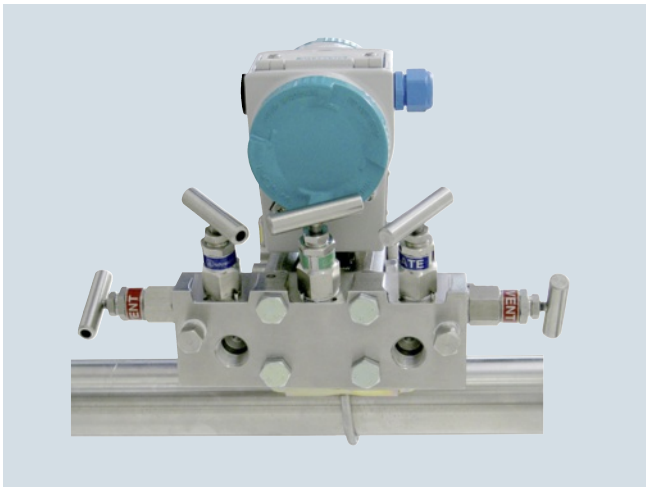
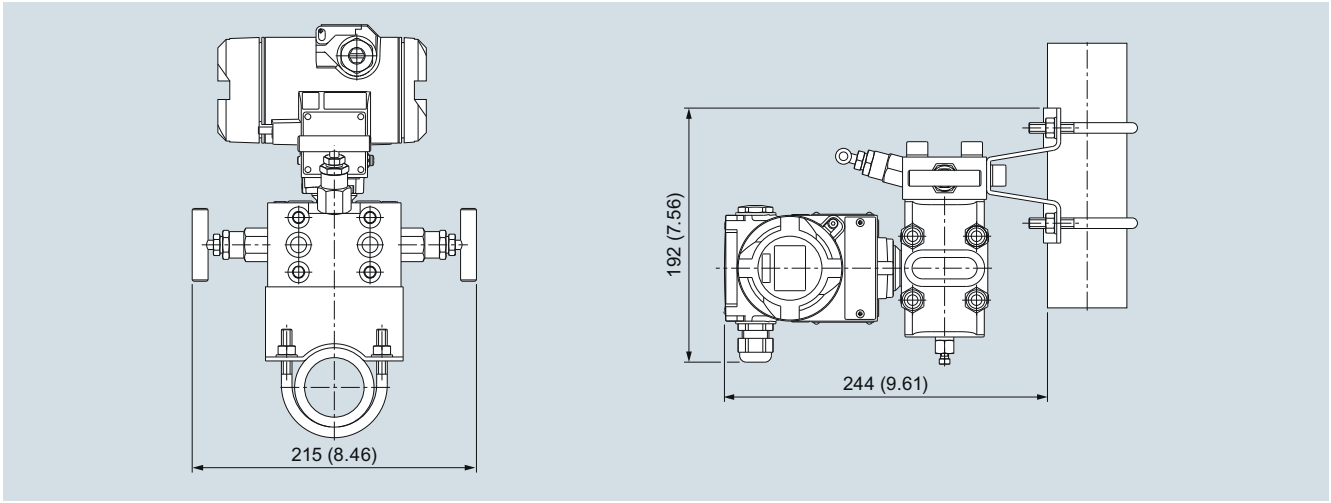
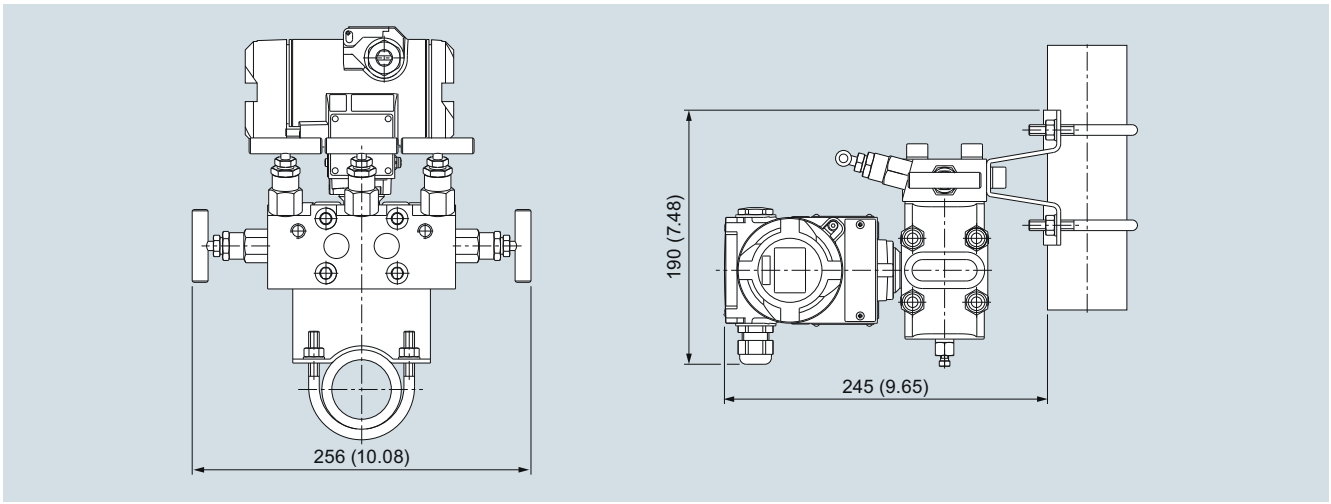
7MF9411-5BA valve manifold with mounted differential pressure transmitter



7MF9411-5CA valve manifold with mounted differential pressure transmitter



7MF9411-5BA valve manifold with mounted differential pressure transmitter, dimensions in mm (inch)



7MF9411-5CA valve manifold with mounted differential pressure transmitter, dimensions in mm (inch)

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SITRANS P500 - Technical description

Overview

SITRANS P500 pressure transmitters are digital pressure transmitters featuring extensive user-friendliness and which fulfil the most stringent demands of accuracy, long-term stability, speed and lots more.

Extensive functionality allows you to set the pressure transmitter specifically to your own requirements. Despite their many settings options, local set-up is easy. A multi-lingual menu with clear text instructions guides you through the process. There are also help texts available.

The innovative EDD with integrated QuickStart assistance is also quick and easy to configure by computer using the HART protocol.

Extensive diagnostic functions, e.g. min/max pointer for pressure and temperature, or limit value indicator, make sure you always have the process under control. You can also display additional process values such as temperature or static pressure. The simultaneous display of mass, resulting from a volume, is also easy.

The SITRANS P500 pressure transmitters can be configured to measure:

- Differential pressure
- Level
- Volume
- Mass
- Volume flow
- Mass flow

Benefits

- High measuring accuracy
- Very fast response time
- Extremely good long-term stability
- High reliability even under extreme chemical and mechanical loads
- For aggressive and non-aggressive gases, vapors and liquids
- Extensive diagnosis and simulation functions which can be used both on site as well as via HART.
- Optional separate replacement of measuring cell and electronics without recalibration.
- Extremely low conformity error values
- Infinitely adjustable spans of 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH_2O)
- Extremely good total performance and conformity error values with no loss of performance up to a turndown of 10 guaranteed.
- Additional integrated sensor for static pressure
- Parameterization via on-site control keys or HART
- Short process flanges nable space-saving installation.

Application

The SITRANS P500 pressure transmitters can be used in industrial areas with extreme chemical and mechanical loads. Electromagnetic compatibility in the range 10 kHz to 1 GHz makes them suitable for locations with high electromagnetic emissions.

Pressure transmitters with ratings "Intrinsic safety" and "Explosion-proof" may be installed within potentially explosive atmospheres (zone 1) or in zone 0. The pressure transmitter comes with a CE-declaration of conformity and fulfils the corresponding unified European directives (ATEX).

Pressure transmitters with the type of protection "Intrinsic safety" for use in zone 0 may be operated with power supply units of category "ia" and "ib".

With newly designed measuring cell, it is possible to work with process temperatures of -40 to 125 °C (-40 to +257 °F)) without having to use a remote seal.

The transmitters can be equipped with various designs of remote seals for special applications such as the measurement of highly viscous fluids.

The pressure transmitter can be fully parameterized locally via the three operating keys and externally via HART.

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Pressure transmitters for differential pressure and flow

- Measured variables:
  - Differential pressure
  - Small positive or negative pressure
  - Flow q ~ √Δp (together with a primary element (see Chapter "Flow Meters"))
- Span (freely adjustable)
  for SITRANS P500: 1 mbar to 32 bar (0.0145 to 465 psi; 0.4 to 12860 inH_2O)

Pressure transmitters for level

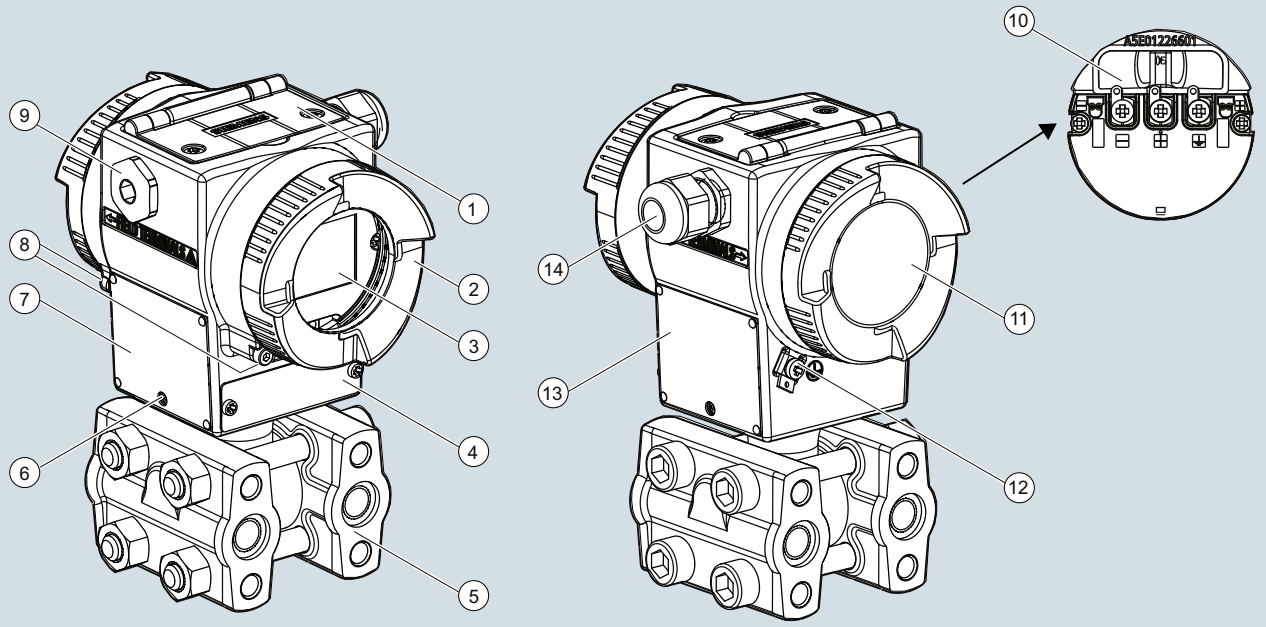
- Measured variable: Level of aggressive and non-aggressive liquids in open and closed vessels.
- Span (freely adjustable)
  for SITRANS P500: 1.25 to 6250 mbar (0.5 to 2509 inH_2O)
- Nominal diameter of the mounting flange
  - DN 50 / PN 40
  - DN 80 / PN 40
  - DN 100/ PN 16, PN 40
  - 2 inch/class 150, class 300
  - 3 inch/class 150, class 300
  - 4 inch/ class 150, class 300
  - customized special version

In the case of level measurements in open vessels, the low-pressure connection of the measuring cell remains open (measurement "compared to atmospheric").

In the case of measurements in closed vessels, the lower-pressure connection has to be connected to the vessel in order to compensate the static pressure.

The wetted parts are made from a variety of materials, depending on the degree of corrosion resistance required.

Design



1	Cover for the pushbuttons	9	Blanking plug
2	Cover, optionally with window	10	Terminal compartment
3	Display (optional)	11	Cover for terminal compartment
4	TAG plate	12	PE/ground terminal
5	Process flange with process connection	13	Nameplate
6	Lock screws (on two sides) for the measuring cell	14	Cable inlet, optionally with cable gland or plug-in connection
7	Approval plate		
8	Safety catch		

View of transmitter

- The electronics housing is made of coated die-cast aluminum.
- The casing has round screwed covers front and back.
- Depending on the design the front cover is fitted with an inspection window. You can read off the measured value directly from the optional display through the window.
- The inlet to the terminal compartment is located either on the left or right side. The unused opening in each case is sealed by a blanking plug.
- The PE/ground terminal is on the back of the housing.
- Access to the terminal compartment for auxiliary power and shielding by unscrewing the cover.
- Beneath the electronic housing is the measuring cell with its process flanges at which the process connections are available. The modular design of the pressure transmitter lets you replace the measuring cell, electronics and connection board as required.
- On the top of the housing you can see the screwed cover of the three local pushbuttons of the transmitter.

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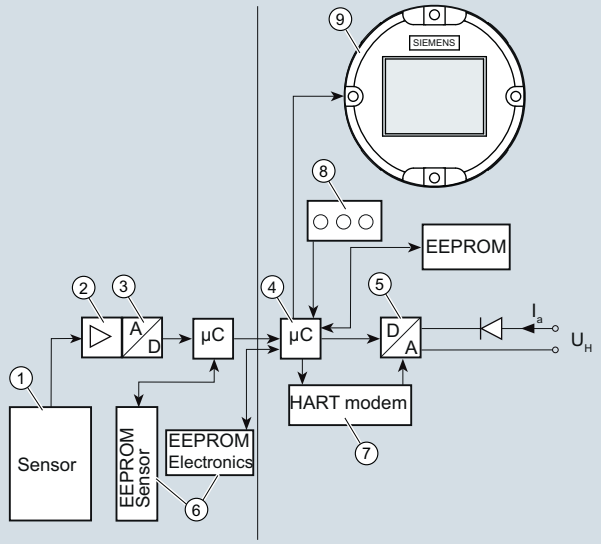
Function

Operation of electronics with HART communication



1 Sensor of the measuring cell
2 Measuring amplifier
3 Analog-to-digital converter
4 Microcontroller
5 Digital-to-analog converter
6 One EEPROM each in the measuring cell and in the electronics
7 HART modem
8 Keys (local operation)
9 Digital display
I_A Output current
U_H Auxiliary power

Function diagram of electronics

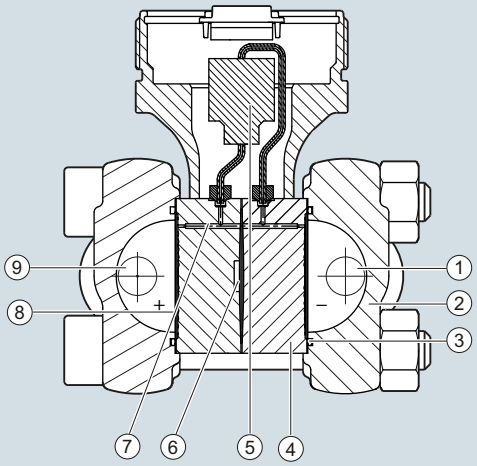
- The input pressure is converted into an electrical signal by the sensor.
- This signal is amplified by the measuring amplifier and digitalized in an analog-to-digital converter.
- The digital signal is analyzed in a microcontroller and corrected according to linearity and thermal characteristics.
- In a digital-to-analog converter it is then converted into the output current of 4 to 20 mA. When connected to supply lines, a diode circuit provides reverse polarity protection.
- The measuring cell-specific data, the electronic data and the parameterization data is held in two EEPROMs. One EEPROM is incorporated into the measuring cell electronics, the other is incorporated into the application electronics.

Operation

- The three local pushbuttons enable you both to navigate and carry out configuration and to visually track messages and process values, provided a display is available.
- If you have a device without a display, you can carry out zero adjustment using the three local pushbuttons. It is possible to retrofit a display at any time.
- You can also carry out settings by computer via a HART modem.

Mode of operation of the measuring cells

Measuring cell for differential pressure and flow



1 Input pressure P-
2 Process flange with process connection
3 O-Ring
4 Measuring cell body
5 Silicon pressure sensor
6 Overload diaphragm
7 Filling liquid
8 Seal diaphragm
9 Input pressure P+

Measuring cell for differential pressure and flow, function diagram

- The differential pressure is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until the seal diaphragm touches the body of the measuring cell. This protects the sensor module from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a bridge output voltage proportional to the input pressure.

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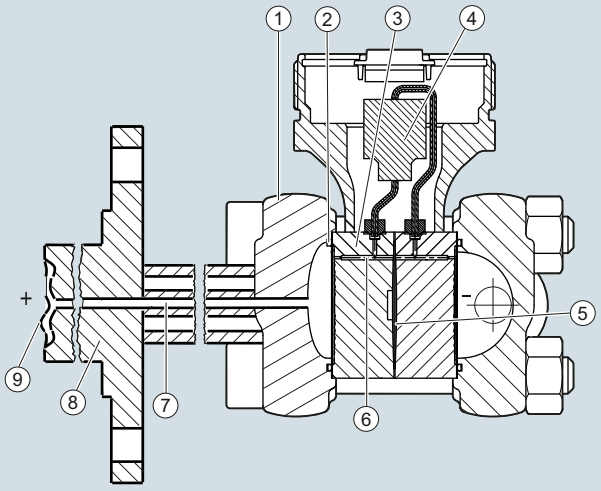
Measuring cell for level



1 Process flange with process connection
2 O-Ring
3 Measuring cell body
4 Silicon pressure sensor
5 Overload diaphragm
6 Filling liquid of the measuring cell
7 Capillary tube with filling liquid of the mounting flange
8 Flange with optional tube
9 Seal diaphragm for mounting flange

Measuring cell for level, function diagram

- The input pressure (hydrostatic pressure) acts hydraulically on the measuring cell via the seal diaphragm on the mounting flange.
- The differential pressure applied to the measuring cell is transmitted via the seal diaphragm and the filling liquid to the silicon pressure sensor.
- If the measuring limits are exceeded, the overload diaphragm flexes until the seal diaphragm touches the body of the measuring cell. This protects the sensor module from overload.
- The differential pressure causes the measuring diaphragm of the silicon pressure sensor to flex.
- The displacement changes the resistance value of the 4 piezo resistors in the measuring diaphragm in a bridge circuit.
- The change in the resistance causes a differential pressure proportional to the input pressure.

Configuration of SITRANS P500 HART

Depending on the version, there are a range of options for configuring the pressure transmitter and for setting or reading the parameters.

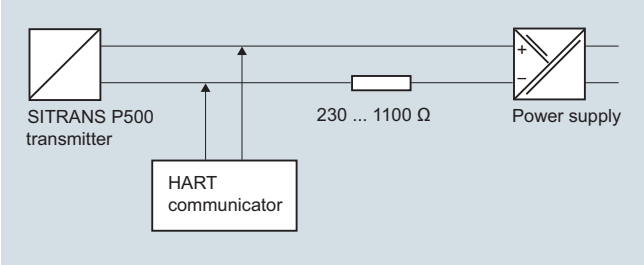
Configuration using the pushbuttons (local operation)

You can configure the transmitter in situ using the three keys provided a display is available. If you have no display, you can only carry out zero adjustment.

It is possible to retrofit a display. See accessories.

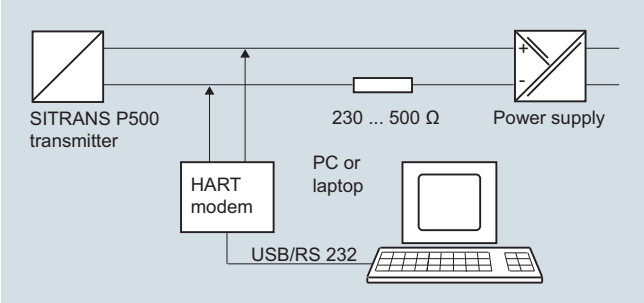
Configuration using HART

Parameterization using HART is carried out using a HART Communicator or a PC in conjunction with a HART modem.



Communication between a HART Communicator and a pressure transmitter

When parameterizing with the HART Communicator, the connection is made directly to the 2-wire cable.



HART communication between a PC communicator and a pressure transmitter

For configuring via PC a HART modem is used which connects the transmitter to the PC.

The signals needed for communication in conformity with the HART 6.0 protocols are superimposed on the output current using the Frequency Shift Keying (FSK) method.

The necessary device files are available for download on the Internet.

SITRANS P500 configuration options

The transmission offers you full configuring options both via HART as well as in situ provided the optional display is available.

For simple parameterizing we also offer the easy to understand QuickStart function with guided commissioning.

SITRANS P500 diagnostic functions

- Maintenance timer
- Min/Max pointer (both resetable and non-resetable)
  - Pressure (incl. time and temperature stamp)
  - Static pressure (incl. time and temperature stamp)
  - Sensor temperature (incl. time stamp)
  - Electronic temperature (incl. time stamp)
- Limit monitor block
- Diagnostic warning
- Diagnostic alarm
- Simulation functions
- Display of trends and histograms
- Operating hours meter

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Physical dimensions available for the SITRANS P500 HART display

Physical variable	Physical dimensions
Pressure (setting can also be made in the factory)	Pa, MPa, kPa, bar, mbar, torr, atm, psi, g/cm^2, kg/cm^2, mmH_2O (4 °C), inH_2O (4 °C), inH_2O (20 °C), mmH_2O, mmH_2O (4 °C), ftH_2O (20 °C), inHg, mmHg, hPA
Level	m, cm, mm, ft, in
Volume	m^3, dm^3, hl, yd^3, ft^3, in^3, gallon, Imp. gallon, bushel, barrel, barrel liquid, l; Norm (standard) l; Norm (standard) m^3, Norm (standard) feet^3
Mass	g, kg, t (metric), lb, Ston, Lton, oz
Volume flow	m^3/d, m^3/h, m^3/s, l/min, l/s, ft^3/d, ft^3/min, ft^3/s, US gallon/min, gallon/s, l/h, milL/d, gallon/d, gallon/h, milgallon/d, Imp.gallon/s, Imp.gallon/m, Imp.gallon/h, Imp.gallon/d, Norm (standard) m^3/h, Norm (standard) l/h, Norm (standard) ft^3/h, Norm (standard) ft^3/m, barrel liquid/s, barrel liquid/m, barrel liquid/h
Mass flow	t/d, t/h, t/min, kg/d, kg/h, kg/min, kg/s, g/h, g/min, g/s, lb/d, lb/min, lb/s, LTon/d, LTon/h, STon/d, STon/h, STon/min
Temperature	K, °C, °F, °R
Miscellaneous	%, mA

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Technical specifications

Input		
Measured variable	Differential pressure and flow	
Span (infinitely adjustable)	Span (min. ... max.)	Maximum operating pressure (static pressure)
	1,00 ... 50 mbar (0.4 ... 20 inH_2O)	160 bar (2320 psi)
	1.25 ... 250 mbar (0.5 ... 100 inH_2O)	
	6.25 ... 1250 mbar (2.5 ... 502 inH_2O)	
	31.25 ... 6250 mbar (12.54 ... 2509 inH_2O)	
	0.16 ... 32 bar (2.33 ... 465 psi)	
Lower range limit		
• Measuring cell with silicone oil filling	-100 % of max. span and/or 30 mbar a (0.44 psia)	
Upper range limit	100 % of max. span	
Start of scale	Between measuring limits (freely adjustable)	
Output		
Output current signal	4 ... 20 mA	
• Lower current limit (freely adjustable)	3.55 mA, factory setting 3.8 mA	
• Upper current limit (freely adjustable)	23 mA, factory setting 20.5 mA	
• Ripple (without HART communication)	I_{pp} ≤ 0.4 % of max. output current	
• adjustable damping	0... 100 s in steps of 0.1 s, factory-seting: 2 s	
• current transmitter	3.55 ... 23 mA	
• Failure signal	adjustable within limits:: • Bottom: 3.55 … 3.7 mA (default value: 3.6 mA) • Top: 21.0 … 23 mA (default value: 22.8 mA)	
Load		
• Without HART communication	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H : Power supply in V	
• With HART communication		
- HART Communicator	R_B = 230 ... 1100 Ω	
- HART modem	R_B = 230 ... 500 Ω	
Characteristic curve	Linearly rising, linearly falling, square rooted characteristic rising, bidirectional square rooted characteristic and user-specific	

Measuring accuracy		
Reference conditions (in accordance with IEC 60770-1) All error information always refers to the set span.	• Rising characteristic curve • Start of scale 0 bar • Stainless steel seal diaphragm • Measuring cell with silicone oil filling • Room temperature (25 °C (77 °F))	
Error in measurement at limit setting incl. hysteresis and reproducibility r: Span ratio (r: Span ratio (r = max. span / set span))		
Linear characteristic	r ≤ 10	r ≥ 10
• 50 mbar (20 inH_2O)	≤ 0.06 %	≤ (0.006 · r) %
• 250 mbar (100 inH_2O) 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O) 32 bar (465 psi)	≤ 0.03 %	≤ (0.003 · r) %
Square-rooted characteristic		
• Flow > 50 %	r ≤ 10	r ≥ 10
- 50 mbar (20 inH_2O)	≤ 0.06 %	≤ (0.006· r) %
- 250 mbar (100 inH_2O) 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O) 32 bar (465 psi)	≤ 0.03 %	≤ (0.003 · r) %
• Flow 25 % … 50 %	r ≤ 10	r ≥ 10
- 50 mbar (20 inH_2O)	≤ 0.12 %	≤ (0.012 · r) %
- 250 mbar (100 inH_2O) 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O) 32 bar (465 psi)	≤ 0.06 %	≤ (0.006 · r) %
Influence of ambient temperature per 28 °C (50 °F)		
• 50 mbar (20 inH_2O)	≤ (0.04 · r + 0.05) %	
• 250 mbar (100 inH_2O)	≤ (0.025 · r + 0.014) %	
• 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O) 32 bar (465 psi)	≤ (0.006 · r + 0.03) %	
Influence of static pressure		
• At the start of scale value (PKN)		
- 50 mbar (20 inH_2O)	≤ (0.1 · r) % per 70 bar (1015 psi) correction via zero point correction	
- 250 mbar (100 inH_2O)	≤ (0.035 · r) % per 70 bar (1015 psi) correction via zero point correction	
- 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O) 32 bar (465 psi)	≤ (0.007 · r) % per 70 bar (1015 psi) correction via zero point correction	
• On the span (PKS)		
- 50 mbar (20 inH_2O)	≤ 0.13 % per 70 bar (1015 psi)	
- 250 mbar (100 inH_2O) 1250 mbar (502 inH_2O)	≤ 0.03 % per 70 bar (1015 psi)	
- 6250 mbar (2509 inH_2O)	≤ 0.09 % per 70 bar (1015 psi)	
- 32 bar (465 psi)	≤ 0.05 % per 70 bar (1015 psi)	

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Total Performance[1)]		
• Linear characteristic	r ≤ 5	5 < r ≤ 10
- 50 mbar (20 inH_2O)	≤ 0,27 %	≤ 0,46 %
- 250 mbar (100 inH_2O)	≤ 0.14 %	≤ 0.27 %
- 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O) 32 bar (465 psi)	≤ 0.09 %	≤ 0.14 %
Square rooted characteristic		
• Flow > 50 %	r ≤ 5	5 < r ≤ 10
- 50 mbar (20 inH_2O)	≤ 0,27 %	≤ 0,46 %
- 250 mbar (100 inH_2O)	≤ 0.14 %	≤ 0.27 %
- 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O) 32 bar (465 psi)	≤ 0.09 %	≤ 0.14 %
• Flow 25 % … 50 %	r ≤ 5	5 < r ≤ 10
- 50 mbar (20 inH_2O)	≤ 0,54 %	≤ 0,92 %
- 250 mbar (100 inH_2O)	≤ 0.28 %	≤ 0.54 %
- 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O) 32 bar (465 psi)	≤ 0.18 %	≤ 0.28 %
Step response time T_{63} without electrical damping		
• 50 mbar (20 inH_2O)	≤ 140 ms, contains a dead time of ≤ 45 ms	
• 250 mbar (100 inH_2O) 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O) 32 bar (465 psi)	≤ 88 ms, contains a dead time of ≤ 45 ms	
Long-term stability	≤ (0.05 · r) % per 5 years ≤ (0.08 · r) % per 10 years	
Influence of power supply	≤ 0.005 %/1 V	
Rated conditions		
Mounting position	Any	
Ambient conditions		
• Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.)		
- Total device	-40 ... +85 °C (-40 ... +185 °F)	
- Readable display	-20 ... +85 °C (-4 ... +185 °F)	
- Storage temperature	-50 ... +90 °C (-58 ... +194 °F)	
Climatic class		
• Condensation	Relative humidity 0 … 100 % (condensation permissible)	
Degree of protection (to IEC 60529)	IP66/IP 68 and NEMA 4X (with corresponding cable gland)	
Electromagnetic Compatibility		
• Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Permissible pressures	According to 97/23/EC pressure equipment directive	
Temperature of medium		
• Measuring cell with silicone oil filling	-40 ... +125 °C (-40 ... +257 °F)	

Design	
Weight (without options)	Approx. 3.3 kg (7.3 lb)
Material of parts in contact with the medium	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L, Hastelloy C276, Monel 400
• Process connection and sealing screw	PN 160: stainless steel, mat.-No. 1.4404/316L
• Sealing material in the process connections	
- O-Ring	• Standard: Viton (FKM (FPM)) • Optional: NBR, PTFE (virginal), PTFE (glass fiber-reinforced), FFPM (Kalrez)[2)2)], Graphite
Material of parts not in contact with media	
Electronics housing	• Low copper die-cast aluminum AC-AlSi12 (Fe) or AC-AlSi 10 Mg (Fe) to DIN EN 1706 • Lacquer on polyurethane base, optional epoxy-based primer • Stainless steel name plates (mat. no. 1.4404/316L)
Process connection screws	Stainless steel, mat. no. 1.4404/316L
Mounting bracket	Steel or stainless steel mat. no. 1.4301
Measuring cell filling	Silicone oil
Process connection	¼-18 NPT female thread and flange connection with M10 to DIN 19213 or 7/16-20 UNF mounting thread to IEC 61518
Electrical connection	• Screw terminals • Cable entry via the following screwed glands: - M20 x 1.5 - ½-14 NPT - Han 7D/Han 8D connector - M12 plug
Displays and controls	
Pushbuttons	3 for local programming directly on transmitter
Display	• With or without integrated display • Cover with or without window
Auxiliary power supply	
Terminal voltage on transmitter	• DC 10.6 ... 44 V • With intrinsically-safe operation DC 10.6 ... 30 V

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Certificates and approvals	
Classification according to PED 97/23/EC	
• PN 160 (MAWP 2320 psi)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Explosion protection	
Explosion protection for Europe (to ATEX)	
• Intrinsic safety "i"	PTB 09 ATEX 2004 X
- Marking	Ex II 1/2 G Ex ia/ib IIC T4
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω
- Effective internal inductance:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF
• Explosion-proof "d"	BVS 09 ATEX E 027
- Marking	Ex II 1/2 G Ex d IIC T4/T6
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6
- Connection	To circuits with values: U_m = DC 10.5 ... 45 V
• Dust explosion protection for zone 20	PTB 09 ATEX 2004 X
- Marking	Ex II 1 D Ex iaD 20 T 120 °C
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω
- Effective internal inductance:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF
• Dust explosion protection for zone 21/22	BVS 09 ATEX E 027
- Marking	Ex II 2 D Ex tD A21 IP68 T120 °C Ex ia D21
- Connection	To circuits with values: U_m = 10.5 ... 45 V DC; P_{max} = 1.2 W
• Type of protection "n" (zone 2)	PTB 09 ATEX 2004 X
- Marking	Ex II 3 G Ex nA II T4/T6 Ex II 2/3 G Ex ib/nL IIC T4/T6 Ex II 2/3 G Ex ib/ic IIC T4/T6
- "nA" connection	U_m = 45 V DC
- "nL, ic" connection	U_i = 45 V
- Effective internal inductance:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF

Explosion protection for USA (to FM)	
Certificate of Compliance	No. 3033013
• Identification (XP/DIP) or (IS)	XP CL I, DIV 1, GP ABCDEFG T4 / T6 DIP CL II, III, DIV1, GP EFG T4/T6 IS CL I, II, III, DIV1, GP ABCDEFG T4 CL I, Zone 0, AEx ia IIC T4 CL I, Zone 1, AEx ib IIC T4
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N U_m = 30 V, I_m = 100 mA, P_i = 750 mW, L_i = 400µH , Ci = 6 nF
• Marking (NI/NO)	NI CL I, DIV 2, GP ABCD T4/T6 NI CL I, Zone 2, GP IIC T4/T6 S CL II, III, GPFG T4/T6 NI CL I, DIV 2, GP ABCD T4/T6, NIFW NI CL I, Zone 2, GP IIC T4/T6, NIFW NI CLII, III, DIV 2, GP FG T4/T6, NIFW
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- (NI/S) parameters	According to "control drawing": A5E02189134N U_m = 45 V, L_i = 400 µH, C_i = 6 nF,
Explosion protection for Canada (to $_C$CSA$_{US}$)	
Certificate of Compliance	No. 2280963
• Marking (XP/DIP)	CL I, DIV 1, GP ABCD T4 /T6; CL II, DIV 1, GP EFG T4/T6
- Permissible ambient temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N U_m = 45 V
• Marking (ia/ib)	CL I, Ex ia/Ex ib IIC, T4 CL II, III, Ex ia/Ex ib, GP EFG, T4 CL I, AEx ia/AEx ib IIC, T4 CL II, III, AEx ia/ AEx ib, GP EFG, T4
- Permissible ambient temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F)
- Entity parameters	U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω , L_i = 400 µH, C_i = 6 nF
• Marking (NI/n)	CL I, DIV 2, GP ABCD T4/T6 CL II, III, DIV 2, GP FG T4/T6 Ex nA IIC T4/T6 AEx nA IIC T4/T6 Ex nL IIC T4/T6 AEx nL IIC T4/T6
- Permissible ambient temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- NI/nA parameters	According to "control drawing": A5E02189134N U_m = 45 V
- nL parameters	According to "control drawing": A5E02189134N U_i = 45 V, I_i = 100 mA, L_i = 400 µH, C_i = 6 nF

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Explosion protection for China (acc. to NEPSI)	
• Intrinsic safety "i"	GYJ111111X
- Marking	Ex ia/ib IIB/IIC T4
- Perm. ambient temperature	40 ... +85 °C (-40 ... +185 °F)
- Connection	To certified intrinsically-safe circuits with maximum values: U_i = 30 V I_i = 100 mA, P_i = 750 mW
- Effective internal inductance	L_i = 400 mH
- Effective inner capacitance	C_i = 6 nF
• Explosion-proof "d"	GYJ111112
- Marking	Ex dia IIC T4/T6
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6
- Connection	To circuits with values: U_m = DC 10.5 ... 45 V
• Dust explosion protection for zone 21/22	GYJ111112
- Marking	DIP A21 TA,T120 °C IP68 D21
- Connection	To circuits with values: U_m = DC 10.5 ... 45 V
• Type of protection "n" (zone 2)	GYJ111111X
- Marking	Ex nL IIB/IIC T4/T6 Ex nA II T4/T6
- Connection	U_i = 45 V DC
- Effective internal inductance	L_i = 400 mH
- Effective inner capacitance	C_i = 6 nF

1) The total performance includes the errors caused by temperature effects, static pressure effects and conformity error, including hysteresis and repeatability.

2) Not in combination wiht span "G".

HART communication	
Load with connection of	
• HART communicator	R_B = 230 ... 1100 Ω
• HART modem	R_B = 230 ... 500 Ω
Cable	2 wire shielded: ≤ 3.0 km (1.86 miles), multiwire shielded: ≤ 1.5 km (0.93 miles)
Protocol	HART Version 6.0
PC/laptop requirements	IBM compatible, RAM > 32 MByte, hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection, VGA graphics
Software for computer	SIMATIC PDM 6.0

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Selection and Ordering data

Article No.

Pressure transmitters for differential pressure and flow, SITRANS P500 HART, PN 160 (MAWP 2320 psi) ↗ 7MF54 ■■ - ■■■■ 0

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Enclosure	**Thread for cable gland**	
Die-cast aluminum, dual compartment	M20x1.5	0
Die-cast aluminum, dual compartment	½-14 NPT	1

Output	
4 ... 20 mA, HART	3

Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1

Measuring span		
1.00 ... 50 mbar	(0.4 ... 20 inH_2O)	C
1.25 ... 250 mbar	(0.5 ... 100.4 inH_2O)	D
6.25 ... 1250 mbar	(2.5 ... 502 inH_2O)	E
31.25 ... 6250 mbar	(12.54 ... 2509 inH_2O)	F
0.16 ... 32 bar	(2.33 ... 465 psi)	G

Wetted parts materials (stainless steel process flanges)		
Seal diaphragm	Process connection	
Stainless steel 1.4404/316L	Stainless steel 1.4404/316L	A
Hastelloy C276[1]	Stainless steel 1.4404/316L	B
Monel 400[1]	Stainless steel 1.4404/316L	C

Process connection	
Female thread ¼-18 NPT	
• Sealing screw opposite process connection	
- Mounting thread 7/16 - 20 UNF according to EN 61518	0
- Mounting thread M10 to DIN 19213	1
• Vent on side of process flange[2]	
- Mounting thread 7/16 - 20 UNF according to EN 61518	4
- Mounting thread M10 to DIN 19213	5

[1] Not together with Measuring span "C".

[2] Not in conjunction with remote seals (option V00).

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Selection and Ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order code.	
Attachments	
Mounting bracket made of steel	**A01**
Mounting bracket made of stainless steel	**A02**
Display (Standard: no display, cover closed)	
With display and blanking cover	**A10**
With display and glass cover	**A11**
Special casing / cover version	
Two coats of lacquer on casing, cover (PU on epoxy)	**A20**
Electrical connection and cable entry (Standard: no cable gland, only dust protection caps)	
Cable gland made of plastic (IP66/68)[4]	**A50**
Cable glands made of metal (IP66/68)	**A51**
Cable glands made of stainless steel (IP66/68)	**A52**
M12 connectors without cable socket (IP66/67)[4]	**A60**
M12 connectors complete with cable socket (IP66/67)[4]	**A61**
Han 7D connectors, plastic, straight (with cable socket) (IP65)[4]	**A71**
Han 7D connectors, plastic, angled (with cable socket) (IP65)[4]	**A72**
Han 7D connectors, metal enclosure, straight (with cable socket) (IP65)[4]	**A73**
Han 7D connectors, metal enclosure, angled (with cable socket) (IP65)[4]	**A74**
Han 8D connectors, plastic, straight (with cable socket) (IP65)[4][8]	**A75**
Han 8D connectors, plastic, angled (with cable socket) (IP65)[4][8]	**A76**
Han 8D connectors, metal enclosure, straight (with cable socket) (IP65)[4][8]	**A77**
Han 8D connectors, metal enclosure, angled (with cable socket) (IP65)[4][8]	**A78**
PG 13.5 adapters[4]	**A82**
Language for labels, leporellos, menu language default[9] (instead of English as standard)	
German	**B10**
French	**B12**
Spanish	**B13**
Italian	**B14**
Chinese	**B15**
Russian	**B16**
Japanese	**B17**
English with units psi/inH_2O/°F	**B21**
Special version: Supplementary menu languages (Standard: English, German, French, Spanish, Italian)	
Asia language package (in addition: Chinese, Japanese, Russian)	**B80**
Certificates (available online for downloading)[1]	
Quality inspection certificate (Five-step factory calibration) according to IEC 60770-2[2]	**C11**
Acceptance test certificate according to EN 10204-3.1[3]	**C12**

Selection and Ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order code.	
Degree of protection approvals: Ex ia/ib (intrinsic safety)	
Ex ia/ib protection (ATEX) (T4)	**E00**
Ex IS protection (FM) (T4)	**E01**
Ex IS protection ($_C$CSA$_{US}$) (T4)	**E02**
Ex ia/ib protection (NEPSI) (T4)	**E06**
Degree of protection approvals: Ex d (flameproof)	
Ex d explosion-proof (ATEX)(T4/T6)	**E20**
Ex XP explosion-proof and DIP (FM)(T4/T6)	**E21**
Ex XP explosion-proof and DIP ($_C$CSA$_{US}$)(T4/T6)	**E22**
Ex d explosion-proof (NEPSI)(T4/T6)	**E26**
Degree of protection approvals: n/NI	
Zone 2 (nA, nL, ic) (ATEX) (T4/T6)	**E40**
Div2 NI, Div2 NI-field wiring (FM) (T4/T6)	**E41**
Zone 2 (nA, nL), Div2 NI ($_C$CSA$_{US}$) (T4/T6)	**E42**
Zone 2 (nA, nL) (NEPSI) (T4/T6)	**E46**
Degree of protection approvals: Dust Zone 20/21/22	
Use in Zone 21/22 (Ex tD) (ATEX)	**E60**
Use in Zone 20/21/22 (Ex iaD) (ATEX)	**E61**
Use in Zone 21/22 (Ex DIP) (NEPSI)	**E66**
Degree of protection approvals: Combinations	
IS protection and XP and DIP (FM)	**E71**
IS protection and XP and DIP ($_C$CSA$_{US}$)	**E72**
IS protection and XP and DIP (FM/$_C$CSA$_{US}$)	**E73**
Supplementary approvals/degree of protection	
Dual Seal approval[5]	**E85**
Export approval Korea	**E86**
Special process connection versions (diff. pressure)	
Side vents for gas measurements[7]	**L32**
Swap process connection: high-pressure side at front	**L33**
Mosquito protection	
4 pcs. for ¼-18 NPT thread	**L36**
Process flanges, O-rings, special material Standard: Viton (FKM (FPM)	
Process conn. sealing rings made of PTFE (Teflon), virginal	**L60**
Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced	**L61**
Process connection sealing rings made of FFPM (Kalrez)[10]	**L62**
Process connection sealing rings made of NBR	**L63**
Process connection sealing rings made of graphite	**L64**
Drain/Vent valve (1 set = 2 units)	
2 ventilation valves ¼- 18 NPT, in material of process flanges)	**L80**
Remote seals	
Transmitters with connection of remote seal[6] (For premounted valve manifolds see page 1/203)	**V00**

1) Enclosed in print or as CD: see page 1/201.

2) When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here.

3) When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals.

4) Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof"

5) Only in conjunction with FM and/or $_C$CSA$_{US}$

6) Please select a remote seal separately. Also refer to the information under footnote 2). Remote seals see page 1/199.

7) Only in conjunction with process connection "Vent on side".

8) The Han 8D plug is identical with the former Han 8U version.

9) For option B15, B16 and B17 the menu language default is english. Otherwise the Option B80 (Asia language package) is necessary.

10) Not together with Measuring span "G".

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Selection and Ordering data	Order code
Additional data Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set	
Specify in plain text:	
• In the case of linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, bar, kPa, MPa, psi	**Y01**
• In the case of square rooted characteristic (max. 5 characters): Y02: ... up to ... mbar, bar, kPa, MPa, psi	**Y02**
Measuring point number and measuring point identifier (only standard ASCII character set)	
Specify in plain text:	
Measuring point number (TAG No.), max. 16 characters Y15:	**Y15**
Measuring point text (max. 27 char.) Y16:	**Y16**
Entry of HART address (TAG), max. 32 characters Y17:	**Y17**
Setting of pressure indication in pressure units Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ... Note: The following pressure units are selectable: bar, mbar, mm H_2O*), in H_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM, % or mA *) Reference temperature 20 °C	**Y21**
Setting of pressure indication in non-pressure units[1)] Specify in plain text: Y22: ... up to ... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	**Y22 +** **Y01 or Y02**
Customer-specific settings	
Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)	**Y30**

[1)] Preset values can only be changed over SIMATIC PDM.

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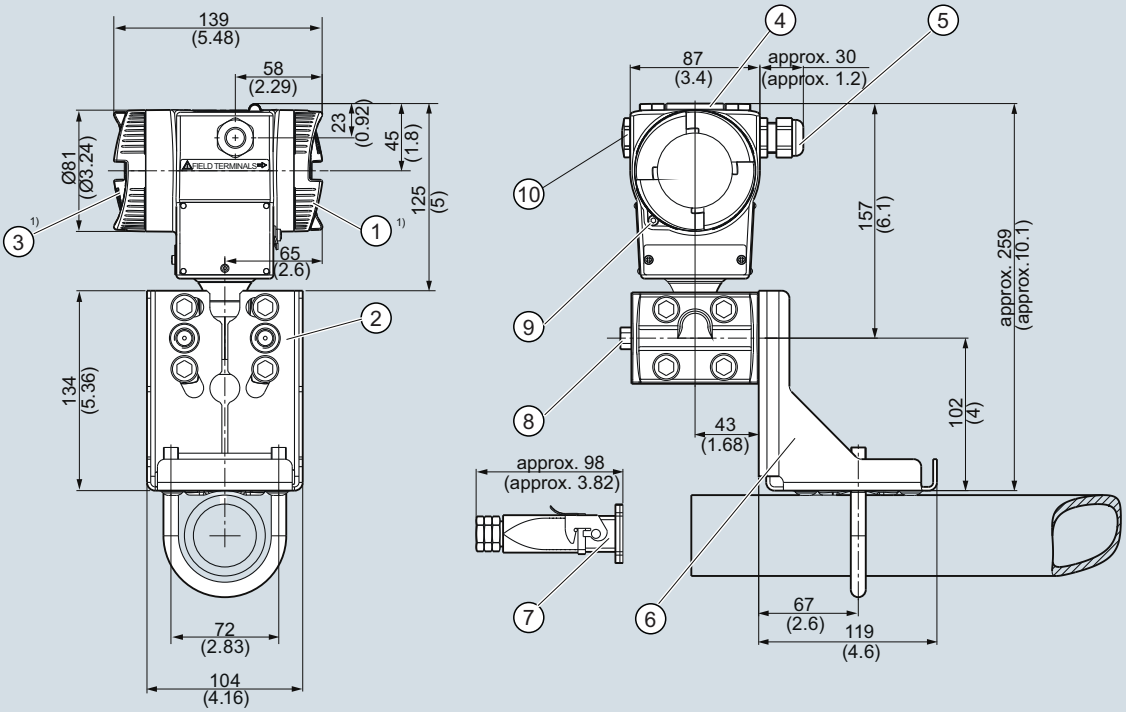
Dimensional drawings



1 Terminal side
2 Process connection: ¼-18 NPT (EN 61518)
3 Electronics side, digital display
4 Protective cover for the pushbuttons
5 Cable entry:
- Screwed gland M20 x 1.5[3)]
- Screwed gland ½-14 NPT
- Han 7D/Han 8D connector[2)3)]
- M12 connector

6 Mounting bracket (optional)
7 Electrical connection:
- Han 7D/Han 8D connector/socket[2)3)]

8 Vent valve (optional)
9 Safety catch
10 Blanking plug

1) Allow approx. 20 mm (0.79 inch) additional thread length
2) Not with type of protection "Explosion-proof"
3) Not with type of protection "FM + $_{C}$CSA$_{US}$ [IS + XP]"

SITRANS P pressure transmitter for differential pressure and flow, P500 series, measurements in mm (inch)

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Technical specifications

Input		
Measured variable	Level	
Span (infinitely adjustable)	Span (min. ... max.)	Maximum operating pressure
	1.25 ... 250 mbar (0.5 … 100 inH_2O)	See "Mounting flange"
	6.25 ... 1250 mbar (2.5 ... 500 inH_2O)	
	31.25 ... 6250 mbar (12.54 ... 2509 inH_2O)	
Lower range limit		
• Measuring cell with silicone oil filling	-100 % of max. span or 500 mbar a (7.25 psia) vacuum resistance Also available as vacuum-resistant remote seal: 30 mbar a (0.44 psia)	
Upper range limit	100% of max. span	
Start of scale	Between measuring limits (freely adjustable)	
Output		
Output current signal	4 ... 20 mA	
• Lower current limit (freely adjustable)	3.55 mA, factory setting 3.8 mA	
• Upper current limit (freely adjustable)	23 mA, factory setting 20.5 mA	
• Ripple (without HART communication)	I_{pp} ≤ 0.4 of max. output current	
• adjustable damping	0... 100 s in steps of 0.1 s, factory setting 2 s	
• current transmitter	3.55 ... 23 mA	
• Failure signal	Adjustable within limits: • Lower: 3.55 … 3.7 mA (factory setting 3.6 mA) • Upper: 21.0 … 23 mA (factory setting 22.8 mA)	
Load		
• Without HART communication	$R_B \leq (U_H - 10.5\ V)/0.023\ A$ in Ω, U_H : Power supply in V	
• With HART communication		
- HART Communicator	R_B = 230 ... 1100 Ω	
- HART modem	R_B = 230 ... 500 Ω	
Characteristic curve	Linearly rising or linearly falling and user-specific	
Measuring accuracy		
Reference conditions (in accordance with IEC 60770-1) All error information always refers to the set span.	• Rising characteristic curve • Start of scale 0 bar • Stainless steel seal diaphragm • Measuring cell with silicone oil filling • Room temperature (25 °C (77 °F))	
Error in measurement at limit setting incl. hysteresis and reproducibility r: Span ratio (r = max. span / set span)		
Linear characteristic	r ≤ 10	r ≥ 10
• 250 mbar (100 inH_2O) 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O)	≤ 0.03 %	≤ (0.003 · r) %
Long-term stability	≤ (0.05 · r) % per 5 years ≤ (0.08 · r) % per 10 years	
Influence of ambient temperature per 28 °C (50 °F)[1]		
• 250 mbar (100 inH_2O)	≤ (0.025 · r + 0.014) %	
• 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O)	≤ (0.006 · r + 0.03) %	
Influence of static pressure		
• At the start of scale value (PKN)		
- 250 mbar (100 inH_2O)	≤ (0.035 · r) % je 70 bar (1015 psi) correction via zero point correction	
- 1250 mbar (502 inH_2O) 6250 mbar (2509 inH_2O)	≤ (0.007 · r) % je 70 bar (1015 psi) correction via zero point correction	
• On the span (PKS)		
- 250 mbar (100 inH_2O) 1250 mbar (502 inH_2O)	≤ 0.03 % je 70 bar (1015 psi)	
- 6250 mbar (2509 inH_2O)	≤ 0.09 % je 70 bar (1015 psi)	
Influence of power supply	≤ 0.005 %/1 V	
Rated conditions		
Mounting position	Defined by flange	
Ambient conditions		
• Ambient temperature (Note: Observe the temperature class in areas subject to explosion hazard.)		
- total device	-40 ... +85 °C (-40 ... +185 °F)	
- Readable display	-20 ... +85 °C (-4 ... +185 °F)	
- Storage temperature	-50 ... +90 °C (-58 ... +194 °F)	
Climatic class		
• Condensation	Relative humidity 0 … 100 % (condensation permissible)	
Degree of protection to IEC 60529	IP66/IP68 and NEMA 4X (with corresponding cable gland)	
Electromagnetic Compatibility		
• Emitted interference and interference immunity	Acc. to IEC 61326 and NAMUR NE 21	
Permissible pressures	According to 97/23/EC pressure equipment directive	
Medium temperature of high-pressure side		
• Measuring cell with silicone oil filling		
- $p_{abs} \geq 1$ bar	-40 ... +175[2] °C (-40 ... +347[2] °F)	
- $p_{abs} < 1$ bar	-40 ... +80 °C (-40 ... +176 °F)	
Design		
Weight		
• To EN (pressure transmitter with mounting flange, without tube)	approx. 9.8 … 11.8 kg (21.6… 26.0 (lb)	
• To ASME (pressure transmitter with mounting flange, without tube)	approx. 9.8 … 16.8 kg (21.6 … 37.0 lb)	

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Material of wetted parts at the high-pressure side	
• Seal diaphragm of mounting flange	Stainless steel 1.4404/316L, Hastelloy C276, mat. no. 2.4819, Monel 400, mat. no. 2.4360, Tantal, PFA auf Edelstahl 1.4404/316L, PTFE auf Edelstahl 1.4404/316L
• Sealing face	Smooth to EN 1092-1, Form B1 and/or ASME B16.5 RF 125 … 250 AA for stainless steel316L, EN1092-1 Form B2 and/or ASME B16.5 RFSF in the case of other materials
• Sealing material in the process connection	
- O-Ring	• Standard: Viton (FKM (FPM)) • Optional: NBR, PTFE (virginal), PTFE (glas fiber-reinforced), FFPM (Kalrez), Graphite
- For vacuum application of mounting flange	copper
Material of wetted parts at the low-pressure side	
• Seal diaphragm	Stainless steel, mat. no. 1.4404/316L, Hastelloy C276, Monel 400
• Process connection and sealing screw	• Stainless steel, mat. no. 1.4404/316L
• Sealing material in the process connection	
- O-Ring	• Standard: Viton (FKM (FPM)) • Optional: NBR, PTFE (virginal), PTFE (glas fiber-reinforced), FFPM (Kalrez), Graphite
Material of parts not in contact with media	
Electronics housing	• Low copper die-cast aluminum AC-AlSi12 (Fe) or AC-AlSi 10 Mg (Fe) to DIN EN 1706 • Lacquer on polyurethane base, optional epoxy-based primer • Stainless steel serial plate
Process connection screws	Stainless steel
Measuring cell filling	Silicone oil
• Liquid mounting flange	Silicone oil or other material
Process connection	
• High-pressure side	Flange to EN and ASME
• Low-pressure side	¼-18 NPT female thread and flange connection with M10 to DIN 19213 or 7/16-20 UNF mounting thread to IEC 61518
Electrical connection	• Screw terminals • Cable entry via the following screwed glands: - M20 x 1.5 - ½-14 NPT - Han 7D/Han 8D connector - M12 plug
Displays and controls	
Push buttons	3; for operation directly on the device
Display	• With or without integrated display • Cover with or without window

Auxiliary power supply	
Terminal voltage on transmitter	• DC 10.6 ... 44 V • With intrinsically-safe operation DC 10.6 ... 30 V
Certificates and approvals	
Classification according to PED 97/23/EC	
• PN 160 (MAWP 2320 psi)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
Explosion protection	
Explosion protection for Europe (to ATEX)	
• Intrinsic safety "i"	PTB 09 ATEX 2004 X
- Marking	Ex II 1/2 G Ex ia/ib IIC T4
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW; R_i = 300 Ω
- Effective internal inductance:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF
• Explosion-proof "d"	BVS 09 ATEX E 027
- Marking	Ex II 1/2 G Ex d IIC T4/T6
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6
- Connection	To circuits with values: U_m = DC 10.5 ... 45 V
• Dust explosion protection for zone 20	PTB 09 ATEX 2004 X
- Marking	Ex II 1 D Ex iaD 20 T 120 °C
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
- Max. surface temperature	120 °C (248 °F)
- Connection	To certified intrinsically-safe circuits with peak values: U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω
- Effective internal inductance:	L_i = 400 µH
- Effective inner capacitance:	C_i = 6 nF
• Dust explosion protection for zone 21/22	BVS 09 ATEX E 027
- Marking	Ex II 2 D Ex tD A21 IP68 T120 °C Ex ia D21
- Connection	To circuits with values: U_H = 10.5 ... 45 V DC; P_{max} = 1.2 W
• Type of protection "n" (zone 2)	PTB 09 ATEX 2004 X
- Marking	Ex II 3 G Ex nA II T4/T6 Ex II 2/3 G Ex ib/nL IIC T4/T6 Ex II 2/3 G Ex ib/ic IIC T4/T6
- "nA" connection	U_m = 45 V DC
- "nL, ic" connection	U_i = 45 V
- Effective internal inductance	L_i = 400 µH
- Effective inner capacitance	C_i = 6 nF

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Explosion protection for USA (to FM)	
Certificate of Compliance	No. 3033013
• Identification (XP/DIP) or (IS)	XP CL I, DIV 1, GP ABCDEFG T4 / T6 DIP CL II, III, DIV1, GP EFG T4/T6 IS CL I, II, III, DIV1, GP ABCDEFG T4 CL I, Zone 0, AEx ia IIC T4 CL I, Zone 1, AEX ib IIC T4
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N U_m = 30 V, I_m = 100 mA, P_i = 750 mW, L_i = 400 µH , C_i = 6 nF
• Marking (NI/NO)	NI CL I, DIV 2, GP ABCD T4/T6 NI CL I, Zone 2, GP IIC T4/T6 S CL II, III, GPFG T4/T6 NI CL I, DIV 2, GP ABCD T4/T6, NIFW NI CL I, Zone 2, GP IIC T4/T6, NIFW NI CLII, III, DIV 2, GP FG T4/T6, NIFW
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- (NI/S) parameters	According to "control drawing": A5E02189134N U_m = 45 V, L_i = 400 µH, Ci = 6 nF
Explosion protection for Canada (to $_{C}CSA_{US}$)	
Certificate of Compliance	No. 2280963
• Marking (XP/DIP)	CL I, DIV 1, GP ABCD T4 /T6; CL II, DIV 1, GP EFG T4/T6
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- Entity parameters	According to "control drawing": A5E02189134N, U_m = 45 V
• Marking (ia/ib)	CL I, Ex ia/Ex ib IIC, T4 CL II, III, Ex ia/Ex ib, GP EFG, T4 CL I, AEx ia/AEx ib IIC, T4 CL II, III, AEx ia/ AEx ib, GP EFG, T4
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F)
- Entity parameters	U_i = 30 V, I_i = 100 mA, P_i = 750 mW, R_i = 300 Ω , L_i = 400 µH, C_i = 6 nF
• Marking (NI/n)	CL I, DIV2, GP ABCD T4/T6 CL II, III, DIV2, GP FG T4/T6 Ex nA IIC T4/T6 AEx nA IIC T4/T6 Ex nL IIC T4/T6 AEx nL IIC T4/T6
- Permissible Ambient Temperature	T_a = T4: -40 ... +85 °C (-40 ... +185 °F) T_a = T6: -40 ... +60 °C (-40 ... +140 °F)
- NI/nA parameters	According to "control drawing": A5E02189134N, U_m = 45 V
- nL parameters	According to "control drawing": A5E02189134N, U_i = 45 V, I_i = 100 mA, L_i = 400 µH, C_i = 6 nF

Explosion protection for China (acc. to NEPSI)	
• Intrinsic safety "i"	GYJ111111X
- Marking	Ex ia/ib IIB/IIC T4
- Permissible ambient temperature	40 ... +85 °C (-40 ... +185 °F)
- Connection	To certified intrinsically-safe circuits with maximum values: U_i = 30 V I_i = 100 mA, P_i = 750 mW
- Effective internal inductance	L_i = 400 mH
- Effective inner capacitance	C_i = 6 nF
• Explosion-proof "d"	GYJ111112
- Marking	Ex dia IIC T4/T6
- Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F) temperature class T4; -40 ... +60 °C (-40 ... +140 °F) temperature class T6
- Connection	To circuits with values: U_m = DC 10.5 ... 45 V
• Dust explosion protection for zone 21/22	GYJ111112
- Marking	DIP A21 TA,T120 °C IP68 D21
- Connection	To circuits with values: U_m = DC 10.5 ... 45 V
• Type of protection "n" (zone 2)	GYJ111111X
- Marking	Ex nL IIB/IIC T4/T6 Ex nA II T4/T6
- Connection	U_i = 45 V DC
- Effective internal inductance	L_i = 400 mH
- Effective inner capacitance	C_i = 6 nF

1) Only relevant for the pressure transmitter. The temperature error of the remote seal must calculated separately.
2) This value may be increased if the process connection is sufficiently insulated.

HART communication	
Load with connection of	
• HART Communicator	R_B = 230 ... 1100 Ω
• HART modem	R_B = 230 ... 500 Ω
Cable	2 wire shielded: ≤ 3.0 km (1.86 miles), multiwire shielded: ≤ 1.5 km (0.93 miles)
Protocol	HART Version 6.0
PC/laptop requirements	IBM compatible, RAM > 32 MByte, hard disk > 70 MByte, depending on modem type: RS 232-interface or USB connection, VGA graphics
Software for computer	SIMATIC PDM 6.0

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Selection and Ordering data		Article No. / Order code
Pressure transmitters for level, SITRANS P500 HART		↗ 7MF56 - 0 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Enclosure	**Thread for cable gland**	
Die-cast aluminum, dual compartment	M20x1.5	0
Die-cast aluminum, dual compartment	½-14 NPT	1
Output		
4 ... 20 mA, HART		3
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	1
Measuring span (min. ... max.)		
1.25 ... 250 mbar	(0.5 ... 100 inH_2O)	D
6.25 ... 1250 mbar	(2.5 ... 500 inH_2O)	E
31.25 ... 6250 mbar	(12.54 ... 2509 inH_2O)	F
Wetted parts of the low-pressure side (stainless steel process flanges)		
Seal diaphragm	Process connection	
Stainless steel 1.4404/316L	Stainless steel 1.4404/316L	A
Hastelloy C276	Stainless steel 1.4404/316L	B
Monel 400	Stainless steel 1.4404/316L	C
Process connection of low-pressure side		
Female thread ¼-18 NPT		
• Sealing screw opposite process connection		
- Mounting thread 7/16 - 20 UNF according to IEC 61518		0
- Mounting thread M10 to DIN 19213		1
• Vent on side of process flange		
- Mounting thread 7/16 - 20 UNF according to IEC 61518		4
- Mounting thread M10 to DIN 19213		5
Wetted parts materials (high-pressure side)		
Stainless steel 1.4404/316L		0
Hastelloy C276 mat. no. 2.4819		1
Monel 400 mat. no. 2.4360		2
Tantalum		3
PFA coated on stainless steel		4
PTFE on stainless steel 1.4404/316L (not in combination with an extension)		6 A
Other version Add Order code and plain text: Material: ... ; Extension length: ...		9 Y N1Y
Process connection on high-pressure side: Extension length		
None		A
50 mm (1.97 inch)		B
100 mm (3.94 inch)		C
150 mm (5.90 inch)		D
200 mm (7.87 inch)		E
Other version: See option "9" for "Wetted parts materials"		
Process connection on high-pressure side: Nominal diameter/Nominal pressure		
DN 50, PN 40[6)]		B
DN 80, PN 40		D
DN 100, PN 16		G
DN 100, PN 40		H
2", class 150[6)]		L
2", class 300[6)]		M
3", class 150		Q
3", class 300		R
4", class 150		T
4", class 300		U
Other version, add Order code and plain text: Nominal diameter: ... ; Nominal pressure: ...		Z Q1Y

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Selection and Ordering data	Article No.	Order code
Pressure transmitters for level, SITRANS P500 HART	**7MF56** ■■ - ■■■■ **0** - ■■■■	■■■
Process connection on high-pressure side: Filling liquid		
Silicone oil M5	**0**	
Silicone oil M50	**1**	
High-temperature oil	**2**	
Halocarbon (for oxygen measurement)	**3**	
FDA compliant oil	**4**	
Other version, add Order code and plain text: Filling liquid: ...	**9**	**R 1 Y**

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Selection and Ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order code.	
Display (Standard: no display, cover closed)	
With display and blanking cover	**A10**
With display and glass cover	**A11**
Special version: cover/casing	
Two coats of lacquer on casing, cover (PU on epoxy)	**A20**
Electrical connection and cable entry (Standard: no cable gland, only dust protection caps)	
Cable gland made of plastic (IP66/68)[4]	**A50**
Cable glands made of metal (IP66/68)	**A51**
Cable glands made of stainless steel (IP66/68)	**A52**
M12 connectors without cable socket (IP66/67)[4]	**A60**
M12 connectors, cable socket (IP66/67)[4]	**A61**
Han 7D connectors, plastic, straight (with cable socket) (IP65)[4]	**A71**
Han 7D connectors, plastic, angled (with cable socket) (IP65)[4]	**A72**
Han 7D connectors, metal enclosure, straight (with cable socket) (IP65)[4]	**A73**
Han 7D connectors, metal enclosure, angled (with cable socket) (IP65)[4]	**A74**
Han 8D connectors, plastic, straight (with cable socket) (IP65)[4][7]	**A75**
Han 8D connectors, plastic, angled (with cable socket) (IP65)[4][7]	**A76**
Han 8D connectors, metal enclosure, straight (with cable socket) (IP65)[4][7]	**A77**
Han 8D connectors, metal enclosure, angled (with cable socket) (IP65)[4][7]	**A78**
PG 13.5 adapters[4]	**A82**
Language for labels, leporellos and menu language default[8] (instead of English as standard)	
German	**B10**
French	**B12**
Spanish	**B13**
Italian	**B14**
Chinese	**B15**
Russian	**B16**
Japanese	**B17**
English with units: psi/inH_2O	**B21**
Special version: Supplementary menu languages (Standard: English, German, French, Spanish, Italian)	
Asia language package (in addition: Chinese, Japanese, Russian)	**B80**
Certificates (available online for downloading)[1]	
Quality inspection certificate (Five-step factory calibration) according to IEC 60770-2[2]	**C11**
Acceptance test certificate according to EN 10204-3.1[3]	**C12**
Degree of protection approvals: Ex ia/ib (intrinsic safety)	
Ex ia/ib protection (ATEX) (T4)	**E00**
Ex IS protection (FM) (T4)	**E01**
Ex IS protection ($_C$CSA$_{US}$) (T4)	**E02**
Ex ia/ib protection (NEPSI) (T4)	**E06**

Selection and Ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order code.	
Degree of protection approvals: Ex d (flameproof)	
Ex d explosion-proof (ATEX)(T4/T6)	**E20**
Ex XP explosion-proof and DIP (FM)(T4/T6)	**E21**
Ex XP explosion-proof and DIP ($_C$CSA$_{US}$)(T4/T6)	**E22**
Ex d explosion-proof (NEPSI)(T4/T6)	**E26**
Degree of protection approvals: n/NI	
Zone 2 (nA, nL, ic) (ATEX) (T4/T6)	**E40**
Div2 NI, Div2 NI-field wiring (FM) (T4/T6)	**E41**
Zone 2 (nA, nL), Div2 NI ($_C$CSA$_{US}$) (T4/T6)	**E42**
Zone 2 (nA, nL) (NEPSI) (T4/T6)	**E46**
Degree of protection approvals: Zone 20/21/22	
Use in Zone 21/22 (Ex tD) (ATEX)	**E60**
Use in Zone 20/21/22 (Ex iaD) (ATEX)	**E61**
Use in Zone (Ex DIP) (ATEX)	**E66**
Degree of protection approvals: Combinations	
IS protection and XP and DIP (FM)	**E71**
IS protection and XP and DIP ($_C$CSA$_{US}$)	**E72**
IS protection and XP and DIP (FM/$_C$CSA$_{US}$)	**E73**
Supplementary approvals / degree of protection	
Dual Seal approval[5]	**E85**
Export approval Korea	**E86**
Special process connection versions (diff. pressure)	
Swap process connection: high-pressure side at front	**L33**
Mosquito protection 4 pcs. for ¼-18 NPT thread	**L36**
Process flanges, O-rings, special material Standard: Viton (FKM (FPM)	
Process connection sealing rings made of PTFE (Teflon), virginal	**L60**
Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced	**L61**
Process connection sealing rings made of FFPM (Kalrez)	**L62**
Process connection sealing rings made of NBR	**L63**
Process connection sealing rings made of graphite	**L64**
Drain/Vent valve (1 set = 2 units)	
2 ventilation valves ¼- 18 NPT, in material of process flange)	**L80**
Vacuum-proof design	
Vacuum service	**V04**
Spark arrester For mounting on zone 0 (including documentation)	**V05**

1) Enclosed in print or as CD: see page 1/201.

2) When also ordering the quality inspection certificate (factory calibration) according to IEC 60770-2 for transmitters with mounted diaphragm seals: Order this certificate only together with the remote seals. The measuring accuracy of the total combination is certified here.

3) When also ordering the acceptance test certificate according to EN 10204-3.1 for transmitters with mounted diaphragm seals: Order this certificate as well in addition to the respective remote seals.

4) Not together with types of protection "Explosion-proof", "Ex nA" and "Intrinsic safety and explosion-proof"

5) Only in conjunction with FM and/or $_C$CSA$_{US}$

6) Not recommended for Measuring span "D"

7) The Han 8D plug is identical with the former Han 8U version.

8) For option B15, B16 and B17 the menu language default is english. Otherwise the Option B80 (Asia language package) is necessary.

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Selection and ordering data	Order code
Additional data Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Measuring range to be set	
Specify in plain text:	
Linear characteristic curve (max. 5 characters): Y01: ... up to ... mbar, kPa, MPa, psi	**Y01**
Measuring point number and measuring point identifier (only standard ASCII character set)	
Specify in plain text:	
Measuring point number (TAG No.), max. 16 characters Y15:	**Y15**
Measuring point text (max. 27 char.) Y16:	**Y16**
Entry of HART address (TAG), max. 32 characters Y17:	**Y17**
Setting of pressure indication in pressure units	**Y21**
Specify in plain text (standard setting: mbar) Y21: bar, kPa, MPa, psi, ...	
Note: The following pressure units are selectable: bar, mbar, mm H_2O*), in H_2O*), ftH_2O*), mmHG, inHG, psi, Pa, kPa, MPa, g/cm^2, kg/cm^2, Torr, ATM, % or mA	
*) Reference temperature 20 °C	
Setting of pressure indication in non-pressure units[1]	**Y22 +**
Specify in plain text:	**Y01**
Y22: ... up to ... l/min, m^3/h, m, USgpm, ... (specification of measuring range in pressure units "Y01" is essential, unit with max. 5 characters)	
Customer-specific settings	
Damping setting (range: 0 ... 100 s) (Standard setting: 2 s)	**Y30**

[1] Preset values can only be changed over SIMATIC PDM.

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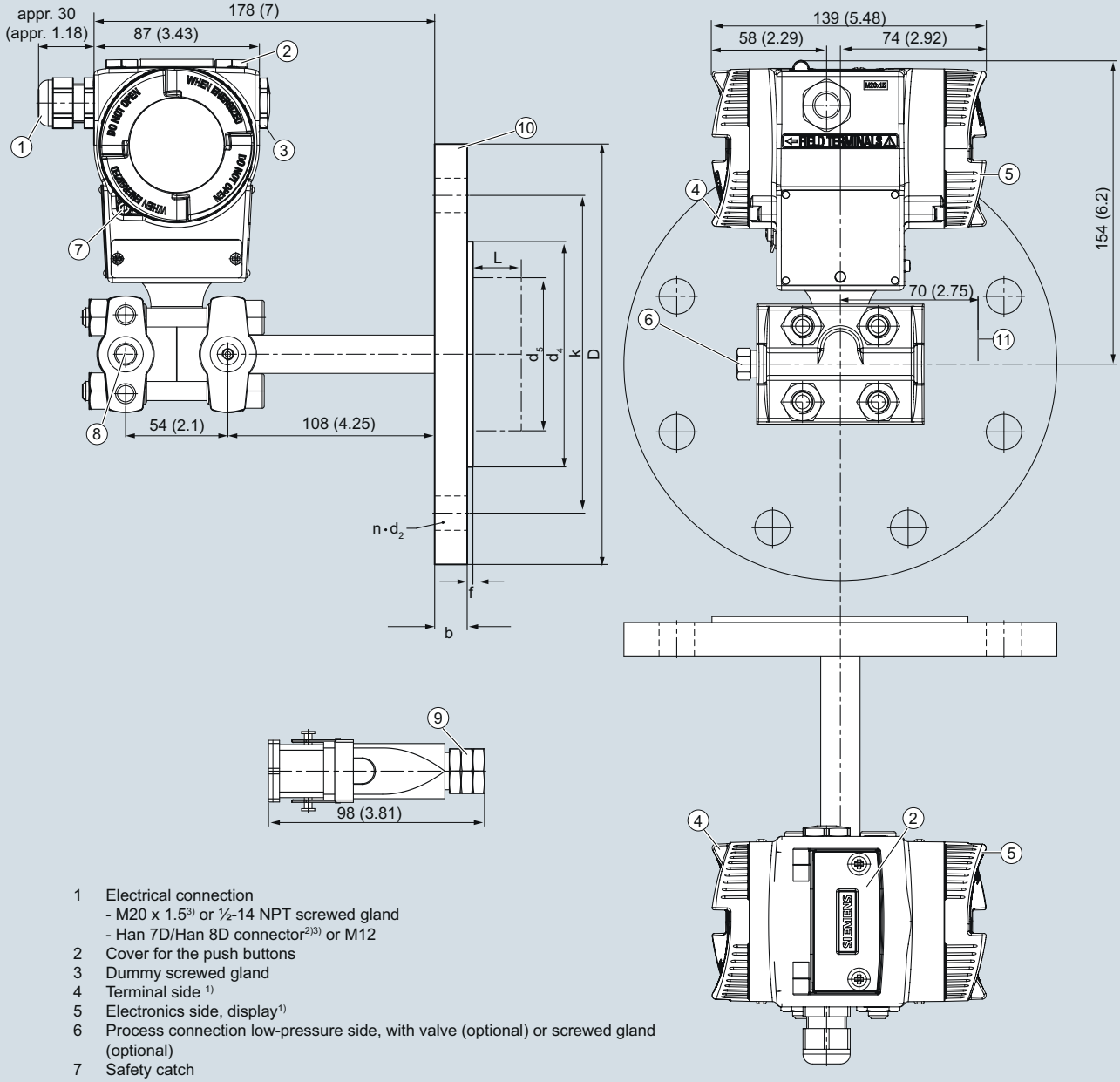
Dimensional drawings



1 Electrical connection
- M20 x 1.5[3] or ½-14 NPT screwed gland
- Han 7D/Han 8D connector[2)3)] or M12

2 Cover for the push buttons
3 Dummy screwed gland
4 Terminal side [1)]
5 Electronics side, display[1)]
6 Process connection low-pressure side, with valve (optional) or screwed gland (optional)
7 Safety catch
(only for type of protection "Explosion-proof"; not shown in the diagram)
8 Process connection: low-pressure side ¼-18NPT (IEC 61518)
9 Electrical connection:
- Han 7D/Han 8D connector/socket[2)3)]

10 Mounting flange according to EN 1092-1 or ASME B16.5
11 Clearance for turning the casing

[1)] Allow approx. 20 mm (0.79 inch) additional thread length
[2)] Not with type of protection "Explosion-proof"
[3)] Not with type of protection "FM + $_{C}CSA_{US}$ [IS + XP]"

SITRANS P pressure transmitter for filling level, P500 series, measurements in mm (inch)

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Connection to EN 1092-1

Nominal diameter	Nominal pressure	b	D	d	d_2	d_4	d_5	d_M	f	k	n	L
		mm	mm	mm	mm	mm	mm	mm	mm	mm		mm
DN50	PN 40	20	165	61	18	102	48.3	45[1)]	2	125	4	0, 50, 100, 150 or 200
DN 80	PN 40	24	200	90	18	138	76	72[2)]	2	160	8	
DN 100	PN 16	20	220	115	18	158	94	89	2	180	8	
	PN 40	24	235	115	22	162	94	89	2	190	8	

Connection to ASME B16.5

Nominal diameter	Nominal pressure	b	D	d_2	d_4	d_5	d_M	f	k	n	L
	lb/sq.in.	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)	inch (mm)		inch (mm)
2 inch	class 150	0.77 (19.5)	5.91 (150)	0.75 (19.0)	3.62 (92)	1.9 (48.3)	1.77 (45)[1)]	0.079 (2.0)	4.75 (120.7)	4	0, 2, 3.94, 5.94 or 7.87 (0, 50, 100, 150 or 200)
	class 300	0.89 (22.7)	6.49 (165)	0.75 (19.0)	3.62 (92)	1.9 (48.3)	1.77 (45)[1)]	0.079 (2.0)	5.0 (127)	8	
3 inch	class 150	0.96 (24.3)	7.5 (190.5)	0.75 (19.0)	5 (127)	3.0 (76)	2.83 (72)[2)]	0.079 (2.0)	6 (152.4)	4	
	class 300	1.14 (29.0)	8.27 (210)	0.87 (22.2)	5 (127)	3.0 (76)	2.83 (72)[2)]	0.079 (2.0)	6.69 (168.3)	8	
4 inch	class 150	0.96 (24.3)	9.06 (230)	0.75 (19.0)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.5 (190.5)	8	
	class 300	1.27 (32.2)	10.04 (255)	0.87 (22.2)	6.19 (157.2)	3.69 (94)	3.5 (89)	0.079 (2.0)	7.88 (200)	8	

Explanations of tables:

d: Internal diameter of gasket to DIN 2690

d_M: Effective diaphragm diameter

d_5: Diameter of extension

f: Milling edge

L: Extension length

1) 59 mm = 2.32 inch with tube length L=0..

2) 89 mm = 3½ inch with tube length L=0.

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SITRANS P500 - Supplementary electronics for 4-wire connection

Overview

SITRANS P pressure transmitter with supplementary electronics for 4-wire connection

Direct connection of the supplementary electronics to a SITRANS P pressure transmitter from the P500 series produces a transmitter for four-wire connection.

The supplementary electronics cannot be attached to explosion-protected pressure transmitters. The supplementary electronics is fitted in a light metal housing which is mounted on the left side of the pressure transmitter.

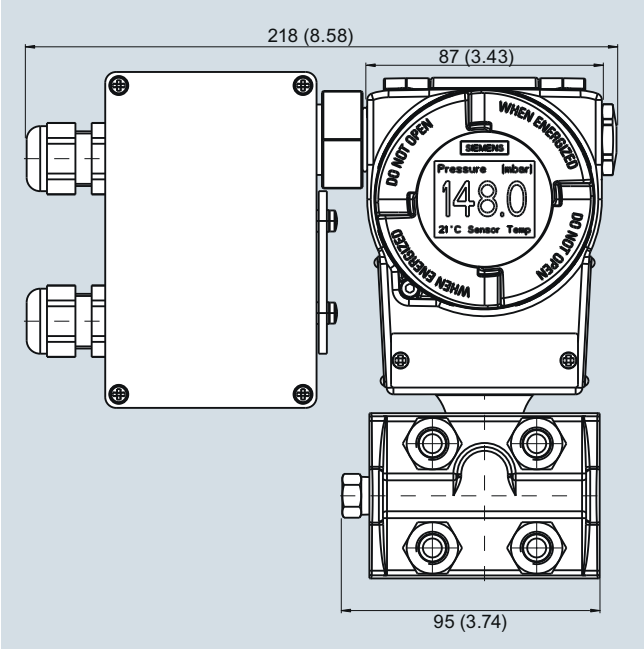
Note on ordering:

The supplementary electronics has to be be ordered through the **supplementary options** of the pressure transmitter in question.

Technical specifications

Output	
Output signal	0 ... 20 mA or 4 ... 20 mA
Load	Max. 750 Ω
Voltage measurement	Linear (square-rooting in transmitter if necessary)
Electrical isolation	Between power supply and input/output
Measuring accuracy	According to IEC 60770-1
Conformity error (in addition to transmitter)	≤ 0.15 % of set span
Influence of ambient temperature	≤ 0.1 % per 10 K
Power supply effect	≤ 0.1 % per 10 % change in voltage or frequency
Load effect	≤ 0.1 % per 100 % change
Rated conditions	
Ambient temperature	
• 24 V version	-20 ... +80 °C (-4 ... +176 °F)
• 230 V version	-20 ... +60 °C (-4 ... +140 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Degree of protection	IP54 to IEC 60529
Electromagnetic compatibility (EMC)	IEC 61236-1
Condensation	Relative humidity 0 ... 95 % condensation permissible
Structural design	
Dimensions (W x H x D) in mm (inch)	80 x 120 x 60 (3.15 x 4.72 x 2.36)
Electrical connection	Screw terminals (Pg 13.5 cable inlet) or Han 7D / Han 8D plug
Power supply	
Supply voltage	230 V AC (-10 ... +6 %, 47 ... 63 Hz, approx. 6 VA) or 24 V AC/DC (24 V AC ± 10 %, 47 ... 63 Hz, approx. 3 VA)
Permissible ripple (within the specified limits)	Approx. 2.5 V_{pp}

Dimensional drawings



SITRANS P pressure transmitters with supplementary electronics for four-wire connection, dimension drawing, dimensions in mm (inch)

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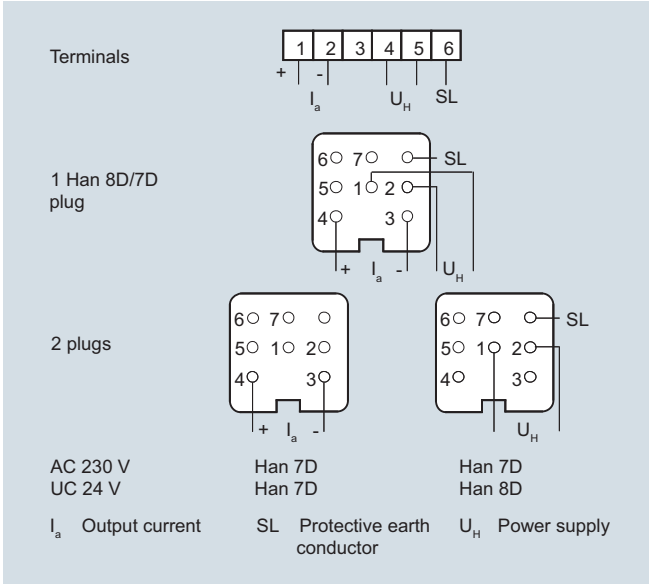
Schematics



Supplementary electronics for 4-wire connection, connection diagram (the HAN 8D conector is identical to the previous version of the HAN 8U)

Selection and Ordering data		Order code
Supplementary electronics for 4-wire connection		**V** ■ ■
Article No. of the transmitter **7MF54..-.....-....** or **7MF56..-.....-....** add **"-Z"** and Order code.		
Power supply	**Electrical connection**	
24 V AC/DC	Terminals; 2 Pg screwed glands, to left	**1**
	2 Han 7D/Han 8D plugs incl. mating connector, to left	**3**
	1 Han 7D plug incl. mating connector, angled	**5**
	Terminals; 1 Pg screwed gland, downwards	**6**
	1 Han 8D plug incl. mating connector, downwards (observe arrangement of plug and differential pressure line)	**9**
230 V AC	Terminals; 2 Pg screwed glands, to left	**7**
	2 Han 7D plugs incl. mating connector, to left	**8**
Output current		
0 ... 20 mA		**0**
4 ... 20 mA		**1**
Accessories		Article No.
Instruction Manual German/English		**A5E00322799**

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Selection and ordering data		Article No.
Replacement measuring cells for differential pressure ↗ SITRANS P pressure transmitters for differential pressure and flow, P500 HART PN 160 series (MAWP 2320 psi) ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		**7 M F 5 9 9 4 -** ■■■■ **1**
Measuring cell filling	**Measuring cell cleaning**	
Silicone oil	normal	**1**
Measuring span (min. ... max.)		
1,00 ... 50 mbar	(0.4 ... 20 inH_2O)	**C**
1.25 ... 250 mbar	(0.5 ... 100 inH_2O)	**D**
6.25 ... 1250 mbar	(2.5 ... 502 inH_2O)	**E**
31.25 ... 6250 mbar	(12.54 ... 2509 inH_2O)	**F**
0.16 ... 32 bar	(2.33 ... 465 psi)	**G**
Wetted parts materials (stainless steel process flanges)		
Seal diaphragm	Parts of measuring cell	
Stainless steel 1.4404/316L	Stainless steel 1.4404/316L	**A**
Hastelloy C276[1]	Stainless steel1.4404/316L	**B**
Monel 400[1]	Stainless steel1.4404/316L	**C**
Process connection		
Female thread ¼-18 NPT		
• Sealing screw opposite process connection		
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		**0**
- Mounting thread M10 to DIN 19213		**1**
• Vent on side of process flange		
- Mounting thread $^7/_{16}$-20 UNF to IEC 61518		**4**
- Mounting thread M10 to DIN 19213		**5**
Further designs		Order code
Add "-Z" to Article No. and specify Order code.		
Acceptance test certificate Acc. to EN 10204-3.1		**C12**
Without process flanges		**K00**
Vent on side for gas measurements[2]		**L32**
Process flanges, O-ring, special material Standard: Viton (FKM (FPM))		
Process connection sealing rings made of PTFE (Teflon), virginal		**L60**
Process connection sealing rings made of PTFE (Teflon), glass fiber-reinforced		**L61**
Process connection sealing rings made of FFPM (Kalrez)[2]		**L62**
Process flanges, O-rings made of NBR		**L63**
Process flanges, O-rings made of graphite		**L64**

[1] Not together with Measuring span "C".

[2] Only in conjunction with process connection code 4 or 5.

[2] Not together with Measuring span "G".

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Selection and Ordering data

		Article No.
Mounting brackets		
For differential pressure transmitters with flange thread M10 (7MF54..-…10 and 7MF54..-…50)		
• Made of steel		**7MF5987-1AA**
• Made of stainless steel	►	**7MF5987-1AD**
Mounting brackets		
for differential pressure transmitter with flange thread 7/16-20 UNF (7MF54..-…00 and 7MF54..-…40)		
• Made of steel		**7MF5987-1AC**
• Made of stainless steel		**7MF5987-1AF**
Cover		
Made of die-cast aluminum, including O-ring		
• Without window		**7MF5987-1BE**
• With window	►	**7MF5987-1BF**
Digital indicator Including mounting material		**7MF5987-1BR**
TAG plate (incl. fastening material)		
Without inscription (5 pcs.)		**7MF5987-1CA**
Printed (1 pc.) Data according to Y01 or Y02, Y15 and Y16 (see "SITRANS P transmitters")		**7MF5987-1CB-Z Y..: .....**
Mounting screws		
For TAG plate, grounding and connection terminals and securing and locking screws (30 units)		**7MF5987-1CC**
Sealing plugs for process flange (1 set = 2 units)		
• Made of stainless steel		**7MF4997-1CG**
• Made of Hastelloy		**7MF4997-1CH**
Vent valve Complete (1 set = 2 units)		
• Made of stainless steel	►	**7MF4997-1CP**
• Made of Hastelloy		**7MF4997-1CQ**
Electronics module		
HART, intrinsically safe Ex ia for installation in transmitter casing (observe warranty conditions)		**7MF5987-1DC**
Connection board (incl. fastening material)		
HART, intrinsically safe Ex ia for installation in transmitter casing (observe warranty conditions)		**7MF5987-1DM**
O-rings for process flanges made of:		
• Viton (FKM (FPM)) (10 pcs.)		**7MF5987-2DA**
• NBR (Buna N) (10 pcs.)		**7MF5987-2DE**
Push buttons assembly (incl. fastening material)		**7MF5987-2AF**
For replacement of operating keys for on-site operation of the transmitter		
Sealing ring for		
• Process connection		**See catalog FI01, "Fittings"**
• NBR sealing ring for screw cover (10 pcs.)		**7MF4997-2EA**
• NBR sealing ring for interface measuring cell/housing (10 pcs.)		**7MF5987-2EB**

Selection and Ordering data

	Article No.
Operating Instructions[1]	
German	**A5E02344527**
English	**A5E02344528**
French	**A5E02344529**
Italian	**A5E02344530**
Spanish	**A5E02344531**
Compact operating instructions[1]	
English, German, Spanish, French, Italian, Dutch	**A5E02344532**
English, Estonian, Latviaan, Lithuanian, Polish, Romanian	**A5E02307339**
English, Bulgarian, Czech, Finnish, Slovakian, Slovenian	**A5E02307340**
English, Danish, Greek, Portuguese, Swedish, Hungarian	**A5E02307341**
Russian	**A5E02307338**
Brief instructions (Leporello)	
German, English, French, Italian, Spanish, Chinese	**A5E02344536**
DVD with SITRANS P documentation	
German, English, French, Spanish, Italian Compact operating instructions in 21 EU languages	**A5E00090345**
Service Instructions[1] for replacement of electronics, measuring cell and terminal board	
• German	**A5E02822443**
• English	**A5E02344534**
HART modem	
With USB interface ►	**7MF4997-1DB**
Operating instruction[1] **Supplementary electronics for 4-wire connection**	**A5E00322799**
German, English	
Certificates (order only via SAP) additional to internet download	
• Hard copy (to order)	**A5E03252406**
• On CD (to order)	**A5E03252407**

[1] You can download these operating instructions free-of-charge from our Internet site at www.siemens.com/sitransp.

► Available ex stock.

For power supply units, see catalog FI01 "Supplementary Components".

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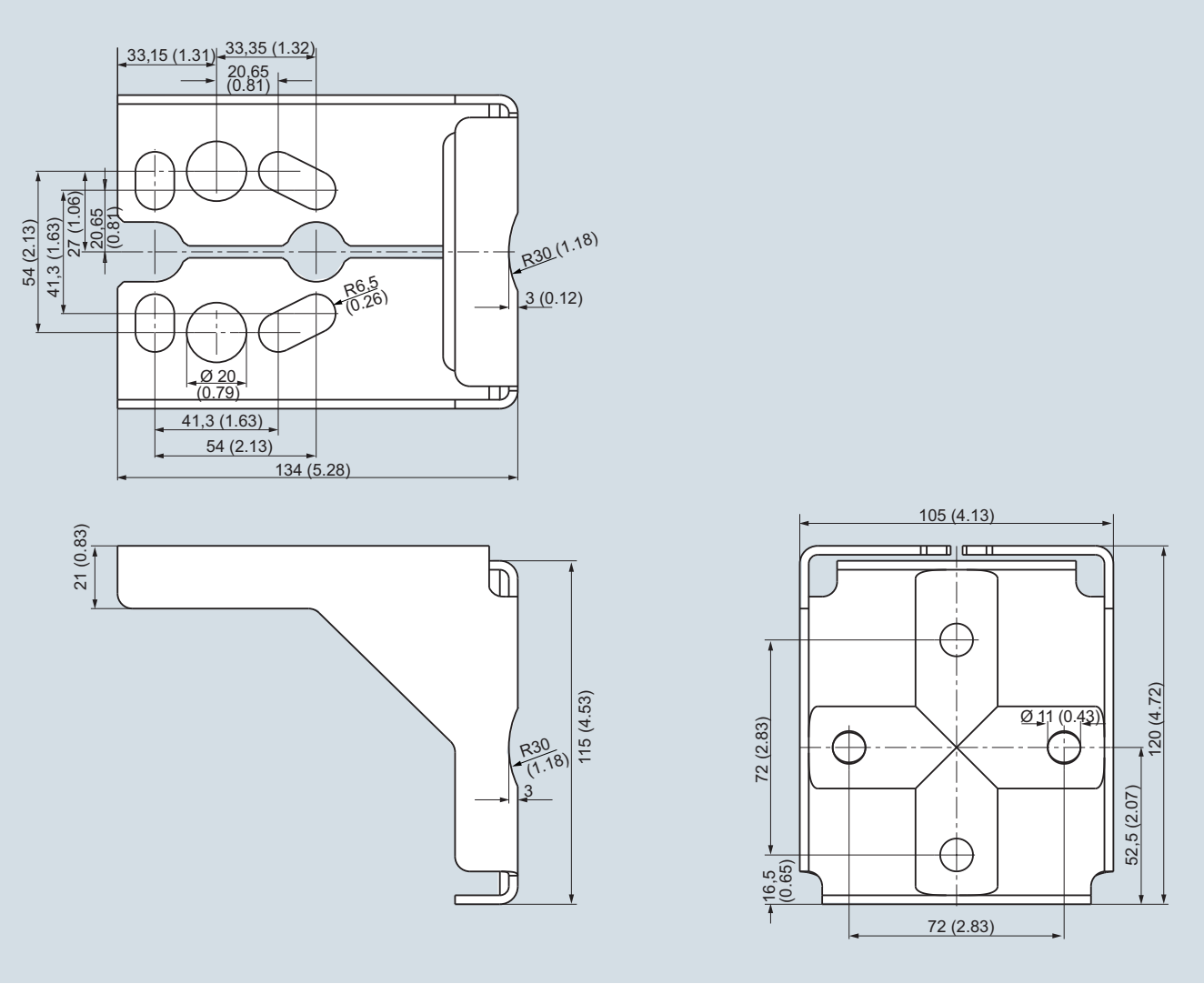
Dimensional drawings



Mounting bracket for SITRANS P pressure transmitter, P500 series, measurements in mm (inch)
Mounting bracket material: Sheet-steel Mat. No. 1.0330, chrome-plated, or stainless steel Mat. No. 1.4301 (304)

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Overview

The SITRANS P500 transmitter can be delivered factory-fitted with the following manifolds:

- Valve manifolds 7MF9411-5BA: Three valve manifold for differential pressure transmitter
- Valve manifolds 7MF9411-5CA: Three valve manifold for differential pressure transmitter

Design

The 7MF9411-5BA and 7MF9411-5CA manifolds are sealed with PTFE sealing rings between the transmitter and the manifold.

Once installed, the complete unit is checked under pressure for leaks (compressed air 6 bar (2411 inH_2O)) and is certified leak-proof with a test report to EN 10204 - 2.2.

All manifolds should preferably be secured with the respective mounting brackets. The transmitters are mounted on the manifold and not on the unit itself.

If you order a mounting bracket when choosing the option "Factory mounting of manifolds", you will receive a mounting bracket for the manifold instead of a bracket for mounting the transmitter.

If you order an acceptance test certificate 3.1 to EN10204 when choosing the option "Factory mounting of manifolds", a separate certificate is provided for the transmitters and the manifolds respectively.

Selection and ordering Data

Manifold 7MF9411-5BA on SITRANS P pressure transmitter P500 for differential pressure and flow

Add -Z to the Article No. of the transmitter and add Order codes	Order code
SITRANS P500 7MF54..-...	
mounted with gaskets made of PTFE and screws made of	
• Chromized steel	**U01**
• Stainless steel	**U02**
Delivery incl. high-pressure test certified by factory certificate to EN10204-2.2	
Further designs:	
Delivery includes mounting bracket and mounting clips made of	
• Steel	**A01**
• Stainless steel	**A02**
(instead of the mounting bracket supplied with the transmitter)	
Supplied acceptance test certificate to EN10204-3.1 for transmitters and mounted valve manifold	**C12**

Manifold 7MF9411-5CA on SITRANS P500 pressure transmitter for differential pressure and flow

Add -Z to the Article No. of the transmitter and add Order codes	Order code
SITRANS P500 7MF54..-...	
mounted with gaskets made of PTFE and screws made of	
• Chromized steel	**U03**
• Stainless steel	**U04**
Delivery incl. high-pressure test certified by factory certificate to EN10204-2.2	
Further designs:	
Delivery includes mounting bracket and mounting clips made of	
• Steel	**A01**
• Stainless steel	**A02**
(instead of the mounting bracket supplied with the transmitter)	
Supplied acceptance test certificate to EN10204-3.1 for transmitters and mounted valve manifold	**C12**

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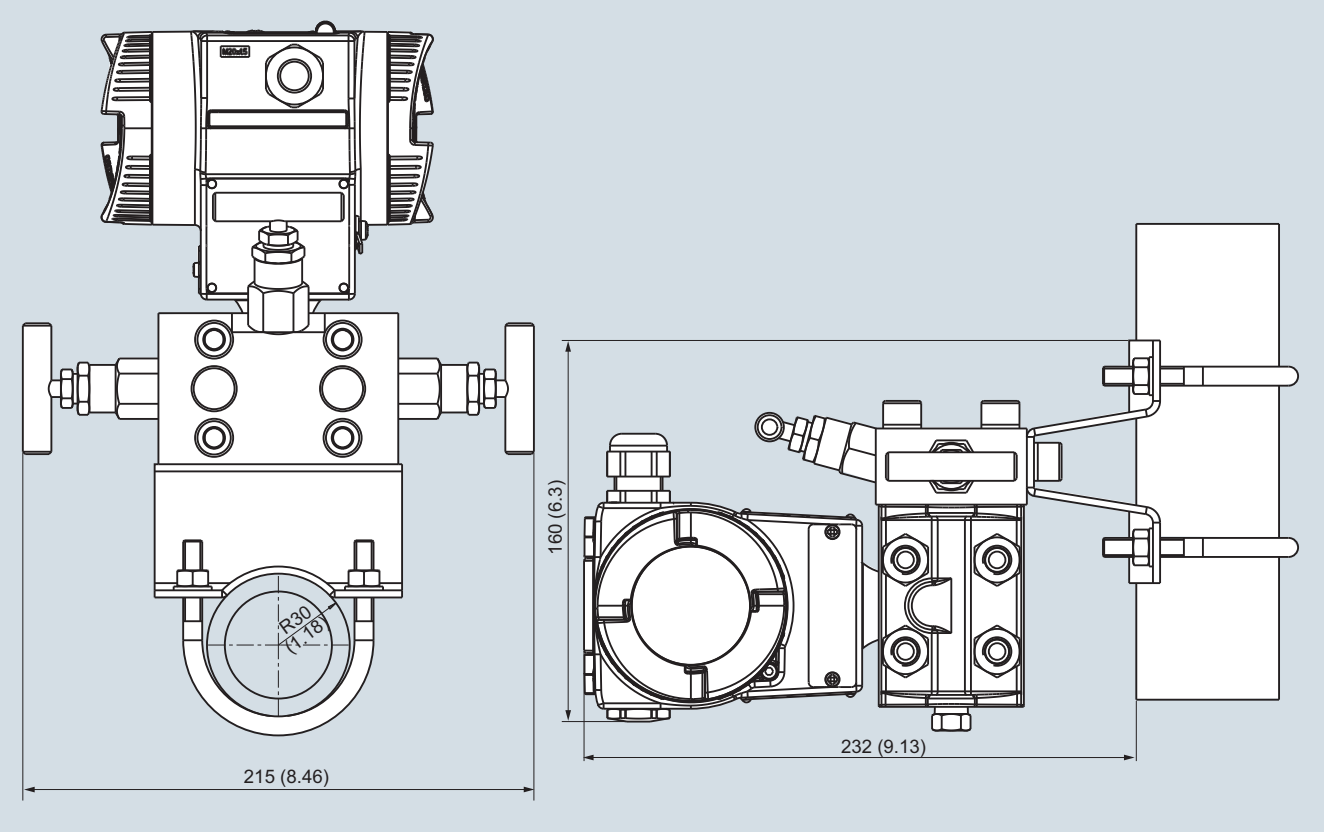
Dimensional drawings

Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



Manifold 7MF9411-5BA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)

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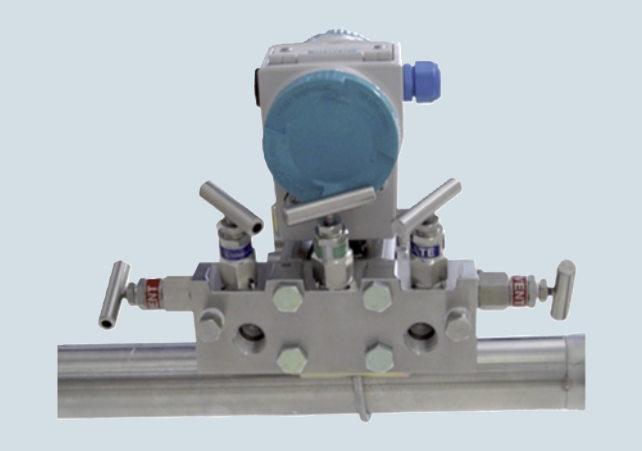
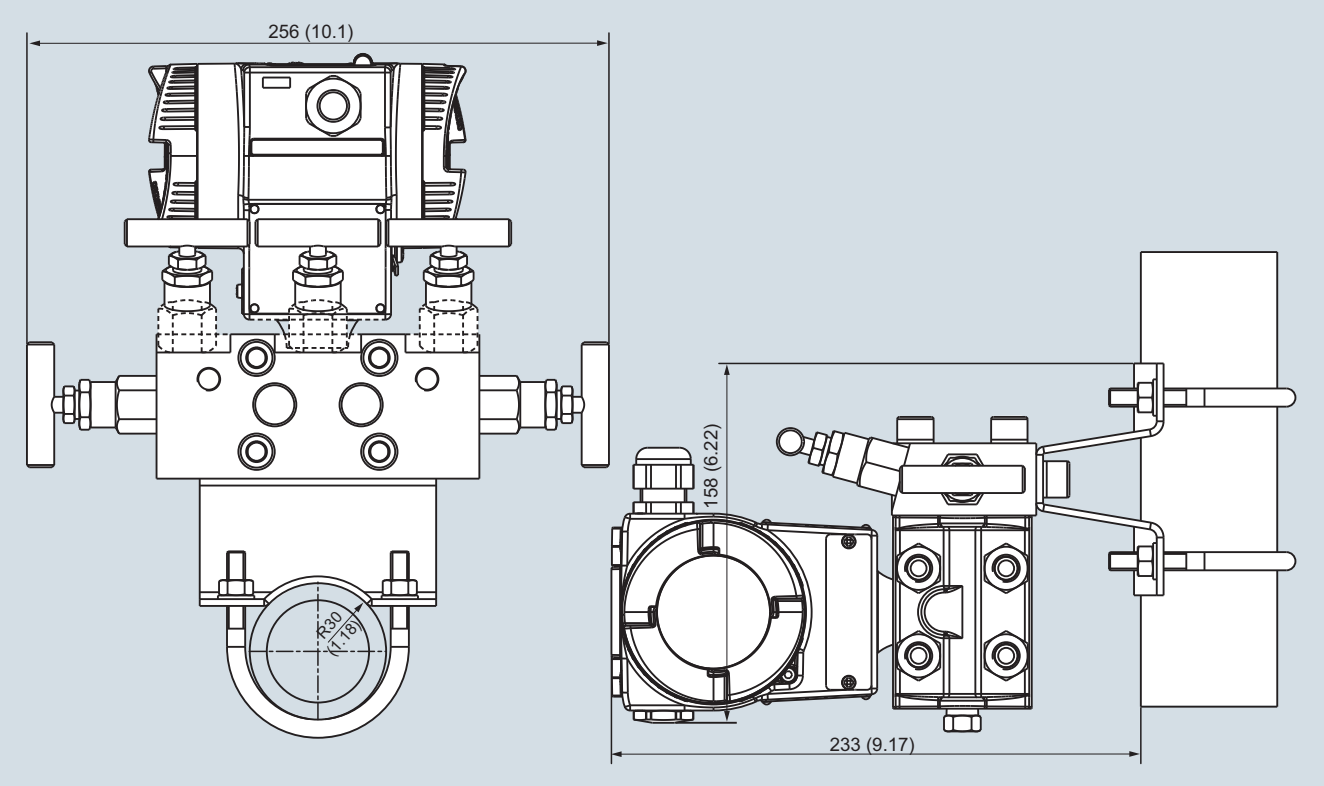


Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow (incl. mounting bracket)



Manifold 7MF9411-5CA with attached SITRANS P500 pressure transmitter for differential pressure and flow, measurements in mm (inch)

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1

Technical description

Overview

In many cases the pressure transmitter and the measured medium have to be physically separated. It is then necessary to use a remote seal.

The remote seals can be used with the following SITRANS P pressure transmitter series:

- Pressure (P300, DS III with HART, DS III with PROFIBUS PA, DS III with FOUNDATION Fieldbus)
- Absolute pressure (P300, DS III with HART, DS III with PROFIBUS PA, DS III with FOUNDATION Fieldbus)
- Differential pressure and flow (P500, DS III with HART, DS III with PROFIBUS PA, DS III with FOUNDATION Fieldbus)

Note

When configuring your remote seal, be sure to read the information about transmission response, temperature error and response time to be found in the sections "Function" and "Technical data". Only then will the remote seal work to optimum effect.

Benefits

- No direct contact between the pressure transmitter and the medium
- Individual configuration of the pressure transmitter for perfect adaptation to the operating conditions
- Available in many versions
- Specially designed for difficult operating conditions
- Quick-release versions available for the food industry

Application

Remote seal systems should be used if a separation between the measured medium and the measuring instrument is essential or appropriate.

Examples of such cases:

- The temperature of the medium is outside the limits specified for the pressure transmitter.
- The medium is corrosive and requires diaphragm materials which are not available for the pressure transmitter.
- The medium is highly viscous or contains solids which would block the measuring chambers of the pressure transmitter.
- The medium may freeze in the measuring chambers or pulse line.
- The medium is heterogeneous or fibrous.
- The medium tends towards polymerization or crystallization.
- The process requires quick-release remote seals, as necessary e.g. in the food industry for fast cleaning.
- The process requires cleaning of the measuring point, e.g. in a batch process.

Design

A remote seal system consists of the following components.

- Pressure transmitter
- One or two remote seals
- Filling liquid
- Connection between pressure transmitter and remote seal (direct mounting or by means of capillary)

The volume in contact with the measured medium is terminated by a flat elastic diaphragm lying in a bed. Between the diaphragm and the pressure transmitter is the filling liquid.

In many cases, a capillary has to be connected between the remote seal and the pressure transmitter in order e.g. to minimize temperature effects on the latter when hot media are involved.

However, the capillary influences the response time and the temperature response of the complete remote seal system. Two capillaries of equal length must always be used to connect a remote seal to a pressure transmitter for differential pressure.

The remote seal can be optionally equipped with a projecting diaphragm (tube).

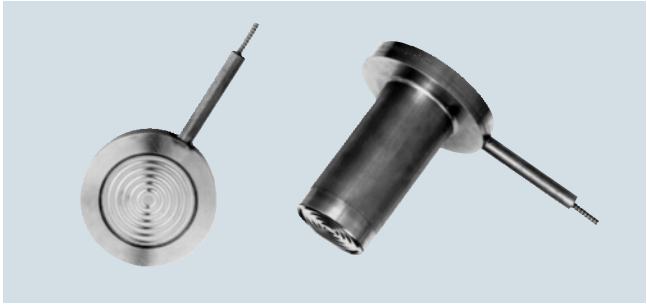
Remote seals of sandwich design are fitted with a dummy flange.

Designs

Diaphragm seal

With diaphragm seals, the pressure is measured by means of a flat diaphragm which rests in a bed.

The following types of diaphragm seals exist:

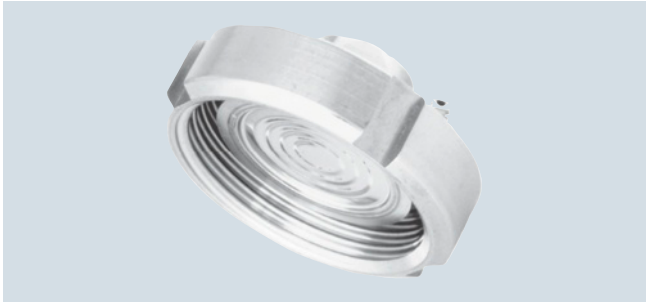


Diaphragm seal of sandwich design without (left) and with a projecting diaphragm (tube)

- Sandwich design
- Sandwich design with projecting diaphragm (tube) to DIN or ASME which are secured using a dummy flange.

Diaphragm seal of flange design without (left) and with a projecting diaphragm (tube)

- Flange design
- Flange design with projecting diaphragm (tube) to DIN or ASME, secured using holes in the flange.



Quick-release diaphragm seal

- Quick-release remote seals, e.g. to DIN 11851, SMS standard, IDF standard, APV RJF standard, clamp connection, etc.
- Miniature diaphragm seal with male thread for screwing into tapped holes
- Remote seals with customer-specific process connections

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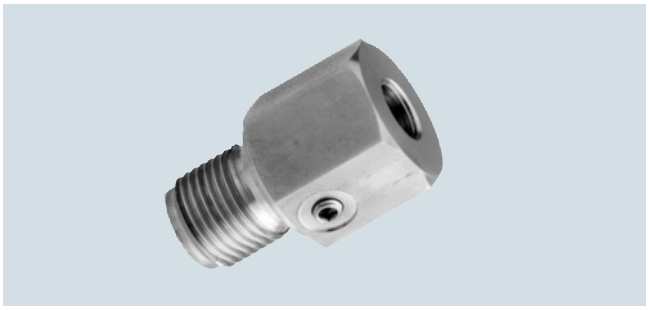
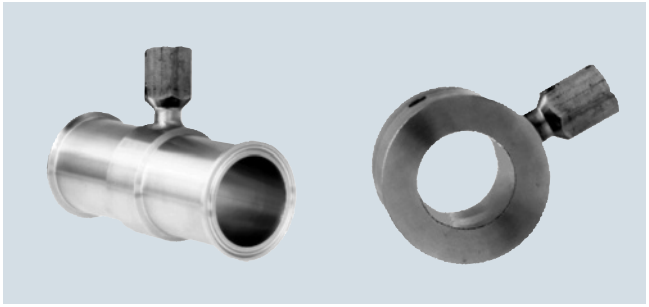


Miniature diaphragm seal with diaphragm flush with front

- Miniature diaphragm seals

The quick-release remote seals are used above all in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The quick-release clamp present on the remote seal means that quick dismounting is possible for cleaning.

Clamp-on seal



Clamp-on seal with quick-release design (left) and for flange mounting

With clamp-on seals, the pressure is first measured using a cylindrical diaphragm positioned in a pipe, and then transmitted to the pressure transmitter by means of the filling liquid.

The clamp-on seal is a special design for flowing media. It consists of a cylindrical pipe in which a cylindrical diaphragm is embedded. Since it is completely integrated in the process pipe, no turbulences, dead volumes or other obstructions to the flow occur. Furthermore, the clamp-on seal can be cleaned by a pig.

The following types of clamp-on seals exist:

- Quick-release clamp-on seals, e.g. to DIN 11851, SMS standard, IDF standard, APV/RJF standard, clamp connection etc. The quick-release facility attached to the remote seal enables the seal to be removed quickly for cleaning purposes.
- Clamp-on seals for flanging to EN or ASME.
- Clamp-on seals with customer-specific process connections.

Note:

The pressure data on the transmitter and the remote seal must be observed with regard to pressure/temperature behavior.

Function

The measured pressure is transferred from the diaphragm to the filling liquid and passes through the capillary to the measuring chamber of the pressure transmitter. The interior of the diaphragm seal and of the capillary, as well as the measuring chamber of the transmitter, are filled gas-free by the filling liquid.

Transmission response

The transmission response of a remote seal is characterized by the following variables:

- Temperature error
- Adjustment time

Temperature error

Temperature errors are caused by the change of volume of the filling liquid due to temperature variations. To select the right remote seal you must calculate the temperature error.

Below you will find an overview of the factors which influence the size of the temperature error, as well as information on how to calculate the temperature error.

The temperature error is dependent on the following variables:

- Rigidity of the diaphragm used
- Filling liquid used
- Influence of the filling liquid underneath the process flanges or in the connection shank of the pressure transmitter
- Internal diameter of the capillary: The bigger the internal diameter, the bigger the temperature error
- Length of the capillary: The longer the capillary, the bigger the temperature error

Diaphragm rigidity

The rigidity of the diaphragm is of decisive importance. The bigger the diameter of the diaphragm, the softer the diaphragm and the more sensitively it reacts to temperature-induced changes in volume of the filling liquid.

The result is that small measuring ranges are only possible with large diaphragm diameters.

Other factors apart from diaphragm rigidity which also play a role:

- Diaphragm thickness
- Diaphragm material
- Coatings if present

Filling liquid

Every filling liquid reacts to temperature variations with a change of volume. Temperature errors can be minimized by selecting a suitable filling liquid, but the filling liquid must also be appropriate for the temperature limits and operating pressure. Furthermore, the filling liquid must also be physiologically harmless.

Since the filling liquid is present under the diaphragm, in the capillary and under the process flange of the pressure transmitter (or in the connection shank), the temperature error must be calculated separately for each combination.

Note:

A vacuum-resistant remote seal is recommended for continuous low-pressure operation at 500 mbar a or below, including during commissioning (see ordering data).

An example of a temperature error calculation can be found in the section "Technical Specifications".

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Technical description

Response time

The response time is dependent on the following factors:

- Internal diameter of the capillary: The bigger the internal diameter, the shorter the response time
- Viscosity of the filling liquid The greater the viscosity, the longer the response time
- Length of the capillary: The longer the capillary, the longer the response time
- Pressure in the pressure measuring system: The higher the pressure, the shorter the response time

Recommendations

The following should be observed to obtain an optimum combination of transmitter and remote seal:

- Choose the biggest possible diameter for the remote seal. The effective diameter of the seal diaphragm is then bigger and the temperature error smaller.
- Choose the shortest possible capillary. The response time is then shorter and the temperature error smaller
- Choose the filling liquid with the least viscosity and the smallest coefficient of expansion. Make sure, however, that the filling liquid meets the process requirements with regard to pressure, vacuum and temperature. And ensure that the filling liquid and the medium are compatible with one another.
- Note the following points for use in the vacuum range:
  - The pressure transmitter must always be positioned below the lowest spigot.
  - The operating range of some filling liquids is very limited with regard to the permissible temperature of the medium.
  - A vacuum-proof seal is necessary for continuous operation in the low-pressure range.
- Recommendations for the minimum span can be found in the section "Technical data".

Note

The remote seals listed here are a selection of the most common designs. On account of the large variety of process connections, certain remote seals which are not listed here may be available nevertheless.

Other versions can be:

- Other process connections, standards
- Aseptic or sterile connections
- Other dimensions
- Other nominal pressures
- Special diaphragm materials, including coatings
- Other sealing faces
- Other filling liquids
- Other capillary lengths
- Sheathing of capillaries with protective hose
- Calibration at higher/lower temperatures etc.

Please contact your local Siemens office for further information.

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Technical specifications

Temperature error Diaphragm seals

Temperature errors of diaphragm seals when connected to pressure transmitters for pressure, absolute pressure, differential pressure (single-sided) and level

	Nominal diameter/ design	Diaphragm diameter		Temperature error of remote seal f_{RS}		Temperature error of capillary f_{Cap}		Temperature error of process flange/connection spigot f_{PF}		Recommended min. spans (guidance values, observe temp. error)	
		mm	(inch)	mbar/ 10 K	(psi/ 10 K)	mbar/ (10 K · m_{Cap})	(psi/ (10 K · m_{Cap}))	mbar/ 10 K	(psi/ 10 K)	mbar	(psi)
Sandwich design or with flange to EN 1092-1	DN 50 without tube	59	(2.32)	1.5	(0.022)	2	(0.029)	2	(0.029)	200	(2.90)
	DN 50 with tube	45	(1.89)	5	(0.073)	10	(0.145)	10	(0.145)	500	(7.25)
	DN 80 without tube	89	(3.50)	0.2	(0.003)	0.2	(0.003)	0.2	(0.003)	100	(1.45)
	DN 80 with tube	72	(2.83)	1	(0.015)	1	(1.015)	1	(1.015)	250	(3.63)
	DN 100 without tube	89	(3.50)	0.2	(0.003)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	DN 100 with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	DN 125 without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
	DN 125 with tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
Sandwich design or with flange to ASME B16.5	2 inch without tube	59	(2.32)	1.5	(0.022)	2	(0.029)	2	(0.029)	200	(2.90)
	2 inch with tube	45	(1.89)	5	(0.073)	10	(0.145)	10	(0.145)	500	(7.25)
	3 inch without tube	89	(3.50)	0.2	(0.003)	0.2	(0.003)	0.2	(0.003)	100	(1.45)
	3 inch with tube	72	(2.83)	1	(0.015)	1	(1.015)	1	(1.015)	250	(3.63)
	4 inch without tube	89	(3.50)	0.2	(0.003)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	4 inch with tube	89	(3.50)	0.4	(0.006)	0.4	(0.006)	0.4	(0.006)	100	(1.45)
	5 inch without tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
	5 inch with tube	124	(4.88)	0.2	(0.003)	0.1	(0.002)	0.1	(0.002)	20	(0.29)
Remote seal with union nut to DIN 11851	DN 25	25	(0.98)	20	(0.290)	60	(0.870)	60	(0.870)	6000	(87)
	DN 32	32	(1.26)	8	(0.116)	25	(0.363)	25	(0.363)	4000	(58)
	DN 40	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)
	DN 65	59	(2.32)	3	(0.044)	4	(0.058)	4	(0.058)	500	(7.25)
	DN 80	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)
Remote seal, screwed gland design	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)
Remote seal with threaded socket to DIN 11851	DN 25	25	(0.98)	20	(0.290)	60	(0.870)	60	(0.870)	6000	(87)
	DN 32	32	(1.26)	8	(0.116)	25	(0.363)	25	(0.363)	4000	(58)
	DN 40	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)
	DN 50	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)
	DN 65	59	(2.32)	3	(0.044)	4	(0.058)	4	(0.058)	500	(7.25)
	DN 80	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)
Clamp connection	1½ inch	32	(1.26)	8	(0.116)	25	(0.363)	25	(0.363)	4000	(58)
	2 inch	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)
	2½ inch	59	(2.32)	3	(0.044)	5	(0.073)	5	(0.073)	500	(7.25)
	3 inch	72	(2.83)	1	(0.015)	1	(0.015)	1	(0.015)	250	(3.63)
Miniature diaphragm seal	G1B	25	(0.98)	20	(0.290)	60	(0.870)	60	(0.870)	6000	(87)
	G1½B	40	(1.57)	4	(0.058)	10	(0.145)	10	(0.145)	2000	(29)
	G2B	52	(2.05)	4	(0.058)	5	(0.073)	5	(0.073)	500	(7.25)

Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed).
- Values apply to stainless steel as the diaphragm material.

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Temperature errors of diaphragm seals with connection to differential pressure transmitters (double-sided)

	Nominal diameter/ design	Diaphragm diameter		Temperature error of remote seal f_{RS}		Temperature error of capillary f_{Cap}		Temperature error of process flange/connection spigot f_{PF}		Recommended min. spans (guidance values, observe temperature error)	
		mm	(inch)	mbar/ 10 K	(psi/ 10 K)	mbar/ (10 K · m_{Cap})	(psi/ (10 K · m_{Cap}))	mbar/ 10 K	(psi/ 10 K)	mbar	(psi)
Sandwich design or with flange to EN 1092-1	DN 50 without tube	59	(2.32)	0.3	(0.0043)	0.3	(0.0045)	0.3	(0.0045)	250	(3.626)
	DN 50 with tube	45	(1.89)	1.26	(0.018)	1.7	(0.025)	1.7	(0.025)	250	(3.626)
	DN 80 without tube	89	(3.50)	0.05	(0.001)	0.05	(0.001)	0.05	(0.0007)	50	(0.725)
	DN 80 with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.45)
	DN 100 without tube	89	(3.50)	0.05	(0.001)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	DN 100 with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	DN 125 without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
	DN 125 with tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
Sandwich design with flange to ASME B16.5	2 inch without tube	59	(2.32)	0.3	(0.0043)	0.3	(0.0043)	0.3	(0.0045)	250	(3.626)
	2 inch with tube	45	(1.89)	1.26	(0.018)	1.7	(0.025)	1.7	(0.025)	250	(3.626)
	3 inch without tube	89	(3.50)	0.05	(0.001)	0.05	(0.0007)	0.05	(0.0007)	50	(0.725)
	3 inch with tube	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.45)
	4 inch without tube	89	(3.50)	0.05	(0.001)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	4 inch with tube	89	(3.50)	0.1	(0.002)	0.07	(0.001)	0.07	(0.001)	50	(0.725)
	5 inch without tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
	5 inch with tube	124	(4.88)	0.05	(0.001)	0.03	(0.0004)	0.03	(0.0004)	20	(0.29)
Remote seal, screwed gland design	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
Remote seal with union nut to DIN 11851	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)
Remote seal with threaded socket to DIN 11851	DN 50	52	(2.05)	1	(0.015)	0.83	(0.012)	0.83	(0.012)	250	(3.626)
	DN 65	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	DN 80	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)
Clamp connection	2 inch	40	(1.57)	1	(0.015)	2.5	(0.036)	2.5	(0.036)	2000	(29.01)
	2½ inch	59	(2.32)	0.7	(0.010)	0.67	(0.010)	0.67	(0.010)	250	(3.626)
	3 inch	72	(2.83)	0.24	(0.004)	0.17	(0.003)	0.17	(0.003)	100	(1.450)

Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed).
- Values apply to stainless steel as the diaphragm material.

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Temperature error Clamp-on seals

Temperature errors of clamp-on seals when connected to pressure transmitters for gauge pressure and absolute pressure, and with single-sided connection to pressure transmitters for differential pressure

Nominal diameter/ design	Temperature error of remote seal f_{RS}		Temperature error of capillary f_{Cap}		Temperature error of process flange/connection spigot f_{PF}		Recommended min. spans (guidance values, observe temperature error)	
	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar	(psi)
DN 25 (1 inch)	6.0	(0.0870)	8.5	(0.123)	8.5	(0.123)	1000	(14.5)
DN 40 (1½ inch)	4.5	(0.065)	4.5	(0.065)	4.5	(0.065)	250	(3.63)
DN 50 (2 inch)	4.0	(0.058)	3.0	(0.044)	3.0	(0.044)	100	(1.45)
DN 80 (3 inch)	9.5	(0.138)	5.0	(0.073)	5.0	(0.073)	100	(1.45)
DN 100 (4 inch)	8.0	(0.012)	3.0	(0.044)	3.0	(0.044)	100	(1.45)

Temperature errors of clamp-on seals with double-sided connection to pressure transmitters for differential pressure

Nominal diameter/ design	Temperature error of remote seal f_{RS}		Temperature error of capillary f_{Cap}		Temperature error of process flange/connection spigot f_{PF}		Recommended min. spans (guidance values, observe temperature error)	
	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar/10 K	(psi/10 K)	mbar	(psi)
DN 25 (1 inch)	2.3	(0.033)	1.8	(0.026)	1.8	(0.026)	1000	(14.5)
DN 40 (1½ inch)	0.8	(0.012)	0.3	(0.004)	0.3	(0.004)	250	(3.63)
DN 50 (2 inch)	0.3	(0.004)	0.1	(0.002)	0.1	(0.002)	100	(1.45)
DN 80 (3 inch)	3.0	(0.044)	0.5	(0.007)	0.5	(0.007)	100	(1.45)
DN 100 (4 inch)	1.0	(0.015)	0.1	(0.002)	0.1	(0.002)	100	(1.45)

Remarks:

- Values apply for the filling liquids silicone oil M5, silicone oil M50, high-temperature oil, halocarbon oil and food oil (FDA listed).
- Half the values apply to glycerin/water mixture as the filling liquid.
- Values apply to stainless steel as the diaphragm material.
- Diaphragm thickness 0.05 mm (0.002 inch) for DN 25/DN 40/DN 50 and 0.1 mm (0.004 inch) for DN 80/DN 100

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Technical description

Calculation of the temperature error

The following equation is used to calculate the temperature error:

$$dp = (\vartheta_{RS} - \vartheta_{Cal}) \cdot f_{RS} + (\vartheta_{Cap} - \vartheta_{Cal}) \cdot l_{Cap} \cdot f_{Cap} + (\vartheta_{TR} - \vartheta_{Cal}) \cdot f_{PF}$$

dp	Additional temperature error (mbar)
ϑ_{RS}	Temperature on remote seal diaphragm (generally corresponds to temperature of medium)
ϑ_{Cal}	Calibration (reference) temperature (20 °C (68 °F))
f_{RS}	Temperature error of remote seal
ϑ_{Cap}	Ambient temperature on the capillaries
l_{Cap}	Capillary length
f_{Cap}	Temperature error of capillaries
ϑ_{TR}	Ambient temperature on pressure transmitter
f_{PF}	Temperature error of the oil filling in the process flanges of the pressure transmitter

Example of temperature error calculation

Existing conditions:

SITRANS P pressure transmitter for differential pressure, 250 mbar, set to 0 ... 100 mbar, with DN 100 remote seal diaphragms without tube, diaphragm made of stainless steel, mat. No. 1.4404/316L	f_{RS} = 0.05 mbar/10 K (0.039 inH_2O/10 K)
Capillary length	l_{Cap} = 6 m (19.7 ft)
Capillaries fitted on both sides	f_{Cap} = 0.07 mbar/(10 K · m_{Cap}) (0.028 inH_2O/(10 K · m_{Cap}))
Filling liquid silicone oil M5	f_{PF} = 0.07 mbar/10 K (0.028 inH_2O/10 K)
Process temperature	ϑ_{RS} = 100 °C (212 °F)
Temperature on the capillaries	ϑ_{Cap} = 50 °C (122 °F)
Temperature on pressure transmitter	ϑ_{TR} = 50 °C (122 °F)
Calibration temperature	ϑ_{Cal} = 20 °C (68 °F)

Required:

Additional temperature error of remote seals: dp

Calculation:

in mbar

dp = (100 °C – 20 °C) · 0.05 mbar/10 K + (50 °C – 20 °C) · 6 m · 0.07 mbar/(10 K · m) + (50 °C – 20 °C) · 0.07 mbar/10 K

dp = 0.4 mbar + 1.26 mbar + 0.21 mbar

in inH_2O

dp = (212 °F - 68 °F) · 0.039 inH_2O/10 K + (112 °F - 68 °F) · 19.7 ft · 0.028 inH_2O/(10 K · 3.28 ft) + (112 °F - 68 °F) · (0.028 inH_2O/10 K)

dp = 0.16 inH_2O + 0.51 inH_2O + 0.08 inH_2O

Result:

dp = 1.87 mbar (0.75 inH_2O)
(corresponds to 2.27% of set span)

Note

The determined temperature error only applies to the error resulting from connection of the remote seal.

The transmission response of the respective transmitter is not included in this consideration.
It must be calculated separately, and the resulting error added to the error determined above from connection of the remote seal.

Dependence of temperature error on diaphragm material

The temperature errors listed in the previous table are based on the use of stainless steel as the diaphragm material. If other diaphragm materials are used, the temperature errors change as follows:

Diaphragm material	Change in temperature error of remote seal
	Increase in values by
Stainless steel, Duplex, ...	See previous tables
Hastelloy C4, mat. No. 2.4610	50 %
Hastelloy C276, mat. No. 2.4819	50 %
Monel 400, mat. No. 2.4360	60 %
Tantalum	50 %
Titanium	50 %
PTFE coating on stainless steel diaphragm	80 %
ECTFE coating or PFA coating on stainless steel diaphragm	100 %
Gold coating on stainless steel diaphragm	40 %
Inconel	50 %
Incoloy	50 %

Maximum temperature of medium

The following maximum temperatures of the medium apply depending on the material of the wetted parts:

Material	p_{abs} < 1 bar (402 inH_2O)		p_{abs} > 1 bar (402 inH_2O)	
	°C	(°F)	°C	(°F)
Stainless steel, 316L	200	(392)	400	(662)
PTFE coating	200	(392)	260	(500)
ECTFE coating	100	(212)	150	(302)
PFA coating	200	(392)	260	(500)
Hastelloy C4, mat. No. 2.4610	200	(392)	260	(500)
Hastelloy C276, mat. No. 2.4819	200	(392)	400	(662)
Monel 400, mat. No. 2.4360	200	(392)	400	(662)
Tantalum	200	(392)	300	(572)
Duplex, mat. No. 1.4462	200	(392)	300	(572)
Titanium	100	(212)	150	(302)
Inconel	200	(392)	400	(752)
Incoloy	200	(392)	400	(752)
Gold coating	200	(392)	400	(752)

Maximum capillary length for diaphragm seals (guidance values)

Nom. diam.		Max. length of capillary			
		Diaphragm seal		Clamp-on seal	
		m	(ft)	m	(ft)
DN 25	(1 inch)	2.5	(8.2)	2.5	(8.2)
DN 32	(1¼ inch)	2.5	(8.2)	2.5	(8.2)
DN 40	(1½ inch)	4	(13.1)	6	(19.7)
DN 50	(2 inch)	6	(19.7)	10	(32.8)
DN 65	(2½ inch)	8	(26.2)	10	(32.8)
DN 80	(3 inch)	15	(49.1)	10	(32.8)
DN 100	(4 inch)	15	(49.1)	10	(32.8)
DN 125	(5 inch)	15	(49.1)	-	-

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Response times

The values listed in the following table are the response times (in seconds per meter of capillary) for a change in pressure which corresponds to the set span.

The listed values must be multiplied by the respective length of the capillary, or with transmitters for differential pressure and flow by the total length of both capillaries.

The response times are independent of the set span within the range of the respective transmitter. The response times are of insignificant importance for spans above 10 bar (145 psi). The response times of the pressure transmitters are not considered in the table.

Filling liquid	Density		Temperature on capillary		Response time in s/m (s/ft) with max. span of pressure transmitter					
	kg/dm³	(lb/in³)	°C	(°F)	250 mbar	(101 inH_2O)	600 mbar	(241 inH_2O)	1600 mbar	(643 inH_2O)
Silicone oil M5	0.914	(0.033)	+60	(140)	0.06	(0.018)	0.02	(0.006)	0.01	(0.003)
			+20	(68)	0.11	(0.034)	0.02	(0.006)	0.02	(0.006)
			- 20	(-4)	0.3	(0.091)	0.12	(0.037)	0.05	(0.015)
Silicone oil M50	0.966	(0.035)	+60	(140)	0.6	(0.183)	0.25	(0.076)	0.09	(0.027)
			+20	(68)	0.61	(0.186)	0.26	(0.079)	0.1	(0.030)
			- 20	(-4)	1.69	(0.515)	0.71	(0.216)	0.27	(0.082)
High-temperature oil	1.070	(0.039)	+60	(140)	0.14	(0.043)	0.06	(0.018)	0.02	(0.006)
			+20	(68)	0.65	(0.198)	0.27	(0.082)	0.1	(0.030)
			-10	(14)	3.96	(1.207)	1.65	(0.503)	0.62	(0.189)
Halocarbon oil	1.968	(0.071)	+60	(140)	0.07	(0.021)	0.03	(0.009)	0.01	(0.003)
			+20	(68)	0.29	(0.088)	0.12	(0.037)	0.05	(0.015)
			- 20	(-4)	2.88	(0.878)	1.2	(0.366)	0.45	(0.137)
Food oil (FDA listed)	0.920	(0.033)	+60	(140)	0.75	(0.229)	0.33	(0.101)	0.17	(0.052)
			+20	(68)	4	(1.220)	1.75	(0.534)	0.67	(0.204)
			- 20	(-4)	20	(6.100)	8.5	(2.593)	3.25	(0.991)

Technical data of filling liquids

When selecting the filling liquid, check that it is suitable with respect to the permissible temperature of the medium and the process pressure.

Also check the compatibility of the filling liquid with the measured medium. For example, only physiologically harmless filling liquids may be used in the food industry.

Oxygen and chlorine are special cases of measured medium. The liquid must not react with either of these two media or a leaking remote seal may lead to an explosion or fire.

Halocarbon oil must be used as the fill fluid with the media oxygen and chlorine.

Filling liquid	Digit in Article No.	Permissible temperature of medium				Density at 20 °C (68 °F)		Viscosity at 20 °C (68 °F)		Coefficient of expansion	
		p_{abs} < 1 bar	(p_{abs} < 402 inH_2O)	p_{abs} > 1 bar	(p_{abs} > 402 inH_2O)						
		°C	(°F)	°C	(°F)	kg/dm³	(lb/in³)	m²/s·10⁶	(ft²/s·10⁶)	1/°C	(1/°F)
Silicone oil M5	1	-60 ... +80	(-76 ... +176)	-90 ... +180	(-130 ... +356)	0.914	(0.03)	4	(43)	0.00108	(0.00060)
Silicone oil M50	2	-40 ... +150	(-40 ... +302)	-40 ... +250	(-40 ... +482)	0.96	(0.03)	50	(538)	0.00104	(0.00058)
High-temperature oil	3	-10 ... +200	(+14 ... +392)	-20 ... +400	(-4 ... +752)	1.07	(0.04)	57	(613)	0.00080	(0.00044)
Halocarbon oil	4[1)]	-40 ... +80	(-40 ... +176)	-40 ... +175	(-40 ... +347)	1.968	(0.07)	14	(151)	0.00086	(0.00048)
Food oil (FDA listed)	7	-20 ... +160	(-4 ... +320)	-20 ... +200	(-4 ... +392)	0.92	(0.03)	10	(107)	0.00080	(0.00044)

1) Max. pressure and temperature for oxygen measurements: 50 bar (725 psi) and 60° (140 °F).

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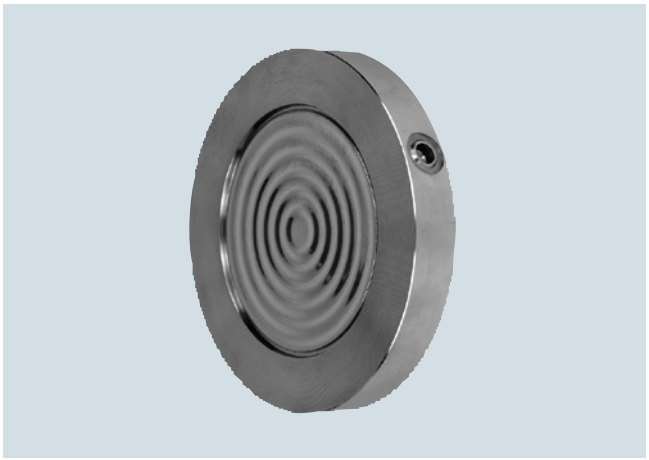
Overview



Diaphragm seals of sandwich design

Technical specifications

Diaphragm seals of sandwich design	
Nominal diameter	Nominal pressure
• DN 50	PN 16 ... PN 400
• DN 80	PN 16 ... PN 400
• DN 100	PN 16 ... PN 400
• DN 125	PN 16 ... PN 400
• 2 inch	Class 150 ... class 2500
• 3 inch	Class 150 ... class 2500
• 4 inch	Class 150 ... class 2500
• 5 inch	Class 150 ... class 2500
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
• For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel mat. no. 1.4404/316L
• Wetted parts	Stainless steel mat. no. 1.4404/316L
	• Without coating
	• PTFE coating (for vacuum on request)
	• ECTFE coating (for vacuum on request)
	• PFA coating (for vacuum on request)
	Monel 400, mat. No. 2.4360
	Hastelloy C276, mat. No. 2.4819
	Hastelloy C4, mat. No. 2.4610
	Tantalum
	Duplex 2205, mat. no. 1.4462
	Stainless steel 316L, gold plated, thickness approx. 25 µm
• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• Sheath	Spiral hose made of stainless steel, mat. No. 1.4301/316

Sealing material in the process flanges	
• For pressure transmitters, absolute pressure transmitters and low-pressure applications	Copper
• For other applications	Viton
Maximum pressure	See above and the technical data of the pressure transmitters
Tube length	Without tube as standard (tube available on request)
Capillary	
• Length	Max. 10 m (32.8 ft), longer lengths on request
• Internal diameter	max. 2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	Silicone oil M5
	Silicone oil M50
	High-temperature oil
	Halocarbon oil (for measuring O_2)
	Food oil (FDA listed)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal
	More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
Weight	Approx. 4 kg (8.82 lb)
Certificate and approvals	
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

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Selection and Ordering data	Article No. Ord.code
Diaphragm seal	
Sandwich-type design, with flexible capillary connected to a SITRANS P transmitter (order separately):	
for pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; Scope of delivery (1 off)	7MF4900-
for absolute pressure 7MF433.-...; Scope of delivery (1 off)	7MF4901-
for differential pressure and flow 7MF443.-... and 7MF54..-...; scope of delivery 2 off	7MF4903-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	1 ■■■■ - ■ B ■■■
Nominal diameter and nominal pressure	
• DN 50 PN 16 ... 400	A
(recommended only for pressure transmitters for pressure)	
• DN 80 PN 16 ... 400	B
• DN 100 PN 16 ... 400	C
• DN 125 PN 16 ... 400	D
• 2 inch Class 150 ... 2500	E
(recommended only for pressure transmitters for pressure)	
• 3 inch Class 150 ... 2500	H
• 4 inch Class 150 ... 2500	L
• 5 inch Class 150 ... 2500	N
Smooth sealing face to EN 1092-1, form B1 or to ASME B16.5 RF 125 ... 250 AA	
Other version Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ... Sealing face: see "Technical data"	Z J 1 Y
Wetted parts materials	
• Stainless steel 316L	
- without coating	A
- with PTFE coating[2]	E 0
- with ECTFE coating [2) 3)]	F
- with PFA coating [2)]	D
• Monel 400, mat. No. 2.4360	G
• Hastelloy C276, mat. No. 2.4819	J
• Hastelloy C4, mat. No. 2.4610	U
• Tantalum	K
• Duplex 2205, mat. no. 1.4462	Q
• Duplex 2205, mat. no. 1.4462, incl. main body	R
• Stainless steel 316L, gold plated, thickness approx. 25 µm	S 0
Other version Add Order code and plain text: Wetted parts materials: ...	Z K 1 Y
Tube length	
• without tube	0
Other version: Add Order code and plain text: Tube length: ...	9 L 1 Y
Filling liquid	
• Silicone oil M5	1
• Silicone oil M50	2
• High-temperature oil	3
• Halocarbon oil (for measuring O_2)[4]	4
• Food oil (FDA listed)l	7
Other version Add Order code and plain text: Filling liquid: ...	9 M 1 Y

Selection and Ordering data	Article No. Ord.code
Diaphragm seal	
Sandwich-type design, with flexible capillary connected to a SITRANS P transmitter (order separately):	
for pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; Scope of delivery (1 off)	7MF4900-
for absolute pressure 7MF433.-...; Scope of delivery (1 off)	7MF4901-
for differential pressure and flow 7MF443.-... and 7MF54..-...; scope of delivery 2 off	7MF4903-
	1 ■■■■ - ■ B ■■■
Length of capillary[5]	
• 1.0 m (3.28 ft)	2
• 1.6 m (5.25 ft)	3
• 2.5 m (8.20 ft)	4
• 4.0 m (13.1 ft)	5
• 6.0 m (19.7 ft)	6
• 8.0 m (26.25 ft)	7
• 10.0 m (32.8 ft)	8
Special lengths for capillaries	
• 2.0 m	9 N 1 C
• 3.0 m	9 N 1 E
• 5.0 m	9 N 1 G
• 7.0 m	9 N 1 J
• 9.0 m	9 N 1 L
only for 7MF4903-...	
• 11.0 m	9 N 1 N
• 12.0 m	9 N 1 P
• 13.0 m	9 N 1 Q
• 14.0 m	9 N 1 R
• 15.0 m	9 N 1 S

1) With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.
2) Only possible up to max. PN 100.
3) For vacuum on request
4) Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.
5) Max. capillary length, see section "Technical description".

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
Spark arrestor	
With spark arrestor for mounting on zone 0 (including documentation)	
• Pressure and absolute pressure	**A01**
• for differential pressure transmitters	**A02**
Remote seal nameplate	**B20**
Attached out of stainless steel, contains Article No. and order number of the remote seal supplier	
Oil- and grease-free cleaned version	**C10**
Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate	**C12**
to EN 10204, section 3.1	
2.2 Certificate of FDA approval of fill oil	**C17**
Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	
Functional safety certificate ("SIL 2") to IEC 61508	**C20**
(Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	
Functional safety certificate ("SIL 2/3") to IEC 61508	**C23**
(Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	
Certification acc. to NACE MR-0175	**D07**
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	
Certification acc. to NACE MR-0103	**D08**
Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	
Oil- and grease-free cleaned version	**E10**
Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	
Epoxy painting	**E15**
(not possible with vacuum-proof design and not for 7MF4901-...)	
Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40.. and 7MF42.., only possible with process connection G½B according to EN837-1	

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
Sealing surface B1 or ASME B16.5 RF 125 ... 250 AA	**J12**
instead of sealing surface B2 or RFSF (only for wetted parts made of Hastelloy C276 (2.4819), tantalum and Duplex 2205 (1.4462) and for nominal sizes 2", 3", DN 50 and DN 80)	
Sealing surface groove, EN 1092-1, form D	**J14**
instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)	
Sealing surface RJF (groove) ASME B16.5	**J24**
instead of sealing surface ASME B16.5 RF 125 ... 250 AA (only for wetted parts made of stainless steel 316L)	
PE protective tube	
over the spiral protective tube (color: white) of the capillaries	
1.0 m	**N20**
1.6 m	**N21**
2.0 m	**N22**
2.5 m	**N23**
3.0 m	**N24**
4.0 m	**N25**
5.0 m	**N26**
6.0 m	**N27**
7.0 m	**N28**
8.0 m	**N29**
9.0 m	**N30**
10.0 m	**N31**
only for 7MF4903-...	
11.0 m	**N32**
12.0 m	**N33**
13.0 m	**N34**
14.0 m	**N35**
15.0 m	**N36**
Vacuum-proof design	
for use in low-pressure range for transmitters for	
• Gauge and absolute pressure from the pressure series	**V01**
• Differential pressure transmitters	**V03**

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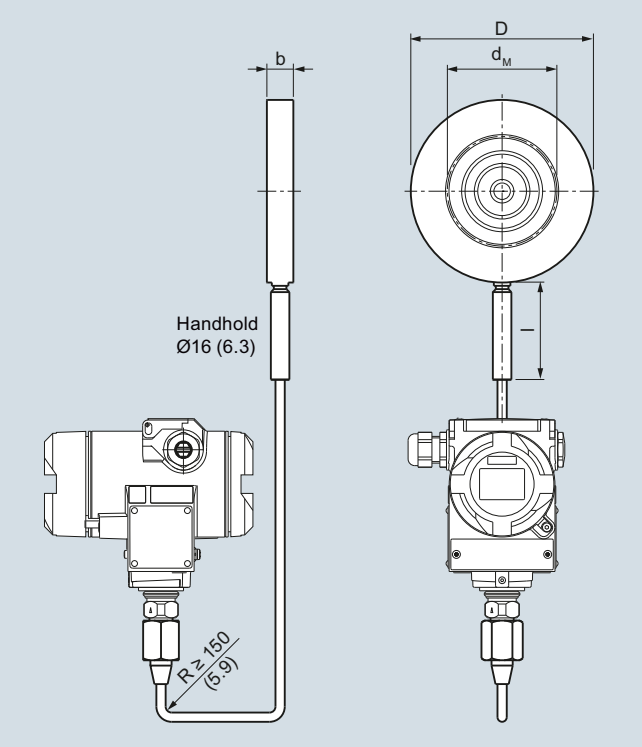
Dimensional drawings



Diaphragm seals of sandwich design with flexible capillary for connection to SITRANS P pressure transmitters for pressure, dimensions in mm (inch)

Connection to EN 1092-1

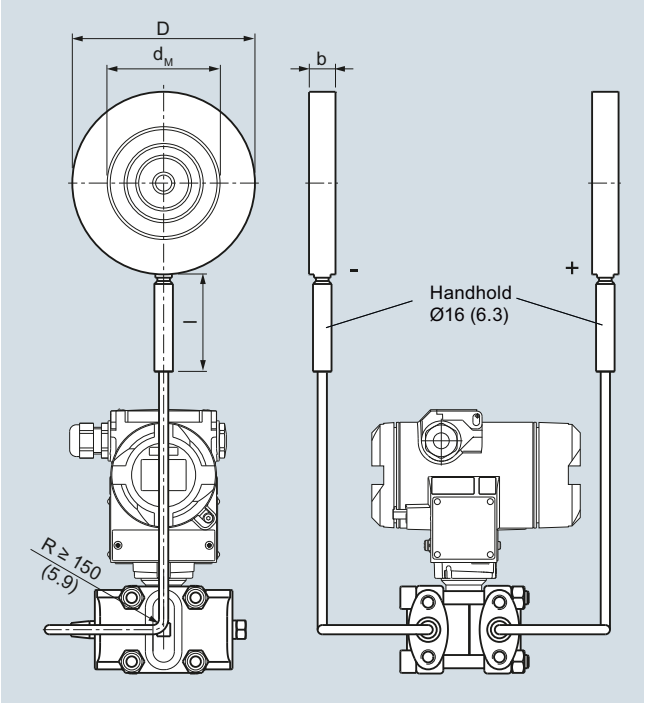
Nom. diam.	Nom. press.	b	D	d_M	l
		mm	mm	mm	mm
DN 50	PN 16 ... PN 400	20	102	59	100
DN 80		20	138	89	100
DN 100		20	158	89	100
DN 125		22	188	124	100

Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d_M	l
	lb/sq.in.	mm (inch)	mm (inch)	mm (inch)	mm (inch)
2 inch	150 2500	20	100	59	100
		(0.79)	(3.94)	(2.32)	(3.94)
3 inch		20	134	89	100
		(0.79)	(5.28)	(2.32)	(3.94)
4 inch		20	158	89	100
		(0.79)	(6.22)	(2.32)	(3.94)
5 inch		22	186	124	100
		(0.87)	(7.32)	(4.88)	(3.94)

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5

d_M: Effective diaphragm diameter



Diaphragm seals of sandwich design (without flange) with flexible capillary for connection to SITRANS P pressure transmitters for absolute pressure or differential pressure and flow, dimensions in mm (inch)

Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d_M	l
		mm	mm	mm	mm
DN 50	PN 16 ... PN 400	20	102	59	100
DN 80		20	138	89	100
DN 100		20	158	89	100
DN 125		22	188	124	100

Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d_M	l
	lb/sq.in.	mm (inch)	mm (inch)	mm (inch)	mm (inch)
2 inch	150 ... 2500	20	100	59	100
		(0.79)	(3.94)	(2.32)	(3.94)
3 inch		20	134	89	100
		(0.79)	(5.28)	(2.32)	(3.94)
4 inch		20	158	89	100
		(0.79)	(6.22)	(2.32)	(3.94)
5 inch		22	186	124	100
		(0.87)	(7.32)	(4.88)	(3.94)

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5

d_M: Effective diaphragm diameter

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Diaphragm seals of flange design with flexible capillary

Overview

Diaphragm seals of flange design

Technical specifications

Diaphragm seals of flange design with flexible capillary	
Nominal diameter	Nominal pressure
• DN 50 (recommendable only for pressure transmitters for pressure)	PN 10/16/25/40, PN 100
• DN 80	PN 10/16/25/40, PN 100
• DN 100	PN 10/16, PN 25/40
• DN 125	PN 16, PN 40
• 2 inch (recommendable only for pressure transmitters for pressure)	class 150, class 300, class 400/600, class 900/1500
• 3 inch	Class 150, class 300, class 600
• 4 inch	Class 150, class 300, class 400
• 5 inch	Class 150, class 300, class 400
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASMR B16.5 RF 125 ... 250 AA
• For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel mat. no. 1.4404/316L
• Wetted parts	Stainless steel mat. no. 1.4404/316L
	• Without coating
	• PTFE coating (for vacuum on request)
	• ECTFE coating (for vacuum on request)
	• PFA coating (for vacuum on request)
	Monel 400, mat. No. 2.4360
	Hastelloy C276, mat. No. 2.4819
	Hastelloy C4, mat. No. 2.4610
	Tantalum
	Duplex 2205, mat. no. 1.4462
	Stainless steel 316L, gold plated, thickness approx. 25 µm
• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• Sheath	Spiral hose made of stainless steel, mat. No. 1.4404/316L

Sealing material in the process flanges	
• For pressure transmitters, absolute pressure transmitters and low-pressure applications	Copper
• For other applications	Viton
Maximum pressure	See above and the technical data of the pressure transmitter
Tube length	Without tube as standard (tube available on request)
Capillary	
• Length	Max. 10 m (32.8 ft), longer lengths on request
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	
(for remote seals of sandwich and flange design)	Silicone oil M5
	Silicone oil M50
	High-temperature oil
	Halocarbon oil (for measuring O_2)
	Food oil (FDA listed)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal
	More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
Weight	Approx. 4 kg (8.82 lb)
Certificate and approvals	
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

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Selection and Ordering data	Article No. Ord. code
Diaphragm seal	
Flange design, with flexible capillary, connected to a pressure transmitter SITRANS P (order separately):	
for pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; scope of delivery: 1 off ↗	7MF4920-
for absolute pressure 7MF433.-...; scope of delivery: 1 off ↗	7MF4921-
for differential pressure and flow 7MF443.-... and 7MF54..-...; scope of delivery: 2 off ↗	7MF4923-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	1 ■■■■-■B ■■■
Nominal diameter and nominal pressure	
• DN 50 PN 10/16/25/40	A
PN 100	B
(DN 50 recommended only for pressure transmitters for pressure)	
• DN 80 PN 10/16/25/40	D
PN 100	E
• DN 100 PN 10/16	G
PN 25/40	H
• DN 125 PN 16	J
PN 40	K
• 2 inch Class 150	L
Class 300	M
class 400/600	N
class 900/1500	P
(2 inch recommended only for pressure transmitters for pressure)	
• 3 inch Class 150	Q
Class 300	R
Class 600	S
• 4 inch Class 150	T
Class 300	U
Class 400	V
• 5 inch Class 150	W
Class 300	X
Class 400	Y
Smooth sealing face to EN 1092-1, form B1 or to ASME B16.5 RF 125 ... 250 AA	
Other version Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ... Sealing face: See "Technical data"	Z J 1 Y
Wetted parts materials	
• Stainless steel 316L	
- without coating	A
- with PTFE coating	E 0
- with ECTFE coating[2]	F
- with PFA coating	D
• Monel 400, mat. No. 2.4360	G
• Hastelloy C276, mat. No. 2.4819	J
• Hastelloy C4, mat. No. 2.4610	U
• Tantalum	K
• Duplex 2205, mat. no. 1.4462	Q
• Duplex 2205, mat. no. 1.4462, incl. main body	R
• Stainless steel 316L, gold plated, thickness approx. 25 µm	S 0
Other version Add Order code and plain text: Wetted parts materials: ...	Z K 1 Y
Tube length	
• without tube	0
Other version: Add Order code and plain text: Tube length: ...	9 L 1 Y

Selection and Ordering data	Article No. Ord. code
Diaphragm seal	
Flange design, with flexible capillary, connected to a pressure transmitter SITRANS P (order separately):	
for pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; scope of delivery: 1 off	7MF4920-
for absolute pressure 7MF433.-...; scope of delivery: 1 off	7MF4921-
for differential pressure and flow 7MF443.-... and 7MF54..-...; scope of delivery: 2 off	7MF4923-
	1 ■■■■-■B ■■■
Filling liquid	
• Silicone oil M5	1
• Silicone oil M50	2
• High-temperature oil	3
• Halocarbon oil (for measuring O_2)[3]	4
• Food oil (FDA listed)	7
Other version Add Order code and plain text: Filling liquid: ...	9 M 1 Y
Length of capillary[4]	
• 1.0 m (3.28 ft)	2
• 1.6 m (5.25 ft)	3
• 2.5 m (8.20 ft)	4
• 4.0 m (13.1 ft)	5
• 6.0 m (19.7 ft)	6
• 8.0 m (26.25 ft)	7
• 10.0 m (32.8 ft)	8
Special lengths for capillaries	
• 2.0 m	9 N 1 C
• 3.0 m	9 N 1 E
• 5.0 m	9 N 1 G
• 7.0 m	9 N 1 J
• 9.0 m	9 N 1 L
only for 7MF4923-...	
• 11.0 m	9 N 1 N
• 12.0 m	9 N 1 P
• 13.0 m	9 N 1 Q
• 14.0 m	9 N 1 R
• 15.0 m	9 N 1 S

1) With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.
2) For vacuum on request.
3) Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.
4) Max. capillary length, see section "Technical description".

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Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code.	
Spark arrestor With spark arrestor for mounting on zone 0 (including documentation) for transmitters for	
• pressure and absolute pressure	**A01**
• differential pressure	**A02**
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	**B20**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	**C10**
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate to EN 10204, section 3.1	**C12**
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	**C17**
Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	**C20**
Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	**C23**
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D07**
Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D08**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	**E10**
Epoxy painting (not possible with vacuum-proof design and not for 7MF4921-...) Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40.. and 7MF42.., only possible with process connection G½B according to EN837-1.	**E15**

Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code.	
Sealing surface B1 or ASME B16.5 RF 125 ... 250 AA instead of sealing surface B2 or RFSF (only for wetted parts made of Hastelloy C276 (2.4819), tantalum and Duplex 2205 (1.4462) and for nominal sizes 2", 3", DN 50 and DN 80)	**J12**
Sealing surface groove, EN 1092-1, form D instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)	**J14**
Sealing surface RJF (groove) ASME B16.5 instead of sealing surface ASME B16.5 RF 125 ... 250 AA (only for wetted parts made of stainless steel 316L)	**J24**
PE protective tube over the spiral protective tube (color: white) of the capillaries	
1.0 m	**N20**
1.6 m	**N21**
2.0 m	**N22**
2.5 m	**N23**
3.0 m	**N24**
4.0 m	**N25**
5.0 m	**N26**
6.0 m	**N27**
7.0 m	**N28**
8.0 m	**N29**
9.0 m	**N30**
10.0 m	**N31**
only for 7MF4923-...	
11.0 m	**N32**
12.0 m	**N33**
13.0 m	**N34**
14.0 m	**N35**
15.0 m	**N36**
Vacuum-proof design for use in low-pressure range for transmitters for	
• Gauge and absolute pressure from the pressure series	**V01**
• Differential pressure	**V03**

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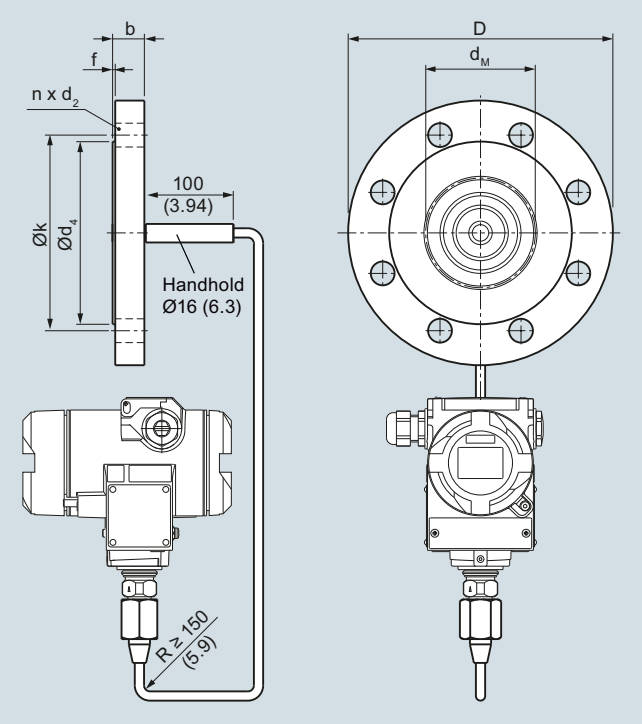
Dimensional drawings



Diaphragm seals of flange design with flexible capillary for connection to SITRANS P pressure transmitters for pressure, dimensions in mm (inch)

Connection to EN 1092-1

Nom. diam.	Nom. press.	b mm	D mm	d_2 mm	d_4 mm	d_M mm	f mm	k mm	n
DN 50	PN 10/16/ 25/40	20	165	18	102	59	2	125	4
	PN 100	28	195	26	102	59	2	145	4
DN 80	PN 10/16/	24	200	18	138	89	2	160	8
	PN 100	32	230	26	138	89	2	180	8
DN 100	PN 10/16	20	220	18	158	89	2	180	8
	PN 25/40	24	235	22	162	89	2	190	8
DN 125	PN 16	22	250	18	188	124	2	210	8
	PN 40	26	270	26	188	124	2	220	8

Connection to ASME B16.5

Nom. diam.	Nom. press. lb/sq.in.	b mm (inch)	D mm (inch)	d_2 mm (inch)	d_4 mm (inch)	d_M mm (inch)	f mm (inch)	k mm (inch)	n
2 inch	150	19.5 (0.77)	150 (5.80)	20 (0.79)	92 (3.62)	59 (2.32)	2 (0.08)	120.5 (4.74)	4
	300	22.7 (0.89)	165 (6.50)	20 (0.79)	92 (3.62)	59 (2.32)	2 (0.08)	127 (5)	8
	400/600	32.4 (1.28)	165 (6.50)	20 (0.79)	92 (3.62)	59 (2.32)	2 (0.08)	127 (5)	8
	900/1500	45.1 (1.78)	215 (8.46)	26 (1.02)	92 (3.62)	59 (2.32)	7 (0.28)	165 (6.5)	8
3 inch	150	24.3 (0.96)	190 (7.48)	20 (0.79)	127 (5)	89 (3.50)	2 (0.08)	152.5 (6)	4
	300	29 (1.14)	210 (8.27)	22 (0.87)	127 (5)	89 (3.50)	2 (0.08)	168.5 (6.63)	8
	600	38.8 (1.53)	210 (8.27)	22 (0.87)	127 (5)	89 (3.50)	7 (0.28)	168.5 (6.63)	8
4 inch	150	24.3 (0.96)	230 (9.06)	20 (0.79)	158 (6.22)	89 (3.50)	2 (0.08)	190.5 (7.5)	4
	300	32.2 (1.27)	255 (10.04)	22 (0.87)	158 (6.22)	89 (3.50)	2 (0.08)	200 (7.87)	8
	400	42 (1.65)	255 (10.04)	26 (1.02)	158 (6.22)	89 (3.50)	7 (0.28)	200 (7.87)	8
5 inch	150	24.3 (0.96)	255 (10.04)	22 (0.87)	186 (7.32)	124 (4.88)	2 (0.08)	216 (8.50)	4
	300	35.8 (1.41)	280 (11.02)	22 (0.87)	186 (7.32)	124 (4.88)	2 (0.08)	235 (9.25)	8
	400	45.1 (1.79)	280 (11.02)	26 (1.02)	186 (7.32)	124 (4.88)	7 (0.28)	235 (9.25)	8

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5
d_M: Effective diaphragm diameter

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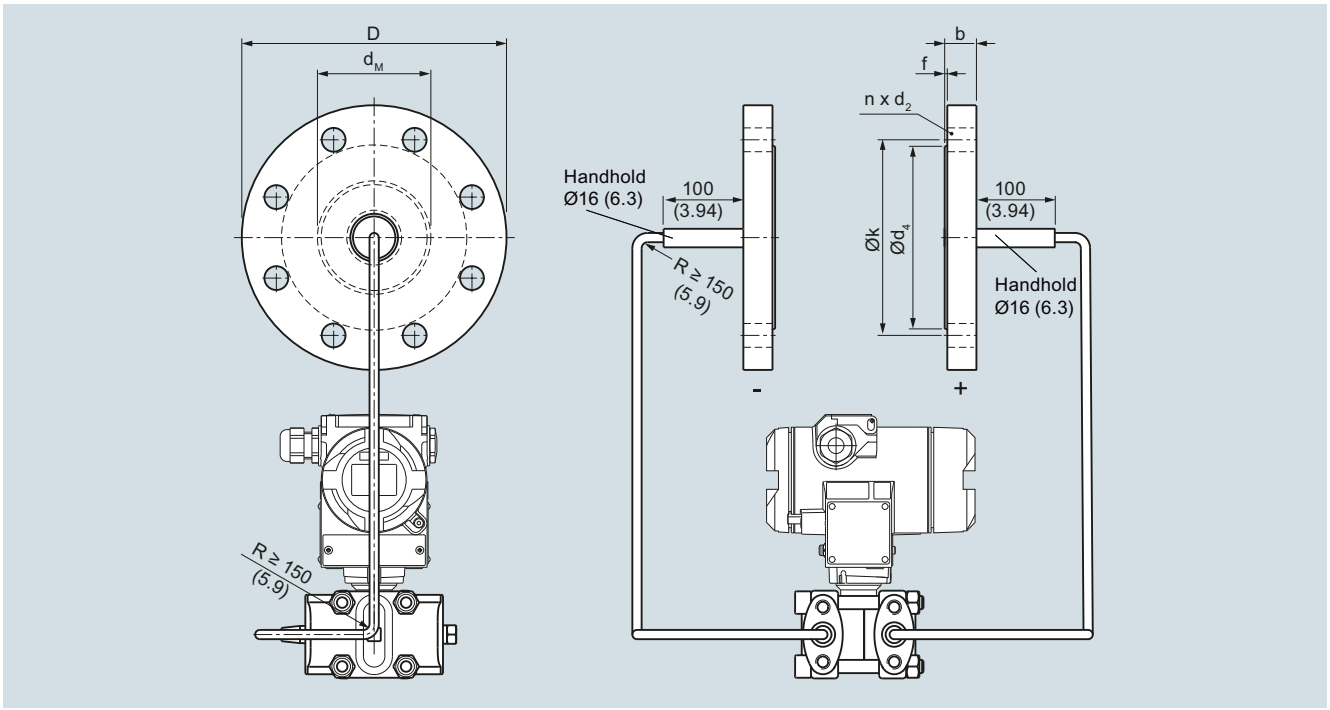
Diaphragm seals of flange design with flexible capillary



Diaphragm seals of flange design with flexible capillary for connection to SITRANS P pressure transmitters for absolute pressure or for differential pressure and flow, dimensions in mm (inch)

Connection to EN 1092-1

Nom. diam.	Nom. press.	b mm	D mm	d_2 mm	d_4 mm	d_M mm	f mm	k mm	n
DN 80	PN 10/16	24	200	18	138	89	2	160	8
	PN 100	32	230	26	138	89	2	180	8
DN 100	PN 10/16	20	220	18	158	89	2	180	8
	PN 25/40	24	235	22	162	89	2	190	8
DN 125	PN 16	22	250	18	188	124	2	210	8
	PN 40	26	270	26	188	124	2	220	8

Connection to ASME B16.5

Nom. diam.	Nom. press. lb/sq.in.	b mm (inch)	D mm (inch)	d_2 mm (inch)	d_4 mm (inch)	d_M mm (inch)	f mm (inch)	k mm (inch)	n
3 inch	150	24.3 (0.96)	190 (7.48)	20 (0.79)	127 (5)	89 (3.50)	2 (0.08)	152.5 (6)	4
	300	29 (1.14)	210 (8.27)	22 (0.87)	127 (5)	89 (3.50)	2 (0.08)	168.5 (6.63)	8
	600	38.8 (1.52)	210 (8.27)	22 (0.87)	127 (5)	89 (3.50)	7 (0.28)	168.5 (6.63)	8
4 inch	150	24.3 (0.96)	230 (9.06)	20 (0.79)	158 (6.22)	89 (3.50)	2 (0.08)	190.5 (7.5)	4
	300	32.2 (1.27)	255 (10.04)	22 (0.87)	158 (6.22)	89 (3.50)	2 (0.08)	200 (7.87)	8
	400	42 (1.65)	255 (10.04)	26 (1.02)	158 (6.22)	89 (3.50)	7 (0.28)	200 (7.87)	8
5 inch	150	24.3 (0.96)	255 (10.04)	22 (0.87)	186 (7.32)	124 (4.88)	2 (0.08)	216 (8.50)	4
	300	35.8 (1.41)	280 (11.02)	22 (0.87)	186 (7.32)	124 (4.88)	2 (0.08)	235 (9.25)	8
	400	45.1 (1.79)	280 (11.02)	26 (1.02)	186 (7.32)	124 (4.88)	7 (0.28)	235 (9.25)	8

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5
d_M: Effective diaphragm diameter

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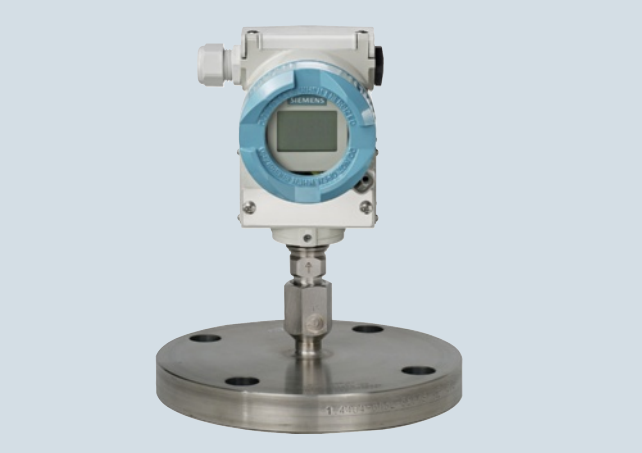
Overview



Diaphragm seals of flange design, directly fitted on a pressure transmitter for pressure

Technical specifications

Diaphragm seals (flange design) for pressure and absolute pressure, directly fitted on a transmitter	
Nominal diameter	Nominal pressure
• DN 50	PN 10/16/25/40, PN 100
• DN 80	PN 10/16/25/40, PN 100
• DN 100	PN 10/16, PN 25/40
• 2 inch	class 150, class 300, class 400/600, class 900/1500
• 3 inch	Class 150, class 300, class 600
• 4 inch	Class 150, class 300, class 400
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
• For the other materials	Smooth to EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel mat. no. 1.4404/316L
• Wetted parts	Stainless steel mat. no. 1.4404/316L
	• Without coating
	• PTFE coating (for vacuum on request)
	• ECTFE coating (for vacuum on request)
	• PFA coating (for vacuum on request)
	Monel 400, mat. No. 2.4360
	Hastelloy C276, mat. No. 2.4819
	Hastelloy C4, mat. No. 2.4610
	Tantalum
	Duplex 2205, mat. no. 1.4462
	Stainless steel 316L, gold plated, thickness approx. 25 µm
• Capillary	Stainless steel, 1.4571/316Ti
• Sealing material at the transmitter connection	Copper
Maximum pressure	See above and the technical data of the transmitter
Tube length	• Without tube
	• 50 mm (1.97 inch)
	• 100 mm (3.94 inch)
	• 150 mm (5.91 inch)
	• 200 mm (7.87 inch)
Capillary	
• Length	Max. 10 m (32.8 ft), longer lengths on request
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	• Silicone oil M5
	• Silicone oil M50
	• High-temperature oil
	• Halocarbon oil (for measuring O_2)
	• Food oil (FDA listed)
Max. recommended process temperature	170 °C (338 °F)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal. More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals.
Weight	Approx. 4 kg (8.82 lb)
Certificate and approvals	
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

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Selection and Ordering data		Article No. Ord.code	7MF4910-					
Diaphragm seal		↗						
Directly fitted to a pressure transmitter SITRANS P for pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; must be ordered separately								
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.								
Process connection								
• Vertical (pressure transmitter upright)			0					
• Horizontal			2					
Nominal diameter and nominal pressure								
• DN 50	PN 10/16/25/40			A				
	PN 100			B				
• DN 80	PN 10/16/25/40			D				
	PN 100			E				
• DN 100	PN 10/16			G				
	PN 25/40			H				
• 2 inch	Class 150			L				
	Class 300			M				
	class 400/600			N				
	class 900/1500			P				
• 3 inch	Class 150			Q				
	Class 300			R				
	Class 600			S				
• 4 inch	Class 150			T				
	Class 300			U				
	Class 400			V				
Smooth sealing face to DIN 1092-01, form B1 or B2, or to ASME B16.5 125 ... 250 AA or RFSF								
Other version Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ...				Z			J	1 Y
Wetted parts materials								
• Stainless steel 316L								
- without coating					A			
- with PTFE coating					E	0		
- with ECTFE coating[2]					F			
- with PFA coating					D			
• Monel 400, mat. No. 2.4360					G			
• Hastelloy C276, mat. No. 2.4819					J			
• Hastelloy C4, mat. No. 2.4610					U			
• Tantalum					K			
• Duplex 2205, W.-Nr. 1.4462					Q			
• Stainless steel 316L, gold plated, thickness approx. 25 µm					S	0		
Tube length								
• Without tube						0		
• 50 mm	• (1.97 inch)					1		
• 100 mm	• (3.94 inch)					2		
• 150 mm	• (5.90 inch)					3		
• 200 mm	• (7.87 inch)					4		
Other version: Add Order code and plain text: Wetted parts materials: ..., Tube length: ...					Z	8	K	1 Y

Selection and Ordering data	Article No. Ord.code	7MF4910-				
Diaphragm seal						
Directly fitted to a pressure transmitter SITRANS P for pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; must be ordered separately						
Filling liquid						
• Silicone oil M5			1			
• Silicone oil M50			2			
• High-temperature oil			3			
• Halocarbon oil (for measuring O_2)[3]			4			
• Food oil (FDA listed)			7			
Other version Add Order code and plain text: Filling liquid: ...			9		M	1 Y

1) With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.
2) For vacuum on request.
3) Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
Spark arrestor With spark arrestor for mounting on zone 0 (including documentation) for transmitters for gauge pressure and absolute pressure	**A01**
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	**B20**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	**C10**
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate to EN 10204, section 3.1	**C12**
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	**C17**
Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	**C20**
Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	**C23**
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D07**
Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D08**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	**E10**
Epoxy painting Not possible with vacuum-proof design Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40.. and 7MF42.., only possible with process connection G½B according to EN837-1.	**E15**

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
Sealing surface B1 or ASME B16.5 RF 125 ... 250 AA Instead of sealing surface B2 and RFSF (Only for wetted parts in Hastelloy C276 (2.4819), Tantal and Duplex 2205 (1.4462) and for sizes 2", 3", DN 50 and DN 80)	**J12**
Sealing surface groove, EN 1092-1, form D instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)	**J14**
Sealing surface RJF (groove) ASME B16.5 instead of sealing surface ASME B16.5 RF 125 ... 250 AA (only for wetted parts made of stainless steel 316L)	**J24**
Elongated pipe 200 mm instead of 89 mm, max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	**R20**
Elongated pipe elbow 200 mm instead of 130 mm, max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	**R21**
Cooling element max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	**R22**
Vacuum-proof design for use in low-pressure range for transmitters for gauge and absolute pressure from the pressure series	**V01**

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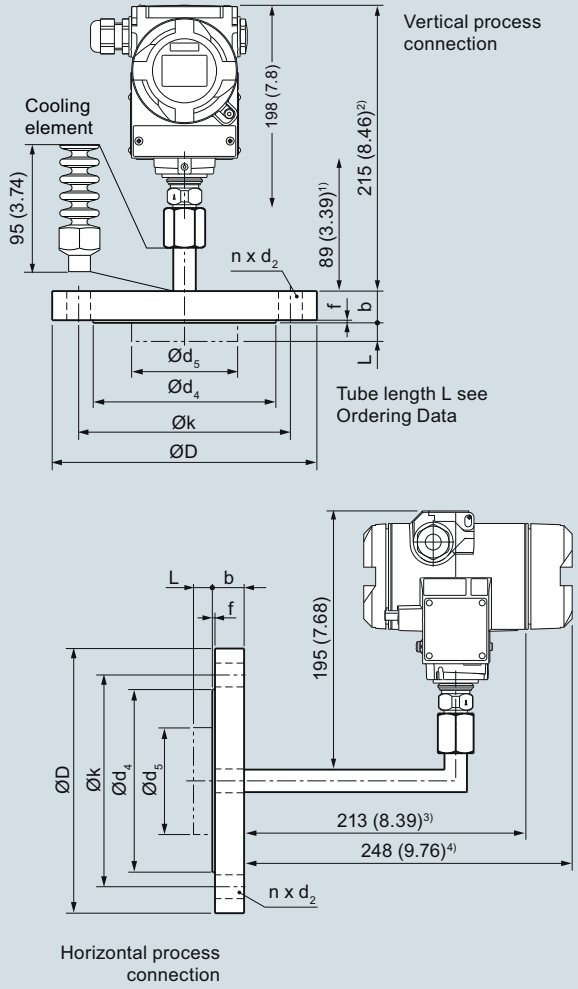
Dimensional drawings



1) 200 (7.9) with option R20, 278 (11.0) with cooling element opt. R22)
2) 324 (12.8) with option R20, 326 (12.9) with cooling element opt. R22)
3) 283 (11.14) with option R21
4) 318 (12.52) with option R21

Diaphragm seals of flange design, direct connection to a SITRANS P pressure transmitter (process connection vertical (top) and horizontal (bottom)), dimensions in mm (inch)

Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d_2	d_4	d_5	d_M	f	k	n
		mm	mm	mm	mm	mm	mm	mm	mm	
DN 50	PN 10/16/ 25/40	20	165	18	102	48.3	45[1)]	2	125	4
	PN 100	28	195	26	102	48.3	45[1)]	2	145	4
DN 80	PN 10/16/ 25/40	24	200	18	138	76	72[1)]	2	160	8
	PN 100	32	230	26	138	76	72[1)]	2	180	8
DN 100	PN 10/16	20	220	18	158	94	89-2	2	180	8
	PN 25/40	24	235	22	162	94	89	2	190	8

Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d_2	d_4	d_5	d_M	f	k	n
	lb/ sq.in.	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	
2 inch	150	19.5	150	20	92	48.3	45[1)]	2	120.5	4
		(0.77)	(5.91)	(0.79)	(3.62)	(1.9)	(1.77)[1)]	(0.08)	(4.74)	
	300	22.7	165	20	92	48.3	45[1)]	2	127	8
		(0.89)	(6.5)	(0.79)	(3.62)	(1.9)	(1.77)[1)]	(0.08)	(5)	
	400/ 600	32.4	165	20	92	48.3	45[1)]	7	127	8
		(1.28)	(6.5)	(0.79)	(3.62)	(1.9)	(1.77)[1)]	(0.28)	(5)	
	900/ 1500	45.1	215	26	92	48.3	45[1)]	7	165	8
		(1.78)	(8.46)	(1.02)	(3.62)	(1.9)	(1.77)[1)]	(0.28)	(6.5)	
3 inch	150	24.3	190	20	127	76	72[2)]	2	152.5	4
		(0.96)	(7.48)	(0.79)	(5)	(3)	(2.83)[2)]	(0.08)	(6)	
	300	29	210	22	127	76	72[2)]	2	168.5	8
		(1.14)	(8.27)	(0.87)	(5)	(3)	(2.83)[2)]	(0.08)	(6.63)	
	600	38.8	210	22	127	76	72[2)]	7	168.5	8
		(1.53)	(8.27)	(0.87)	(5)	(3)	(2.83)[2)]	(0.28)	(6.63)	
4 inch	150	24.3	230	20	158	94	89	2	190.5	8
		(0.96)	(9.06)	(0.79)	(6.22)	(3.69)	(3.50)	(0.08)	(7.5)	
	300	32.2	255	22	158	94	89	2	200	8
		(1.27)	(10.04)	(0.79)	(6.22)	(3.69)	(3.50)	(0.08)	(7.87)	
	400	42	255	26	158	94	89	7	200	8
		(1.65)	(10.04)	(1.02)	(6.22)	(3.69)	(3.50)	(0.28)	(7.87)	

d: Inside diameter of gasket according to EN 1092-1/ ASME B16.5

d_M: Effective diaphragm diameter

1) 59 mm = 2.32 inch with tube length L = 0

2) 89 mm = 3½ inch with tube length L = 0

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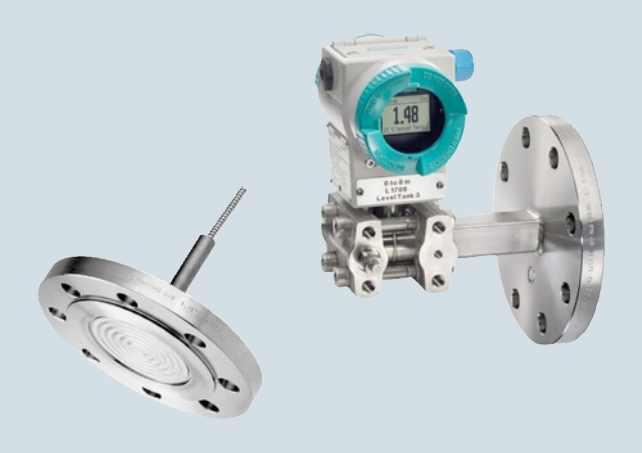
Overview



Diaphragm seals of screwed design for pressure transmitters for differential pressure, fixed connection and with flexible capillary

Technical specifications

Diaphragm seals of screwed design for pressure transmitters for differential pressure, fixed connection and with flexible capillary	
Nominal diameter	Nominal pressure
• DN 50	PN 10/16/25/40, PN 100
• DN 80	PN 10/16/25/40
• DN 100	PN 10/16, PN 25/40
• 2 inch	class 150, class 300, class 400/600, class 900/1500
• 3 inch	Class 150, class 300
• 4 inch	Class 150, class 300
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
• For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel mat. no. 1.4404/316L
• Wetted parts	Stainless steel mat. no. 1.4404/316L
	• Without coating
	• PTFE coating (for vacuum on request)
	• ECTFE coating (for vacuum on request)
	• PFA coating (for vacuum on request)
	Monel 400, mat. No. 2.4360
	Hastelloy C276, mat. No. 2.4819
	Hastelloy C4, mat. No. 2.4610
	Tantalum
	Duplex 2205, mat. no. 1.4462
	Stainless steel 316L, gold plated, thickness approx. 25 µm
• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• Sheath	Spiral hose made of stainless steel, mat. No. 1.4301/316

Sealing material in the process flanges	
• For pressure transmitters, absolute pressure transmitters and low-pressure applications	Copper
• For other applications	Viton
Maximum pressure	See above and the technical data of the pressure transmitter
Tube length	Without tube
	50 mm (1.97 inch)
	100 mm (3.94 inch)
	150 mm (5.91 inch)
	200 mm (7.87 inch)
Capillary	
• Length	Max. 10 m (32.8 ft), longer lengths on request
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	Silicone oil M5
	Silicone oil M50
	High-temperature oil
	Halocarbon oil (for measuring O_2)
	Food oil (FDA listed)
Max. recommended process temperature	170 °C (338 °F)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal
	More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
Weight	Approx. 4 kg (8.82 lb)
Certificate and approvals	
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

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Selection and Ordering data		Article No. Ord. code
Diaphragm seal		7MF4913-
Mounting flange (with tube as option) for direct mounting to high-pressure side **and flanged remote seal without tube**, fitted by means of capillary to low-pressure side of SITRANS P for differential pressure, DS III series (7MF443.-...) and SITRANS P500 (7MF54..-...)		1 ■■■■ - ■B ■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Flange, connection to EN 1092-1		
Nom. diam.	**Nom. press.**	
• DN 50	PN 10/16/25/40	A
	PN 100	B
• DN 80	PN 10/16/25/40	D
• DN 100	PN 10/16	G
	PN 25/40	H
Flange, connection to ASME B16.5		
Nom. diam.	**Nom. press.**	
• 2 inch	class 150	L
	class 300	M
	class 400/600	N
	class 900/1500	P
• 3 inch	Class 150	Q
	Class 300	R
• 4 inch	Class 150	T
	Class 300	U
Other version Add Order code and plain text: Flange: ..., Nominal diameter: ...; Nominal pressure: ...		Z J1Y
Wetted parts materials		
Smooth sealing face to EN 1092-1, form B1 or B2, or to ASME B16.5 RF 125 ... 250 AA or RFSF		
• Stainless steel 316L		
- without coating		A
- with PTFE coating		E0
- with ECTFE coating[1]		F
- with PFA coating		D
• Monel 400, mat. No. 2.4360		G
• Hastelloy C276, mat. No. 2.4819		J
• Hastelloy C4, mat. No. 2.4610		U
• Tantalum		K
• Duplex, mat. no. 1.4462		Q
• Duplex, mat. no. 1.4462, incl. main body		R
• Stainless steel 316L, gold plated, thickness approx. 25 µm		S0
Tube length		
(for mounting flange on high-pressure side)		
• Without tube		0
• 50 mm (1.97 inch)		1
• 100 mm (3.94 inch)		2
• 150 mm (5.90 inch)		3
• 200 mm (7.87 inch)		4
Other version: Add Order code and plain text: Wetted parts materials: ....., Tube length: ...		Z8 K1Y
Filling liquid		
• Silicone oil M5		1
• Silicone oil M50		2
• High-temperature oil		3
• Halocarbon oil (for measuring O_2)[2]		4
• Food oil (FDA listed)		7
Other version Add Order code and plain text: Filling liquid: ...		9 M1Y

Selection and Ordering data		Article No. Ord. code
Diaphragm seal		7MF4913-
Mounting flange (with tube as option) for direct mounting to high-pressure side **and flanged remote seal without tube**, fitted by means of capillary to low-pressure side of SITRANS P for differential pressure, DS III series (7MF443.-...) and SITRANS P500 (7MF54..-...)		1 ■■■■ - ■B ■■■
Length of capillary[3]		
• 1.0 m	(3.28 ft)	2
• 1.6 m	(5.25 ft)	3
• 2.5 m	(8.20 ft)	4
• 4.0 m	(13.1 ft)	5
• 6.0 m	(19.7 ft)	6
• 8.0 m	(26.25 ft)	7
• 10.0 m	(32.8 ft)	8
Special lengths for capillaries		
• 2.0 m		9 N1C
• 3.0 m		9 N1E
• 5.0 m		9 N1G
• 7.0 m		9 N1J
• 9.0 m		9 N1L

1) For vacuum on request.
2) Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.
3) Max. capillary length, see section "Technical description".

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
Spark arrestor With spark arrestor for mounting on zone 0 (including documentation)	**A02**
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	**B20**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	**C10**
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate to EN 10204, section 3.1	**C12**
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	**C17**
Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	**C20**
Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	**C23**
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D07**
Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D08**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	**E10**
Epoxy painting Not possible with vacuum-proof design. Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40.. and 7MF42.., only possible with process connection G½B according to EN837-1.	**E15**
Sealing surface B1 or ASME B16.5 RF 125 ... 250 AA Instead of sealing surface B2 and RFSF (Only for wetted parts in Hastelloy C276 (2.4819), Tantal and Duplex 2205 (1.4462) and for sizes 2“, 3“, DN 50 and DN 80)	**J12**
Sealing surface groove, EN 1092-1, form D instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)	**J14**
Sealing surface RJF (groove) ASME B16.5 instead of sealing surface ASME B16.5 RF 125 ... 250 AA (only for wetted parts made of stainless steel 316L)	**J24**

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
PE protective tube over the spiral protective tube (color: white) of the capillaries	
1.0 m	**N20**
1.6 m	**N21**
2.0 m	**N22**
2.5 m	**N23**
3.0 m	**N24**
4.0 m	**N25**
5.0 m	**N26**
6.0 m	**N27**
7.0 m	**N28**
8.0 m	**N29**
9.0 m	**N30**
10.0 m	**N31**
Elongated pipe, distance from transmitter process flange to flange is 150 mm instead of 100 mm, max. medium temperature 250 °C, observe the maximum permissible media temperature of the filling liquid.	**R15**
Elongated pipe, distance from transmitter process flange to flange is 100 mm instead of 100 mm, max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	**R20**
Vacuum-proof design for use in low-pressure range	**V03**

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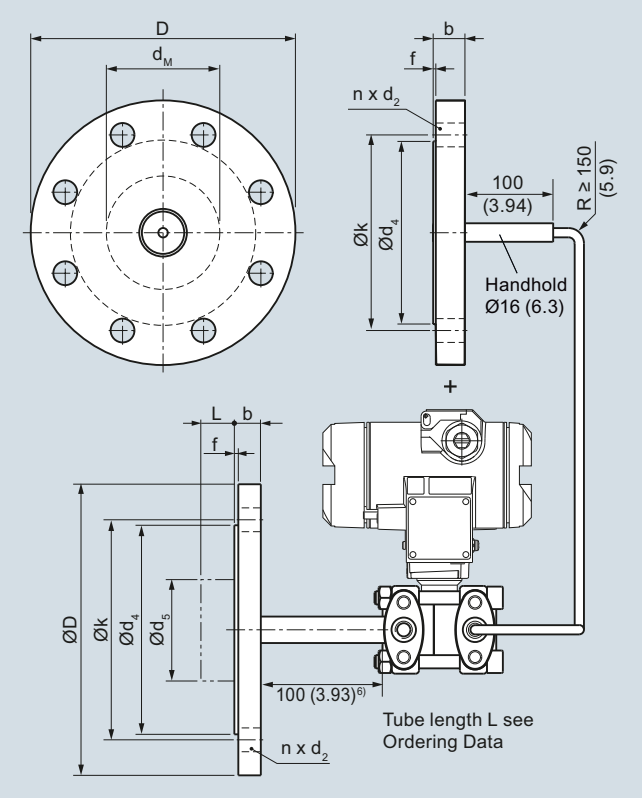
Dimensional drawings



Diaphragm seals of screwed design with flexible capillary, fixed connection, for connection to a SITRANS P pressure transmitter for differential pressure, dimensions in mm (inch)

Connection to EN 1092-1

Nom. diam.	Nom. press.	b	D	d_2	d_4	d_5	d_M	f	k	n
		mm	mm	mm	mm	mm	mm	mm	mm	
DN 50	PN 10/16/ 25/40	20	165	18	102	48.3	45[1)]	2	125	4
	PN 100	28	195	26	102	48.3	45[1)]	2	145	4
DN 80	PN 10/16/ 25/40	24	200	18	138	76	72[2)]	2	160	8
	PN 100	32	230	26	138	76	72[2)]	2	180	8
DN 100	PN 10/16	20	220	18	158	94	89	2	180	8
	PN 25/40	24	235	22	162	94	89	2	190	8

Connection to ASME B16.5

Nom. diam.	Nom. press.	b	D	d_2	d_4	d_5	d_M	f	k	n
	lb/ sq.in.	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	
2 inch	150	19.5	150	20	92	48.3	45[1)]	2	120.5	4
		(0.77)	(5.91)	(0.79)	(3.62)	(1.9)	(1.77)[1)]	(0.08)	(4.74)	
	300	22.7	165	20	92	48.3	45[1)]	2	127	8
		(0.89)	(6.5)	(0.79)	(3.62)	(1.9)	(1.77)[1)]	(0.08)	(5)	
	400/ 600	32.4	165	20	92	48.3	45[1)]	7	127	8
		(1.28)	(6.5)	(0.79)	(3.62)	(1.9)	(1.77)[1)]	(0.28)	(5)	
	900/ 1500	45.1	215	26	92	48.3	45[1)]	7	165	8
		(1.78)	(8.46)	(1.02)	(3.62)	(1.9)	(1.77)[1)]	(0.28)	(6.5)	
3 inch	150	24.3	190	20	127	76	72[2)]	2	152.5	4
		(0.96)	(7.48)	(0.79)	(5)	(3)	(2.83)[2)]	(0.08)	(6)	
	300	29	210	22	127	76	72[2)]	2	168.5	8
		(1.14)	(8.27)	(0.87)	(5)	(3)	(2.83)[2)]	(0.08)	(6.63)	
4 inch	150	24.3	230	20	158	94	89	2	190.5	8
		(0.96)	(9.06)	(0.79)	(6.22)	(3.69)	(3.50)	(0.08)	(7.5)	
	300	32.2	255	22	158	94	89	2	200	8
		(1.27)	(10.04)	(0.79)	(6.22)	(3.69)	(3.50)	(0.08)	(7.87)	

d: Inside diameter of gasket according to EN 1092-1 / ASME B16.5

d_M: Effective diaphragm diameter

1) 59 mm = 2.32 inch with tube length L = 0

2) 89 mm = 3½ inch with tube length L = 0

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Overview

Diaphragm seal, screwed gland design with inside diaphragm for gauge, absolute and differential pressure for direct mounting

Technical specifications

Diaphragm seal, screwed gland with inside diaphragm	
Process connection	Nominal pressure
• Male thread G½B to EN 837-1	PN 100, PN 250
• External thread ½-14“ NPT-M	PN 100, PN 250
• open measurement flange	
- DN 25	PN 10 ... PN 40
- 1 inch	class 150, class 300
Sealing face for open measurement flange	
• For stainless steel, mat. no. 1.4404/316L	To EN 1092-1, form B1 or ASME B16.5 RF 125 ... 250 AA
Materials	
• Lower section (in the case of process connection thread)	Stainless steel, Mat. no. 1.4404/316L
• Diaphragm	Stainless steel, Mat. no. 1.4404/316L
	• No coating
	• With PTFE coating
	Monel 400, mat. no. 2.4360
	Hastelloy C276, mat. no. 2.4819
	Hastelloy C4, mat. no. 2.4610
	Tantal
	Stainless steel 316L, gold plated, thickness approx. 25 µm
• Top section (process connection in the case of an open measurement flange)	Stainless steel, mat. no. 1.4404/316L
• Capillary	Stainless steel 1.4571/316Ti
• Sealing material on the process connection	Viton or copper (in the case of vacuum-free version)
• Sealing material between top and bottom section	Viton (FKM) (standard) Teflon (PTFE) metal spring ring (silver-coated)
Capillary	
• Length	Max. 10 m (32.8 ft)
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	• Silicone oil M5
	• Silicone oil M50
	• High-temperature oil
	• Halocarbon oil (for measuring O_2)
	• Food oil (FDA listed)
Max. recommended process temperature	170 °C (338 °F)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal
	More information can be found in the technical specifications of the pressure transmitters and in the section "Technical data of filling liquid" in the introduction to the remote seals
Weight	Approx. 1.5 kg (3.3 lb)
Certificates and approvals	
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

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1

Diaphragm seal, screwed design directly mounted or/and with capillary

Selection and Ordering data	Article No. Ord. Code
Remote seal, screwed gland with inside diaphragm	
Mounted on SITRANS P pressure transmitter ↗ for	**7MF4930-**
• **gauge pressure** 7MF403.-... and SITRANS P300, 7MF802.-...	
• **absolute pressure** 7MF423.-... and SITRANS P300, 7MF802.-...	
In conjunction with Order code "V01" (vacuum-proof design)	
Mounted on either side of SITRANS P pressure transmitter for ↗	**7MF4933-**
• **differential pressure** 7MF443.-... and 7MF54..-...	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	■■■■■-■B ■■■
Type	
• no flushing hole	1
• with flushing hole 1x 1/8 NPT unsealed (only with process connection 316L)	2
Other version, add Order code and plain text: Version: ...	9 H1Y
Process connection version	
Lower flange material / **Process connection** / **Nominal diameter and pressure level**	
316L/1.4404 / Thread / G½B/PN100	B
316L/1.4404 / Thread / G½B/PN250	C
316L/1.4404 / Thread / ½NPT-M/PN100	E
316L/1.4404 / Thread / ½NPT-M/PN250	F
316L/1.4404 / Thread / ½NPT-F/PN100	H
316L/1.4404 / Thread / ½NPT-F/PN250	J
316L/1.4404 / open measurement flange / DN 25/PN 10 ... 40	N
316L/1.4404 / open measurement flange / 1"/Class 150	P
316L/1.4404 / open measurement flange / 1"/Class 300	Q
PTFE / Thread / G½B/PN100	T
PTFE / open measurement flange / DN 25/PN 10 ... 40	U
PTFE / open measurement flange / 1"/Class 150	V
PTFE / open measurement flange / 1"/Class 300	W
Other version, add Order code and plain text: Lower flange material: ...; Process connection: ...; Nominal diameter/pressure level: ...	Z J1Y
Diaphragm material	
Stainless steel 316L	A
316L stainless steel with PTFE film	E
Hastelloy C276	J
Hastelloy C4	U
Tantalum	K
Stainless steel 316L, gold plated, thickness approx. 25 µm	S
Other version, add Order code and plain text: Diaphragm material: ...	Z K1Y

Selection and Ordering data	Article No. Ord. Code
Remote seal, screwed gland with inside diaphragm	
Mounted on SITRANS P pressure transmitter for	**7MF4930-**
• **gauge pressure** 7MF403.-... and SITRANS P300, 7MF802.-...	
• **absolute pressure** 7MF423.-... and SITRANS P300, 7MF802.-...	
In conjunction with Order code "V01" (vacuum-proof design)	
Mounted on either side of SITRANS P pressure transmitter for	**7MF4933-**
• **differential pressure** 7MF443.-... and 7MF54..-...	
	■■■■■-■B ■■■
Sealing material between top and bottom section	
FKM (standard with diaphragm and 316L process connection)	1
PTFE (standard with custom material with max. 260 °C)	2
Metal C- circlip, silver coated for >260 °C) incl. high temperature-resistant screwed gland	3
Filling liquid	
• Silicone oil M5	1
• Silicone oil M50	2
• High-temperature oil	3
• Halocarbon oil (for measuring O_2)[1]	4
• Food oil (FDA-listed)	7
Other version, add Order code and plain text: filling liquid: ...	9 M1Y
Capillary length[2]	
• none, direct mounting	0
• none, direct mounting with cooling element (not in conjunction with transmitter for differential pressure)	1
• 1 m	2
• 1.6 m	3
• 2.5 m	4
• 4 m	5
• 6 m	6
• 8 m	7
• 10 m	8
Special lengths for capillaries	
• 2.0 m	9 N1C
• 3.0 m	9 N1E
• 5.0 m	9 N1G
• 7.0 m	9 N1J
• 9.0 m	9 N1L

[1] Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.

[2] Max. capillary length, see section "Technical description".

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Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order code.	
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	**B20**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	**C10**
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate to EN 10204, section 3.1	**C12**
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	**C17**
Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	**C20**
Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	**C23**
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D07**
Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D08**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	**E10**
Epoxy painting Not possible with vacuum-proof design. Color: transparent, coverage: front and rear of the remote seal, capillary(ies) or connecting tube, process connection of the transmitter. With transmitters 7MF40.. and 7MF42.., only possible with process connection G½B according to EN837-1.	**E15**
Sealing surface groove, EN 1092-1, form D instead of sealing surface B1 (only for wetted parts made of stainless steel 316L)	**J14**
Sealing surface RJF (groove) ASME B16.5 instead of sealing surface ASME B16.5 RF 125 ... 250 AA (only for wetted parts made of stainless steel 316L)	**J24**

Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order code.	
PE protective tube over the spiral protective tube (color: white) of the capillaries	
1.0 m	**N20**
1.6 m	**N21**
2.0 m	**N22**
2.5 m	**N23**
3.0 m	**N24**
4.0 m	**N25**
5.0 m	**N26**
6.0 m	**N27**
7.0 m	**N28**
8.0 m	**N29**
9.0 m	**N30**
10.0 m	**N31**
Vacuum-proof design for use in low-pressure range for tranmitters for	
• Gauge and absolute pressure from the pressure series	**V01**
• Differential pressure	**V03**

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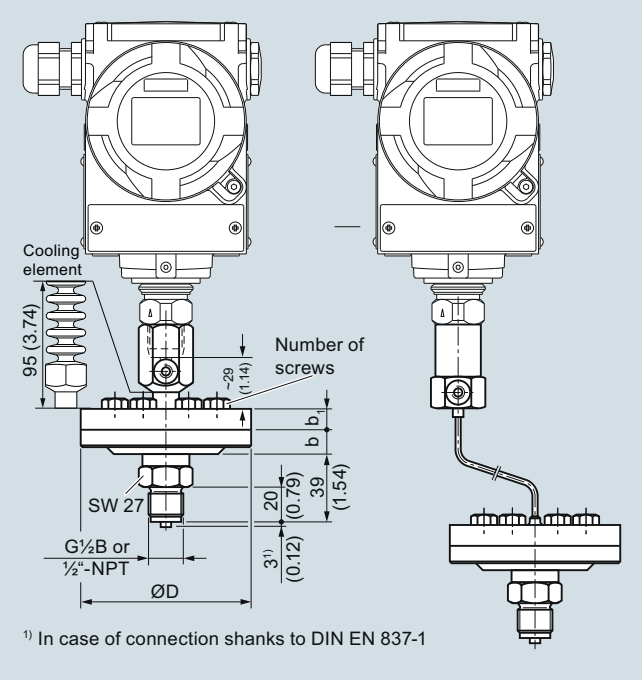
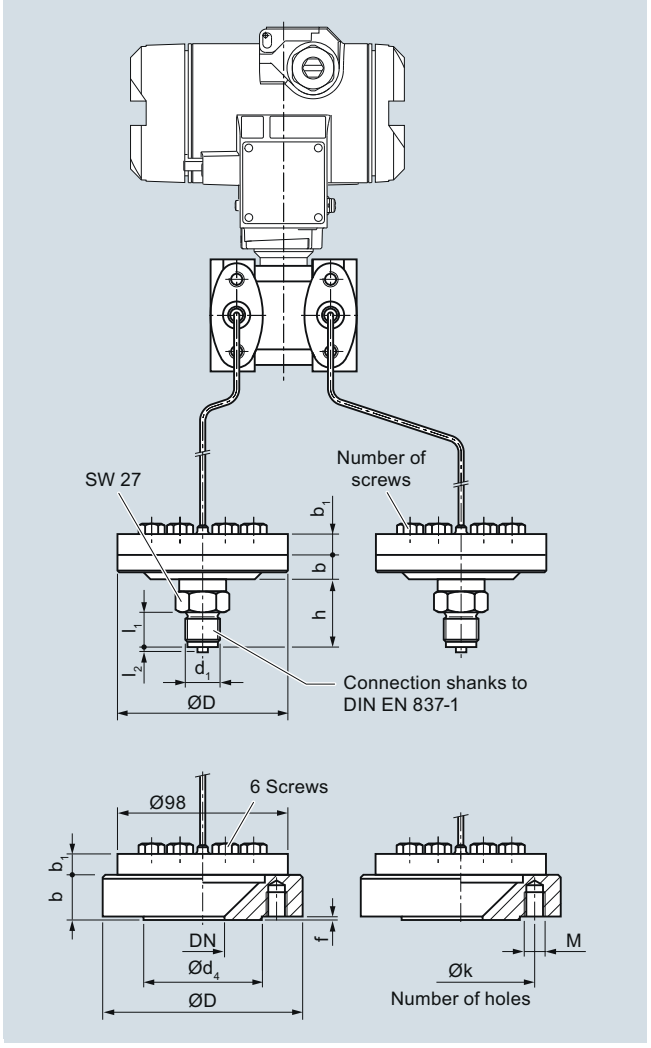
Dimensional drawings



Diaphragm seal, screwed gland with inside diaphragm, for gauge and absolute pressure, direct and attached directly to the transmitter with with capillaries, dimensions in mm (inch)

Range	D mm	b mm	b_1 mm	Number of screws
bis 100 bar	98	14	16	6
bis 250 bar	98	14	20	12



Diaphragm seal, screwed gland with inside diaphragm, for differential pressure, direct and attached directly to the transmitter with with capillaries, dimensions in mm (inch)

Nominal diameter	Nominal pressure	D mm	d_4 mm	k mm	M	Number of holes	b mm	b_1 mm	f mm
DN 25	PN 10/16/25/40	115	68	85	M12	4	26	12	2
1 inch	150 lb/sq.in	108	50.8	79.2	M12	4	22	12	1.6
1 inch	300 lb/sq.in	124	50.8	88.9	M16	4	22	12	1.6

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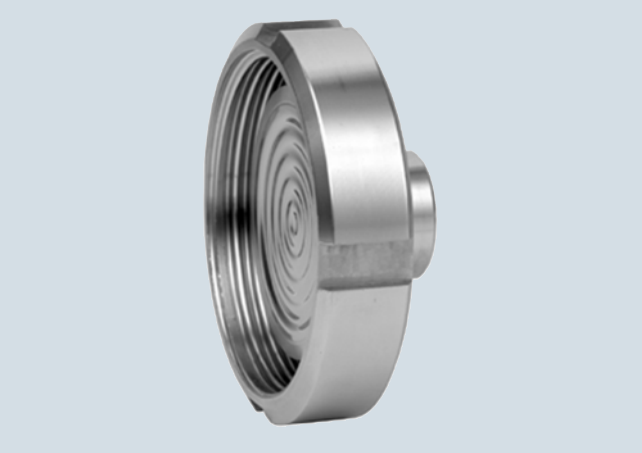
Overview



Quick-release diaphragm seals, to DIN 11851 with slotted union nut

Quick-release diaphragm seals, with clamp connection

Quick-release diaphragm seals are available for the following SITRANS P pressure transmitter series:

- For pressure: P300, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus
- For differential pressure and flow: P500, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus
- The quick-release remote seals are common designs in the food industry. Their design means that the measured medium cannot accumulate in dead volumes. The quick-release clamp present on the remote seal means that quick dismounting is possible for cleaning.

Technical specifications

Quick-release diaphragm seal	
Connection, nominal diameter	Nominal pressure
For pressure	
• To DIN 11851 with slotted union nut	
- DN 25	PN 40
- DN 32	PN 40
- DN 40	PN 40
- DN 50	PN 25
- DN 65	PN 25
- DN 80	PN 25
• To DIN 11851 with threaded socket	
- DN 25	PN 40
- DN 32	PN 40
- DN 40	PN 40
- DN 50	PN 25
- DN 65	PN 25
- DN 80	PN 25
• Clamp connection	
- 1½ inch	PN 16
- 2 inch	PN 16
- 2½ inch	PN 16
- 3 inch	PN 10
For differential pressure and flow	
• To DIN 11851 with slotted union nut	
- DN 50	PN 25
- DN 65	PN 25
- DN 80	PN 25
• To DIN 11851 with threaded socket	
- DN 50	PN 25
- DN 65	PN 25
- DN 80	PN 25
• Clamp connection	
- 2 inch	PN 16
- 2½ inch	PN 16
- 3 inch	PN 10
Sealing face	
• For stainless steel, mat. No. 1.4404/316L	To EN 1092-1, form B1 or ASME B 16.5RF 125 ... 250 AA
• For the other materials	To EN 1092-1, form B2 or ASME B16.5 RFSF
Materials	
• Main body	Stainless steel 316L
• Wetted parts	Stainless steel 316L
• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• Sheath	Spiral hose made of stainless steel, mat. No. 1.4301/316
Maximum pressure	See above and the technical data of the pressure transmitter
Tube length	Without tube
Capillary	
• Length	Max. 10 m (32.8 ft), longer lengths on request
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	Food oil (FDA listed)
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals
Weight	Approx. 4 kg (8.82 lb)
Certificates and approvals	
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)
EHEDG	Complies with EHEDG recommendations

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Quick-release diaphragm seals

Selection and Ordering data		Article No. Ord. code
Quick-release diaphragm seal ↗		7MF4940-
for SITRANS P pressure transmitters for pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; must be ordered separately Filling liquid: Food oil (FDA listed) Material: Stainless steel, mat. No. 1.4435		A0-B
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Nom. diam.	**Nom. press.**	
• Connection to DIN 11851 with slotted union nut		
- DN 25	PN 40	1B
- DN 32	PN 40	1C
- DN 40	PN 40	1D
- DN 50	PN 25	1E
- DN 65	PN 25	1F
- DN 80	PN 25	1G
• Connection to DIN 11851 with screw necks		
- DN 25	PN 40	2B
- DN 32	PN 40	2C
- DN 40	PN 40	2D
- DN 50	PN 25	2E
- DN 65	PN 25	2F
- DN 80	PN 25	2G
• Tri-Clamp connection to DIN 32676/ISO 2852		
- DN 40/1½ inch	PN 16	4L
- DN 50/2 inch	PN 16	4M
- DN 65/2½ inch	PN 16	4N
- DN 80/3 inch	PN 10	4P
Other version Add Order codes and plain text: Process connection: ..., Nominal diameter: ...; Nominal pressure: ...		9A ... HIY
Filling liquid		
• Food oil (FDA listed)		7
Other version Add Order code and plain text: Filling liquid: ...		9 ... MIY
Connection to pressure transmitter		
• direct		0
through capillary, length:[2]		
• 1.0 m	(3.28 ft)	2
• 1.6 m	(5.25 ft)	3
• 2.5 m	(8.20 ft)	4
• 4.0 m	(13.1 ft)	5
• 6.0 m	(19.7 ft)	6
• 8.0 m	(26.25 ft)	7
• 10.0 m	(32.8 ft)	8
Special lengths for capillaries		
• 2.0 m		9 ... N1C
• 3.0 m		9 ... N1E
• 5.0 m		9 ... N1G
• 7.0 m		9 ... N1J
• 9.0 m		9 ... N1L

Selection and Ordering data	Ord. code
Further designs Please add "**-Z**" to Article No. and specify Order code.	
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	**B20**
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate to EN 10204, section 3.1	**C12**
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	**C17**
Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	**C20**
Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	**C23**
PE protective tube over the spiral protective tube (color: white) of the capillaries	
1.0 m	**N20**
1.6 m	**N21**
2.0 m	**N22**
2.5 m	**N23**
3.0 m	**N24**
4.0 m	**N25**
5.0 m	**N26**
6.0 m	**N27**
7.0 m	**N28**
8.0 m	**N29**
9.0 m	**N30**
10.0 m	**N31**
Cooling element max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	**R22**
Vacuum-proof design for use in low-pressure range for gauge and absolute pressure from the pressure series	**V01**

[1] With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.
[2] Max. capillary length, see section "Technical description"

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Selection and Ordering data		Article No. Ord. code
Quick-release diaphragm seal ↗		7 M F 4 9 4 3 -
for SITRANS P pressure transmitters for pressure for differential pressure and flow, type 7MF443.-... and 7MF54..-...; order separately Filling liquid: Food oil (FDA listed) Material: Stainless steel, mat. No. 1.4435 Delivery unit: 2 off		■■ A 0 ■ - ■ B ■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Nom. diam.	**Nom. press.**	
• Connection to DIN 11851 with slotted union nut		
- DN 50	PN 25	1 E
- DN 65	PN 25	1 F
- DN 80	PN 25	1 G
• Connection to DIN 11851 with threaded socket		
- DN 50	PN 25	2 E
- DN 65	PN 25	2 F
- DN 80	PN 25	2 G
• Tri-Clamp connection to DIN 32676/ ISO 2852		
- DN 50/2 inch	PN 16	4 M
- DN 65/2½ inch	PN 16	4 N
- DN 80/3 inch	PN 10	4 P
Other version Add Order codes and plain text: Process connection: ..., Nominal diameter: ...; Nominal pressure: ...		9 A ■■■ H 1 Y
Filling liquid		
• Food oil (FDA listed)		7
Other version Add Order code and plain text: Filling liquid: ...		9 M 1 Y
Connection to transmitter		
through capillary, Length:[1]		
• 1.0 m	(3.28 ft)	2
• 1.6 m	(5.25 ft)	3
• 2.5 m	(8.20 ft)	4
• 4.0 m	(13.1 ft)	5
• 6.0 m	(19.7 ft)	6
• 8.0 m	(26.25 ft)	7
• 10.0 m	(32.8 ft)	8
Special lengths for capillaries		
• 2.0 m		9 N 1 C
• 3.0 m		9 N 1 E
• 5.0 m		9 N 1 G
• 7.0 m		9 N 1 J
• 9.0 m		9 N 1 L

[1] Max. capillary length, see section "Technical description"

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	**B20**
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate to EN 10204, section 3.1	**C12**
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	**C17**
Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	**C20**
Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	**C23**
PE protective tube over the spiral protective tube (color: white) of the capillaries	
1.0 m	**N20**
1.6 m	**N21**
2.0 m	**N22**
2.5 m	**N23**
3.0 m	**N24**
4.0 m	**N25**
5.0 m	**N26**
6.0 m	**N27**
7.0 m	**N28**
8.0 m	**N29**
9.0 m	**N30**
10.0 m	**N31**
Vacuum-proof design for use in low-pressure range	**V03**

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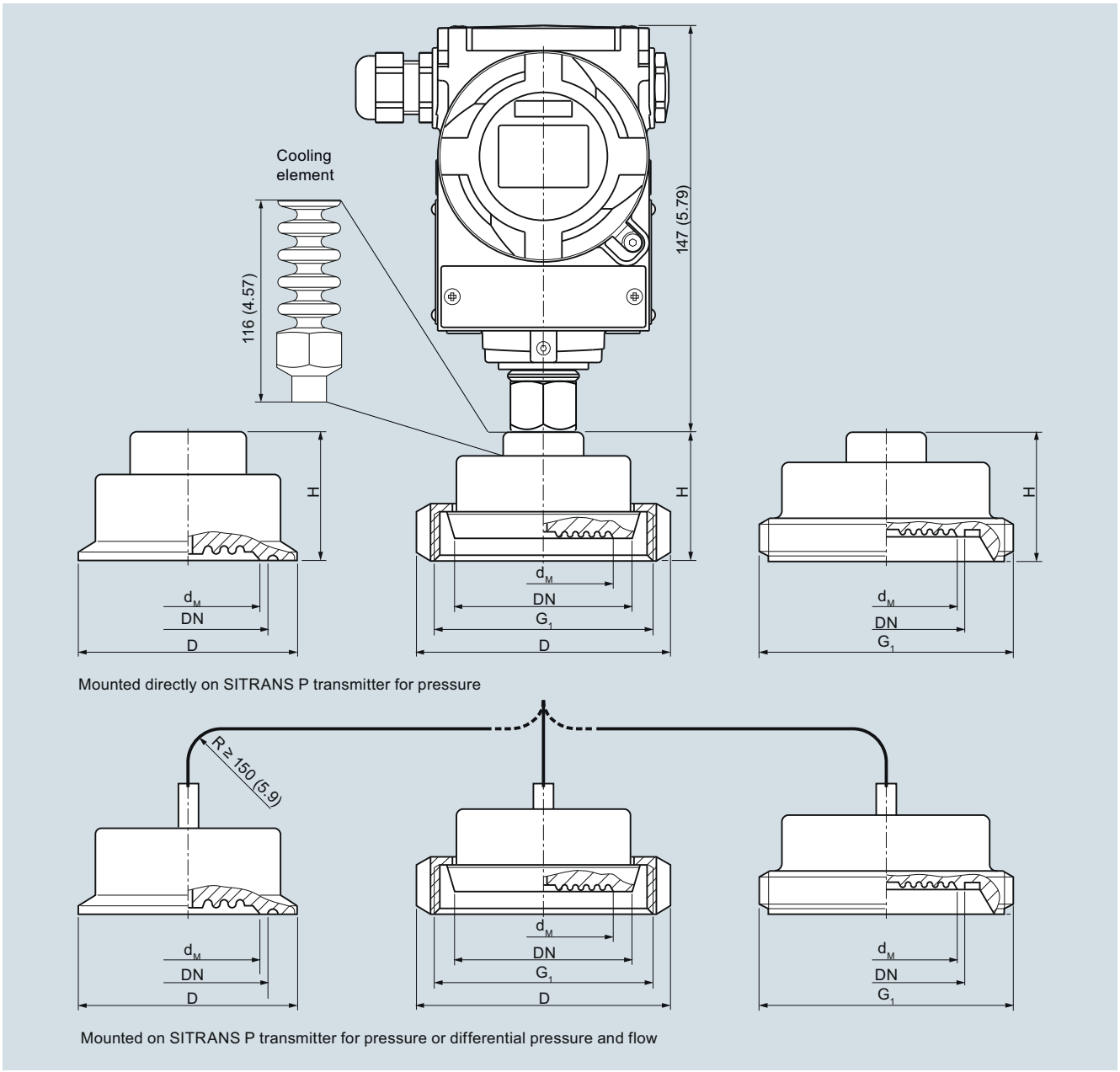
Dimensional drawings



Quick-release diaphragm seal, dimensions in mm (inch)

Clamp connection (left)

DN	Ø d_M		Ø D		H	
40 (1½ inch)	32	(1.26)	50.5	(2)	35	(1.38)
50 (2 inch)	40	(1.57)	64	(2.52)	35	(1.38)
65 (2½ inch)	52	(2.05)	77.5	(3.05)	35	(1.38)
80 (3 inch)	72	(2.83)	91	(3.58)	35	(1.38)

Connection to DIN 11851 with slotted union nut (center)

DN	Ø d_M	Ø D	H	G_1
25	25	63	36	Rd 52x1/6
32	32	70	36	Rd 52x1/6
40	40	78	36	Rd 65x1/6
50	52	112	36	Rd 78x1/6
65	65	112	36	Rd 95x1/6
80	72	127	36	Rd 110x1/6
25	25	63	36	Rd 52x1/6

Connection to DIN 11851 with threaded socket (right)

DN	Ø d_M	H	G_1
25	25	36	Rd 52x1/6
32	32	36	Rd 52x1/6
40	40	36	Rd 65x1/6
50	52	36	Rd 78x1/6
65	65	36	Rd 95x1/6
80	72	36	Rd 110x1/6

d_M Effective diaphragm diameter

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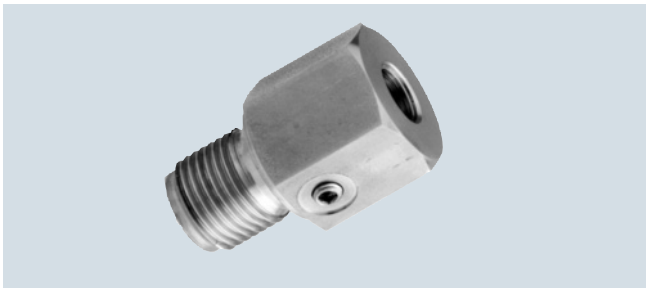
Overview



Miniature diaphragm seals

The miniature diaphragm seals are available for the following SITRANS P pressure transmitter series for pressure:

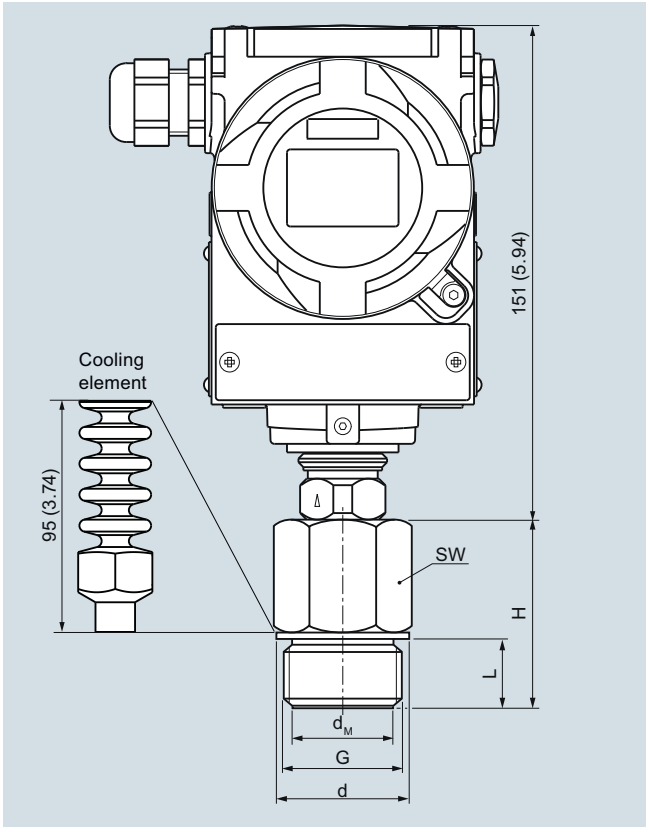
- P300, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus

Suitable for high pressures, contaminated, fibrous and viscous media in the chemical, paper, food and drink industries.

Design

- Flush-mounted diaphragm
- No dead spaces
- Fixed threaded stems

Dimensional drawings



Miniature diaphragm seal, dimensions in mm (inch)

G	Ø d_M		SW		Ø d		L		H	
	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)
G1B	25	(0.98)	41	(1.61)	39	(1.53)	28	(1.1)	56	(2.21)
G1½B	40	(1.57)	55	(2.17)	60	(2.36)	30	(1.18)	50	(1.97)
G2B	50	(1.97)	60	(2.36)	70	(2.76)	30	(1.18)	63	(2.48)

G	Ø d_M		SW		L		H	
	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)
1"-NPT	27	(1.06)	41	(1.61)	25	(0.98)	40	(1.57)
1½"-NPT	34	(1.34)	55	(2.17)	26	(1.02)	45	(1.77)
2"-NPT	46	(1.81)	65	(2.56)	26	(1.02)	45	(1.77)

d_M: Effective diaphragm diameter

Technical specifications

Miniature diaphragm seals	
Span with	
• G1B and 1"-NPT	> 6 bar (> 87 psi)
• G1½B and 1½"-NPT	> 2 bar (> 29 psi)
• G2B and 2"-NPT	> 600 mbar (> 8.7 psi)
Filling liquid	Silicone oil M5 or food oil (FDA listed)
Material	
• Main body	Stainl. steel mat No. 1.4404/ 316L
• Diaphragm	Stainl. steel mat No. 1.4404 / 316L
Maximum pressure	100% of nominal pressure of pressure transmitter, up to maximum of PN 400 (5802 psi) (depending on the seal used)
Temperature of use	Same as pressure transmitter
Temperature range of medium	Same as pressure transmitter
Max. recommended process temperature	150 °C (302 °F)
Weight	
• G1B and 1"-NPT	Approx. 0.3 kg (approx. 0.66 lb)
• G1½B and 1½"-NPT	Approx. 0.5 kg (approx. 1.10 lb)
• G2B and 2"-NPT	Approx. 0.8 kg (approx. 1.76 lb)
Certificate and approvals	
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engineering practice)

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Miniature diaphragm seals

Selection and Ordering data	Article No. Ord. code
Miniature diaphragm seals ↗	**7MF4960 -**
directly fitted to SITRANS P pressure transmitters for pressure; type, 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; must be ordered separately Material: Stainless steel, mat. No. 1.4404/316L Nominal pressure, see "Pressure transmitters"	**1** ■■ **0** ■ ■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
• G1B	**C**
• G1½B	**D**
• G2B	**E**
• 1" - NPT	**K**
• 1½" - NPT	**L**
• 2" - NPT	**M**
Other version, add Order code and plain text: Process connection: ...	**Z** **J 1 Y**
Wetted parts materials	
• Stainless steel 316L	**A**
Other version, add Order code and plain text: Wetted parts materials: ...	**Z** **K 1 Y**
Filling liquid	
• Silicone oil M5	**1**
• Food oil (FDA listed)	**7**
Other version, add Order code and plain text: Filling liquid: ...	**9** **M 1 Y**

[1] With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.

Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code.	
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	**B20**
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate to EN 10204, section 3.1	**C12**
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	**C17**
Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	**C20**
Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	**C23**
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D07**
Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D08**
Cooling element max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	**R22**
Vacuum-proof design for use in low-pressure range for gauge and absolute pressure from the pressure series	**V01**

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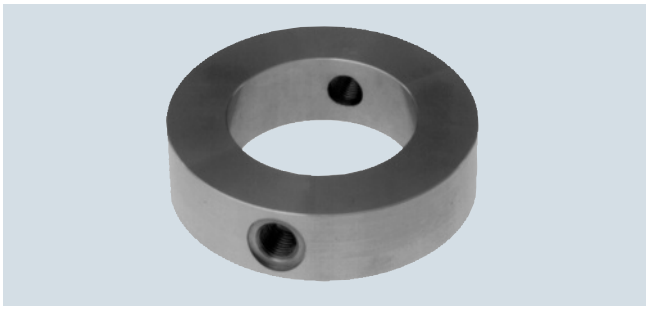
Overview



Flushing ring

Flushing rings are required for flange-mounted and sandwich-type remote seals (Article No. 7MF4900 ... 7MF4923) if the danger exists that the process conditions and the geometry of the connection could cause the medium to form deposits or blockages.

The flushing ring is clamped between the process flange and the remote seal.

Deposits can be flushed away from the diaphragm through the holes in the side, or the pressure volume can be vented. Different nominal diameters and forms permit adaptation to the respective process flange.

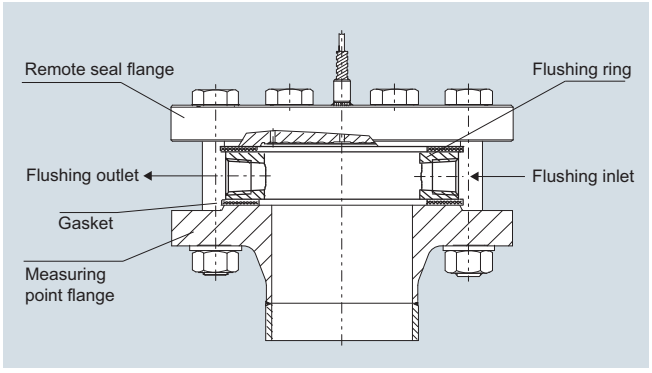
Process connection

For flanges to EN and ASME:
DN 50, 80, 100, 125; PN 16 ... 100 or
DN 2 inch, 3 inch, 4 inch, 5 inch; Class 150 ... 600

Standard design

Material: CrNi-Stahl, mat. No. 1.4404/316L
Sealing faces and flushing holes: See Selection and Ordering data

Design



Installation example

Technical specifications

Flushing ring for remote seals of sandwich and flange design	
Nominal diameter	Nominal pressure
• DN 50	PN 16 ... PN 100
• DN 80	PN 16 ... PN 100
• DN 100	PN 16 ... PN 100
• DN 125	PN 16 ... PN 100
• 2 inch	Class 150 ... class 600
• 3 inch	Class 150 ... class 600
• 4 inch	Class 150 ... class 600
• 5 inch	Class 150 ... class 600
Sealing face	
• To EN 1092-1	Form B1
	Form B2
	Form D/Form D
	Form C/Form C
	Form C/Form C
	Form E
	Form F
• To ASME B16.5	RF 125 ... 250 AA
	RFSF
	RJF ring groove
Flushing holes (2 off), female thread	• G¼
	• G½
	• ¼-18 NPT
	• ½-14 NPT
Material	Stainless steel 1.4404/316L

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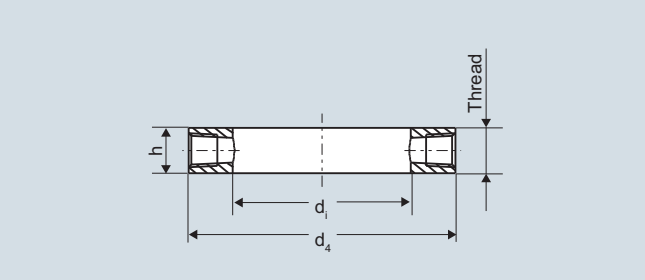
Flushing rings for diaphragm seals

Selection and Ordering data		Article No.Ord. code						
Flushing ring ↗		**7MF4925-**						
for remote seals 7MF4900 to 7MF4923		**1**						
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.								
Nom. diam.	**Nom. press.**							
• DN 50	PN 16 ... PN 100		**A**					
• DN 80	PN 16 ... PN 100		**B**					
• DN 100	PN 16 ... PN 100		**C**					
• DN 125	PN 16 ... PN 100		**D**					
• 2 inch	Class 150 ... 600		**G**					
• 3 inch	Class 150 ... 600		**H**					
• 4 inch	Class 150 ... 600		**J**					
• 5 inch	Class 150 ... 600		**K**					
Other version Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ...			**Z**				**J 1 Y**	
Sealing face								
• EN 1092-1								
- Form B1			**A**					
- Form B2			**C**					
- Form C/Form C			**D**					
- Form D/Form C			**E**					
- Form D/Form D			**F**					
- Form E			**G**					
- Form F			**H**					
• ASME B16.5								
- RF 125 ... 250 AA			**M**					
- RFSF			**Q**					
- RJF ring groove			**R**					
Other version Add Order code and plain text: Sealing face: ...			**Z**				**K 1 Y**	
Flushing holes (2 off)								
• Female thread G¼				**1**				
• Female thread G½				**2**				
• Female thread ¼-18 NPT				**3**				
• Female thread ½-14 NPT				**4**				
Material								
• Stainless steel 316L					**0**			
Other version Add Order code and plain text: Material: ...					**9**		**M 1 Y**	
Further designs Please add "**-Z**" to Article No. and specify Order code.		Order code						
Inspection certificate to EN 10204, section 3.1		**C12**						

Dimensional drawings



Flushing ring, dimension drawing

Connection to EN 1092-1

DN	PN	d_4	d_i	h	Weight
(mm)	(bar)	(mm)	(mm)	(mm)	(kg)
50	16 ... 100	102	62	30	1.10
80	16 ... 100	138	92	30	1.90
100	16 ... 100	162	92	30	3.15
125	16 ... 100	188	126	30	3.50

Connection to ASME B 16.5

DN	Class	d_4		d_i		h		Weight	
inch		mm	(in.)	mm	(in.)	mm	(in.)	kg	(lb)
2	150 ... 600	92	(3.62)	62	(2.44)	30	(1.18)	0.60	(1.32)
3	150 ... 600	127	(5)	92	(3.62)	30	(1.18)	1.05	(2.31)
4	150 ... 600	157	(6.18)	92	(3.62)	30	(1.18)	2.85	(6.28)
5	150 ... 600	185.5	(7.3)	126	(4.96)	30	(1.18)	3.30	(7.28)

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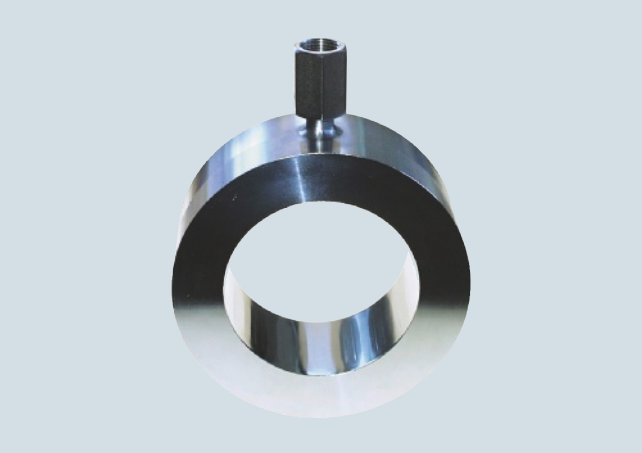
Overview



Inline seals for flange-mounting

The inline seal is completely integrated in the process line. It is particularly suitable for flowing and highly viscous media.

The inline remote seal consists of a cylindrical jacket into which a thin-walled pipe is welded. It is clamped directly between two flanges in the pipeline.

Design

- Inline seals for flange-mounting (flange design) to EN/ASME for SITRANS P pressure transmitters
  - For pressure: P300, DS III with HART, DS III with PROFIBUS PA and DS III with FOUNDATION Fieldbus
  - For differential pressure and flow: DS III with HART, DS III with PROFIBUS PA, DS III with FOUNDATION Fieldbus and P500
- Sealing face to EN 1092-1 or ASME B16.5
- Connection to the transmitter directly or by means of a flexible capillary (max. 10 m long)
- See Technical data for details of materials used for the wetted parts
- Material used for the capillary, the guard sleeve, the seal's main body and the measuring cell: Stainless steel, mat.-No. 1.4571
- Filling liquid: Silicone oil, high-temperature oil, halocarbon oil, food oil (FDA listed) or glycerin/water (not suitable for uses in low-pressure range)

Function

The measured pressure is transferred from the diaphragm to the filling liquid and passes either directly or through the capillary to the measuring chamber of the pressure transmitter. The interior of the diaphragm seal and of the capillary, as well as the measuring chamber of the pressure transmitter, are filled gas-free by the filling liquid.

Note:

When operating in the low-pressure range, also during commissioning, it is recommended to use a vacuum-proof remote seal (see Selection and Ordering data).

Technical specifications

Inline seals for flange-mounting	
Nominal diameter	Nominal pressure
• DN 25	PN 6 ... PN 100
• DN 40	PN 6 ... PN 100
• DN 50	PN 6 ... PN 100
• DN 80	PN 6 ... PN 100
• DN 100	PN 6 ... PN 100
• 1 inch	Class 150 ... class 2500
• 1½ inch	Class 150 ... class 2500
• 2 inch	Class 150 ... class 2500
• 3 inch	Class 150 ... class 2500
• 4 inch	Class 150 ... class 2500
Process connection	Flange to EN 1092-1 or ASME B 16.5
Sealing face	To EN 1092-1, form B1 or to ASME B16.5 RF 125 ... 250 A or RFSF
Materials	
• Main body	Stainless steel 1.4404/316L
• Diaphragm	Stainless steel 1.4404/316L
• Wetted parts	Stainless steel 1.4404/316L
	• Without coating
	• ECTFE coating
	• PFA coating (for vacuum on request)
	Monel 400, mat. No. 2.4360
	Hastelloy C276, mat. No. 2.4819
	Hastelloy C4, mat. No. 2.4610
	Tantalum
• Capillary	Stainless steel, mat. No. 1.4571/316Ti
• Sheath	Spiral hose made of stainless steel, mat. No. 1.4301/316
Capillary	
• Length	Max. 10 m (32.8 ft)
• Internal diameter	2 mm (0.079 inch)
• Minimum bending radius	150 mm (5.9 inch)
Filling liquid	Silicone oil M5
	Silicone oil M50
	High-temperature oil
	Halocarbon oil
	Food oil (FDA listed)
Permissible ambient temperature	See pressure transmitters, see filling liquid
Weight	Approx. 4 kg (8.82 lb)
Certificates and approvals	
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord

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Selection and Ordering data	Article No.Ord. code								
Inline seal for flange-mounting for SITRANS P pressure transmitters									
for gauge pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; must be ordered separately, scope of delivery: 1 off	7MF4980-								
for differential pressure and flow 7MF4433 or 7MF54..-...; order separately, scope of delivery: 1 pair (set); Material: Completely of stainless steel, mat. No. 1.4404/316L; Process connection to EN 1092-1 or ASME B16.5; sealing face to EN 1092-1, form B1, or to ASME B16.5 RF 125 ... 250 AA	7MF4983-								
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	1		0		-		B		
Nominal diameter and nominal pressure									
• DN 25 PN 6 ... 100		B							
• DN 40 PN 6 ... 100		D							
• DN 50 PN 6 ... 100		E							
• DN 80 PN 6 ... 100		G							
• DN 100 PN 6 ... 100		H							
• 1 inch Class 150 ... 2500		L							
• 1½ inch Class 150 ... 2500		M							
• 2 inch Class 150 ... 2500		N							
• 3 inch Class 150 ... 2500		P							
• 4 inch Class 150 ... 2500		Q							
Other version Add Order code and plain text: Nominal diameter: ...; Nominal pressure: ...		Z						J	1 Y
Wetted parts materials									
• Stainless steel 316L									
- Without coating		A							
- With PFA coating		D							
- With ECTFE coating[2]		F							
• Monel 400, mat. No. 2.4360		G							
• Hastelloy C276, mat. No. 2.4819		J							
• Hastelloy C4, mat. No. 2.4610		U							
• Tantalum		K							
Other version Add Order code and plain text: Wetted parts materials: ...		Z						K	1 Y
Filling liquid									
• Silicone oil M5				1					
• Silicone oil M50				2					
• High-temperature oil				3					
• Halocarbon oil (for measuring O_2)[3]				4					
• Food oil (FDA listed)				7					
Other version Add Order code and plain text: Filling liquid: ...				9				M	1 Y

Selection and Ordering data	Article No.Ord. code								
Inline seal for flange-mounting for SITRANS P pressure transmitters									
for gauge pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; must be ordered separately, scope of delivery: 1 off	7MF4980-								
for differential pressure and flow 7MF4433 or 7MF54..-...; order separately, scope of delivery: 1 pair (set); Material: Completely of stainless steel, mat. No. 1.4404/316L; Process connection to EN 1092-1 or ASME B16.5; sealing face to EN 1092-1, form B1, or to ASME B16.5 RF 125 ... 250 AA	7MF4983-								
	1		0		-		B		
Connection to transmitter									
• direct (only for 7MF4980)					0				
through capillary, length:[4]									
• 1.0 m (3.28 ft)					2				
• 1.6 m (5.25 ft)					3				
• 2.5 m (8.20 ft)					4				
• 4.0 m (13.1 ft)					5				
• 6.0 m (19.7 ft)					6				
• 8.0 m (26.25 ft)					7				
• 10.0 m (32.8 ft)					8				
Special lengths for capillaries									
• 2.0 m					9		N	1	C
• 3.0 m					9		N	1	E
• 5.0 m					9		N	1	G
• 7.0 m					9		N	1	J
• 9.0 m					9		N	1	L
only for 7MF4983-...									
• 11.0 m					9		N	1	N
• 12.0 m					9		N	1	P
• 13.0 m					9		N	1	Q
• 14.0 m					9		N	1	R
• 15.0 m					9		N	1	S

1) With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.
2) For vacuum on request.
3) Oil- and grease- free cleaning to DIN 25410, level 2 and packaging included in the scope of delivery.
4) Max. capillary length, see section "Technical description"

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
Spark arrestor With spark arrestor for mounting on zone 0 (including documentation)	
• Pressure and absolute pressure	**A01**
• for differential pressure transmitters	**A02**
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	**B20**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, not for oxygen application, only in conjunction with halocarbon oil fill fluid, certified by certificate acc. to EN 10204-2.2	**C10**
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate to EN 10204, section 3.1	**C12**
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	**C17**
Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	**C20**
Functional safety certificate ("SIL 2/3") to IEC 61508	**C23**
Certification acc. to NACE MR-0175 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D07**
Certification acc. to NACE MR-0103 Includes acceptance test certificate 3.1 according to EN 10204 (only for wetted parts made of stainless steel 1.4404/316L and Hastelloy C276)	**D08**
Oil- and grease-free cleaned version Oil- and grease-free cleaned and packed version, only for oxygen application, only inert fill fluid may be used. Max. temperature: 60 °C (140 °F), max. pressure 50 bar (725 psi), only in connection with halocarbon oil, certified by certificate acc. to EN 10204-2.2	**E10**
PE protective tube over the spiral protective tube (color: white) of the capillaries	
1.0 m	**N20**
1.6 m	**N21**
2.0 m	**N22**
2.5 m	**N23**
3.0 m	**N24**
4.0 m	**N25**
5.0 m	**N26**
6.0 m	**N27**
7.0 m	**N28**
8.0 m	**N29**
9.0 m	**N30**
10.0 m	**N31**
only for 7MF4983-...	
11.0 m	**N32**
12.0 m	**N33**
13.0 m	**N34**
14.0 m	**N35**
15.0 m	**N36**

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
Cooling element max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	**R22**
Vacuum-proof design for use in low-pressure range	
• for gauge and absolute pressure from the pressure series	**V01**
• for transmitters for differential pressure	**V03**
Note: Suffix "Y01" required with pressure transmitter	

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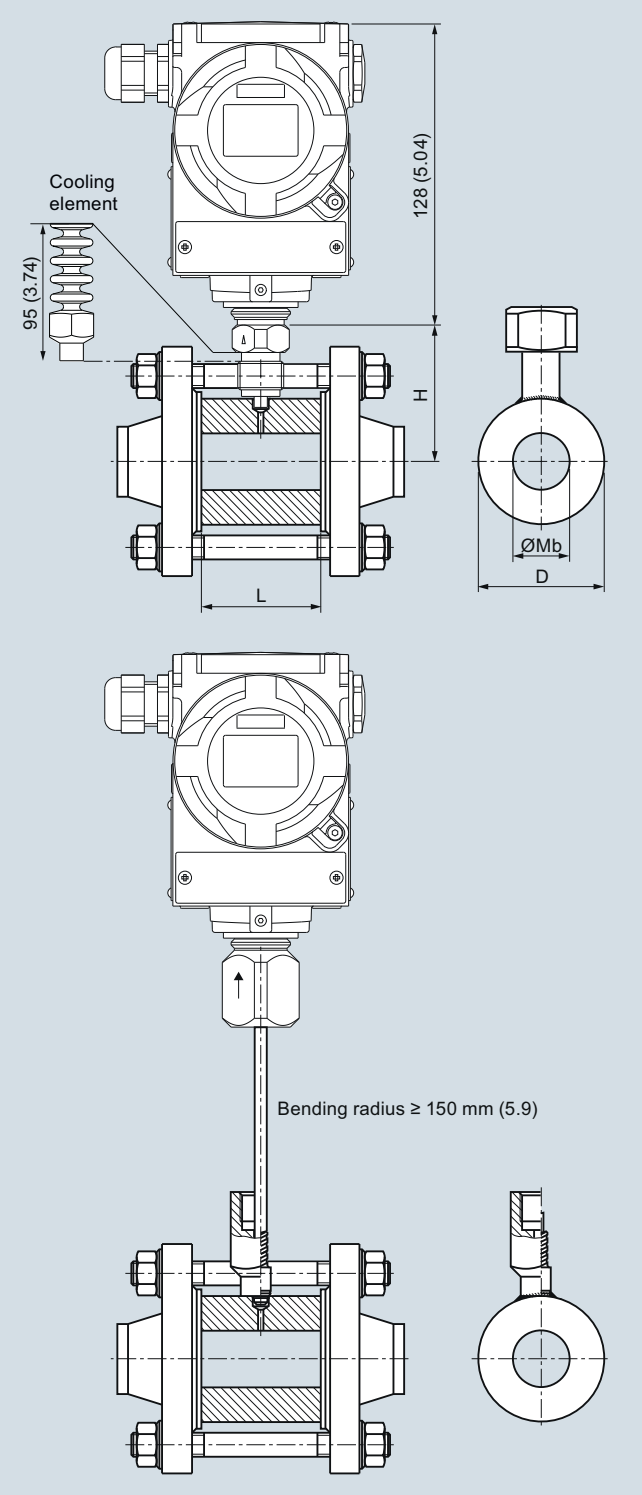
Dimensional drawings



Inline seal for flange-mounting, connected to SITRANS P pressure transmitter, dimensions in mm (inch)

Connection to EN 1092-1

DN	PN	D	Mb	L	H
mm	bar	mm	mm	mm	mm
25	6 ... 100	63	28.5	60	78.5
40	6 ... 100	85	43	60	89.5
50	6 ... 100	95	54.5	60	92.5
80	6 ... 100	130	82.5	60	112
100	6 ... 100	150	107	60	122

Connection to ASME B16.5

DN	Class	D	Mb	L	H
(inch)		mm (inch)	mm (inch)	mm (inch)	mm (inch)
1	150 ... 2500	63 (2.48)	28.5 (1.12)	60 (2.36)	78.5 (3.1)
1½	150 ... 2500	85 (3.35)	43 (1.69)	60 (2.36)	86 (3.4)
2	150 ... 2500	95 (3.74)	54.5 (2.15)	60 (2.36)	94.5 (3.72)
3	150 ... 2500	130 (5.12)	82.5 (3.25)	60 (2.36)	112 (4.4)
4	150 ... 2500	150 (5.9)	107 (4.21)	60 (2.36)	122 (4.8)

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Overview

Quick-release inline seals, to DIN 11851 with threaded socket

Quick-release inline seals, with clamp connection

Quick-release inline seals for pressure are available for the following SITRANS P pressure transmitter series:

- P300
- DS III with HART
- DS III with PROFIBUS PA
- DS III with FOUNDATION Fieldbus

Application

The quick-release inline seal is a special design for flowing media and high-viscosity media. Since it is completely integrated in the process pipe, no turbulences, dead volumes or other obstructions to the flow occur. The measured medium flows unhindered through the inline seal and results in self-cleaning of the measuring chamber. Furthermore, the inline seal can be cleaned by a pig.

Design

The quick-release clamp is available in two versions:

- DIN 11851 with threaded socket
- Clamp connection

The inline seal is connected to the pressure transmitter either directly or by way of a capillary.

Function

The measured pressure is transferred from the diaphragm, mounted on the inner circumference of the inline seal, to the filling liquid and then passes through the capillary to the measuring chamber of the pressure transmitter. The interior of the inline seal and of the capillary, as well as the measuring chamber of the pressure transmitter, are filled gas-free by the filling liquid.

Note:

When operating in the low-pressure range, also during commissioning, it is recommended to use a vacuum-proof pressure transmitter (see Selection and Ordering data).

Technical specifications

Inline seals of quick-release design for pressure		
Connection	Nominal diameter	Nominal pressure
• To DIN 11851 with threaded socket	DN 25	PN 40
	DN 40	PN 40
	DN 50	PN 25
	DN 65	PN 25
	DN 80	PN 25
	DN 100	PN 25
• Clamp connection	1½ inch	PN 40
	2 inch	PN 40
	2½ inch	PN 40
	3 inch	PN 40
Material		
• Main body	Stainless steel 1.4404/316L	
• Diaphragm	Stainless steel 1.4404/316L	
Capillary		
• Length	Max. 10 m (32.8 ft)	
• Internal diameter	2 mm (0.079 inch)	
• Minimum bending radius	150 mm (5.9 inch)	
Filling liquid	• Food oil (FDA listed)	
Permissible ambient temperature	Dependent on the pressure transmitter and the filling liquid of the remote seal More information can be found in the technical data of the pressure transmitters and in the section "Technical data of filling liquid" in the Technical description to the remote seals	
Weight	Approx. 4 kg (approx. 8.82 lb)	
Certificate and approvals		
Classification according to pressure equipment directive (DRGL 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1; complies with the requirements of article 3, paragraph 1 (appendix 1); assigned to category III, conformity evaluation module H by the TÜV Nord	
EHEDG	Complies with EHEDG recommendations	

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Quick-release inline seals

Selection and Ordering data		Article No. Ord. code
Quick-release inline seal ↗		7 M F 4 9 5 0 -
for SITRANS P pressure transmitters for pressure 7MF403.-... and 7MF423.-... together with Order code "V01" (vacuum-proof design) and 7MF802.-...[1]; must be ordered separately Filling liquid: Food oil (FDA listed) Material: Stainless steel 316L		■■ A 0 ■ - ■ B ■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Nom. diam.	**Nom. press.**	
• Connection to DIN 11851 with screw necks		
- DN 25	PN 40	2 B
- DN 40	PN 40	2 D
- DN 50	PN 25	2 E
- DN 65	PN 25	2 F
- DN 80	PN 25	2 G
- DN 100	PN 25	2 H
• Clamp connection		
- 1½ inch	PN 16	4 L
- 2 inch	PN 16	4 M
- 2½ inch	PN 16	4 N
- 3 inch	PN 10	4 P
Other version Add Order codes and plain text: Process connection: ..., Nominal diameter: ...; Nominal pressure: ...		9 A H 1 Y
Filling liquid		
• Food oil (FDA listed)		7
Other version Add Order code and plain text: Filling liquid: ...		9 M 1 Y
Connection to transmitter		
• Direct		0
Through capillary, length:[2]		
• 1.0 m	(3.28 ft)	2
• 1.6 m	(5.25 ft)	3
• 2.5 m	(8.20 ft)	4
• 4.0 m	(13.1 ft)	5
• 6.0 m	(19.7 ft)	6
• 8.0 m	(26.25 ft)	7
• 10.0 m	(32.8 ft)	8
Special lengths for capillaries		
• 2.0 m		9 N 1 C
• 3.0 m		9 N 1 E
• 5.0 m		9 N 1 G
• 7.0 m		9 N 1 J
• 9.0 m		9 N 1 L

1) With 7MF802.-... and the measuring cells Q, S, T and U also order the vacuum-tight version.
2) Max. capillary length, see section "Technical description"

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code.	
Remote seal nameplate Attached out of stainless steel, contains MLFB and order number of the remote seal	**B20**
Quality inspection certificate (Five-step factory calibration) to IEC 60770-2	**C11**
Inspection certificate to EN 10204, section 3.1	**C12**
2.2 Certificate of FDA approval of fill oil Only in conjunction with "Food-grade oil" fill liquid (FDA listed)"	**C17**
Functional safety certificate ("SIL 2") to IEC 61508 (Only in conjunction with the Order code "C20" in the case of SITRANS P DSIII transmitter)	**C20**
Functional safety certificate ("SIL 2/3") to IEC 61508 (Only in conjunction with the Order code "C23" in the case of SITRANS P DSIII transmitter)	**C23**
Special lengths for capillaries	
2.0 m (select 2.5 m capillary pipe length for order and add N1C as identifier)	**N1C**
3.0 m (select 4 m capillary pipe length for order and add N1E as identifier)	**N1E**
5.0 m (select 6 m capillary pipe length for order and add N1G as identifier)	**N1G**
7.0 m (select 8 m capillary pipe length for order and add N1J as identifier)	**N1J**
9.0 m (select 10 m capillary pipe length for order and add N1L as identifier)	**N1L**
PE protective tube over the spiral protective tube (color: white) of the capillaries	
1.0 m	**N20**
1.6 m	**N21**
2.0 m	**N22**
2.5 m	**N23**
3.0 m	**N24**
4.0 m	**N25**
5.0 m	**N26**
6.0 m	**N27**
7.0 m	**N28**
8.0 m	**N29**
9.0 m	**N30**
10.0 m	**N31**
Cooling element max. medium temperature 300 °C, observe the maximum permissible media temperature of the filling liquid.	**R22**
Vacuum-proof design for use in low-pressure range for gauge and absolute pressure from the pressure series	**V01**

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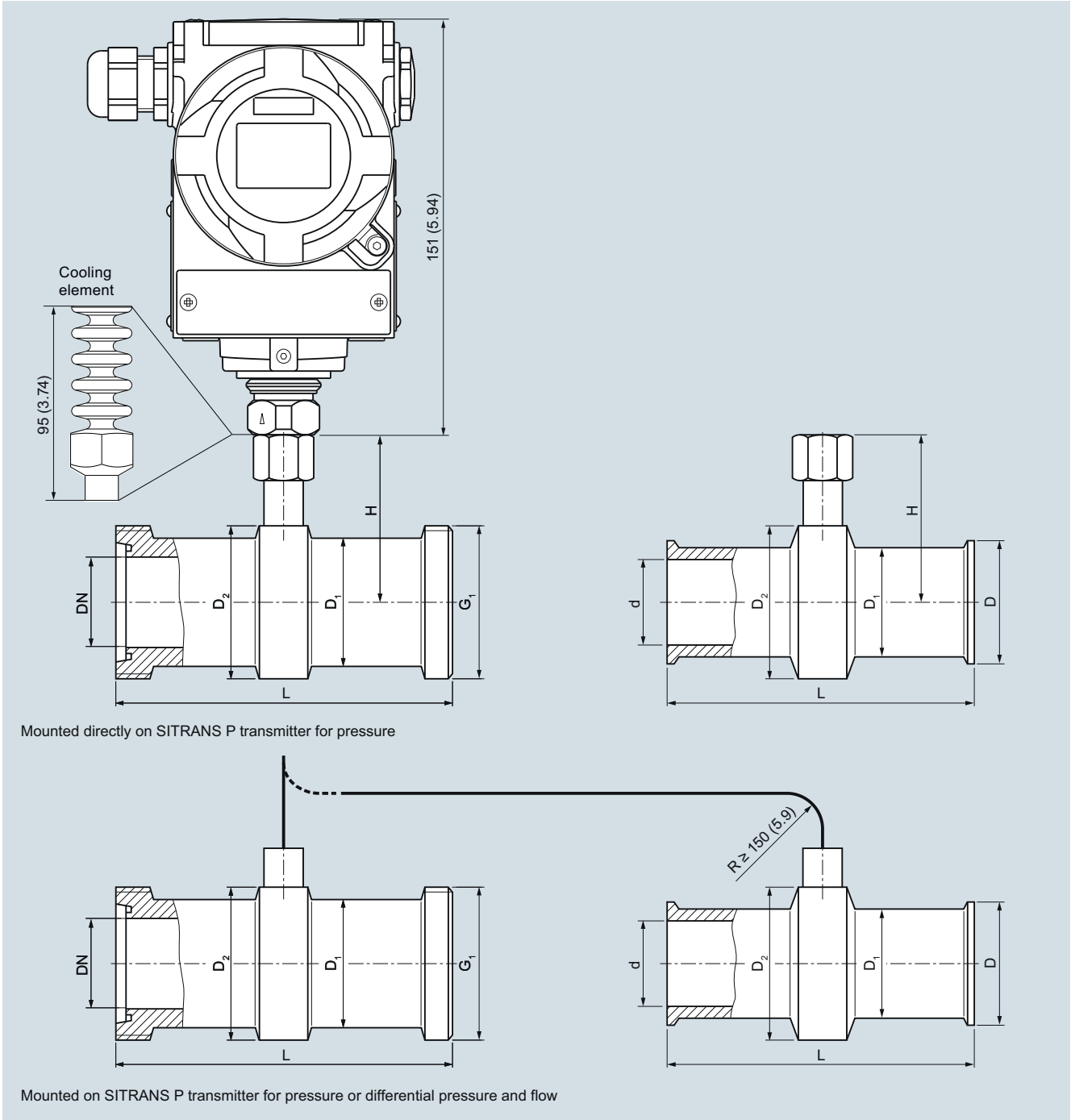
Dimensional drawings



Mounted directly on SITRANS P transmitter for pressure

Mounted on SITRANS P transmitter for pressure or differential pressure and flow

Connection to DIN 11851 with screw necks

DN	Ø D_1	Ø D_2	H	L	G_1
25	38	52	68	128	Rd 52x1/6
40	55	65	74.5	160	Rd 65x1/6
50	68	78	81	170	Rd 78x1/6
65	85	95	89.5	182	Rd 95x1/6
80	110	110	97	182	Rd 110x1/4
100	130	130	107	182	Rd 110x1/4

Clamp connection for pipes to BS 4825/3 and o.D. tubes

d		Ø D_1		Ø D_2		H		L		D	
mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)	mm	(inch)
22.2	(1)	38	(1.5)	50	(1.97)	67	(2.64)	114	(4.49)	50.5	(1.98)
34.9	(1½)	43	(1.69)	65	(2.56)	74.5	(2.93)	146	(5.75)	50.5	(1.98)
47.6	(2)	56	(2.2)	75	(2.95)	79.5	(3.13)	156	(6.14)	64	(2.52)
60.3	(2½)	68	(2.68)	77	(3.03)	80.5	(3.17)	156	(6.14)	77.5	(3.05)
73.0	(3)	82	(3.23)	91	(3.58)	87.5	(3.44)	156	(6.14)	91	(3.58)

Quick-release inline seal, dimensions in mm (inch)

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Overview

This section shows examples of typical measuring setups for using SITRANS P pressure transmitters with and without remote seals.

Equations for calculating start of scale and full scale are provided for each example.

Questionnaires are included to help you select the right combination of remote seal and pressure transmitter.

Installation

Remote seals of sandwich design are fitted between the connection flange of the measuring point and a dummy flange. Remote seals of flange design are fitted directly on the connection flange of the measuring point. The respective pressure rating of the dummy flange or the flanged remote seal must be observed.

The pressure transmitter should be installed below the connection flange (and below the lower connection flange in the case of differential pressure transmitters). This arrangement must be used in the low-pressure range.

When measuring at pressures above atmospheric, the pressure transmitter can also be installed above the connection flange.

The capillaries between the remote seal and the pressure transmitter should be as short as possible to obtain a good transmission response.

Offset of measuring range

If there is a difference in height between the two connection flanges when measuring with two remote seals, an additional differential pressure will result from the oil filling of the remote seal capillaries. This results in a measuring range offset which has to be taken into account when you set the pressure transmitter.

An offset in the measuring range also occurs when combining a remote seal with a transmitter if the remote seal is not installed at the same height as the transmitter.

Pressure transmitter output

If the level, separation layer or density increase in closed vessels, the differential pressure and hence the output signal of the pressure transmitter also increase.

For an inverted relationship between the differential pressure and the output signal, the start-of-scale and full-scale values of the SITRANS P must be interchanged.

With open vessels, a rising pressure is usually assigned to an increasing level, separation layer or density.

Influence of ambient temperature

Temperature differences between the individual capillaries and between the individual remote seals should be avoided.

Temperature variations in the area of the measuring setup cause a change in volume of the filling liquid and hence measuring errors.

Notes

- For the separation layer measurement, the separation layer has to be positioned between the two spigots. Also you must make sure that the level in the container is always above the top spigot.
- When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot.

Possible combinations of pressure transmitters and remote seals

Type of installation	Pressure transmitters	Remote seals
A/B	7MF4033 7MF4034 7MF4035 7MF8023 7MF8024 7MF8025	7MF4900 7MF4910 7MF4920
C_1 and C_2	7MF4233 7MF4234 7MF4235	7MF4900 7MF4910 7MF4920 (vacuum-proof design in each case)
	7MF4333 7MF4334 7MF4335	7MF4901 7MF4921
D	7MF4433 7MF4434 7MF4435 7MF5403 7MF5413	7MF4903 7MF4923
E	7MF4433 7MF4434 7MF4435 7MF5403 7MF5413	7MF4913
G, H and J	7MF4433 7MF4434 7MF4435 7MF5403 7MF5413	7MF4903 7MF4923

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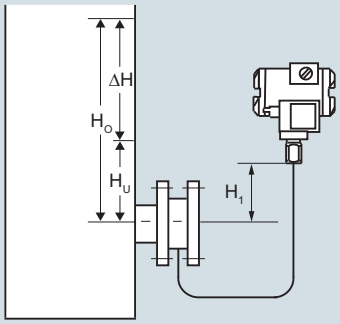
Dimensional drawings

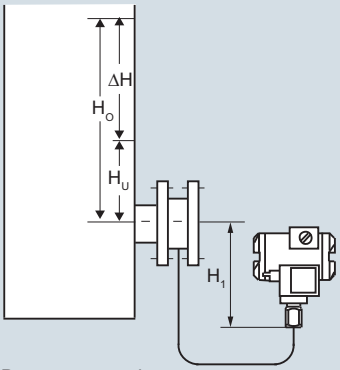
Types of installation for pressure and level measurements (open vessels)

Installation type A



Pressure transmitter above the measuring point

Installation type B



Pressure transmitter below the measuring point

$H_1 \leq 7$ m (23 ft), with halocarbon oil as filling liquid only $H_1 \leq 4$ m (13.1 ft)

Installation type A

Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_1$

Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_1$

Installation type B

Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U + \rho_{Oil} \cdot g \cdot H_1$

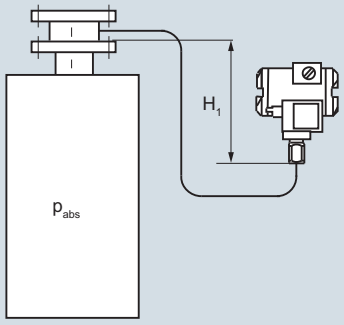
Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O + \rho_{Oil} \cdot g \cdot H_1$

Legend

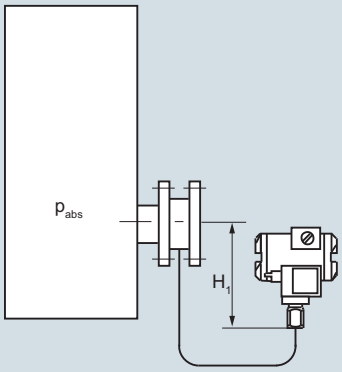
p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{FL}	Density of medium in vessel
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_1	Distance between vessel flange and pressure trans.

Types of installation for absolute level measurements (closed vessels)

Installation type C_1



Installation type C_2



Pressure transmitter for absolute pressure always below the measuring point: $H_1 \geq 200$ mm (7.9 inch)

Installation type C_1 and C_2

Start-of-scale: $p_{MA} = p_{START} + \rho_{Oil} \cdot g \cdot H_1$

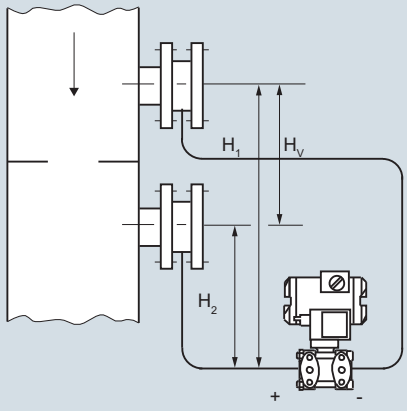
Full-scale: $p_{ME} = p_{END} + \rho_{Oil} \cdot g \cdot H_1$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
p_{START}	Start-of-scale value
p_{END}	Full-scale value
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_1	Distance between vessel flange and pressure trans.

Type of installation for differential pressure and flow measurements

Installation type D Filter monitoring



Installation type D

Start-of-scale: $p_{MA} = p_{START} - \rho_{Oil} \cdot g \cdot H_V$

Full-scale: $p_{ME} = p_{END} - \rho_{Oil} \cdot g \cdot H_V$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
p_{START}	Start-of-scale value
p_{END}	Full-scale value
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_V	Distance between the measuring points (spigots)

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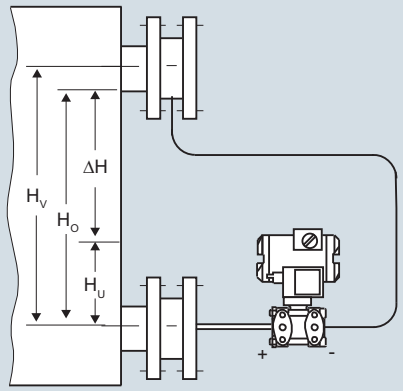
Measuring setups with remote seals

Types of installation for level measurements (closed vessels)

Installation type E



Installation type E

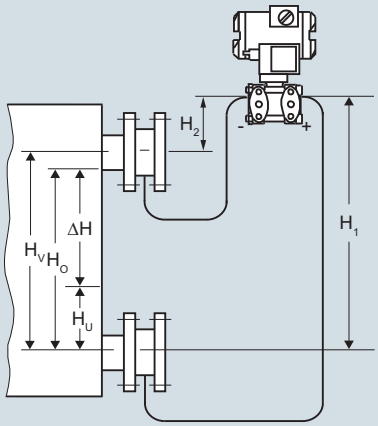
Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_V$

Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_V$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{FL}	Density of medium in vessel
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

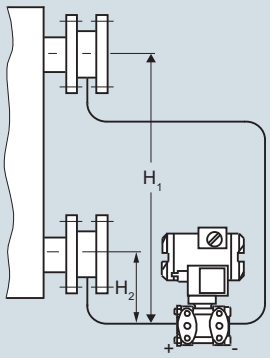
Installation type G



Pressure transmitter for differential pressure above the upper measuring point, no vacuum

$H_1 \leq 7$ m (23 ft), with halocarbon oil as filling liquid only $H_1 \leq 4$ m (13.1 ft)

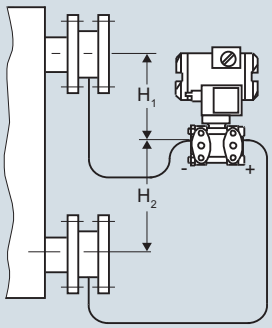
Installation type H



below the lower measuring point

Installation type for vacuum applications

Installation type J



between the measuring points, no vacuum

$H_2 \leq 7$ m (23 ft), with halocarbon oil as filling liquid only $H_2 \leq 4$ m (13.1 ft)

Installation type G, H and J

Start-of-scale: $p_{MA} = \rho_{FL} \cdot g \cdot H_U - \rho_{Oil} \cdot g \cdot H_V$

Full-scale: $p_{ME} = \rho_{FL} \cdot g \cdot H_O - \rho_{Oil} \cdot g \cdot H_V$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{FL}	Density of medium in vessel
ρ_{Oil}	Density of filling oil in the capillary to the remote seal
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

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Overview

Notes

- For the separation layer measurement, the separation layer has to be positioned between the two spigots.

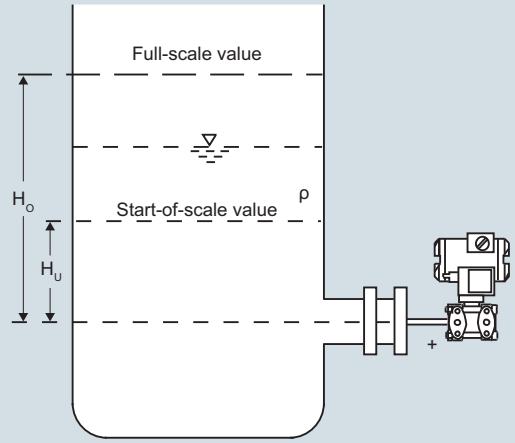
Also you must make sure that the level in the container is always above the top spigot.

- When measuring density, make sure that the level of the medium remains constant. The level should be above the top spigot

Dimensional drawings

Pressure transmitters for differential pressure, for flanging

Measuring setups for open containers



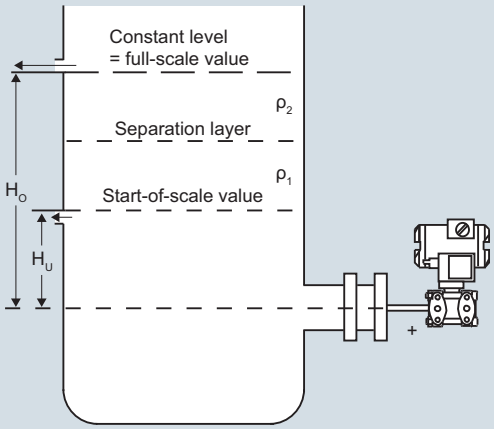
Level measurement

Start-of-scale: $p_{MA} = \rho \cdot g \cdot H_U$

Full-scale: $p_{ME} = \rho \cdot g \cdot H_O$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value



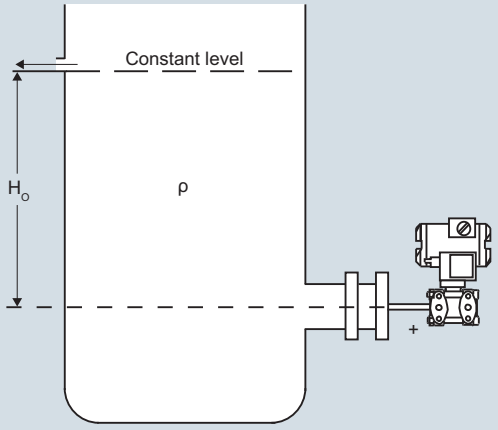
Separation layer measurement

Start-of-scale: $p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2)$

Full-scale: $p_{ME} = \rho_1 \cdot g \cdot H_O$

Legend

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_1	Density of heavier liquid
ρ_2	Density of lighter liquid
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value



Density measurement

Start-of-scale: $p_{MA} = \rho_{MIN} \cdot g \cdot H_O$

Full-scale: $p_{ME} = \rho_{MAX} \cdot g \cdot H_O$

Legende

p_{MA}	Start-of-scale value to be set
p_{ME}	Full-scale value to be set
ρ_{MIN}	Minimum density of medium in vessel
ρ_{MAX}	Maximum density of medium in vessel
g	Local acceleration due to gravity
H_O	Full-scale value in m

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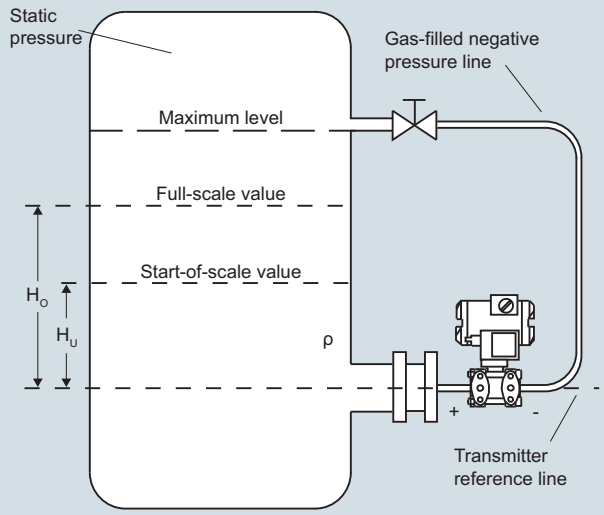
Measuring setups without remote seals

Measuring setups for closed containers



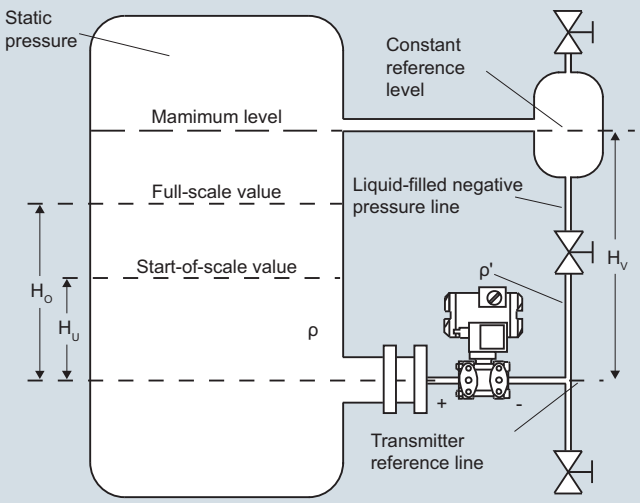
Level measurement, Version 1

Start-of-scale: $\Delta p_{MA} = \rho \cdot g \cdot H_U$

Full-scale: $\Delta pME = \rho \cdot g \cdot H_O$

Legend

Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value



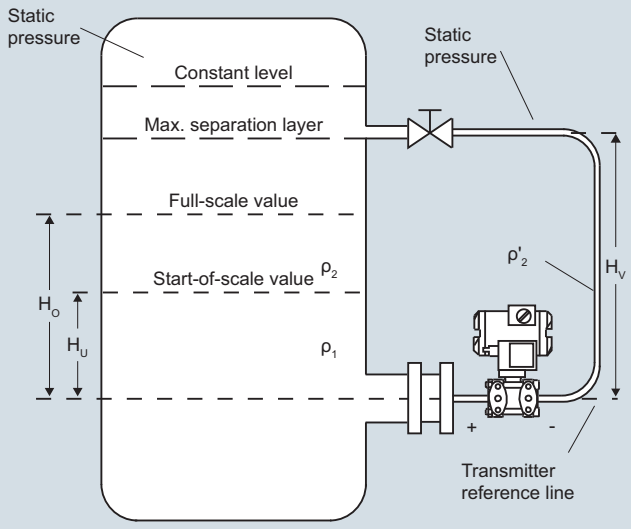
Level measurement, Version 2

Start-of-scale: $\Delta p_{MA} = g \cdot (H_U \cdot \rho - H_V \cdot \rho')$

Full-scale: $\Delta p_{ME} = g \cdot (H_O \cdot \rho - H_V \cdot \rho')$

Legend

Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ	Density of medium in vessel
ρ'	Density of liquid in the negative pressure line (corresponding to the temperature existing there)
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)



Separation layer measurement

Start-of-scale: $\Delta p_{MA} = g \cdot (H_U \cdot \rho_1 + (H_O - H_U) \cdot \rho_2 - H_V \cdot \rho'_2)$

Full-scale: $\Delta p_{ME} = g \cdot (H_O \cdot \rho_1 - H_V \cdot \rho'_2)$

Legend

Δp_{MA}	Start-of-scale value to be set
Δp_{ME}	Full-scale value to be set
ρ_1	Density of heavier liquid with separation layer in vessel
ρ_2	Density of lighter liquid with separation layer
ρ'_2	Density of liquid in the negative pressure line (corresponding to the temperature existing there)
g	Local acceleration due to gravity
H_U	Start-of-scale value
H_O	Full-scale value
H_V	Distance between the measuring points (spigots)

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* Customer:_____ Tag. No.: _____
* Plant: _____ Item No.: _____
* Ordering code:_____ Person responsible: _____
* Ordering department: ____ Phone: _____
*** Transmitter Article No. SITRANS P DSIII/P300: 7MF ☐☐☐ –1 ☐ Y ☐☐ –1 ☐☐☐**
*** Transmitter Article No. SITRANS P500: 7MF5 ☐☐☐ – ☐☐☐☐ 0 –Z V00**

Article No. of diaphragm seal known?

Yes

*** Article No. of remote seal:**
7MF 4 9 ☐☐ – ☐☐☐☐☐ – ☐☐ –Z
Suffixes _____
Suffixes _____

No

*** Or without Article No.: Process connection**
* Standard: _____
* Nominal diameter: _____
* Nominal pressure: _____
* Constructional design:
☐ Sandwich-type rem. seal
☐ Flanged remote seal
☐ Quick-release remote seal
☐ Clamp-on seal
☐ Other.: _____
* Connection:
☐ Direct connection
☐ Capillary on one side; connection to: ☐ + side ☐ – side
☐ Capillaries on both sides;
☐ Capillary length: ___ m
* Vacuum-proof design ☐ Yes ☐ No
* Wetted parts materials: _____
* Tube: ☐ No ☐ Yes, ___mm long
* Filling liquid _____
* Miscellaneous _____

Calculation of measuring range necessary?

No

*** Range to be set:**
(without calculation)
Start-of-scale:_____ mbar (4 mA)
Full-scale: _____ mbar (20 mA)
*** Required measuring accuracy:**
Error: < . % of set span per 10 V change in temperature

Please fill in this questionnaire and enclose with every order!
***) Values must be entered here!**

Checked: Name:
Department:
Date:

Yes

Medium _____
Density of medium: _____ kg/m^3
*** Temperature of medium:** Normal _____ °C
Minimum_____ °C
Maximum_____ °C
*** Ambient temperature on capillaries:** Normal _____ °C
Minimum_____ °C
Maximum_____ °C
*** Ambient temperature on transmitter:** Normal _____ °C
Minimum_____ °C
Maximum_____ °C
*** Operating pressure referred to absolute zero:** ____ bar a
* Does a **vacuum** occur **during startup**? ☐ No ☐ Yes
If yes, associated temperature of medium: _____ °C
*** Installation type**, see pages 1/251 and 1/252 A B C_1 C_2 D E G H J
*** Measuring range:** With install. types A, B, C_1, C_2 and D: from ___ to ___ mbar
With install. types A, B, G, H and J: H_U = ___ mm; H_O = ___ mm
*** Dimensions:** With install. types A, B, C_1 and C_2: H_1 = ___ mm
With install. types D, G, H and J: H_V = ___ mm
*** Start-of-scale value following calculation:**_____ mbar (4 mA)
Full-scale value following calculation:_____ mbar (20 mA)
Associated span: _____ mbar
Error to be expected: < . % of set span per 10 K change in temperature

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Questionnaire
for hydrostatic level measurements

1

Order date: _____

Processing date: _____

Ordering code (customer): _____

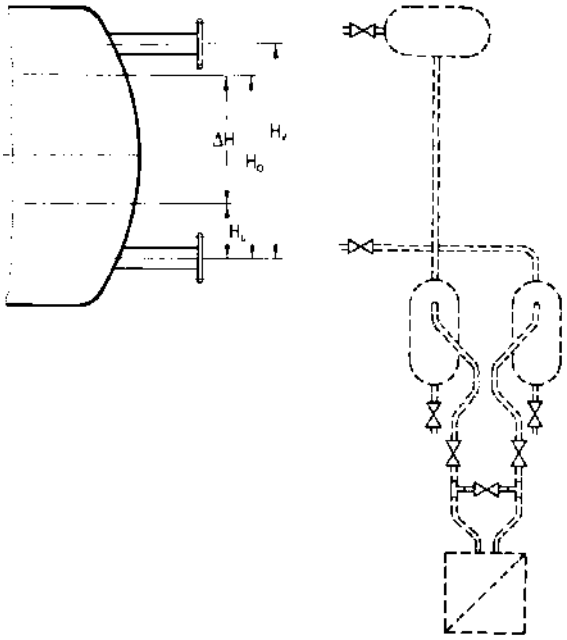
Ordering code (supplier): _____

Customer reference: _____

Measuring point: _____

Position: _____

Dimensions: _____



Pressure: ☐ bar

Temperature: ☐ K ☐ °C

Measuring range: ☐ cm ☐ m
(please mark with cross)

Article No. of transmitter SITRANS P DS III/P300[1]:

7 M F 4 _ _ _ _ – _ _ _ _ _ _ _ – _ _ _ _ _ _ _ –Z

Y01

Article No. of transmitter SITRANS P500[1]:

7 M F 5 _ _ _ _ – _ _ _ _ _ _ _ _ 0

The different pressures and temperatures (densities) in the vessel and in the reference column result in an offset in the start-of-scale and full-scale values.
The calibration data are determined in addition.
It is also checked whether – as a result of the range offset – the ordered transmitter is suitable for this measurement.

Please supply the following characteristic data so that we can calculate the measuring range, start-of-scale value, full-scale value and calibration data:

Please mark type of boiler with a cross:	Closed[1]	☐
	Open or not under pressure[2]	☐
Medium _____		
Licensed boiler pressure (absolute)		_____ bar
Operating pressure (absolute)	Lowest	_____ bar
	Normal[3]	_____ bar
	Highest	_____ bar
Temperature of reference column (cold)		_____ K
Distance between measuring points (dimension according to sketch) H_V =		_____ m
Measuring range[4] = start-of-scale value to full-scale value		
	Start-of-scale value	H_U = _____ m
	Full-scale value	H_O = _____ m
Position of equalizing vessel above bottom measuring point if different from H_V		_____ m
Please mark pressure correction of level with a cross:	No	☐
	Yes[4]	☐

[1] Reference line filled with condensation! Falling differential pressure with increasing level.
[2] Reference line without gas or filled with gas (air). Rising differential pressure with increasing level.
[3] If not specified otherwise, this value is assumed as the calculation pressure of the level meter. The input signal (differential pressure) depends on the density (pressure and temperature). The influence is practically negligible for a lowest liquid level of 20 to 30% of the distance between the measuring points.
[4] If a pressure correction of the level is required, the **measuring range must be the same as the distance between the measuring points**, and the transmitter is designed for the calculation pressure of 1 bar (absolute).Pressure correction means: the static pressure and the temperature are measured separately and calculated by a correction computer or measured-value computer.

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* Customer:_____ Tag. No.: _____
* Plant: _____ Item No.: _____
* Ordering code:_____ Person responsible: _____
* Ordering department: _____ Phone: _____
*** Transmitter Article No. SITRANS P DS III/P300: 7MF ☐☐☐☐ –1 ☐ Y ☐☐ –1 ☐☐☐**
*** Transmitter Article No. SITRANS P500: 7MF5 ☐☐☐ – ☐☐☐☐ 0 –Z V00**

Article No. of diaphragm seal known?

Yes

*** Article No. of remote seal:**
7MF 4 9 ☐☐ – ☐☐☐☐☐ – ☐☐ –Z
Suffixes _____
Suffixes _____

No

*** Or without Article No.: Process connection**
* Standard: _____
* Nominal diameter: _____
* Nominal pressure: _____
* Constructional design:
☐ Sandwich-type rem. seal
☐ Flanged remote seal
☐ Quick-release remote seal
☐ Clamp-on seal
☐ Other.: _____
* Connection:
☐ Direct connection
☐ Capillary on one side; connection to: ☐ + side ☐ – side
☐ Capillaries on both sides;
☐ Capillary length: ___ ft
* Vacuum-proof design ☐ Yes ☐ No
* Wetted parts materials: _____
* Tube: ☐ No ☐ Yes, __inch long
* Filling liquid _____
* Miscellaneous _____

Calculation of measuring range necessary?

No

*** Range to be set:**
(without calculation)
Start-of-scale: _____ psi (4 mA)
Full-scale: _____ psi (20 mA)
*** Required measuring accuracy:**
Error: < . % of set span per 18 °F change in temperature

Please fill in this questionnaire and enclose with every order!
***) Values must be entered here!**

Checked: Name:
Department:
Date:

Yes

Medium _____
Density of medium: _____ kg/m³
*** Temperature of medium:** Normal _____ °F
Minimum _____ °F
Maximum _____ °F
*** Ambient temperature on capillaries:** Normal _____ °F
Minimum _____ °F
Maximum _____ °F
*** Ambient temperature on transmitter:** Normal _____ °F
Minimum _____ °F
Maximum _____ °F
*** Operating pressure referred to absolute zero:** ____ psi_{abs}
* Does a **vacuum** occur **during startup**? ☐ No ☐ Yes
If yes, associated temperature of medium: _____ °F
*** Installation type**, see pages 1/251 and 1/252 ☐ A ☐ B ☐ C_1 ☐ C_2 ☐ D ☐ E ☐ G ☐ H ☐ J
*** Measuring range:** With install. types A, B, C_1, C_2 and D: from ___ to ___ psi
With install. types A, B, G, H and J: H_U = ___ inch; H_O = ___ inch
*** Dimensions:** With install. types A, B, C_1 and C_2: H_1 = ___ inch
With install. types D, G, H and J: H_V = ___ inch
*** Start-of-scale value following calculation:** _____ psi (4 mA)
Full-scale value following calculation: _____ psi (20 mA)
Associated span: _____ psi
Error to be expected: < . % of set span per 18 °F change in temperature

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1

Technical description

Overview

All shut-off fittings can be secured onto walls, racks (72 mm grid) and vertical and horizontal pipes.

This offers the advantage when assembling a plant that the shut-off fittings can be secured first and the lines for the medium and differential pressure connected to them. It is then possible to check all connections for leaks and to blow out or flush the pipes in order to remove dirt (welding residues, shavings etc.).

The measuring instruments can be screwed onto the shut-off fittings right at the end when all piping has been completed.

If an instrument has to be removed for maintenance, the fittings and pipes remain as they are. It is only necessary to close the valves – the instrument can then be removed, and refitted following maintenance.

Classification according to pressure equipment directive (PED 97/23/EC):

For gases of fluid group 1 and liquids of fluid group 1; compliance with requirements of article 3, paragraph 3 (sound engineering practice).

New standard IEC 61518

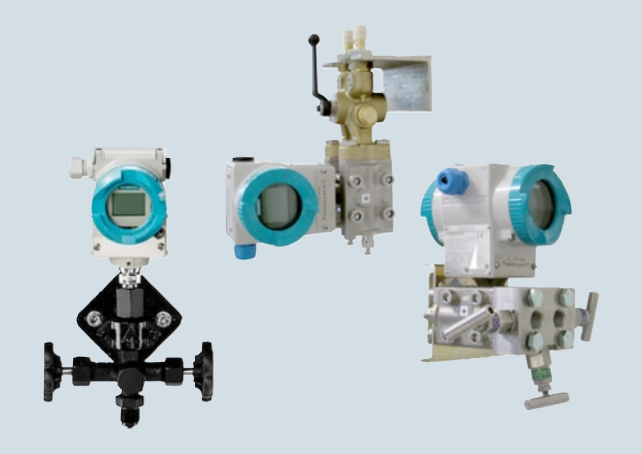
The flange connection between transmitter and valve manifold was modified in the new standard IEC 61518. The only connection thread approved for use in the process flanges of the pressure transmitter is $^{7}/_{16}$-20 UNF.

The valve manifolds for M12 screws, including the accessory sets, have therefore been deleted.

Material acceptance test certificate to EN 10204-3.1

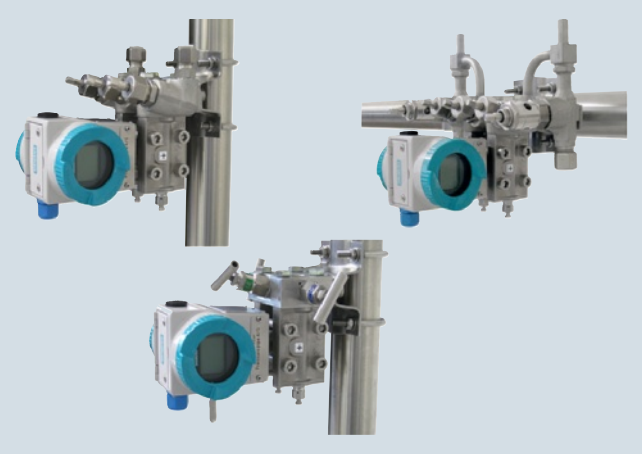
If a material acceptance test certificate to EN 10204-3.1 is required when ordering valve manifolds or shut-off fittings, please note that a single certificate is sufficient for each ordered item type. This means that you will only be charged for one certificate in the cost calculations.

Pressure transmitters with shut-off fittings - mounting examples

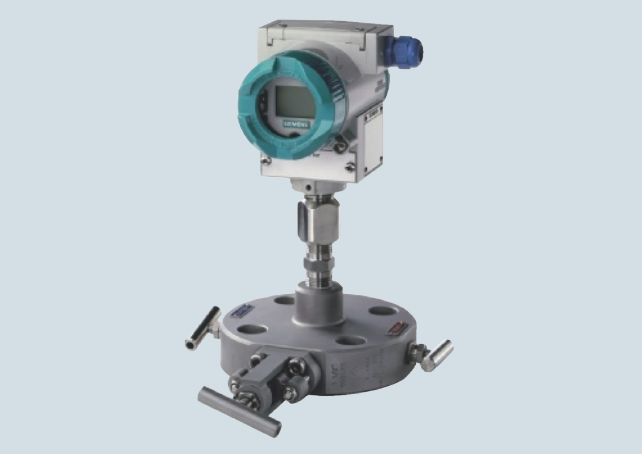


SITRANS P transmitter for gauge pressure with double shut-off valve, SITRANS P pressure transmitter with multiway cock or 3-spindle valve manifold

SITRANS P pressure transmitter for differential pressure, mounted in protective box (available on request)



SITRANS P transmitter for differential pressure with 3-way valve manifold, 3-spindle valve manifold or valve manifold combination DN 5/DN 8



SITRANS P pressure transmitter mounted on valve combination "Monoflange" for direct connection to flanges (available on request)

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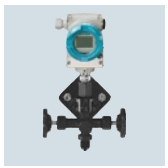
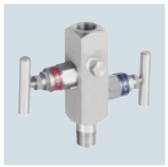
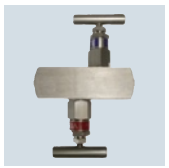
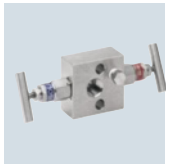
Selection of available shut-off valves

Transmitters	Shut-off valves for general applications	Page		Shut-off valves for special applications	Page	
Relative and absolute pressure transmitters with process connection G½" male thread e.g. • SITRANS P200 7MF1565-... • SITRANS P210 7MF1566-... • SITRANS P220 7MF1567-... • SITRANS P300 7MF802.-...0.-.... • SITRANS P DS III series 7MF403.-...0.-.... and 7MF423.-...0.-....	Shut-off valves/double shut-off valves to DIN 16270, DIN 16271 and DIN 16272	1/261		Double shut-off valve DN 5 for crossover ½-NPT-F to G½ nipple connection 7MF9011-4EA	1/264	
				2-spindle valve manifold DN 5 for installation in protective boxes 7MF9412-1B	1/282	
Relative and absolute pressure transmitter with ½"-14 NPT female thread e.g. • SITRANS P200 7MF1565-... • SITRANS P210 7MF1566-... • SITRANS P220 7MF1567-... • SITRANS P300 7MF802.-...1.-.... • SITRANS P DS III series 7MF403.-...1.-.... and 7MF423.-...1.-....	Double shut-off valve DN 5 7MF9011-4EA, -4FA, -4GA and -4KA	1/264	 7MF9011-4FA  7MF9011-4KA	Double shut-off valve DN 5 for process connection ½-NPT 7MF9011-4HA	1/264	
Absolute pressure transmitter with process connection to IEC 61518 e.g. • SITRANS P DS III series 7MF433.-...	2-spindle valve manifold DN 5 7MF9411-5A.	1/267		2-spindle valve manifold DN 5 for installation in protective boxes 7MF9412-1C.	1/282	

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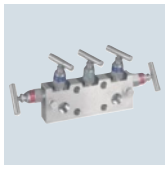
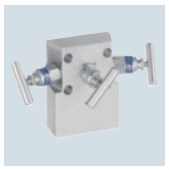
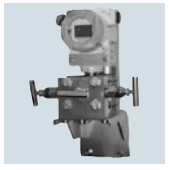
Selection aid

Transmitters	Shut-off valves for general applications	Page		Shut-off valves for special applications	Page	
Differential pressure transmitter with process connection to IEC 61518 e.g. SITRANS P DS III series 7MF443.-... and 7MF453.-... SITRANS P500 7MF54..-...	For 3/5-spindle valve manifold DN 5 7MF9411-5B. and 7MF9411-5C.	1/267		3-way valve manifolds, DN 5, forged version 7MF9410-1..	1/272	
				5-way valve manifolds, DN 5, forged version 7MF9410-3..	1/272	
	PN 100 multiway cocks 7MF9004-...	1/270		3-way valve manifolds, DN 8, forged version 7MF9416-1.. and 7MF9416-2..	1/275	
				Valve manifold combination DN 5/DN 8 for vapor measurement 7MF9416-6..	1/278	
				Valve manifold combination DN 8 for vapor measurement 7MF9416-4..	1/280	
				3- and 5-spindle valve manifolds for DN 5 for installation in protective boxes 7MF9412-1D. and 7MF9412-1E.	1/282	
				3- and 5-spindle valve manifolds for vertical differential pressure lines 7MF9413-1..	1/286	
				Low-pressure multiway cock 7MF9004-4..	1/289	

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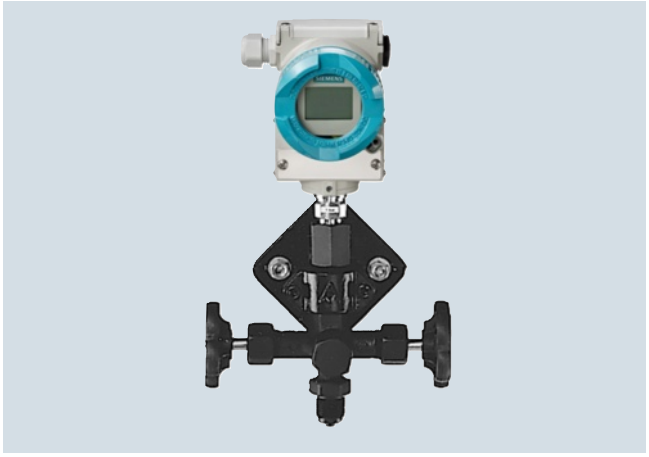
Overview



Transmitter for pressure with double shut-off valve 7MF9401-...

The shut-off valves for pressure gauges are used to shut off the line of the measured medium when dealing with aggressive and non-aggressive gases, vapors and liquids.

Design

A water trap must be connected upstream of the shut-off valve in the case of temperatures of the medium above 120 °C. The shut-off valves form B have a shaft with which they can be secured on an instrument bracket. An adapter is therefore not required to secure these valves. The vent/test connection can be shut off separately with the double shut-off valves DN 5. This permits checking of the zero on the pressure gauge. In addition, the characteristic of the pressure gauge can be checked using an external pressure source.

Selection and Ordering data	Material Valve housing	Maximum permissible working pressure	Article No.
Shut-off valves, form B, DIN 16270			
without test collar, connection shank, without certificate			
	CW614N (CuZn39Pb3) (mat. No. 2.0402)	250 bar (3626 psi)	**7MF9401-7AA**
	P250GH (mat. No. 1.0460)	400 bar (5800 psi)	**7MF9401-7AB**
	X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	400 bar (5800 psi)	**7MF9401-7AC**
Shut-off valves, form B, DIN 16271			
with test collar, connection shank, without certificate			
	CW614N (CuZn39Pb3) (mat. No. 2.0402)	250 bar (3626 psi)	**7MF9401-7BA**
	P250GH (mat. No. 1.0460)	400 bar (5800 psi)	**7MF9401-7BB**
	X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	400 bar (5800 psi)	**7MF9401-7BC**
Shut-off valves, form B, DIN 16270			
without test collar, pipe union with ferrule 12 S DIN EN ISO 8434-1, without certificate			
	P250GH (mat. No. 1.0460)	400 bar (5800 psi)	**7MF9401-8AB**
	X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	400 bar (5800 psi)	**7MF9401-8AC**
Shut-off valves, form B, DIN 16271			
with test collar, pipe union with ferrule 12 S DIN EN ISO 8434-1, without certificate			
	P250GH (mat. No. 1.0460)	400 bar (5800 psi)	**7MF9401-8BB**
	X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	400 bar (5800 psi)	**7MF9401-8BC**
Double shut-off valves, form B, DIN 16272			
with test collar, connection shank, without certificate			
	CW614N (CuZn39Pb3) (mat. No. 2.0402)	250 bar (3626 psi)	**7MF9401-7DA**
	P250GH (mat. No. 1.0460)	400 bar (5800 psi)	**7MF9401-7DB**
	X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	400 bar (5800 psi)	**7MF9401-7DC**
Double shut-off valves, form B, DIN 16272			
with test collar, pipe union with ferrule 12 S DIN EN ISO 8434-1, without certificate			
	P250GH (mat. No. 1.0460)	400 bar (5800 psi)	**7MF9401-8DB**
	X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	400 bar (5800 psi)	**7MF9401-8DC**
Accessories			
Factory test certificate EN 10204–2.2			**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1			**7MF9000-8AD**

Instrument bracket, see page 1/266.

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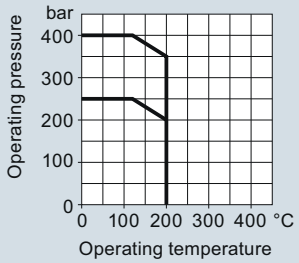
Shut-off valves to DIN 16270, DIN 16271 and DIN 16272

Characteristic curves

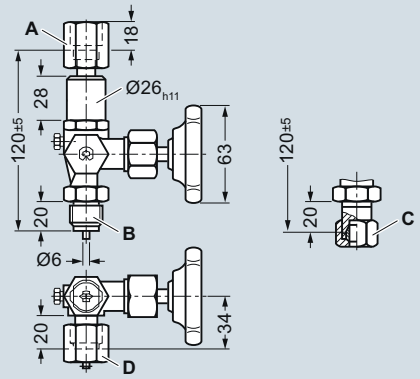


Steel or stainless steel version
400 bar (5800 psi) at 120 °C (248 °F)
350 bar (5076 psi) at 200 °C (392 °F)

Brass version
250 bar (3626 psi) at 120 °C (248 °F)
200 bar (2901 psi) at 200 °C (392 °F)

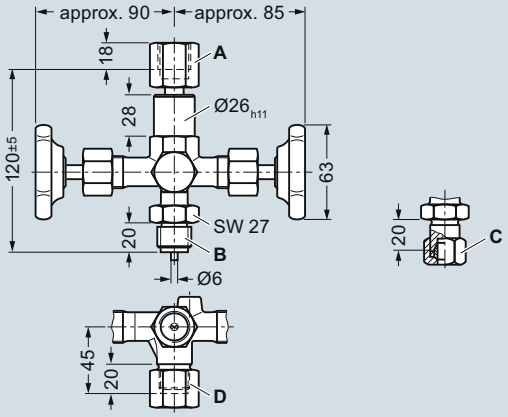
Permissible operating pressure as a function of the permissible operating temperature

Dimensional drawings



A Connection on device side: to DIN 16284, G½, SW 27
B Connection on measurement side: connection shank to DIN EN 837-1, G½
C Connection on measurement side: pipe union with ferrule 12 mm diameter, S series, to DIN EN ISO 8434-1
D Connection on test collar (with sealing cap): thread M20 x 1,5

Shut-off valve, form B, dimension drawing, dimensions in mm



A Connection on device side: to DIN 16284, G½, SW 27
B Connection on measurement side: connection shank to DIN EN 837-1, G½
C Connection on measurement side: pipe union with ferrule 12 mm diameter, S series, to DIN EN ISO 8434-1
D Connection on test collar (with sealing cap): thread M20 x 1,5

Double shut-off valve, form B, dimension drawing, dimensions in mm

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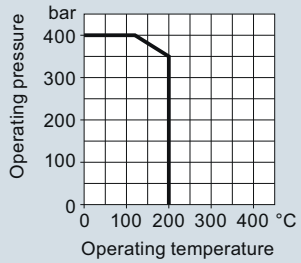
Overview

P300 pressure transmitter with shut-off valve and angle adapter

The angle adapter enables pressure transmitters with top displays to be read from the front.

Selection and Ordering data	Article No.
Angle adapters	**7MF9401-7WA**
Material: X 12 CrNiMoTi 17 12 2 (mat. No. 1.45714/316Ti), max. permissible operating pressure 400 bar (5800 psi)	
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

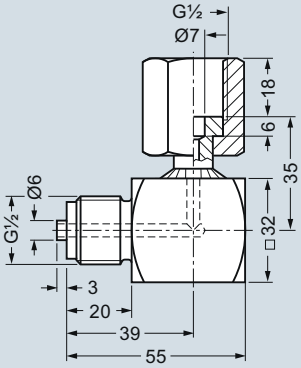
Characteristic curves



Stainless steel version
400 bar (5800 psi) at 120 °C (248 °F)
350 bar (5076 psi) at 200 °C (392 °F)

Permissible operating overpressure as a function of the permissible operating temperature

Dimensional drawings



Angle adapter, dimensions in mm

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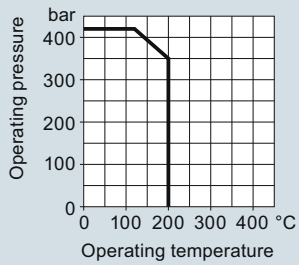
Double shut-off valves

Overview

The double shut-off valves DN 5 are suitable for pressure gauges and pressure transmitters and available in 5 versions:

- Sleeve-nipple
- Sleeve-sleeve
- Sleeve-collar
- Collar-collar
- Collar-sleeve

Characteristic curves

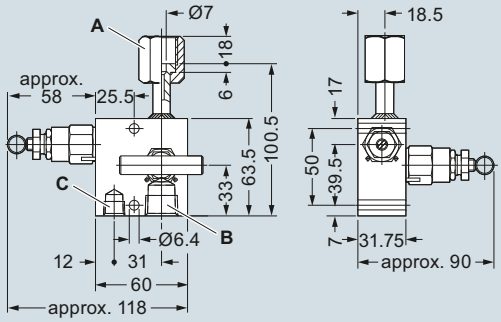


420 bar (6092 psi) at 120 °C (248 °F)
350 bar (5076 psi) at 200 °C (392 °F)

Permissible operating pressure as a function of the permissible operating temperature

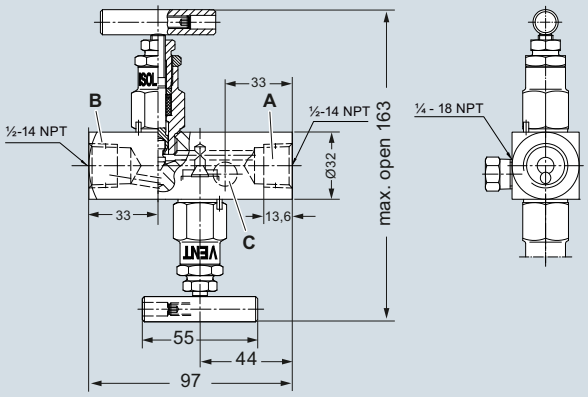
Selection and Ordering data	Article No.
Double shut-off valves DN 5	
Material: X 6 CrNiMoTi 17 13 2 (mat. No. 1.4404/316L), max. permissible working pressure 420 bar (6092 psi);	
• Sleeve-nipple connection	**7MF9011-4EA**
• Sleeve-sleeve	**7MF9011-4HA**
• Sleeve-collar	**7MF9011-4FA**
• Collar-collar	**7MF9011-4GA**
• Collar-sleeve	**7MF9011-4KA**
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**
Further designs	Order code
Add "**-Z**" to Article No. and specify Order code.	
Oil- and grease-free cleaning for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F)	**S12**
NACE MR-0175-certified	**D07**
incl. acceptance test certificate 3.1 to EN 10204	

Dimensional drawings



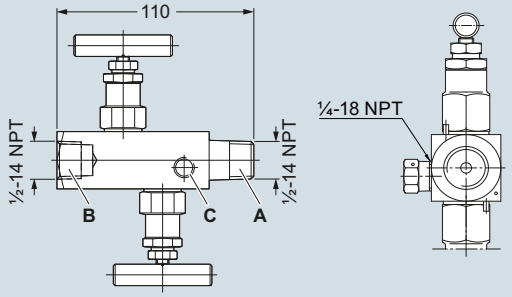
A Connection on device side: nipple to DIN 16284, G½, SW 27
B Connection on measurement side: ½-14 NPT
C Vent and test connection: ¼-18 NPT

Double shut-off valve DN 5 (sleeve-nipple) 7MF9011-4EA, dimensions in mm



A Connection on device side : ½-14 NPT
B Connection on measurement side: ½-14 NPT
C Vent and test connection: ¼-18 NPT

Double shut-off valve DN 5 (sleeve-sleeve) 7MF9011-4HA, dimensions in mm



A Connection on device side : ½-14 NPT
B Connection on measurement side: ½-14 NPT
C Vent and test connection: ¼-18 NPT

Double shut-off valve DN 5 (sleeve-collar) 7MF9011-4FA, dimensions in mm

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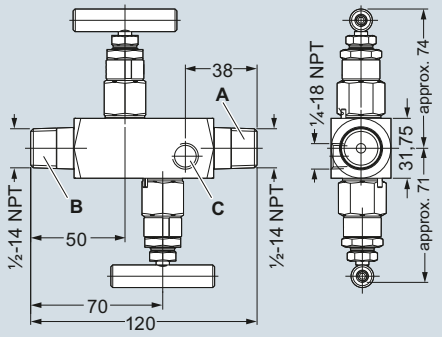
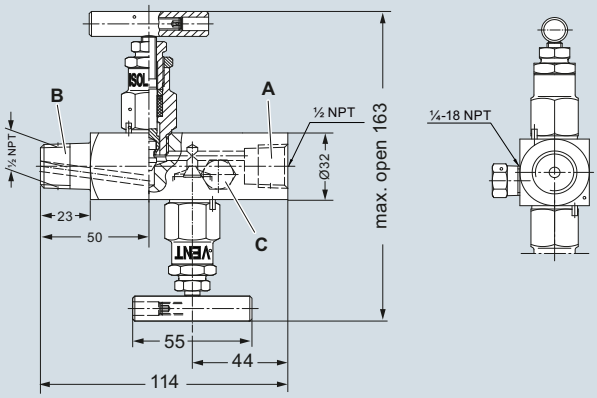


A Connection on device side : ½-14 NPT
B Connection on measurement side: ½-14 NPT
C Vent and test connection: ¼-18 NPT

Double shut-off valve DN 5 (collar-collar) 7MF9011-4GA, dimensions in mm



A Connection on device side : ½-14 NPT
B Connection on measurement side: ½-14 NPT
C Vent and test connection: ¼-18 NPT

Double shut-off valve DN 5 (collar-sleeve) 7MF9011-4KA, dimensions in mm

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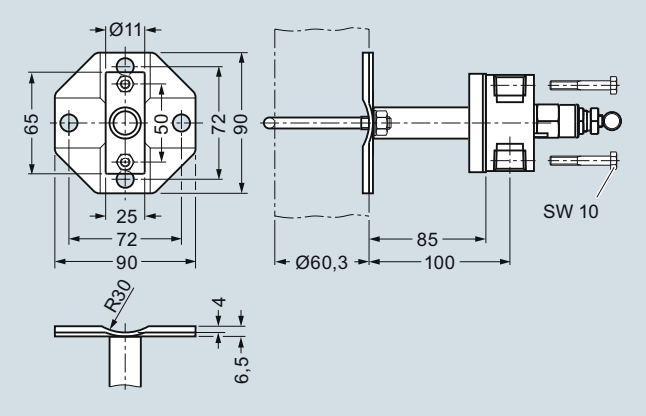
Overview

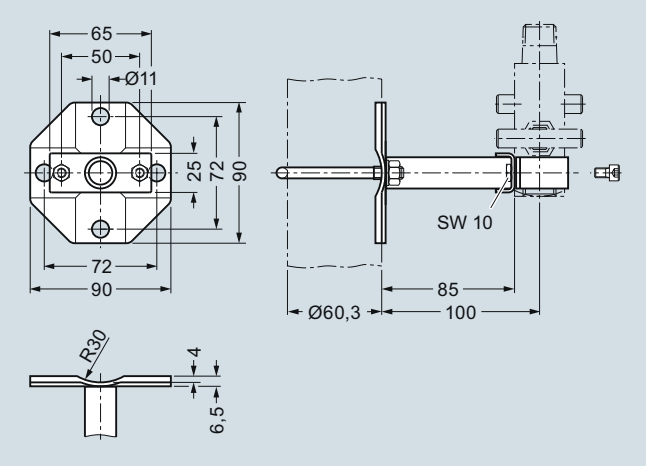
The mounting set is suitable for the double shut-off valves 7MF9011-4.A and for wall, rack and pipe mounting.

Selection and Ordering data	Article No.
Mounting set for shut-off valves	
• 7MF9011-4DA and -4EA made of stainless steel, scope of delivery: 1x mounting bracket, 2x hexagon screws M6x40, 1x mounting clip, 2x washers 8.4 to DIN 125; 2x hexagon nuts 8.4 to DIN EN 24032	**7MF9011-8AB**
• 7MF9011-4FA and -4GA made of stainless steel, scope of delivery: 1x mounting bracket, 2x hexagon screws M6x10, 1x mounting clip, 2x washers 8.4 to DIN 125; 2x hexagon nuts 8.4 to DIN EN 24032	**7MF9011-8AC**

Dimensional drawings



Mounting bracket (7MF9011-8AB) for shut-off valves 7MF9011-4DA and 7MF9011-4EA for wall, rack or pipe mounting, dimensions in mm



Mounting bracket (7MF9011-8AC) for shut-off valves 7MF9011-4FA and 7MF9011-4GA for wall, rack or pipe mounting, dimensions in mm

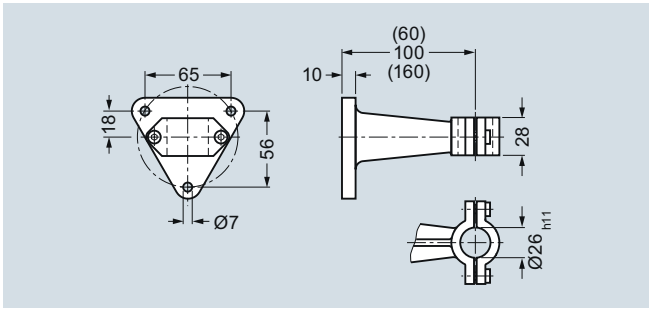
Overview

The instrument brackets are needed to mount the following units:

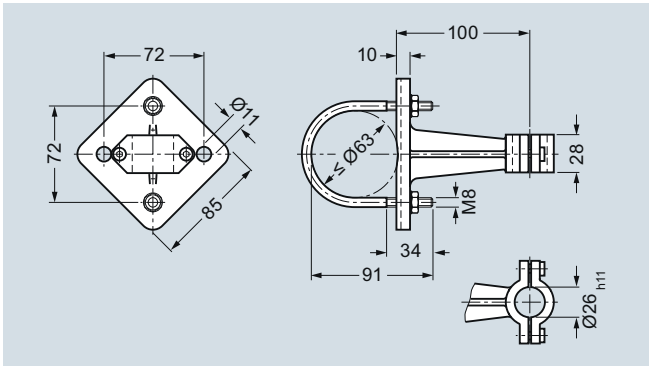
- Pressure gauges with threaded connection at the bottom
- Shut-off valves to DIN 16270, DIN 16271 and DIN 16272 (7MF9401-7.. and 7MF9401-8..)

Selection and Ordering data	Article No.
Instrument bracket, form H, DIN 16281 (e.g. for gauge) made of aluminium alloy, painted black, **for wall mounting**, screw-type bracket cover	
• Projection length 60 mm	**M56340-A0046**
• Projection length 100 mm	**M56340-A0047**
Instrument bracket, form A, DIN 16281 (e.g. for transmitter) made of annealed cast iron, galvanized and primed **for mounting on a wall** or rack or or on a sectional rail (horizontal/vertical); Screw-type bracket cover	**M56340-A0053**
Instrument bracket, form A, DIN 16281 (e.g. for transmitter) made of annealed cast iron, galvanized and primed with pipe clamp for **wall and pipe mounting** (horizotal/vertical) Screw-type bracket cover	**M56340-A0079**

Dimensional drawings



Instrument bracket form H, for wall mounting, M56340-A0046/-A0047, dimensions in mm



Instrument bracket form A, wall or pipe mounting, M56340-A0053/-A0079, dimensions in mm

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Overview

The 2-spindle, 3-spindle and 5-spindle valve manifolds 7MF9411-5.. are for pressure transmitters for absolute pressure or differential pressure.

The valve manifolds are used to shut off the differential pressure lines and to check the pressure transmitter zero.

The 2-spindle and the 5-spindle valve manifold enable in addition venting on the transmitter side and checking of the pressure transmitter characteristic.

Benefits

- Max. working pressure 420 bar (6092 psi)
- Each available in version for oxygen

Application

The spindle valve manifolds DN 5 are designed for liquids and gases.

Each is available in a version for oxygen on request.

Design

All versions of the valve manifolds have a process connection ½-14 NPT. The connection for the pressure transmitter is always designed as a flange connection to IEC 61518, form B . The 2-spindle and the 5-spindle valve manifold have in addition a vent and test connection ¼-18 NPT.

The valves have an external spindle thread.

Materials used

Component	Material	Mat. No.
Housing	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero

Additional functions of the 2-spindle and 5-spindle valve manifolds through the vent and test connection:

- Venting on the transmitter side
- Checking the pressure transmitter characteristic

Selection and Ordering data	Article No.
Valve manifolds DN 5 ↗	**7MF9411 - ■■ A**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
for liquids and gases, for flanging to pressure transmitters for absolute and differential pressure, max. working pressure 420 bar (order accessory set with Order code), without certificate	
• 2-spindle valve manifold	**5 A**
• 3-spindle valve manifold	**5 B**
• 5-spindle valve manifold	**5 C**
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

Selection and Ordering data	Order code	Article No.
Further designs[1]		
Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN		
(connection between valve manifold and pressure transmitter)		
for valve manifold 7MF9411-5A.		
2x screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1; chromized steel 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**K35**	**7MF9411-7DB**
2x screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1; **stainless steel** 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**K45**	**7MF9411-7DC**
for valve manifold 7MF9411-5B. and -5C.		
4x screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1; chromized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**K36**	**7MF9411-5DB**
4x screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1; **stainless steel** 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**K46**	**7MF9411-5DC**
Accessory set to DIN[2]		
(connection between valve manifold and pressure transmitter)		
for valve manifold 7MF9411-5A.		
2x screws M10x45 to DIN EN 24014; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**K15**	**7MF9411-7BB**
2x screws M10x45 to DIN EN 24014; **stainless steel** 2x washers Ø 10.5 mm to DIN 125, **stainless steel**; 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**K25**	**7MF9411-7BC**

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2-, 3- and 5-spindle valve manifolds DN 5

Selection and Ordering data	Order code	Article No.
Further designs[1]		
Please add "**-Z**" to Article No. and specify Order code.		
for valve manifolds 7MF9411-5B. and -5C.		
4x screws M10x45 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) Flange connection with M10 screws only permissible up to PN 160.	**K16**	**7MF9411-6BB**
4x screws M10x45 to DIN EN 24014; **stainless steel** 4x washers Ø 10.5 mm to DIN 125, **stainless steel**; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F) Flange connection with M10 screws only permissible up to PN 160.	**K26**	**7MF9411-6BC**
Mounting plate		
• for valve manifold, made of electrogalvanized sheet-steel		
- **for wall mounting** or for securing on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 mounting plate with bolts for mounting on valve manifold	**M11**	**7MF9006-6EA**
- **for pipe mounting,** weight 0.7 kg Scope of delivery: 1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm) and fastening screws for mounting on valve manifold	**M12**	**7MF9006-6GA**
• for valve manifold, made of **stainless steel**		
- **for wall mounting** or for securing on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 mounting plate with bolts for mounting on valve manifold	**M21**	**7MF9006-6EC**
- **for pipe mounting,** weight 0.7 kg Scope of delivery: 1x mounting plate M21, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm)	**M22**	**7MF9006-6GC**
Valve manifold 100 bar		
Oil- and grease-free cleaning for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F)		
• for 7MF9411-5A.	**S12**	
• for 7MF9411-5B.	**S13**	
• for 7MF9411-5C.	**S14**	
NACE MR-0175-certified incl. acceptance test certificate 3.1 to EN 10204	**D07**	

1) When ordering accessory set or mounting together with the valve manifolds, please use Order code; otherwise use Article No.
2) Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)!

Accessories

Accessory set for 2-, 3- and 5-spindle valve manifolds

2-spindle valve manifold DN 5

- K35: 2 screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1, 1 flat gasket
- K15: 2 screws M10x45 to DIN EN 24014, 2 washers, 1 flat gasket

3-spindle and 5-way valve manifold DN 5

- K36: 4 screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1, 2 flat gaskets
- K16: 4 screws M10x45 to DIN EN 24014, 4 washers, 2 flat gaskets

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

Note: Flange connection with M10 screws only permissible up to PN 160!

Mounting plate

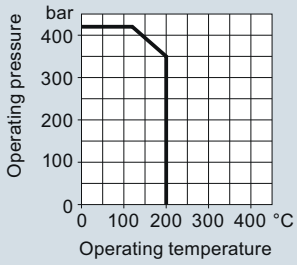
Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid)
  Scope of delivery:
  - 1 mounting plate with bolts for mounting on valve manifold
- M12: For pipe mounting
  Scope of delivery:
  - 1 mounting plate M11
  - 2 pipe brackets with nuts and washers for pipes with max. Ø 60.3 mm

Valve manifold 100 bar, suitable for oxygen

- S12: For 2-way valve manifold
- S13: For 3-way valve manifold
- S14: For 5-way valve manifold

Characteristic curves



Valve manifolds PN 5 (7MF9411-5..), permissible working pressure as a function of the permissible working temperature

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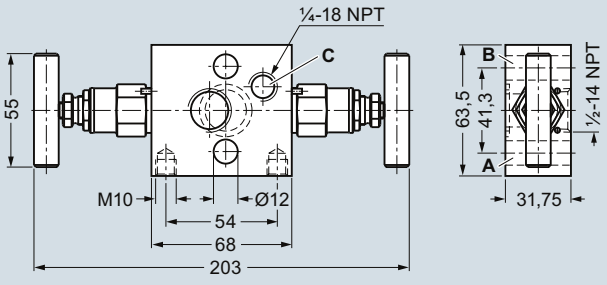
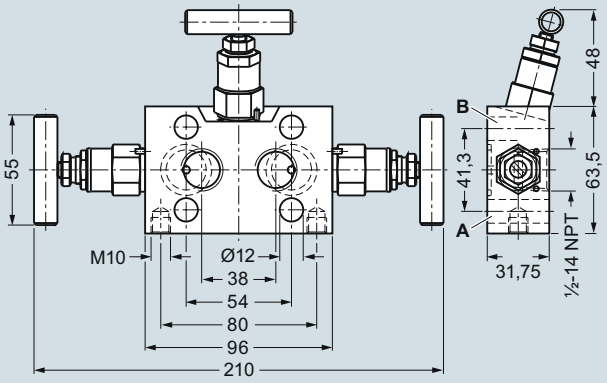
Dimensional drawings



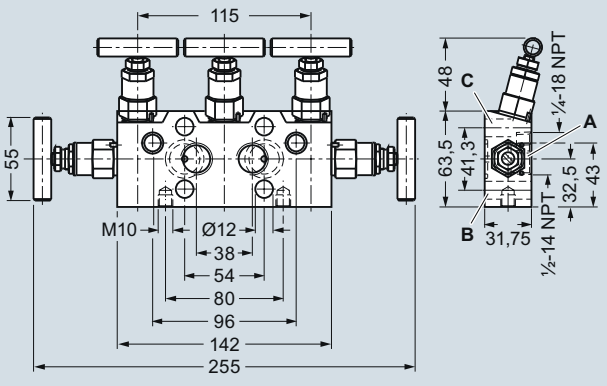
A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to EN 61518, form B
C Vent / test connection: ¼-18 NPT
Valve design: external spindle thread

2-spindle valve manifold DN 5 (7MF9411-5A.), dimensions in mm



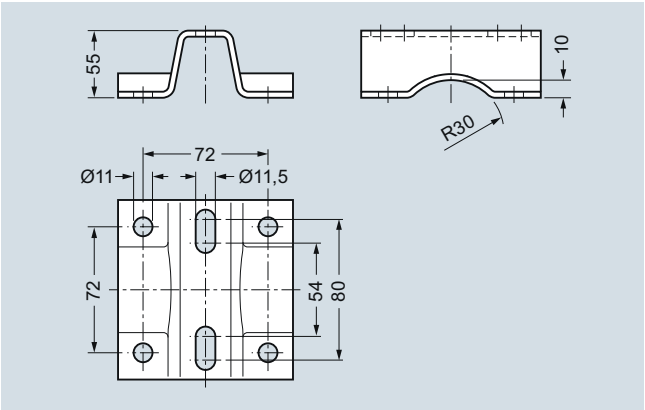
A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to EN 61518, form B
Valve design: external spindle thread

3-spindle valve manifold DN 5 (7MF9411-5B.), dimensions in mm



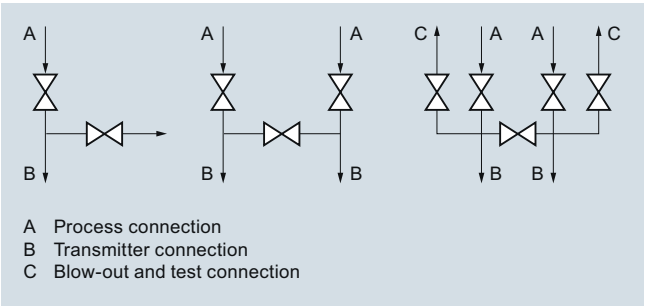
A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to EN 61518, form B
C Vent / test connection: ¼-18 NPT
Valve design: external spindle thread

5-spindle valve manifold DN 5 (7MF9411-5C.), dimensions in mm



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

Schematics



A Process connection
B Transmitter connection
C Blow-out and test connection

2-spindle, 3-spindle and 5-spindle valve manifold DN 5, connections

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Multiway cocks PN 100

Overview

Multiway cock PN 100 (1450 psi) (7MF9004-1P.) for differential pressure transmitters

The multiway cock PN 100 (1450 psi) can be flanged to pressure transmitters for differential pressure.

Benefits

- Version available for aggressive liquids, gases and vapors
- Robust design
- Oil-free and grease-free version possible
- One-hand operation

Application

The PN 100 (1450 psi) multiway cock is available in versions for aggressive and non-aggressive liquids, gases and vapors.

Design

The multiway cock can be flanged with four screws to pressure transmitters for differential pressure.

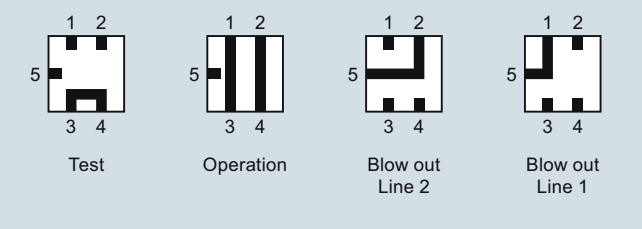
The PN 100 (1450 psi) has 2 process connections and one blow-out connection. A steel version of the multiway cock is available for non-aggressive media, and a stainless steel version for aggressive media. The housing is forged in one piece. The switching lever is removable.

Sealing can be improved during operation.

Note: An accessory set is always required for flanging of the multiway cock to a differential pressure transmitter.

Function

- Shutting off the differential pressure lines
- Blowing out the differential pressure lines
- Testing the pressure transmitter zero



Cock positions; the symbols are printed on the cock

Technical specifications

Multiway cocks PN 100		
Measured medium	**Water, non-aggressive liquids and gases**	**Aggressive liquids, gases and vapors**
Material	P250GH, mat. No.: 1.0460	X 6 CrNiMoTi 17 12 2, mat. No. 1.4571/316Ti
Connections	Steel, for pipe Ø 12 mm, L series	Stainless steel, for pipe Ø 12 mm, L series
• Process connection • Connection for blowing out	2 bulkhead glands Pipe union with ferrule	
Max. permissible working temperature	200 °C (392 °F)	
Max. permissible working pressure	100 bar (1450 psi) (up to max. 60 °C (140 °F))	
Weight	2.5 kg	

Selection and Ordering data	Article No.
Multiway cock PN 100 (1450 psi) ↗	**7MF9004-■■A**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
for flanging to pressure transmitters, weight 2.5 kg (without accessory set), without certificate	
For water and non-aggressive gases and vapors	**1P**
For aggressive liquids, gases and vapors	**1Q**
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

Selection and Ordering data	Order code	Article No.
Further designs[1] Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg) 4x screws $^{7}/_{16}$-20 UNF x 1 inch to ASME B18.2.1; chromized steel 2x gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)	**L31**	**7MF9004-5CC**
Accessory set to DIN (required for flanging, weight 0.2 kg) 4x screws M10x25 to DIN EN 24017; chromized steel, 4x washers Ø 10.5 mm to DIN 125; 2x gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)		
• Standard design • Version for oxygen (together with Order code S11	**L11** **L15**	**7MF9004-6AD** **7MF9004-6AE**
Multiway cock in oil-free and grease-free design Oil- and grease-free cleaning for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F), BAM-tested lubricant, gasket suitable for oxygen measurement (only with Article No. 7MF9004–1Q.Z)	**S11**	
Mounting bracket Required **for wall mounting** or for securing on rack (72 mm grid), made of electrogalvanized sheet-steel, weight 0.85 kg	**M13**	**7MF9004-6AA**
NACE MR-0175-certified incl. acceptance test certificate 3.1 to EN 10204 (only available for version 7MF9004-1QA)	**D07**	

[1] When ordering accessory set or mounting together with the multiway cock, please use Order code; otherwise use Article No.

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Accessories

Accessory set for multiway cock PN 100

- L31: 4 screws $^{7}/_{16}$-20 UNF x 1 inch, 2 flat gaskets
- L11: 4 screws M10x25 to DIN EN 24017, 4 washers, 2 flat gaskets
- L15 (suitable for oxygen): 4 screws M10x25 to DIN EN 24017, 4 washers, 2 flat gaskets

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)

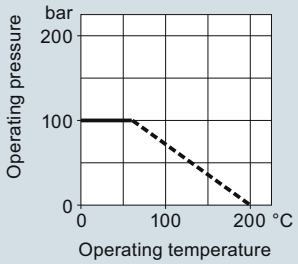
Multiway cock in oil-free and grease-free design

- S11 (only for aggressive liquids, gases and vapors (7MF9004-1Q.)): Max. PN 63 (914 psi) (instead of PN 100 (1450 psi)), BAM-tested lubricant, gasket suitable for oxygen

Mounting brackets

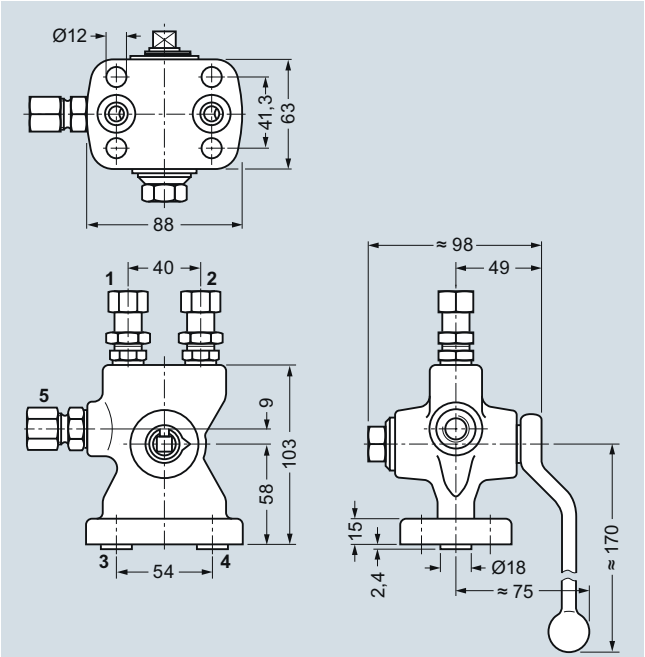
- M13: Required for wall mounting or for securing on rack (72 mm grid); made of electrogalvanized sheet-steel

Characteristic curves



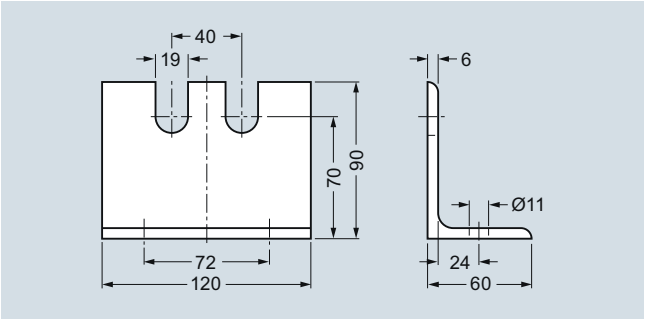
Multiway cock PN 100 (1450 psi), permissible operating pressure as a function of the permissible operating temperature

Dimensional drawings



1 and 2 Process connections
3 and 4 Connections for transmitter (DIN EN 61518, form A)
5 Connections for blowing out

Multiway cock 7MF9004-1P. for flanging to pressure transmitters for differential pressure, dimensions in mm



Mounting bracket 7MF9004-6AA (M13), dimensions in mm

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3-way and 5-way valve manifolds DN 5

Overview

The three-spindle and five-spindle valve manifolds DN 5 (7MF9410-1../-3..) are used to shut off the differential pressure lines and to check the transmitter zero.

In addition, the five-way valve manifold permits blowing out of the differential pressure lines.

Benefits

- Available for aggressive and non-aggressive liquids and gases
- Max. working pressure 420 bar (6092 psi), with version for oxygen max. 100 bar (1450 psi)

Application

The 3-way and 5-way valve manifolds are available in versions for aggressive and non-aggressive liquids and gases.

Mounting plates are available for wall mounting, for securing to mounti ng racks or for pipe mounting.

Design

The process connection of the 3-way and 5-way valve manifolds is a pipe union with ferrule.

Both valve manifolds have 2 flange connections for connecting a pressure transmitter.

In addition, the five-way valve manifold has 2 blow-out connections.

Depending on the version the valve manifold has either 3 or 5 valves, each with an internal spindle thread.

Materials used

	For non-aggressive liquids and gases		For aggressive liquids and gases	
Component	**Material**	**Mat. No.**	**Material**	**Mat. No.**
Housing	P250GH	1.0460	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti
Head parts	C 35	1.0501		
Spindles	X 12 CrMoS 17	1.4104		
Cones	X 35 CrMo 17 hardened and tempered	1.4122		
Valve seats	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti		
Packings	PTFE	-	PTFE	-

Function

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero
- In addition, the five-way valve manifold permits blowing out of the differential pressure lines.

Selection and Ordering data

Selection and Ordering data	Article No.
3-way valve manifold DN 5 ↗	**7MF9410-■■A**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
For flanging to pressure transmitters for differential pressure, process connection: Pipe union with ferrule, max. working pressure 420 bar (6092 psi), weight 2.9 kg (order accessory set and mounting plate with Order code), without certificate	
• for non-aggressive liquids and gases	**1E**
• for aggressive liquids and gases	**1F**
5-way valve manifold DN 5	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
For flanging to pressure transmitters for differential pressure, process connection: Pipe union with ferrule, max. working pressure 420 bar (6092 psi), weight 4.4 kg (order accessory set and mounting plate with Order code), without certificate	
• for non-aggressive liquids and gases	**3E**
• for aggressive liquids and gases	**3F**
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

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Selection and Ordering data	Order code	Article No.
Further designs[1]		
Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN		
(required for flanging, weight 0.2 kg)		
4x screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2; chromized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**B31**	**7MF9010-5CC**
4x screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	**B34**	**7MF9410-5CA**
Accessory set to DIN[2]		
(required for flanging, weight 0.2 kg)		
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)		
• Standard design	**B11**	**7MF9010-6AD**
• Version for oxygen	**B15**	**7MF9010-6AE**
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	**B16**	**7MF9010-6CC**
Mounting plate		
for valve manifold, made of electrogalvanized sheet-steel		
for wall mounting or for securing on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 mounting plate with bolts for mounting on valve manifold	**M11**	**7MF9006-6EA**
for pipe mounting, weight 0.7 kg Scope of delivery: 1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm)	**M12**	**7MF9006-6GA**
Valve manifold 100 bar		
suitable for oxygen		
for 7MF9410-1F	**S13**	
for 7MF9410-3F	**S14**	
NACE MR-0175-certified	**D07**	
incl. acceptance test certificate 3.1 to EN 10204 (only available for version 7MF9410-1FA and -3FA)		

1) When ordering accessory set or mounting together with the valve manifolds, please use Order code; otherwise use Article No.
2) Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)

Accessories

Accessory set for 3-way and 5-way valve manifold DN 5 for flanging

- B31: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2.1, 2 flat gaskets
- B34: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2.1, 2 O-rings (FPM 90)
- B11: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 flat gaskets
- B15 (suitable for oxygen): 4 screws M10x55 to DIN EN 24014, 4 washers, 2 flat gaskets
- B16: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

O-ring to DIN 3771, 20 x 2.65 – S – FPM90, max. 420 bar (6092 psi), 120 °C (248 °F)

Note: M10 screws only permissible up to PN 160 (2320 psi)!

Mounting plate

Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid)
  Scope of delivery:
  - 1 mounting plate 7MF9006-6EA with bolts for mounting on valve manifold
- M12: For pipe mounting
  Scope of delivery:
  - 1 mounting plate M11
  - 2 pipe brackets with nuts and washers for pipes with max. Ø 60.3 mm

Valve manifold 100 bar, suitable for oxygen

S12: Only in combination with versions for aggressive liquids and gases

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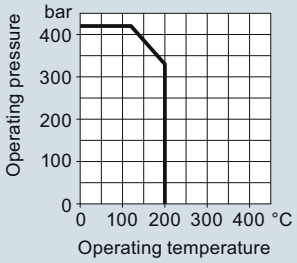
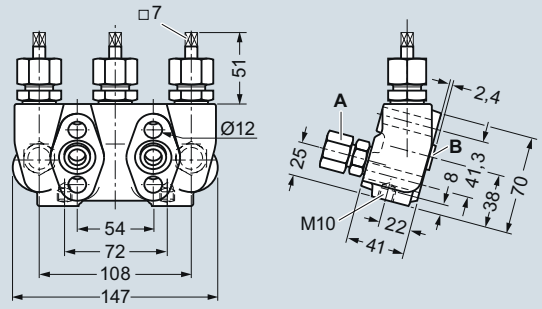
3-way and 5-way valve manifolds DN 5

Characteristic curves



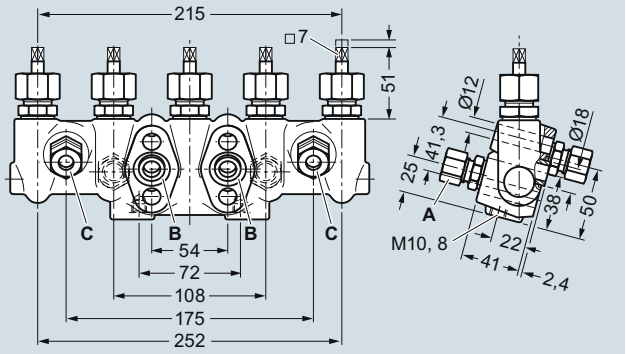
Permissible operating pressure as a function of the permissible operating temperature

Dimensional drawings



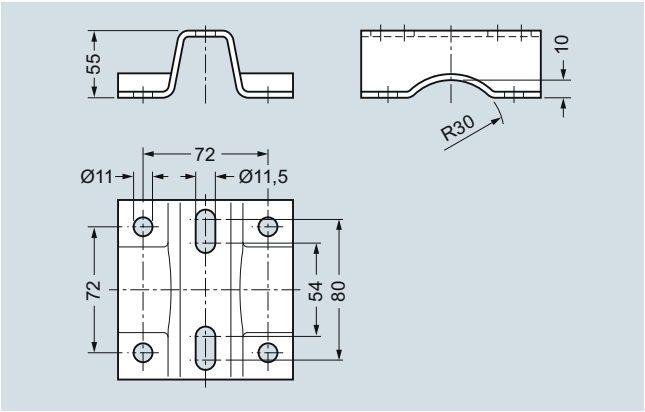
A Process connection (e.g. on primary device): Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
B Transmitter connection: Flange connection to EN 61518, form A
Valve design: internal spindle thread

3-way valve manifold DN 5 (7MF9410-1..), dimensions in mm



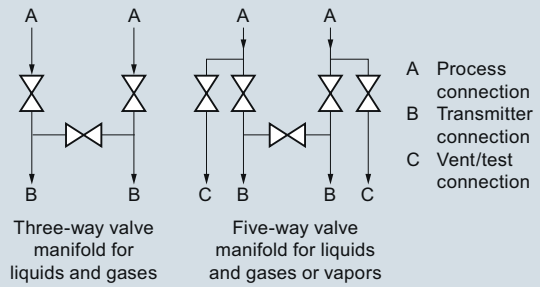
A Process connection (e.g. on primary device): Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
B Transmitter connection: Flange connection to EN 61518, form A
C Blow-out connection: Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
Valve design: internal spindle thread

5-way valve manifold DN 5 (7MF9410-3..), dimensions in mm



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

Schematics



3-way and 5-way valve manifolds, connections

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Overview

The 3-way valve manifold DN 8 (7MF9416-1../-2..) is for pressure transmitters for differential pressure. It is used to shut off and blow out differential pressure lines and to test the pressure transmitter zero.

In the designs with a test connection, a test device can be connected to test the pressure transmitter characteristic.

Benefits

- For aggressive and non-aggressive liquids and gases
- The maximum working pressure is 420 bar (6092 psi).

Application

The 3-way valve manifold is available in versions for aggressive and non-aggressive liquids and gases.

Mounting plates are available for wall mounting, for securing to mounting racks or for pipe mounting.

Design

For the process connection on the version for non-aggressive media it is possible to choose between a pipe union with ferrule and welding pins.

The version for aggressive media always has a pipe union with ferrule.

Both versions are available optionally with a test connection M20x1.5.

The valves have an internal spindle thread.

Materials used

	For non-aggressive liquids and gases		For aggressive liquids and gases	
Component	Material	Mat. No.	Material	Mat. No.
Housing	P250GH	1.0460	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti
Head parts	C 35	1.0501		
Spindles	X 12 CrMoS 17	1.4104		
Cones	X 35 CrMo 17 hard-ened and tempered	1.4122		
Valve seats	X 6 CrNiMoTi 17 12 2	1.4571/316Ti		
Packings	PTFE	-	PTFE	-

Function

The 3-way valve manifold DN 8 performs two functions as standard:

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero

All versions are also available with a test connection, to which a test device for checking the pressure transmitter characteristic can be connected.

Selection and Ordering data	Article No.
3-way valve manifold DN 8 ↗	**7MF9416 - ■■ A**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
For flanging to pressure transmitters for differential pressure, max. working pressure 420 bar (6092 psi), (order accessory set and mounting plate with Order code), without certificate	
For non-aggressive liquids and gases procedss connection: Pipe union with ferrule Ø 12 mm	
• without test connection	**1 B**
• with test connection	**1 C**
For non-aggressive liquids and gases procedss connection: Welding pin Ø 14 x 2.5	
• without test connection	**2 C**
• with test connection	**2 D**
For aggressive liquids and gases process connection: Pipe union with ferrule Ø 12 mm	
• without test connection	**1 D**
• with test connection	**1 E**
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

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3-way valve manifold DN 8

Selection and Ordering data	Order code	Article No.
Further designs[1]		
Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg)		
4x screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2; chromized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**B31**	**7MF9010-5CC**
4x screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)	**B34**	**7MF9410-5CA**
Accessory set to DIN[2] (required for flanging, weight 0.2 kg)		
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**B11**	**7MF9010-6AD**
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissible 420 bar (6092 psi), 120 °C (248 °F)	**B16**	**7MF9010-6CC**
Mounting plate For valve manifold, made of electrogalvanized sheet-steel		
for wall mounting or for securing on rack (72 mm grid), weight 0.5 kg Scope of delivery: 1 mounting plate with bolts for mounting on valve manifold	**M11**	**7MF9006-6EA**
for pipe mounting, weight 0.7 kg Scope of delivery: 1x mounting plate M11, 2x pipe brackets with nuts and washers (for pipe with max. Ø 60.3 mm)	**M12**	**7MF9006-6GA**
NACE MR-0175-certified incl. acceptance test certificate 3.1 to EN 10204 (only available for version 7MF9416-1DA and -1EA)	**D07**	

1) When ordering accessory set or mounting together with the valve manifold, please use Order code; otherwise use Article No.
2) Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)!

Accessories

Accessory set for 3-way valve manifold DN 8 for flanging

- B31: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2.1, 2 flat gaskets
- B34: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2.1, 2 O-rings (FPM 90)
- B11: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 flat gaskets
- B16: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

O-ring to DIN 3771, 20 x 2.65 – S – FPM90, max. 420 bar (6092 psi), 120 °C (248 °F)

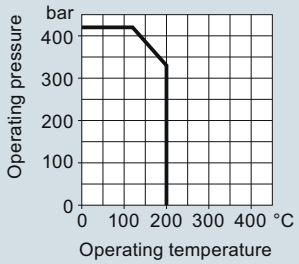
Note: M10 screws only permissible up to PN 160 (2320 psi)!

Mounting plate

Made of electrogalvanized sheet-steel

- M11: For wall mounting or for securing on rack (72 mm grid)
  Scope of delivery:
  - 1 mounting plate with bolts for mounting on valve manifold
- M12: For pipe mounting
  Scope of delivery:
  - 1 mounting plate M11
  - 2 pipe brackets with nuts and washers for pipes with max. Ø 60.3 mm

Characteristic curves



3-way valve manifold DN 8, permissible working pressure as a function of the permissible working temperature

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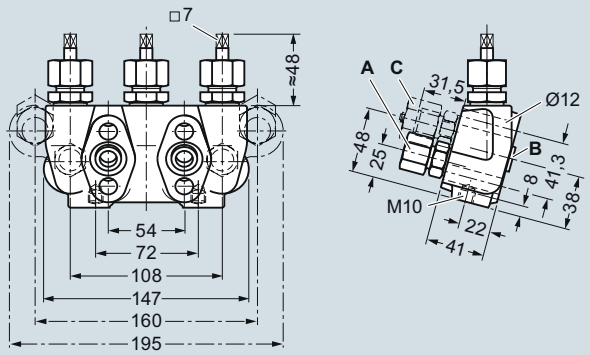
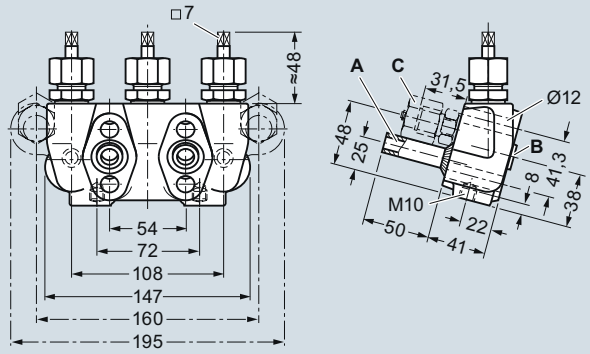
Dimensional drawings



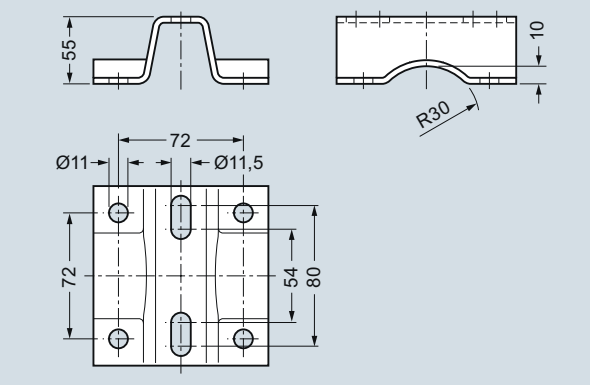
A Process connection (e.g. on primary device): Pipe union with ferrule, diameter 12 mm, S series to DIN 2353
B Transmitter connection: Flange connection to EN 61518, form A
C Test connection: M20 x 1,5
Valve design: internal spindle thread

3-way valve manifold DN 8 (7MF9416-1..) with pipe union, dimensions in mm



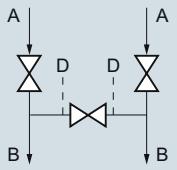
A Process connection (e.g. on primary device):
Welding pin, diameter 14 x 2,5
B Transmitter connection: Flange connection to EN 61518, form A
C Test connection: M20 x 1,5
Valve design: internal spindle thread

3-way valve manifold DN 8 (7MF9416-2..) with welding pin, dimensions in mm



Mounting plate 7MF9006-6.. (M11, M12) for valve manifold, dimensions in mm

Schematics



A Process connection
B Transmitter connection
D Vent/test connection

Three-way valve manifold for liquids and gases

3-way valve manifold DN 8, connections

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Valve manifold combination DN 5/DN 8

Overview

The valve manifold combination DN 5/DN 8 (7MF9416-6..) is for pressure transmitters for differential pressure.

The combination is used to shut off and blow out differential pressure lines and to test the pressure transmitter zero.

In the designs with a test connection, a test device can be connected to test the pressure transmitter characteristic.

Benefits

- Max. working pressure 420 bar (6092 psi)

Application

The valve manifold combination DN 5/DN 8 is designed for vapors.

Design

The valve manifold combination DN 5/DN 8 has a process connection with welding pins.

The connection for the pressure transmitter is designed as as flange connection, while the blow-out connection is designed as a pipe union with ferrule.

The manifold valves have an internal spindle thread, while the blow-out valves have an external spindle thread.

The optional test connections are M20x1.5.

Materials used

	Valve manifold DN 5		Blow-out valves DN 8	
Component	**Material**	**Mat. No.**	**Material**	**Mat. No.**
Housing	P250GH	1.0460	16 Mo 3	1.5415
Head parts	C 35	1.0501	21 CrMo V57	1.7709
Spindles	X 12 CrMoS 17	1.4104	X 20 Cr 13	1.4021
Cones	X 35 CrMo 17	1.4122	X 35 CrMo 17 hardened and tempered	1.4122
Valve seats	X 6 CrNiMoTi	1.4571/316Ti	X 20 Cr 13	1.4021
Packings	PTFE	-	Pure graphite	-
Welding pins	-	-	16 Mo 3	1.5415

Function

- Shutting off the differential pressure lines
- Blowing out the differential pressure lines
- Checking the pressure transmitter zero

As an option it is possible to order a version with a test connection, to which a test device for checking the transmitter characteristic can be connected.

Selection and Ordering data	Article No.
Valve manifold combination DN 5/DN 8 for vapors ↗	**7MF9416-6 ■ A**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
For flanging to pressure transmitters for differential pressure, max. working pressure 420 bar (6092 psi), also available in stainless steel on request (order accessory set with Order code), without certificate	
• without test connection	**C**
• with test connection M20 × 1.5	**D**
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

Selection and Ordering data	Order code	Article No.
Further designs[1]		
Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg)		
4x screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	**B34**	**7MF9410-5CA**
Accessory set to DIN[2] (required for flanging, weight 0.2 kg)		
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F);Flange connection to DIN 19213 only permissible up to PN 160!	**B16**	**7MF9010-6CC**

[1] When ordering accessory set together with the valve manifold combination, please use Order code; otherwise use Article No.

[2] Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)

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Accessories

Accessory set for valve manifold combination DN 5/DN 8 for flanging

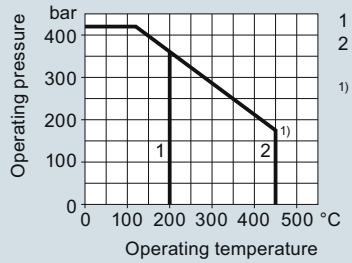
- B34: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2.1, 2 O-rings (FPM 90)
- B16: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 to DIN 125

O-ring to DIN 3771, 20 x 2.65 - S – FPM90, max. 420 bar (6092 psi), 120 °C (248 °F)

Note: M10 screws only permissible up to PN 160 (2321 psi)!

Characteristic curves

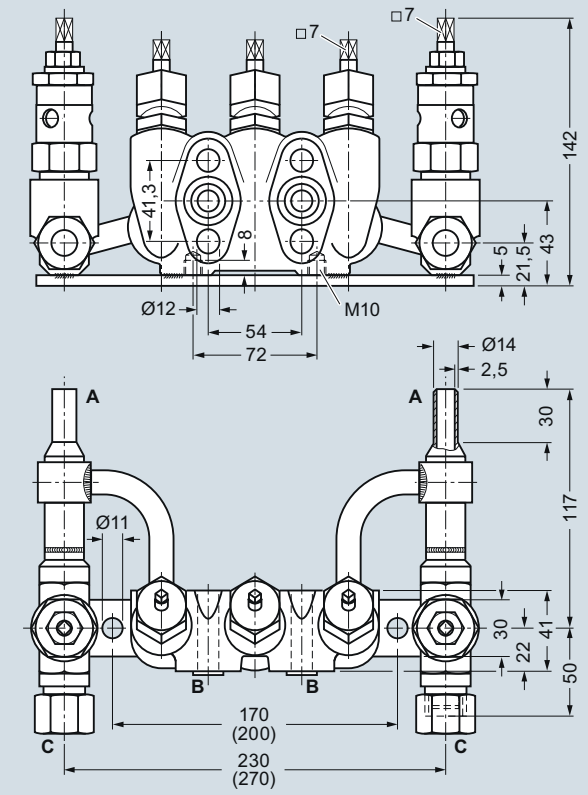


1 Valve manifold
2 Blow-out connection

1) According to DIN 19210 the design can be such that the temperatures for the differential pressure line can be set approx. 100 °C (212 °F) lower than the media temperature.

Permissible operating pressure as a function of the permissible operating temperature

Dimensional drawings

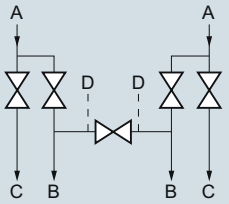


A Process connection (e.g. on primary device): Welding pin
B Transmitter connection: Flange connection to EN 61518, form A
C Blow-out connection: Pipe union with ferrule, diameter 14 mm, S series to DIN 2353

Valve design:
- Manifold valves: internal spindle thread
- Blow-out valves: external spindle thread

Valve manifold combination DN 5/DN 8 (7MF9416-6C.), dimensions in mm (deviating dimensions for 7MF9416-6D. shown in brackets)

Schematics



A Process connection
B Transmitter connection
C Blow-out connection
D Test connection

Valve manifold combination for vapors

Valve manifold combination DN 5/DN 8, connections

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Valve manifold combination DN 8

Overview

The valve manifold combination DN 8 (7MF9416-4..) is for pressure transmitters for differential pressure.

It is used to shut off and blow out the differential pressure lines and to check the pressure transmitter zero.

In the designs with a test connection, a test device can be connected to check the pressure transmitter characteristic.

Benefits

- Max. working pressure 420 bar (6092 psi)

Application

The valve manifold combination DN 8 is designed for vapors.

Design

The valve manifold combination DN 8 has a process connection with welding pins.

The connection for the pressure transmitter is designed as as flange connection, while the blow-out connection is designed as a pipe union with ferrule.

The manifold valves have an internal spindle thread, while the blow-out valves have an external spindle thread.

The optional test connection is M20x1.5.

The valve manifold combination DN 8 is supplied with a mounting plate.

Materials used

	Valve manifold		Blow-out valves	
Component	**Material**	**Mat. No.**	**Material**	**Mat. No.**
Housing	P250GH	1.0460	16 Mo 3	1.5415
Head parts	C 35	1.0501	21 CrMo V57	1.7709
Spindles	X 12 CrMoS 17	1.4104	X 20 Cr 13	1.4021
Cones	X 35 CrMo 17	1.4122	X 35 CrMo 17 hardened and tempered	1.4122
Valve seats	X 6 CrNiMoTi	1.4571/316Ti	X 20 Cr 13	1.4021
Packings	PTFE	-	Pure graphite	-
Welding pins	-	-	16 Mo 3	1.5415

Function

- Shutting off the differential pressure lines
- Blowing out the differential pressure lines
- Checking the pressure transmitter zero

As an option it is possible to order a version with a test connection, to which a test device for checking the pressure transmitter characteristic can be connected.

Selection and Ordering data	Article No.
Valve manifold combination DN 8 for vapors ↗	**7MF9416-■■A**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
for flanging to pressure transmitters for differential pressure, with mounting plate, max. working pressure 420 bar (6092 psi), also available in stainless steel on request (order accessory set with Order code), without certificate	
• without test connection	**4C**
• with test connection M20 × 1.5	**4D**
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

Selection and Ordering data	Order code	Article No.
Further designs[1]		
Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg)		
4x screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B18.2; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	**B34**	**7MF9410-5CA**
Accessory set to DIN[2] (required for flanging, weight 0.2 kg)		
4x screws M10x55 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F) Flange connection to DIN 19 213 only permissible up to PN 160!	**B16**	**7MF9010-6CC**

1) When ordering accessory set together with the valve manifold combination, please use Order code; otherwise use Article No.
2) Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)

Accessories

Accessory set for valve manifold combination DN 8 for flanging

- B34: 4 screws $^{7}/_{16}$-20 UNF x $2^{1}/_{8}$ inch to ASME B 18.2.1, 2 O-rings (FPM 90)
- B16: 4 screws M10x55 to DIN EN 24014, 4 washers, 2 O-rings (FPM 90)

Washers Ø 10.5 to DIN 125

O-ring to DIN 3771, 20 x 2.65 – S – FPM90, max. 420 bar (6092 psi), 120 °C (248 °F)

Note: M10 screws only permissible up to PN 160 (2321 psi)!

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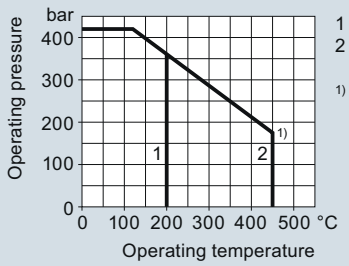
Characteristic curves

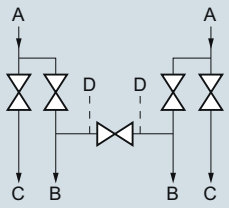


1 Valve manifold
2 Blow-out connection

1) According to DIN 19210 the design can be such that the temperatures for the differential pressure line can be set approx. 100 °C (212 °F) lower than the media temperature.

Permissible operating pressure as a function of the permissible operating temperature

Schematics

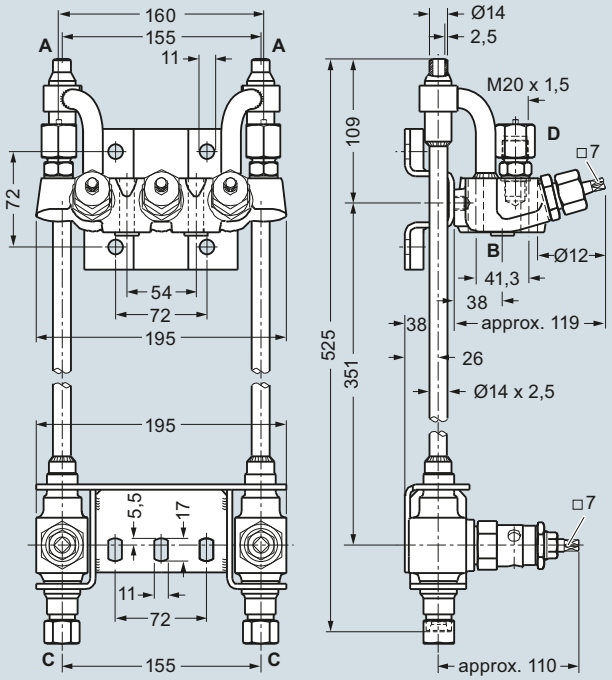


A Process connection
B Transmitter connection
C Blow-out connection
D Test connection

Valve manifold combination for vapors

Valve manifold combination DN 8, connections

Dimensional drawings



A Process connection (e.g. on primary device): Welding pin
B Transmitter connection: Flange connection to EN 61518, form A
C Blow-out connection: Pipe union with ferrule, diameter 14 mm, S series to DIN 2353
D Test connection (only with Article No. 7MF9416-4D.): M20 x 1,5
Valve design:
- Manifold valves: internal spindle thread
- Blow-out valves: external spindle thread

Valve manifold combination DN 8 (7MF9416-4..), dimensions in mm

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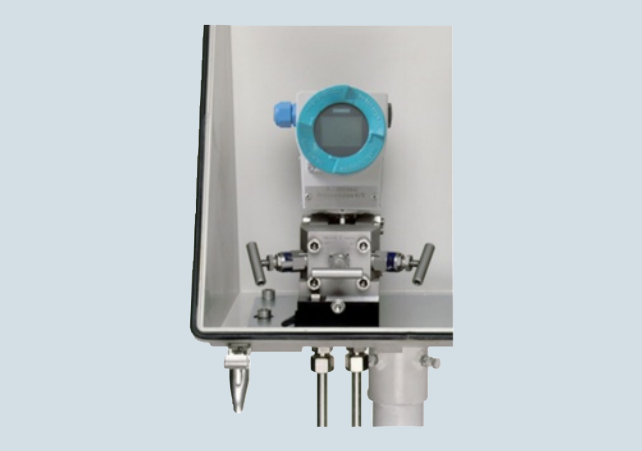
2-, 3- and 5-spindle valve manifolds for installing in protective boxes

Overview



The 2-spindle, 3-spindle and 5-spindle valve manifolds (7MF9412-1..) are used to shut off the differential pressure lines and to check the transmitter zero.

The five-spindle valve manifold permits venting on the transmitter side and checking of the transmitter characteristic.

These valve manifolds are preferentially used when mounting in protective boxes. In addition, they can also be used for wall, frame or pipe mounting together with the mounting bracket.

Transmitters of the DS series can be operated and read from the front when using these valve manifolds.

Application

The valve manifolds DN 5 are designed for liquids and vapors and for installing in protective boxes.

Each is available in a version for oxygen on request

Design

All versions of the spindle manifolds have a process connection ½-14 NPT.

The connection for the pressure transmitter is always designed as a flange connection to IEC 61518, Form A.

The 2-spindle and the 5-spindle valve manifold have in addition a vent and test connection ¼-18 NPT.

The valves have an external spindle thread.

Materials used

Components	Material	Mat. No.
Housing	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

Functions

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero

Additional functions of the 2-spindle and 5-spindle valve manifolds through the vent and test connection:

- Venting on the transmitter side
- Checking the pressure transmitter characteristic

Selection and Ordering data

Selection and Ordering data	Article No.
Valve manifolds DN 5 for mounting in protective boxes ↗	**7MF9412 - ■■ A**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
for liquids and gases for flanging to pressure transmitters for absolute and differential pressure Material: stainless steel, mat. No: 1.4404/316L max. working pressure 420 bar (6092 psi) (order accessory set with Order code), without certificate	
• 2-spindle valve manifold with rotatng sleeve G½	**1 B**
• 2-spindle valve manifold with flange connection	**1 C**
• 3-spindle valve manifold	**1 D**
• 5-spindle valve manifold	**1 E**
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

Selection and Ordering data	Order code	Article No.
Further designs[1]		
Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN (connection between valve manifold and pressure transmitter)		
for valve manifold 7MF9412–1C.		
2x screws $^{7}/_{16}$-20 UNF x 2 inch to ASME B18.2.1; chromized steel 1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	**F32**	**7MF9412-6CA**
2x screws $^{7}/_{16}$-20 UNF x 2 inch to ASME B18.2.1; chromized steel 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)[2]	**F35**	**7MF9412-6DA**
for valve manifold 7MF9412–1D and -1E.		
4x screws $^{7}/_{16}$-20 UNF x 2 inch to ASME B18.2.1; chromized steel 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)[2]	**F34**	**7MF9412-6GA**
4x screws $^{7}/_{16}$-20 UNF x 2 inch to ASME B18.2.1; chromized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)[2]	**F36**	**7MF9412-6HA**

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Selection and Ordering data	Order code	Article No.
Further designs[1]		
Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to DIN (connection between valve manifold and pressure transmitter)		
For valve manifold 7MF9412–1C.		
2x screws M10x50 to DIN EN 24014; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)[2]	**F12**	**7MF9412-6AA**
2x screws M10x50 to DIN EN 24014; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)[2]	**F15**	**7MF9412-6BA**
For valve manifold 7MF9412–1D and -1E.		
4x screws M10x50 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x O-rings to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)[2]	**F14**	**7MF9412-6EA**
4x screws M10x50 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)[2]	**F16**	**7MF9412-6FA**
Mounting bracket required for wall mounting or for securing to mounting rack, with bolts for mounting on valve manifold		
• for valve manifolds 7MF9412-1B. and -1C.	**M14**	**7MF9006-6LA**
• for valve manifold 7MF9412-1D.	**M17**	**7MF9006-6NA**
• for valve manifold 7MF9412-1E.	**M18**	**7MF9006-6PA**
Mounting clip		
2 off, to secure mounting bracket to pipe	**M16**	**7MF9006-6KA**
Valve manifold 100 bar		
Oil- and grease-free cleaning for oxygen applications, max. pressure PN 100 (1450 psi) and max. temperature 60 °C (140 °F)		
• for valve manifolds 7MF9412-1B. and -1C.	**S12**	
• for valve manifold 7MF9412-1D.	**S13**	
• for valve manifold 7MF9412-1E.	**S14**	
NACE MR-0175-certified incl. acceptance test certificate 3.1 to EN 10204	**D07**	

1) When ordering accessory set or mounting together with the valve manifolds, please use Order code; otherwise use Article No.
2) Flange connections with M10 screws only permissible up to PN 160 (2321 psi)!

Accessories

Accessory set for 2-, 3- and 5-spindle valve manifolds (Connection between manifold and transmitter)

2-spindle valve manifold DN 5 with flange connection

- F32: 2 screws 7/16 20 UNF x 2 inch to ASME B 18.2.1, 1 O Ring (FPM90)
- F35: 2 screws 7/16 20 UNF x 2 inch to ASME B 18.2.1, 1 flat-gasket
- F12: 2 screws M10x50 to DIN EN 24014, 2 washers, 1 O-ring (FPM90)
- F15: 2 screws M10x50 to DIN EN 24014, 2 washers, 1 flat gasket

3-spindle and 5-way valve manifold DN 5

- F34: 4 screws 7/16 20 UNF x 2 inch toASME B 18.2.1, 2 O-rings (FPM90)
- F36: 4 screws 7/16 20 UNF x 2 inch toASME B 18.2.1, 2 flat-gaskets
- F14: 4 screws M10x50 to DIN EN 24014, 4 washers, 2 O-rings (FPM90)
- F16: 4 screws M10x50 to DIN EN 24014, 4 washers, 2 flat-gaskets

Washers Ø 10.5 to DIN 125

Flat-gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

O-ring to DIN 3771, 20 x 2.65 - S - FPM90; max.420 bar (6092 psi), 120 °C (248 °F)

Note:
Flange connections with M10 screws only permissible up to PN 160 (2321 psi)!

Mounting bracket for wall mounting or for securing to mounting rack

With bolds for mounting on valve manifold

- M14: For 2-spindle valve manifold DN 5
- M17: For 3-spindle valve manifold DN 5
- M18: For 5-spindle valve manifold DN 5

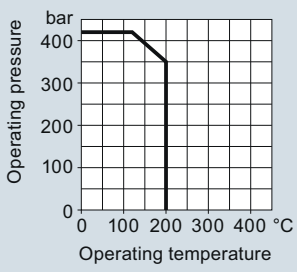
Mounting clips (2 off)

- M16: For securing the mounting brackets M14, M17 and M18 to pipe

Valve manifold 100 bar, suitable for oxygen

- S12: For 2-spindle valve manifold DN 5
- S13: For 3-spindle valve manifold DN 5
- S14: For 5-spindle valve manifold DN 5

Characteristic curves



420 bar (6092 psi) at 120 °C (248 °F)
350 bar (5076 psi) at 200 °C (392 °F)

Permissible operating pressure as a function of the permissible operating temperature

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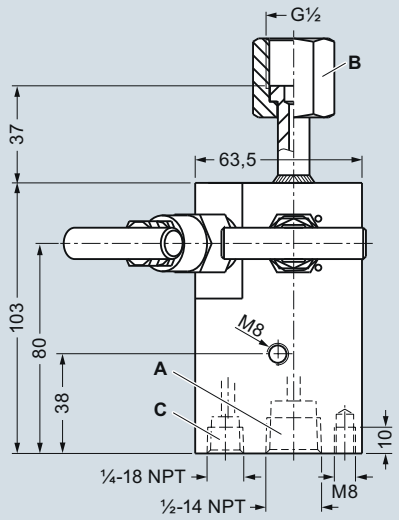
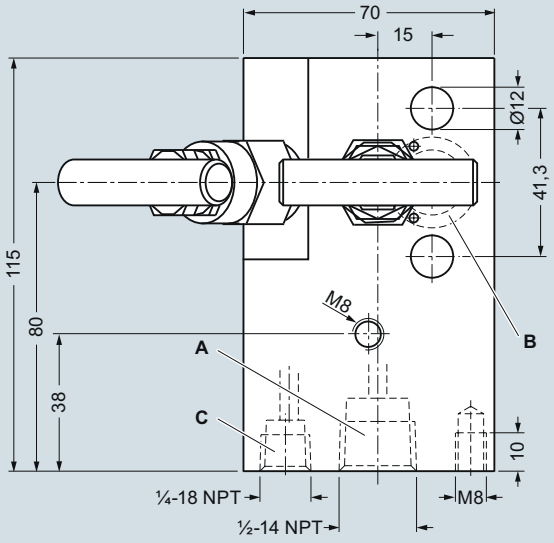
Dimensional drawings



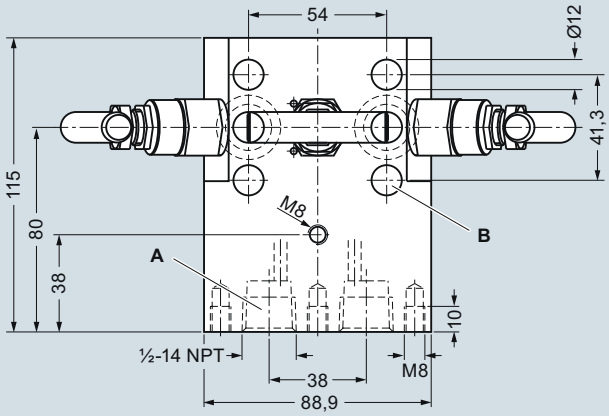
A Process connection: ½-14 NPT
B Transmitter connection: Nipple to DIN 16284, G½, SW 27
C Vent / test connection: ¼-18 NPT

2-spindle valve manifold DN 5 (7MF9412-1B..) with rotating sleeve, dimensions in mm



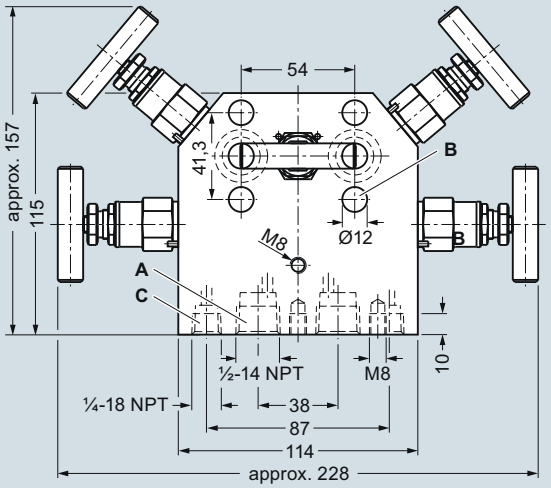
A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to EN 61518, form A
C Vent / test connection: ¼-18 NPT
Valve design: external spindle thread

2-spindle valve manifold DN 5 (7MF9412-1C..), dimensions in mm



A Process connection: ½-14 NPT
B Transmitter connection: Flange connection EN 61518, form A
Valve design: external spindle thread

3-spindle valve manifold DN 5 (7MF9412-1D..), dimensions in mm



A Process connection: ½-14 NPT
B Transmitter connection: Flange connection to EN 61518, form A
C Vent / test connection: ¼-18 NPT
Valve design: external spindle thread

5-spindle valve manifold DN 5 (7MF9412-1E..), dimensions in mm

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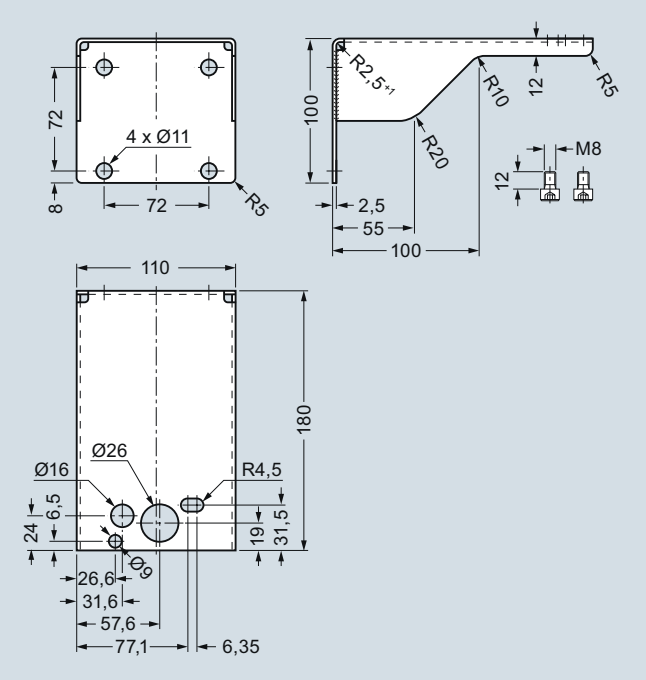
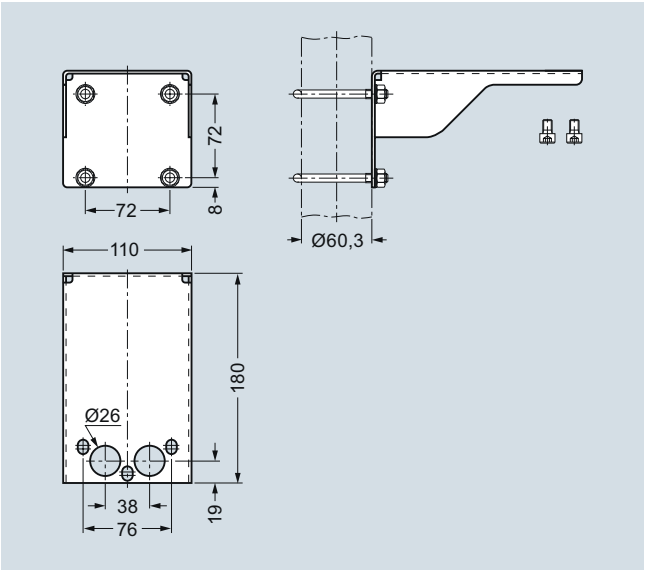
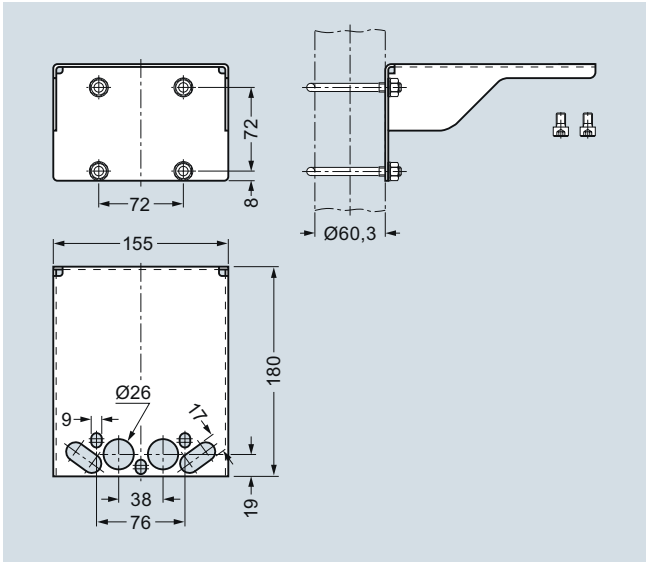


Mounting bracket (7MF9006-6LA)/(M14) for 2-spindle valve manifolds, dimensions in mm

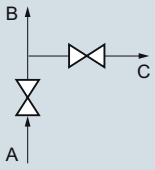


Mounting bracket (7MF9006-6NA)/(M17) for 3-spindle valve manifolds, dimensions in mm



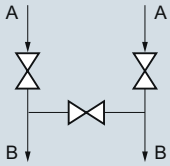
Mounting bracket (7MF9006-6PA)/(M18) for 5-spindle valve manifolds, dimensions in mm

Schematics



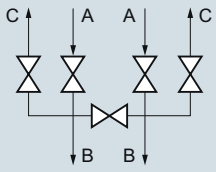
A Process connection
B Connection for pressure gauge or transmitter for pressure or absolute pressure
C Vent/test connection

2-spindle valve manifold DN 5 (with rotating sleeve G½ or flange connection), connections



A Process connection
B Transmitter connection

3-spindle valve manifold DN 5, connections



A Process connection
B Transmitter connection
C Vent/test connection

5-spindle valve manifold DN 5, connections

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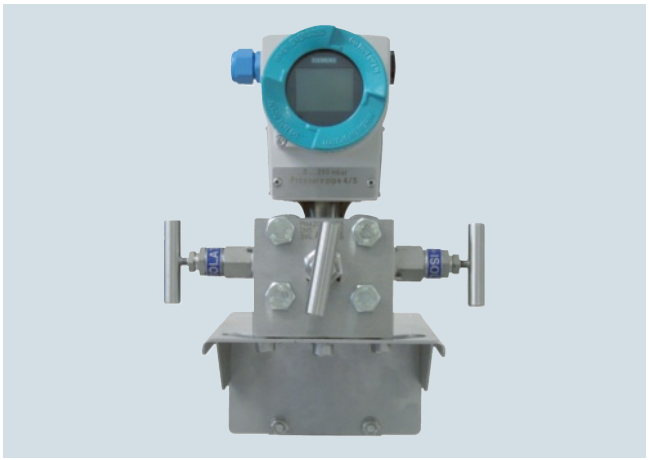
3- and 5-spindle valve manifolds for vertical angular differential pressure lines

Overview



These 3-spindle and 5-spindle valve manifolds 7MF9413-1.. were developed specially for vertical differential pressure lines.

The valve manifolds are used to shut off the differential pressure lines and to check the pressure transmitter zero.

The 5-spindle valve manifold permits venting on the transmitter side and checking of the pressure transmitter characteristic.

Benefits

- For vertical differential pressure lines
- Max. operating pressure 420 bar (6092 psi)
- Transmitters of the DS series can be operated and read from the front.

Application

The 3-spindle and 5-spindle valve manifolds for vertical differential pressure lines are for liquids and gases. The valve manifolds are flanged on the pressure transmitter.

Design

All versions of the spindle valve manifolds have a process connection ½-14 NPT.

The connection for the pressure transmitter is always designed as a flange connection to IEC 61518, form B .

The 2-spindle and the 5-spindle valve manifold have in addition a vent and test connection ¼-18 NPT.

Materials used:

Component	Material	Mat. No.
Housing	X 2 CrNiMo 17 13 2	1.4404/316L
Cones	X 6 CrNiMoTi 17 12 2	1.4571/316Ti
Spindles	X 2 CrNiMo 18 10	1.4404/316L
Head parts	X 5 CrNiMo 18 10	1.4401/316
Packings	PTFE	-

Function

Functions of all valve manifolds:

- Shutting off the differential pressure lines
- Checking the pressure transmitter zero

Additional functions of the 2-spindle and 5-spindle valve manifolds through the vent and test connection:

- Venting on the transmitter side
- Checking the pressure transmitter characteristic

Selection and Ordering data

Selection and Ordering data	Article No.
Valve manifolds for vertical differential pressure lines ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7MF9413 - ■■ A**
for liquids and gases for flanging to pressure transmitters for absolute and differential pressure Material: stainless steel, mat. No: 1.4404/316L max. working pressure 420 bar (6092 psi) (order accessory set with Order code), without certificate	
• 3-spindle valve manifold	**1 D**
• 5-spindle valve manifold	**1 E**
Accessories	
Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

Selection and Ordering data	Order code	Article No.
Further designs[1]		
Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN (connection between valve manifold and pressure transmitter)		
4x screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1; chromized steel 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**K36**	**7MF9411-5DB**
Accessory set to DIN[2] (connection between valve manifold and pressure transmitter)		
4x screws M10x45 to DIN EN 24014; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x flat gaskets made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F); Flange connection with M10 screws only permissible up to PN 160 (2321 psi).	**K16**	**7MF9411-6BB**
Mounting bracket		
required **for wall mounting** or for securing to mounting rack, with bolts for mounting on valve manifold		
• for valve manifold 7MF9413-1D.	**M17**	**7MF9006-6NA**
• for valve manifold 7MF9413-1E.	**M18**	**7MF9006-6PA**
required **for mounting on 2" standpipe**, with bolts for mounting on valve manifold		
• for valve manifold 7MF9413-1D.	**M19**	**7MF9006-6QA**
Mounting clip		
2 off, to secure mounting bracket to pipe	**M16**	**7MF9006-6KA**
Valve manifold 100 bar (1450 psi) suitable for oxygen		
• for valve manifold 7MF9413-1D.	**S13**	
• for valve manifold 7MF9413-1E.	**S14**	
NACE MR-0175-certified incl. acceptance test certificate 3.1 to EN 10204	**D07**	

[1] When ordering accessory set or mounting together with the multiway cock, please use Order code; otherwise use Article No.

[2] Flange connections to DIN 19213 only permissible up to PN 160 (2321 psi)!

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Accessories

Accessory set (connection between manifold and transmitter)

- K36: 4 screws $^{7}/_{16}$-20 UNF x 1¾ inch to ASME B18.2.1, 2 flat gaskets
- K16: 4 screws M10x45 to DIN EN 24014, 4 washers, 2 flat gaskets

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

Note: Flange connection with M10 screws only permissible up to PN 160 (2321 psi)!

Mounting bracket for wall mounting or for securing to mounting rack

With bolts for mounting on valve manifold

- M17: For 3-spindle valve manifold
- M18: For 5-spindle valve manifold

Mounting bracket for mounting on 2" standpipe

With bolts for mounting on valve manifold

- M19: For 3-spindle valve manifold

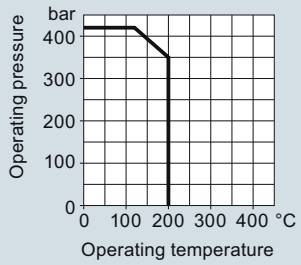
Mounting clips (2 off)

For securing the mounting brackets M17, M18 and M19 to pipe

Valve manifold 100 bar, suitable for oxygen

- For 3-spindle valve manifold
- For 5-spindle valve manifold

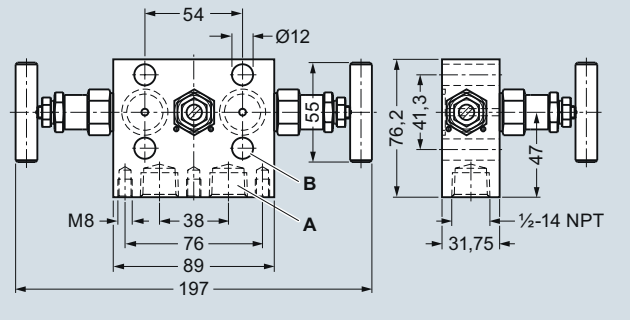
Characteristic curves



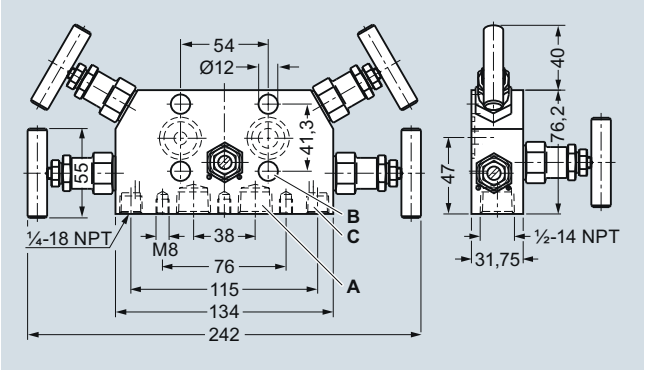
420 bar (6092 psi) at 120 °C (248 °F)
350 bar (5076 psi) at 200 °C (392 °F)

Permissible operating pressure as a function of the permissible operating temperature

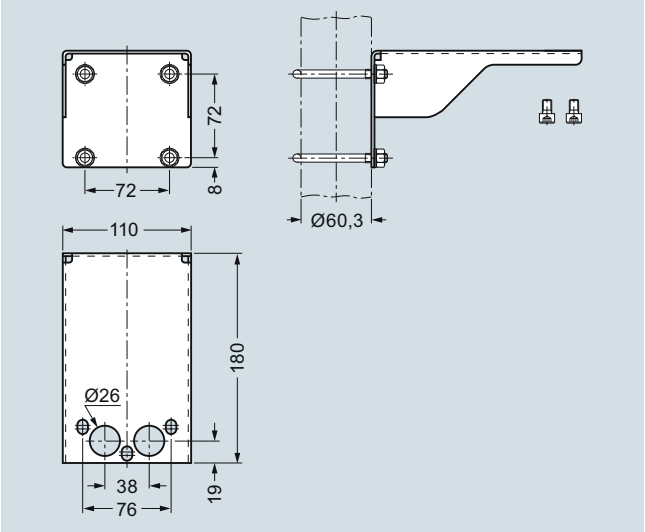
Dimensional drawings



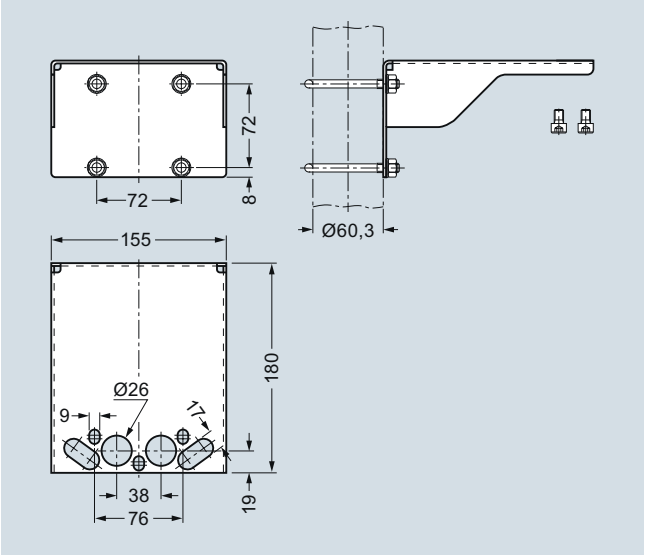
3-spindle valve manifold 7MF9413-1D. for vertical differential pressure lines, dimensions in mm



5-spindle valve manifold 7MF9413-1E. for vertical differential pressure lines, dimensions in mm



Mounting bracket (7MF9006-6NA)/(M17) for 3-spindle valve manifolds, dimensions in mm



Mounting bracket (7MF9006-6PA)/(M18) for 5-spindle valve manifolds, dimensions in mm

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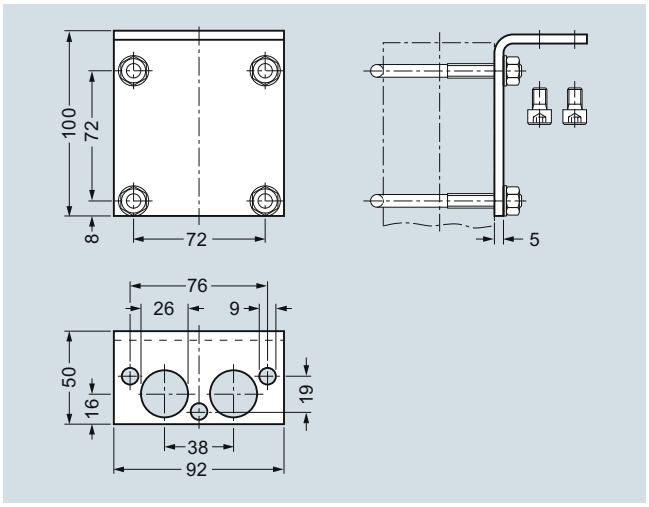
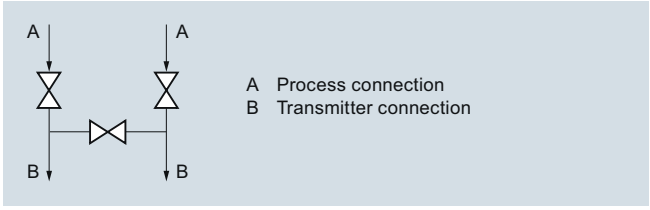
3- and 5-spindle valve manifolds for vertical angular differential pressure lines

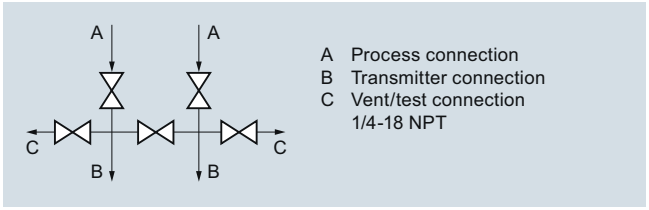


Mounting bracket (7MF9006-6QA)/(M19) for 3-spindle valve manifolds, dimensions in mm

Schematics



3-spindle valve manifold for vertical differential pressure lines, connections



5-spindle valve manifold for vertical differential pressure lines, connections

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Overview

The low-pressure multiway cock 7MF9004-4CA/-4DA can be flanged to pressure transmitters for differential pressure.

Benefits

- Robust design
- For liquids and gases
- One-hand operation

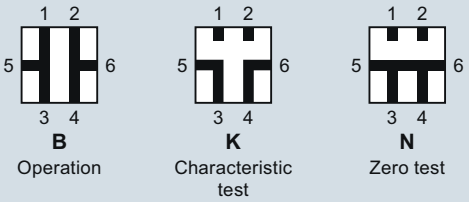
Design

The multiway cock has 2 process connections and 2 test connections, which are available in 2 versions (with sealing screws $G^3/_8$ or quick-release couplings). The housing is made of hot-pressed brass CuZn39Pb3, CW 614N. Test connections with sealing screws or with self-sealing quick-release couplings.

Note: An accessory set is always required for flanging of the multiway cock to a differential pressure transmitter.

Function

- Shutting off the differential pressure lines
- Testing the pressure transmitter zero
- Testing the pressure transmitter characteristic



Cock positions; the symbols are printed on the cock

Selection and Ordering data	Article No.
Low-pressure multiway cock for liquids and gases, for flanging to pressure transmitters, max. working pressure 25 bar (363 psi), max. working temperature 60 °C (140 °F) (up to 80 °C (176 °F) for a short time), weight 1.75 kg (without accessory set)	
Test connections	
2x sealing screws $G^3/_8$	**7MF9004-4CA**
2x quick-release couplings	**7MF9004-4DA**
Accessories	
Test report to EN 10204-3.1	**7MF9000-8AB**
Material acceptance test certificate to EN 10204-3.1	**7MF9000-8AD**

Selection and Ordering data	Order code	Article No.
Further designs[1] Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN (required for flanging, weight 0.2 kg)		
4x screws $^7/_{16}$-20 UNF x 1 inch to ASME B18.2.1; chromized steel 2x gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)	**L31**	**7MF9004-5CC**
Accessory set to DIN (required for flanging, weight 0.2 kg)		
4x screws M10x25 to DIN EN 24017; chromized steel 4x washers Ø 10.5 mm to DIN 125; 2x gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)		
• Standard design	**L11**	**7MF9004-6AD**
• Version for oxygen	**L15**	**7MF9004-6AE**
Multiway cock in oil-free and grease-free design BAM-tested lubricant, gasket suitable for oxygen	**S11**	
Mounting bracket required **for wall mounting** or for securing on rack (72 mm grid), made of electrogalvanized sheet-steel, weight 0.85 kg	**M13**	**7MF9004-6AA**

[1] When ordering accessory set or mounting together with the multiway cock, please use Order code; otherwise use Article No.

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Low-pressure multiway cock

Accessories

Accessory set for low-pressure multiway cock

- L31: 4 screws $^{7}/_{16}$-20 UNF x 1 inch, 2 flat gaskets
- L11: 4 screws M10x25 to DIN EN 24017, 4 washers, 2 flat gaskets
- L15 (suitable for oxygen): 4 screws M10x25 to DIN EN 24017, 4 washers, 2 flat gaskets

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. permissible temperature 80 °C (176 °F)

Multiway cock in oil-free and grease-free design

- S11: BAM-tested lubricant, gasket suitable for oxygen

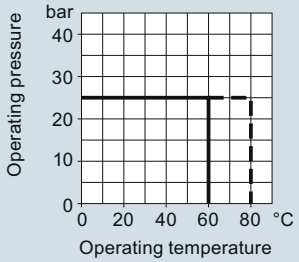
Mounting brackets

- M13: Required for wall mounting or for securing on rack (72 mm grid); made of electrogalvanized sheet-steel

Options

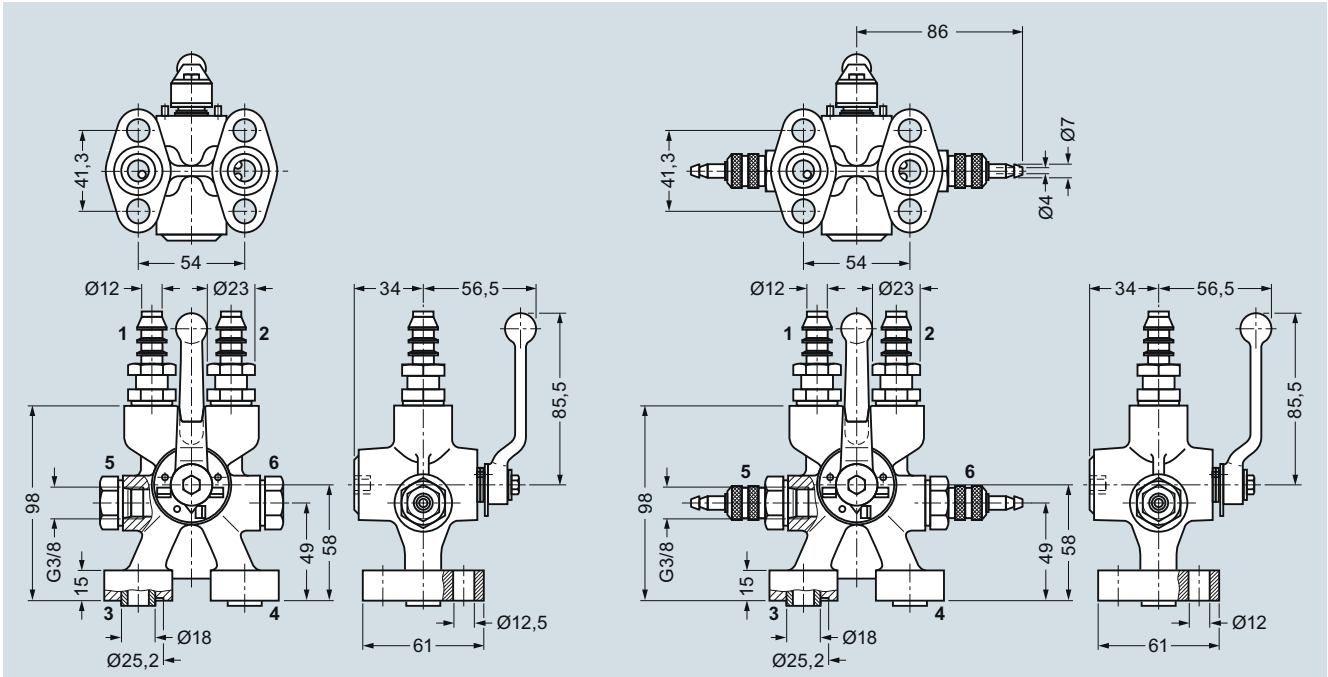
Test connections
- 2 sealing screws G$^{3}/_{8}$
- 2 quick-release couplings

Characteristic curves



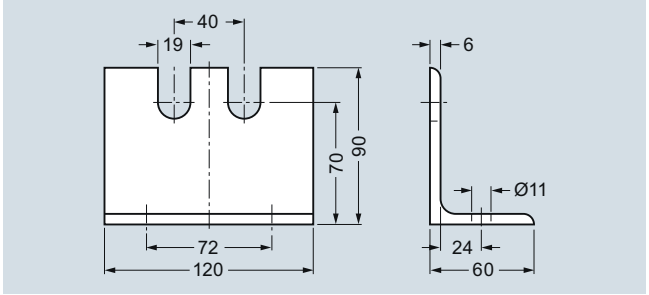
Low-pressure multiway cock, permissible operating pressure as a function of the permissible operating temperature

Dimensional drawings



1 and 2 Process connections (hose sleeve, diameter 12 mm)
3 and 4 Transmitter connections (EN 61518, form A)
5 and 6 Text connections (with sealing screws G3/8 or with quick-release couplings

Low-pressure multiway cock 7MF9004-4CA/-4DA for direct flanging to pressure transmitters for differential pressure, dimensions in mm



Mounting bracket 7MF9004-6AA (M13), dimensions in mm

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Overview

The oval flange 7MF9408-2C. for pressure transmitters for absolute pressure and differential pressure has a ½-14 NPT female thread and is designed for max. operating pressure 400 bar (5800 psi).

Accessories

Accessory set for oval flange

- E36: 2 screws $^{7}/_{16}$-20 UNF x 1½ inch to ASME B18.2.1, 1 flat gasket
- E34: 2 screws $^{7}/_{16}$-20 UNF x 1½ inch to ASME B18.3, 1 O-ring (FPM 90)
- E13: 2 screws M10x40 to DIN EN 4762, 2 washers, 1 O-ring (FPM 90)
- E16: 2 screws M10x40 to DIN EN ISO 4762, 2 washers, 1 flat gasket

Washers Ø 10.5 to DIN 125

Flat gaskets made of PTFE, max. 420 bar (6092 psi), 80 °C (176 °F)

O-ring to DIN 3771, 20 x 2.65 – S – FPM90, max. 420 bar (6092 psi), 120 °C (248 °F)

Note: M10 screws only permissible up to PN 160 (2321 psi)!

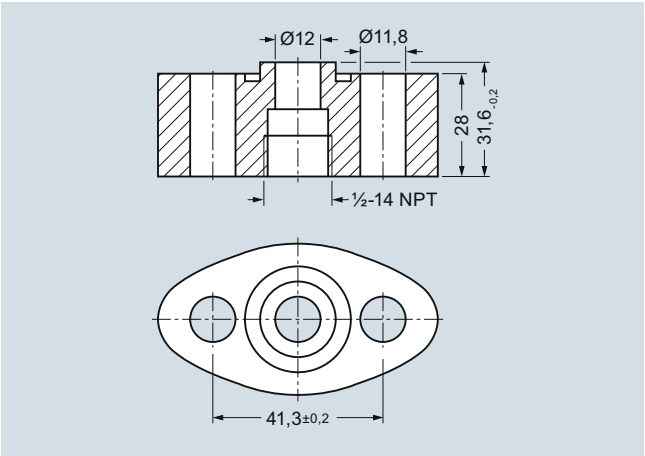
Selection and Ordering data	Article No.
Oval flange with female thread ½-14 NPT, max. working pressure 420 bar (6092 psi), flange connection to IEC 61518, form A	
Material	
P250GH, mat. No.: 1.0460	**7MF9408-2CE**
X 2 CrNiMo 17 13 2, mat. No. 1.4404/316L	**7MF9408-2CL**

Selection and Ordering data	Order code	Article No.
Further designs[1] Please add "**-Z**" to Article No. and specify Order code.		
Accessory set to EN		
2x screws $^{7}/_{16}$-20 UNF x 1½ inch to ASME B 18.2.3; chromized steel 1x flat gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)	**E36**	**7MF9408-5DA**
2x screws $^{7}/_{16}$-20 UNF x 1½ inch to ASME B 18.2.3; chromized steel 1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)	**E34**	**7MF9408-5CA**
Accessory set to DIN		
2x screws M10x40 to DIN EN ISO 4762; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x O-ring to DIN 3771, 20 x 2.65 - S - FPM90, max. permissble 420 bar (6092 psi), 120 °C (248 °F)[2]	**E13**	**7MF9408-6AA**
2x screws M10x40 to DIN EN ISO 4762; chromized steel 2x washers Ø 10.5 mm to DIN 125; 1x flat gasket made of PTFE, max. permissible 420 bar (6092 psi), 80 °C (176 °F)[2]	**E16**	**7MF9408-6BA**
NACE MR-0175-certified incl. acceptance test certificate 3.1 to EN 10204	**D07**	

[1] When ordering accessory set together with the oval flange, please use Order code; otherwise use Article No.

[2] Flange connections with M10 screws only permissible up to PN 160 (2321 psi)

Dimensional drawings



Oval flange 7MF9408-2C., dimensions in mm

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Overview

Adapters enable e.g. a transition from medium connections with NPT thread to shut-off valves to DIN 16270 ... 16272 or pipes in conjunction with a connection gland (e.g. 7MF9008).

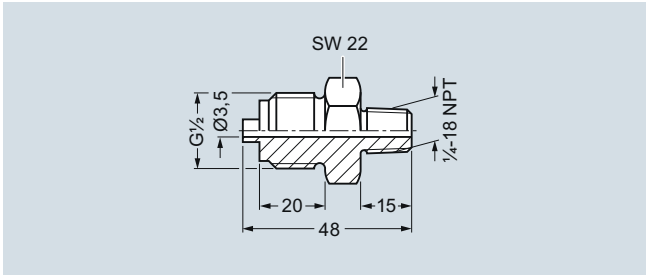
Design

The connection pieces are made of X 6 CrNiMoTi 17 12 2, mat. No. 1.4571 and available in 3 versions

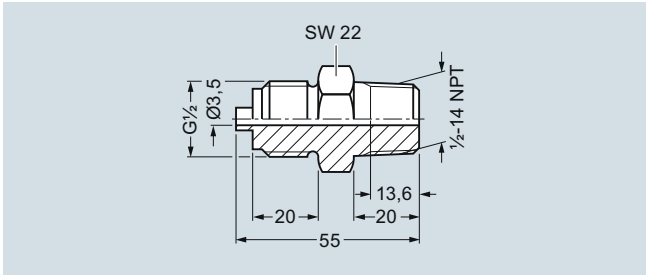
- Thread ¼-18 NPT and connection shank G½ to DIN EN 837-1
- Thread ½-14 NPT and connection shank G½ to DIN EN 837-1
- Thread ½-14 NPT and thread ½-14 NPT

Selection and Ordering data	Article No.
Adapter	
(weight 0.2 kg)	
with thread ¼-18 NPT – G½	**7MF9001-1AA**
with thread ½-14 NPT – G½	**7MF9001-1CA**
with thread ½-14 NPT – ½-14 NPT	**7MF9001-1DA**
with thread ½-14 NPT – M20 x 1.5	**7MF9001-1EA**
with pipe union with ferrule 12 S, ∅ 12 mm – ½-14 NPT	
• 9 SMnPb 28, mat. No. 1.0718	**7MF9008-1CA**
• X 6 CrNiMoTi 17 122, mat. No. 1.4571	**7MF9008-1CB**
with pipe union with ferrule 14 S, ∅ 14 mm – ½-14 NPT	
• 9 SMnPb 28, mat. No. 1.0718	**7MF9008-1CC**
• X 6 CrNiMoTi 17 122, mat. No. 1.4571	**7MF9008-1CD**

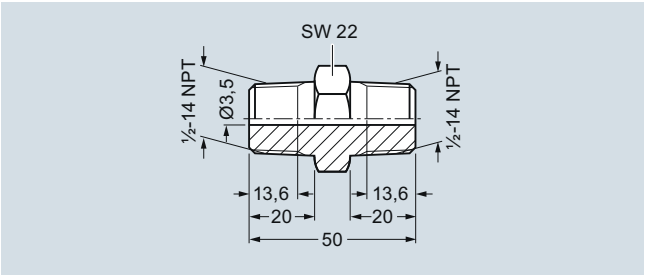
Dimensional drawings



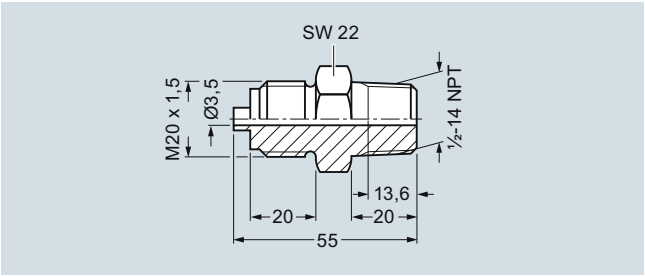
Connection piece with thread ¼-18 NPT and connection shank G½ (7MF9001-1AA), dimensions in mm



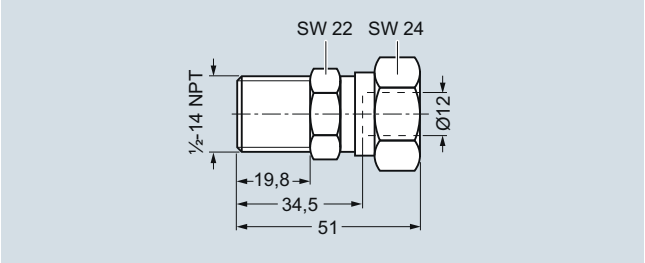
Connection piece with thread ½-14 NPT and connection shank G½ (7MF9001-1CA), dimensions in mm



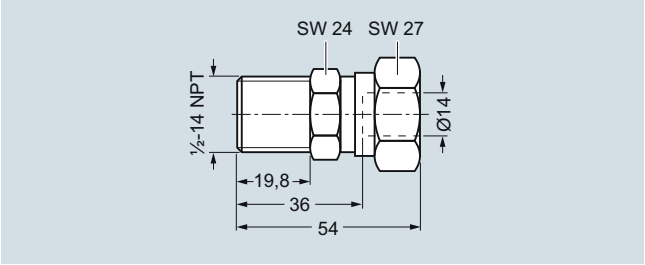
Connection piece with thread ½-14 NPT and thread ½-14 NPT (7MF9001-1DA), dimensions in mm



Connection piece with thread ½-14 NPT and connection shank M20 x 1.5 (7MF9001-1EA), dimensions in mm



Connection piece with pipe union with ferrule 12 S, ∅ 12 mm and thread ½-14 NPT (7MF9008-1CA and -1CB), dimensions in mm



Connection piece with pipe union with ferrule 14 S, ∅ 14 mm and thread ½-14 NPT (7MF9008-1CC and -1CD), dimensions in mm

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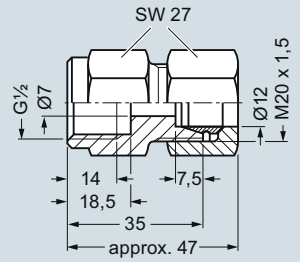
Overview

Connection glands to connect medium or differential pressure lines to collars G½ to DIN EN 837-1

- For rated pressures up to PN 630 (9137psi)
- For oxygen only up to PN 250 (3626 psi)

Selection and Ordering data		Article No.
Connection screwed gland for pipelines (weight 0.2 kg)		
Material	Design	
11SMn30 (mat. No. 1.0715)	Standard	**7MF9008-1GA**
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	Standard	**7MF9008-1GB**
X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	Grease-free	**7MF9008-1GC**

Dimensional drawings



Connection gland 7MF9008-1G., dimensions in mm

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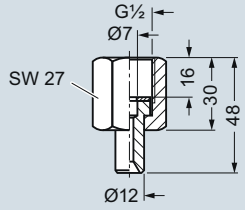
Overview

Connection parts G½ for pressure gauges and shut-off fittings are available in 3 versions:

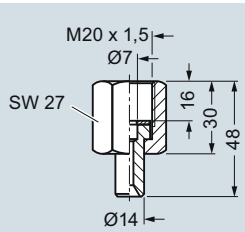
- Nipple connection
- Clamping sleeve
- Collar connection piece

Selection and Ordering data		Article No.
Adapters G½		
for pressure gauges and shut-off fittings		
Nipple connection		
G½ to DIN 16284 (union nut with nipple and gasket); max. working pressure 400 bar (5802 psi); weight 0.1 kg; connection: G½ to DIN EN 837-1; Female thread G½		
Material	Mat. No.	
CuZn39Pb3	CW 614N	**M56340-A0001**
Union nut 9 SMn 28 k	1.0715	**M56340-A0002**
Nipple: RSt 37-2	1.0037	
Union nut X 8 CrNiS 18 9	1.4305	**M56340-A0003**
Nipple: X 6 CrNiMoTi 17 12 2	1.4571/316Ti	
Nipple connection		
M20 x 1.5 to DIN 16284 (union nut with nipple and gasket); max. working pressure 400 bar (5802 psi); weight 0.1 kg; connection: M20 x 1.5 to DIN EN 837-1; Female thread M20 x 1.5		
Material	Mat. No.	
Union nut X 8 CrNiS 18 9	1.4305	**M56340-A0008**
Nipple: X 6 CrNiMoTi 17 12 2	1.4571/316Ti	
Clamping sleeve		
G½ to DIN 16283; max. working pressure 400 bar (5802 psi); weight 0.1 kg; Connections: G½ to DIN EN 837-1; Female thread: G½ right-hand G½ left-hand		
Material	Mat. No.	
CuZn39Pb3	CW614N	**M56340-A0004**
9 SMn 28 k	1.0715	**M56340-A0005**
Collar-adapter		
max. working pressure; weight 0.1 kg; Connections: G½ to DIN EN 837-1; Male thread: G½, G½		
Material	Mat. No.	
CuZn39Pb3	CW614N	**M56340-A0006**
9 SMn 28 k	1.0715	**M56340-A0007**

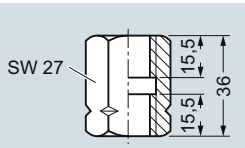
Dimensional drawings



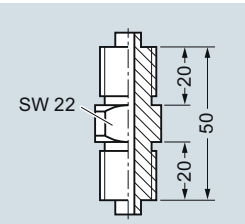
Nipple connection G½ (M56340-A0001 to -A0003), dimensions in mm



Nipple connection M20 x 1.5 (M56340-A0008), dimensions in mm



Clamping sleeve (M56340-A0004/-A0005), dimensions in mm



Collar connection piece (M56340-A0006/-A0007), dimensions in mm

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Overview

Water traps protect pressure gauges and shut-off fittings from heating up (e.g. by steam) by the water column produced by the water trap.

The max. working temperature is 120 °C (248 °F) at 100 bar (1450 psi), 300 °C (572 °F) at 80 bar (1160 psi) or 400 °C (752 °F) at 63 bar (914 psi). If the temperature of the measured medium is higher, a sufficiently long line has to be connected upstream of the trap to enable heat dissipation.

Design

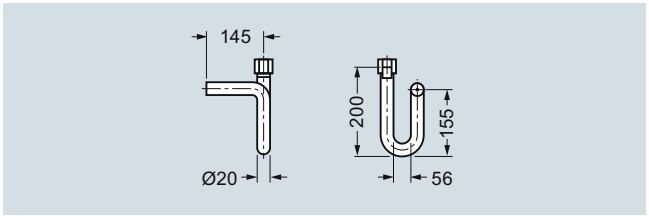
The water traps are available in U shape (type B) or circular shape (type D) to DIN 16282. They have a weld-on end Ø 20 mm × 2.6 mm on the measurement side. The connection on the device side is a clamping sleeve G½ to DIN 16283.

The water traps are made of steel (P250GH) or stainless steel (X 6 CrNiMoTi 17 12 2)

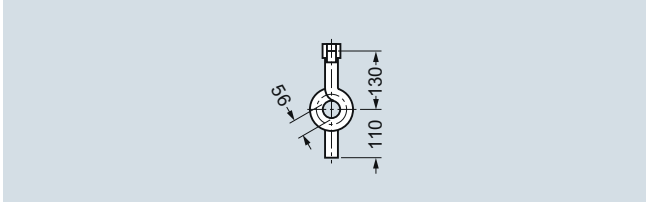
Water traps are designed as standard for max. operating temperature 120 °C (248 °F) at max. operating pressure 100 bar (1450 psi) (300 °C (572 °F) at 80 bar (1160 psi), 400 °C (752 °F) at 63 bar (914 psi). Water traps for higher operating pressures and temperatures are available on request.

Selection and Ordering data		Article No.
Water traps for pressure gauges and pressure transmitters, max. working temperature 120 °C (248 °F), max. working pressure 100 bar (1450 psi) (or 300 °C (572 °F) at 80 bar (1160 psi), or 400 °C (752 °F) at 63 bar (914 psi)), weight 0.7 kg		
Water trap B to DIN 16282		
Material	Mat. No.	
P235GH	1.0345	**M56340-A0043**
X 6 CrNiMoTi 17 12 2	1.4571/316Ti	**M56340-A0061**
Water trap D to DIN 16282		
Material	Mat. No.	
P235GH	1.0345	**M56340-A0045**
X 6 CrNiMoTi 17 12 2	1.4571/316Ti	**M56340-A0063**

Dimensional drawings



Water traps, type B, M56340-A0043/-A0061, dimensions in mm

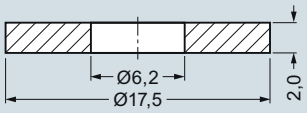


Water traps, type D, M56340-A0045/-A0063, dimensions in mm

Overview

The sealing rings to EN 837-1 are required to seal measuring instruments for pressure with the process connection G½B.

Dimensional drawings



Sealing ring 7MF9007-7A. to EN 837-1, dimensions in mm

Selection and Ordering data	Article No.
Sealing ring to EN 837-1 for thread G½ made of (packing unit 100 pcs)	
• Copper	**7MF9007-7AA**
• Soft iron	**7MF9007-7AB**
• Stainless steel, mat.-No. 1.4571	**7MF9007-7AC**
• PTFE	**7MF9007-7AD**
Accessories	
Test report to EN 10204-3.1	**7MF9000-8AB**
Material acceptance test certificate to EN 10204-3.1	**7MF9000-8AD**

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1

Pressure surge reducers

Overview

The pressure surge reducer protects the pressure gauge against damage, premature wear and tear and inaccurate/fluctuating indications.

Application

The pressure reducer is used when pulsations occur in the measured medium (e.g. in slow-running vapor engines, piston pumps and compressors), or if drastic fluctuations are likely to occur in the measured medium (e.g. in hydraulic presses and tensile testing machines).

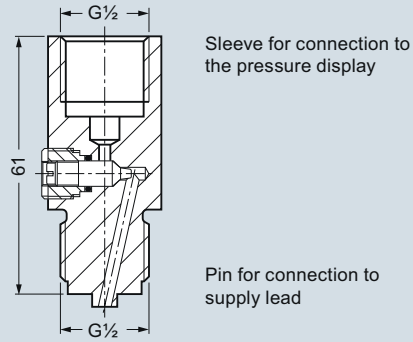
Design

- Enclosure made of brass or stainless steel (mat. no. 1.4571)
- Adjustable nozzle
- Sleeve for connection to the measuring instrument
- Pin for connection to supply lead

Selection and Ordering data

			Article No.
Pressure surge reducer Weight approx. 0.21 kg			
Material	Full-scale value	Weight approx. in kg	
Brass	250 bar (3626 psi)	0.21	**M56340-A54**
Stainless steel	600 bar (8702 psi)	0.21	**M56340-A59**

Dimensional drawings



Pressure surge reducer, dimensions in mm

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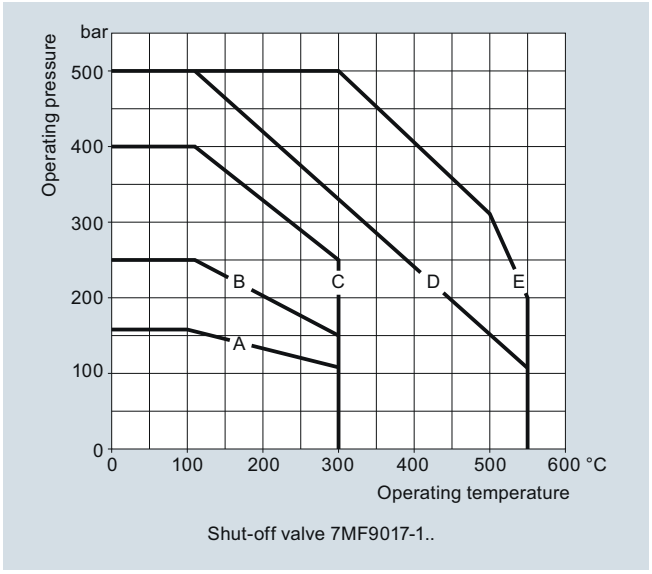
Overview

Primary shut-off valves are available in the following versions:

- For non-corrosive liquids, gases and vapors
- For corrosive liquids and gases
- Grease-free for oxygen

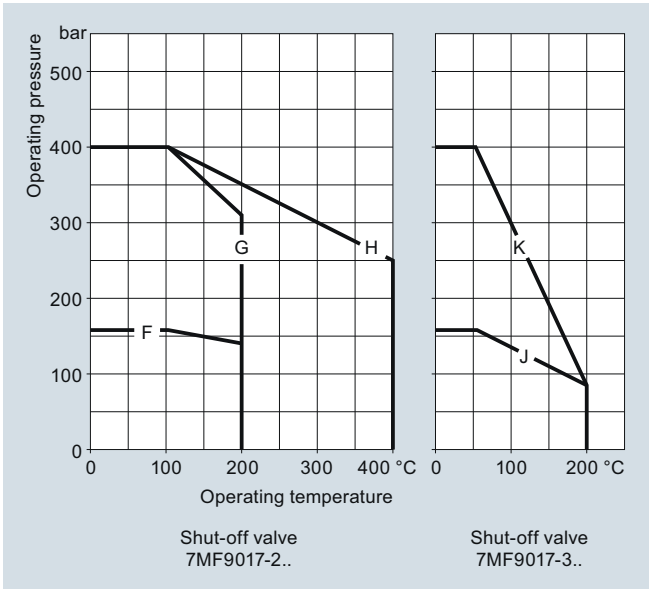
The shut-off valves are available in various materials and with various connections (see Selection and Ordering data)

Characteristic curves



Shut-off valve 7MF9017-1..

Shut-off valve 7MF9017-1.., permissible working pressure as a function of the permissible working temperature

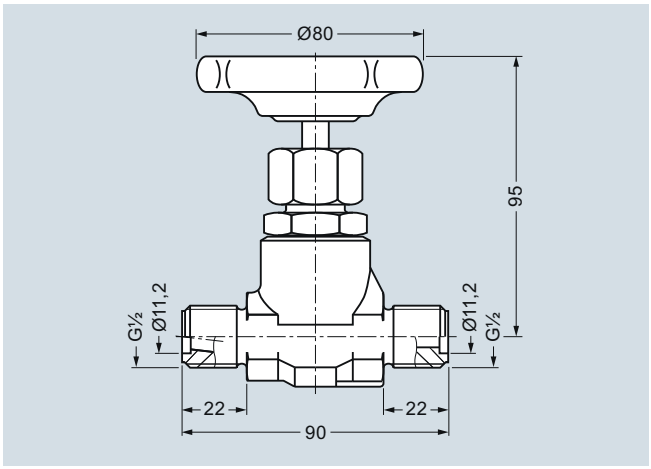


Shut-off valve 7MF9017-2..

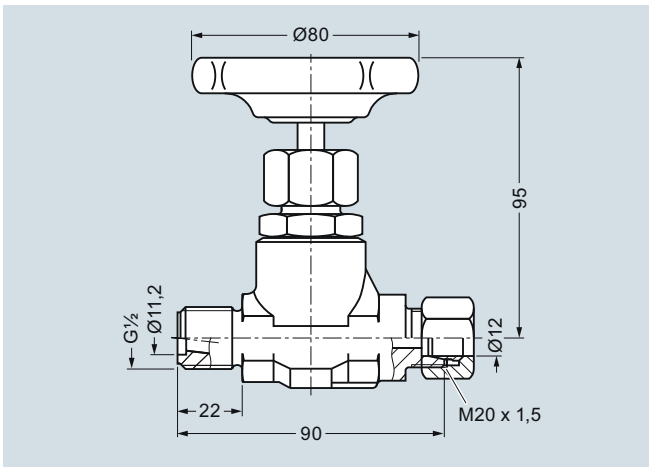
Shut-off valve 7MF9017-3..

Shut-off valve 7MF9017-2.. and -3.., permissible working pressure as a function of the permissible working temperature

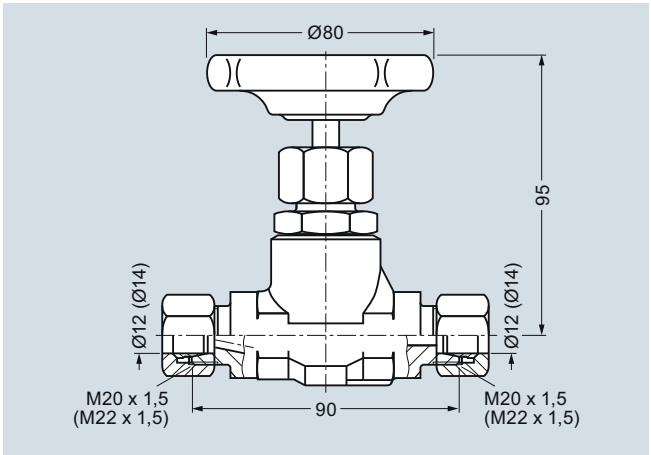
Dimensional drawings



Shut-off valve 7MF9017–1A., dimensions in mm



Shut-off valve 7MF9017-1B. and -2B., dimensions in mm



Shut-off valves 7MF9017-1C., -1D. and -2C., dimensions in mm

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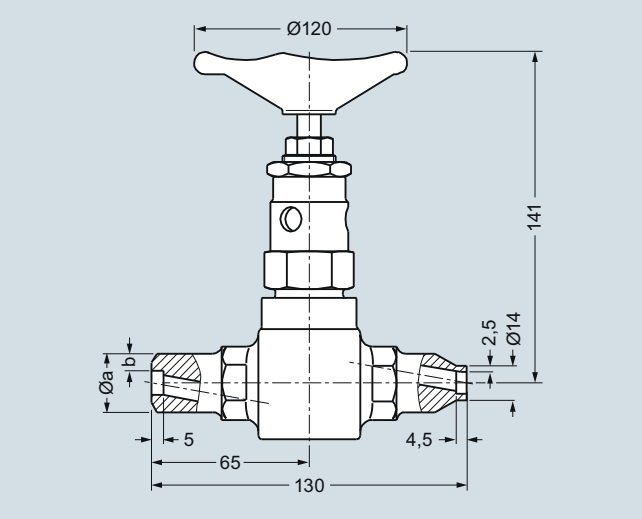

Shut-off valves 7MF9017-, dimensions in mm

Ø A x b	7MF9017-
14 mm x 2.5 mm	1F. and 1G.
21.3 mm x 6.3 mm	1H. and 2H.
24 mm x 7.1 mm	1J., 1K. and 2J.

Selection and Ordering data

Primary shut-off valves, without certificate

Max. working pressure	Charac-teristic[1]	Material	Mat. No.	Spindle thread	Connections	Approx. weight kg	Article No.
Shut-off valve for non-aggressive liquids, gases and vapors							↗ **7MF9017-1** **A**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.							
160 bar (2321 psi)	A	P250GH	1.0460	Internal	Threaded socket G½ form R, DIN 19207	0.8	**A**
160 bar (2321 psi)	A	P250GH	1.0460	Internal	Threaded socket G½ form R, DIN 19207 DIN 19207 and pipe union with ferrule for pipe ∅ 12 mm, S series	0.8	**B**
400 bar (5800 psi)	C	P250GH	1.0460	Internal	Pipe union with ferrule for pipe ∅ 12 mm, S series	1	**C**
400 bar (5800 psi)	C	P250GH	1.0460	Internal	Pipe union with ferrule for pipe ∅ 14 mm, S series	1	**D**
500 bar (7252 psi)	D	16 Mo 3	1.5415	External	Welding sleeves ∅ 14 mm × 2.5 mm	1.6	**F**
500 bar (7252 psi)	E	11 CrMo 9 10	1.7383	External	Welding sleeves ∅ 14 mm × 2.5 mm	1.6	**G**
500 bar (7252 psi)	D	16 Mo 3	1.5415	External	Welding sleeves ∅ 21.3 mm × 6.3 mm and ∅ 14 mm × 2.5 mm	1.6	**H**
500 bar (7252 psi)	D	16 Mo 3	1.5415	External	Welding sleeves ∅ 24 mm × 7.1 mm and ∅ 14 mm × 2.5 mm	1.6	**J**
500 bar (7252 psi)	E	11 CrMo 9 10	1.7383	External	Welding sleeves ∅ 24 mm × 7.1 mm and ∅ 14 mm × 2.5 mm	1.6	**K**
Shut-off valve for aggressive liquids and gases							↗ **7MF9017-2** **A**
160 bar (2321psi)	F	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti	Internal	Threaded socket G½ form R, DIN 19207 DIN 19207 and pipe union with ferrule for pipe ∅ 12 mm, S series	0.8	**B**
400 bar (5800 psi)	G	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti	Internal	Pipe union with ferrule for pipe ∅ 12 mm, S series	1	**C**
400 bar (5800 psi)	H	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti	External	Welding sleeves ∅ 21.3 mm × 6.3 mm and ∅ 14 mm × 2.5 mm	1.6	**H**
400 bar (5800 psi)	H	X 6 CrNiMoTi 17 12 2	1.4571/ 316Ti	External	Welding sleeves ∅ 24 mm × 7.1 mm and ∅ 14 mm × 2.5 mm	1.6	**J**

Accessories

Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

[1] See Figure "Permissible working pressure as a function of the permissible working temperature"

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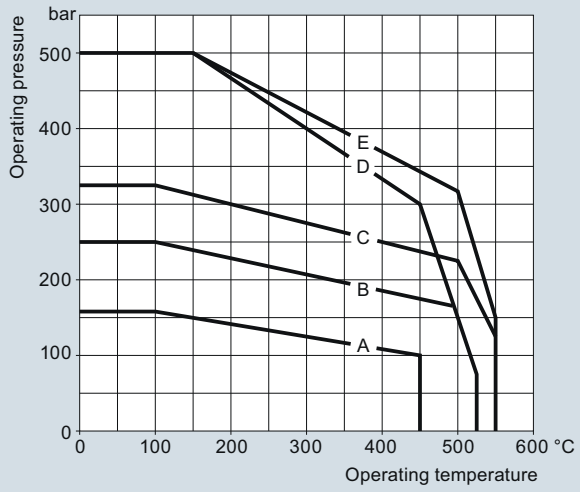
Overview

The compensation vessels prevent the level difference which occurs with pressure changes in the pressure lines and which falsifies the measurement.

According to DIN 19211, the temperature in the compensation vessel must be assumed to be 50 K less than the steam temperature in the pipe when calculating the wall thicknesses. This is because the temperature in the compensation vessel during operation can only rise up to the saturated steam temperature.

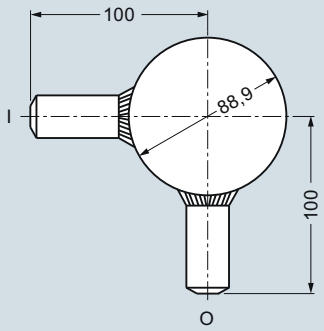
A material acceptance test certificate A to EN 10204-3.1 is available for the materials from which the compensation vessels are made.

Characteristic curves



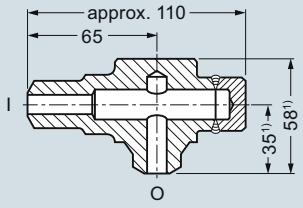
Permissible operating pressure as a function of the permissible operating temperature

Dimensional drawings



I Input (see Ordering data for dimensions)
O Output (see Ordering data for dimensions)

Compensation vessel 7MF9015-1.., dimensions in mm



I Input (see Ordering data for dimensions)
O Output (see Ordering data for dimensions)
1) 30 mm longer with 7MF9015-5A.

Compensation vessel 7MF9015-5.., dimensions in mm

Selection and Ordering data

Compensation vessel, without certificate

Max. working pressure	Characteristic[1]	Material	Mat. No.	Connections Input	Output	Approx. contents cm³	Approx. weight kg	Article No. 7MF9015-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.								
160 bar (2321 psi)	A	16 Mo 3	1.5415	Threaded socket G½, form R, DIN 19207	Threaded socket G½, form V, DIN 19207	250	0.8	1 A
250 bar (3626 psi)	B	16 Mo 3	1.5415	Welding sleeve ∅ 21.3 mm × 6.3 mm	Welding sleeve ∅ 21.3 mm × 6.3 mm	250	0.8	1 B
250 bar (3626 psi)	B	16 Mo 3	1.5415	Welding sleeve ∅ 24 mm × 7.1 mm	Welding sleeve ∅ 24 mm × 7.1 mm	250	1	1 C
500 bar (7252 psi)	E	11 CrMo 9 10	1.7383	Welding sleeve ∅ 24 mm × 7.1 mm	Welding sleeve ∅ 24 mm × 7.1 mm	170	1	1 D
250 bar (3626 psi)	B	16 Mo 3	1.5415	Welding sleeve ∅ 33.7 mm × 4.5 mm	Welding sleeve ∅ 24 mm × 7.1 mm	700	0.7	1 E
160 bar (2321 psi)	A	16 Mo 3	1.5415	Threaded socket G½, form R, DIN 19207	Threaded socket G½, form V, DIN 19207	20	1.6	5 A
500 bar (7252 psi)	D	16 Mo 3	1.5415	Welding sleeve ∅ 21.3 mm × 6.3 mm	Welding sleeve ∅ 21.3 mm × 6.3 mm	20	1.6	5 B
500 bar (7252 psi)	D	16 Mo 3	1.5415	Welding sleeve ∅ 24 mm × 7.1 mm	Welding sleeve ∅ 24 mm × 7.1 mm	20	1.6	5 C
500 bar (7252 psi)	E	11 CrMo 9 10	1.7383	Welding sleeve ∅ 24 mm × 7.1 mm	Welding sleeve ∅ 24 mm × 7.1 mm	20	1.6	5 D

Accessories

Factory test certificate EN 10204–2.2	**7MF9000-8AB**
Material acceptance test certificate EN 10204-3.1	**7MF9000-8AD**

1) See Figure "Permissible working pressure as a function of the permissible working temperature"

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Overview

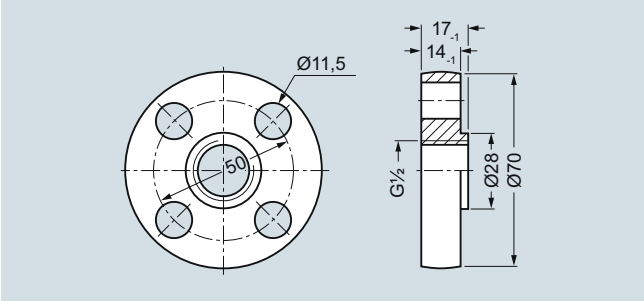
Connection parts are available in the following versions:

- Threaded flange pair G½ with stainless steel gasket
- Nipple G½ form V to DIN 19207
- Union nut G½ made of C 35 to DIN 16284
- Gasket B½ (grooved) to DIN 19207

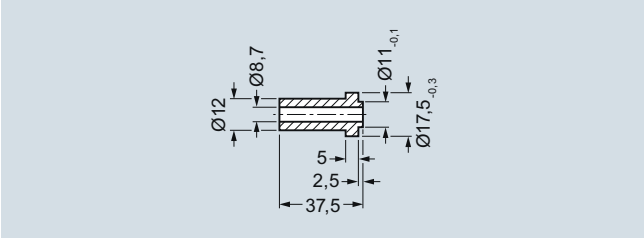
All connection parts are also available grease-free for oxygen.

Selection and Ordering data	Article No.
Threaded flange pair G½	
• with stainless steel gasket	**7MF9007-4CA**
• grease-free for oxygen, with stainless steel gasket	**7MF9007-4DA**
Scope of delivery:	
2x threaded flanges G½ to DIN 19207; material: P250GH (mat. No. 1.0460)	
4x hexagon screws M10x45 to DIN EN 24014; Material: C35E (mat. No. 1.1181)	
4x hexagon screws M10x50 to DIN EN 24032	
1x gasket G½ (7MF9007-6BA) grooved, to DIN 19207; Material: X 6 CrNiMoTi 17 12 2 (mat. No. 14571/316Ti)	
Only for 7MF9007-4CA!	
1x gasket G½ (7MF9k007-6CA), grease-free for oxygen, grooved, to DIN 19207; Material: X 6 CrNiMoTi 17 12 2 (mat. No. 14571/316Ti)	
Only for 7MF9007-4DA!	
Nipple G½	
to DIN 19207	
• Material: 16 Mo 3 (mat. No. 1.5415)	**7MF9007-4KA**
• grease-free for oxygen, Material: X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	**7MF9007-4LA**
Union nut G½	
to DIN 16284	
• Material: C35E (mat. No. 1.1181)	**7MF9007-4MA**
• grease-free for oxygen, Material: X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	**7MF9007-4NA**
Gasket G½	
to DIN 19207, grooved	
• Material: X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	**7MF9007-6BA**
• grease-free for oxygen, Material: X 6 CrNiMoTi 17 12 2 (mat. No. 1.4571/316Ti)	**7MF9007-6CA**

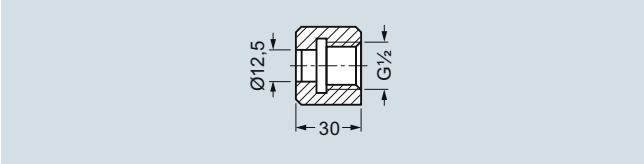
Dimensional drawings



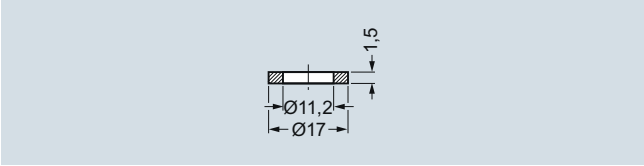
Threaded flange 7MF9007-4CA/-4DA, dimensions in mm



Nipple G½ 7MF9007-4KA/-4LA, dimensions in mm



Union nut G½ 7MF9007-4MA/-4NA, dimensions in mm



Gasket 7MF9007-6BA/-6CA, dimensions in mm

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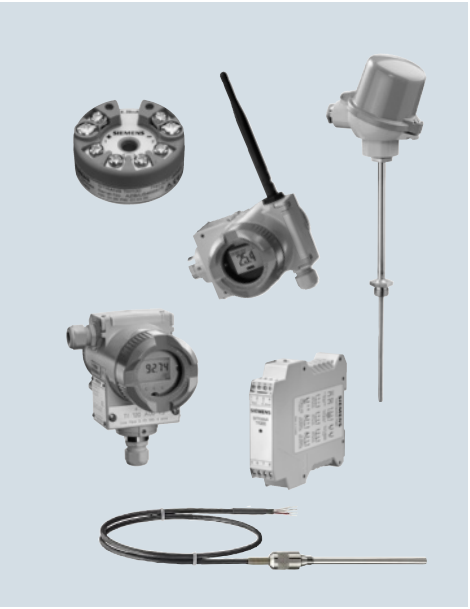

2/2 Product overview

Transmitters for mounting in sensor head

2/7 SITRANS TH100 two-wire system (Pt100)
2/11 SITRANS TH200 two-wire system universal
2/18 SITRANS TH300 two-wire system universal, HART
2/25 SITRANS TH400 fieldbus transmitter

Transmitters for rail mounting

2/31 SITRANS TR200 two-wire system universal
2/38 SITRANS TR300 two-wire system universal, HART
2/45 SITRANS TW four-wire system universal, HART

Transmitters for field mounting

2/57 SITRANS TF280 WirelessHART
2/62 SITRANS TF two-wire system
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Field indicator

2/62 SITRANS TF Field indicator for 4 to 20 mA

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2/109 Ordering examples

SITRANS TS100

2/110 Cable, mineral-insulated

SITRANS TS200

2/114 Compact, mineral-insulated

SITRANS TS300

For food, pharmaceuticals and biotechnology
2/118 - Modular design
2/122 - Clamp-on design

SITRANS TS500

2/126 Type 2, tubular version without process connection
2/130 Type 2N, tubular version, with screw socket
2/134 Type 2G, tubular version, with screw socket and extension
2/138 Type 2F, tubular version, with flange and extension
2/142 Type 3, tubular quick, without process connection
2/146 Type 3G, tubular quick, with screw socket and extension
2/150 Type 3F, tubular quick, with flange and extension
2/154 Type 4+4F barstock thermowell, with extension
2/158 For the installation of existing protective tubes

SITRANS TSinsert

2/162 Measuring inserts for retrofits and upgrades - European and American type

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Straight thermocouples
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You can download all instructions, catalogs and certificates for SITRANS T free of charge at the following Internet address: www.siemens.com/sitranst

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Overview

	Application	Mounting of transmitter with Ex protection		Page	Software for parameterization
		Transmitter	Sensor		
Temperature transmitter for head mounting					
	SITRANS TH100 Transmitters for Pt100 • Two-wire system	zone 2 and zone 1	zone 2, zone 1 and zone 0	2/7	SIPROM T
	SITRANS TH200 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V • Two-wire system • Universal	zone 2 and zone 1	zone 2, zone 1 and zone 0	2/11	SIPROM T
	SITRANS TH300 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V • Two-wire system • Universal • HART	zone 2 and zone 1	zone 2, zone 1 and zone 0	2/18	SIMATIC PDM
	SITRANS TH400 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 0.9 V • Fieldbus transmitters • PROFIBUS PA • FOUNDATION fieldbus	zone 2, zone 1 and zone 21	zone 2, zone 1, zone 0, zone 21, zone 20	2/25	SIMATIC PDM for TH 400 with PROFIBUS PA
Temperature transmitters for rail mounting					
	SITRANS TR200 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V • Two-wire system • Universal	zone 2, zone 1 and zone 21	zone 2, zone 1, zone 0, zone 21, zone 20	2/31	SIPROM T
	SITRANS TR300 Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V • Two-wire system • Universal • HART	zone 2, zone 1 and zone 21	zone 2, zone 1, zone 0, zone 21, zone 20	2/38	SIMATIC PDM

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	Application	Mounting of transmitter with Ex protection		Page	Software for parameterization
		Transmitter	Sensor		
	SITRANS TW Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples, DC voltages and DC currents for: • Four-wire system	Safe area	zone 1, zone 0, zone 21, zone 20	2/45	SIMATIC PDM
Temperature transmitters for field mounting					
	SITRANS TF280 Transmitter for connection to resistance-based sensor • In field enclosure for heavy industrial use • battery-operated • WirelessHART	-	-	2/57	Local operation via buttons SIMATIC PDM local with HART modem and wireless via WirelessHART
	SITRANS TF Transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 1.1 V • In field enclosure for heavy industrial use • HART, Universal	Zone 2 and zone 1	zone 2, zone 1 and zone 0	2/62	depending on the installed TH200/TH300 transmitter
	SITRANS TF Fieldbus transmitters for connection to resistance thermometers, resistance-based sensors, thermocouples and DC voltages up to 0.8 V • In field enclosure for heavy industrial use • PROFIBUS PA • FOUNDATION fieldbus	Zone 2 and zone 1	zone 2, zone 1 and zone 0	2/71	SIMATIC PDM for PROFIBUS PA
Field indicator for 4 to 20 mA signals					
	SITRANS TF Field indicator for 4 to 20 mA signals Display of units can be user-defined	Zone 2 and zone 1	-	2/62	--

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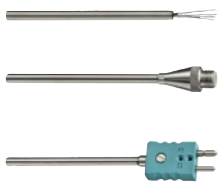
2

	Type	Description	Page	Software for parameterization
Measuring inserts for temperature sensors				
	European type	• Replaceable • Mineral-insulated	2/162	-
	American type		2/164	-
Temperature sensors				
	TS100	• Cable connection • Universal use • For unfavorable space conditions • Mineral-insulated	2/110	-
	TS200	• Compact version • Universal use • Mineral-insulated • For unfavorable space conditions	2/114	-
	TS300	Resistance thermometer for food, pharmaceiticals and biotechnology • Modular design, for installation in pipelines and tanks	2/118	
		• Clamp-on design, for attachment on the pipe primarily for sterilization processes	2/122	
	TS500, Type 2	• For the process industry (piping and tanks) • Tubular thermowell for minimal to medium stress • Thermowell as per DIN 43772, Type 2 without process connection • Without extension, plug-in or use with moveable compression fittings	2/126	-
	TS500, Type 2N	• For the process industry (vessels and pipings) • Tubular thermowell for minimal to medium stress • Thermowell Type 2N similar to DIN 43772, screwed in • Without extension, connection head not adjustable	2/130	-
	TS500, Type 2G	• For the process industry (vessels and pipings) • Tubular version for minimal to medium stress • Thermowell as per DIN 43722, Type 2G, screwed in • With extension	2/134	-

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	Type	Description	Page	Software for parameterization
	TS500, Type 2F	• For the process industry (vessels and pipings) • Tubular version for minimal to medium stress • Thermowell as per DIN 43722, Type 2F with flange • With extension	2/138	-
	TS500, Type 3	• For the process industry (vessels and pipings) • Tubular thermowell for minimal to medium stress • Thermowell as per DIN 43722, Type 3 without process connection, improved response time • Without extension, plug-in or use with moveable compression fittings	2/142	-
	TS500, Type 3G	• For the process industry (vessels and pipings) • Tubular version for minimal to medium stress • Thermowell as per DIN 43722, Type 3G, screwed in, improved response time • With extension	2/146	-
	TS500, Type 3F	• For the process industry (vessels and pipings) • Tubular thermowell for minimal to medium stress • Thermowell as per DIN 43722, Type 3F with flange, improved response time • With extension X	2/150	-
 	TS500, Type 4 TS500, Type 4F	• For the process industry (vessels and pipings) • Barstock thermowell for medium to highest stress • Thermowell as per DIN 43722 • Type 4 for weld-in • Type 4F with flange	2/154	-
	TS500, installation	• For the process industry (vessels and pipings) • For the installation of existing thermowells • Suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001 • With European or American type extension	2/158	-

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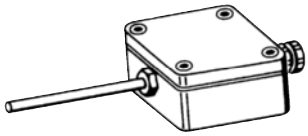
	Measuring instrument	Largest measuring range	Page
Temperature sensors for combustion processes and damp rooms			
	Flue gas resistance thermometers	-50 ... +600 °C (-58 ... +1112 °F)	2/168
	Resistance thermometers for damp rooms	-30 ... +60 °C (-22 ... +140 °F)	2/169
	Straight thermocouples	0 ... 1250 °C (32 ... 2282 °F)	2/173

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Overview

The SITRANS TH100 dispenses with electrical isolation and universal sensor connection to provide a low-cost alternative for Pt100 measurements.

For the parameterization, the SIPROM T software is used in combination with the modem for SITRANS TH100/TH200.

Its extremely compact design makes the SITRANS TH100 ideal for the retrofitting of measuring points or for the use of analog transmitters.

The transmitter is available as a non-Ex version as well as for use in potentially explosive atmospheres.

Benefits

- Two-wire transmitter
- Assembly in connection head type B (DIN 43729) or larger, or on a standard DIN rail
- Can be programmed, which means that the sensor connection, measuring range, etc. can also be programmed
- Intrinsically-safe version for use in potentially explosive areas

Application

Used in conjunction with Pt100 resistance thermometers, the SITRANS TH100 transmitters are ideal for measuring temperatures in all industries. Due to its compact size it can be installed in the connection head type B (DIN 43729) or larger.

The output signal is a direct current from 4 to 20 mA that is proportional to the temperature.

Parameterization is implemented over the PC using the parameterization software SIPROM T and the modem for SITRANS TH100/TH200. If you already have a "modem for SITRANS TK" (Article No. 7NG3190-6KB), you can continue using this to parameterize the SITRANS TH100.

Transmitters of the "intrinsically-safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX), as well as FM and CSA regulations.

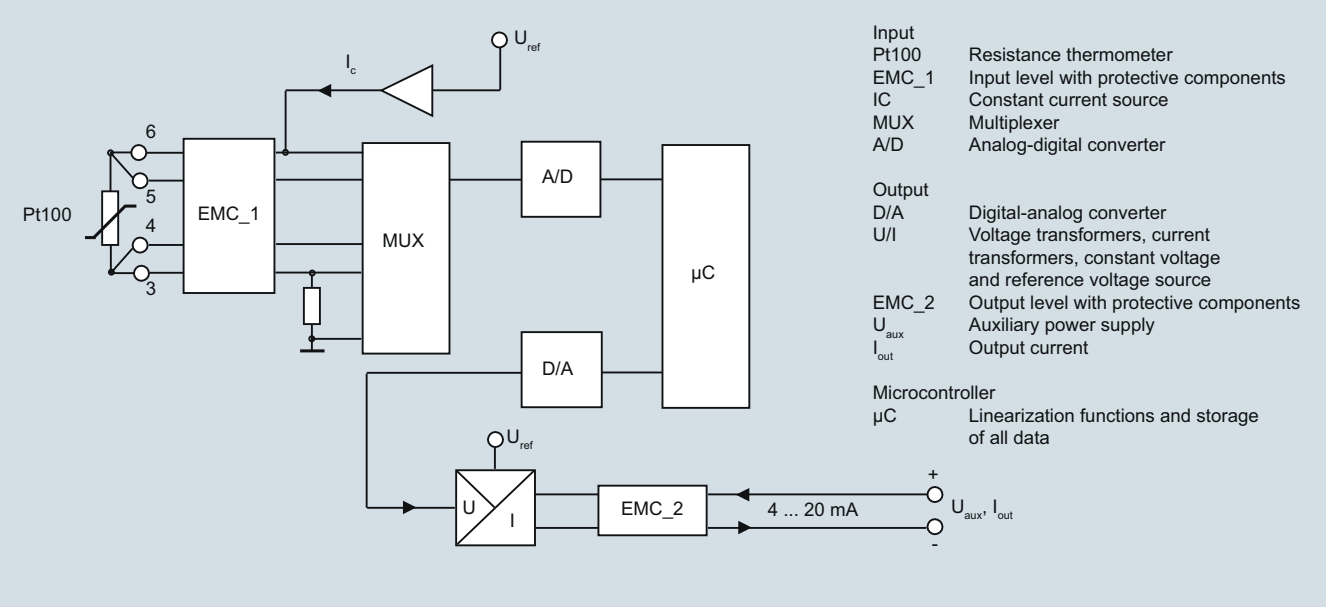
Function

Mode of operation

The measured signal supplied by a Pt100 resistance thermometer (2, 3 or 4-wire system) is amplified in the input stage. The voltage, which is proportional to the input variable, is then converted into digital signals by a multiplexer in an analog/digital converter. They are converted in the microcontroller in accordance with the sensor characteristics and further parameters (measuring range, damping, ambient temperature etc.).

The signal prepared in this way is converted in a digital/analog converter into a load-independent direct current of 4 to 20 mA.

An EMC filter protects the input and output circuits against electromagnetic interferences.



SITRANS TH100, function diagram

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SITRANS TH100 two-wire system (Pt100)

Technical specifications

Input	
Resistance thermometer	
Measured variable	Temperature
Sensor type	PT100 to IEC 60751
Characteristic curve	Temperature-linear
Type of connection	2-, 3- or 4-wire circuit
Resolution	14 bit
Measuring accuracy	
• Span <250 °C (450 °F)	< 0.25 °C (0.45 °F)
• Span >250 °C (450 °F)	< 0.1 % of span
Repeatability	< 0.1 °C (0.18 °F)
Measuring current	approx. 0.4 mA
Measuring cycle	< 0.7 s
Measuring range	-200 ... +850 °C -328 ... +1562 °F)
Measuring span	25 ... 1050 °C (77 ... 1922 °F)
Unit	°C or °F
Offset	programmable: -100 ... +100 °C (-180 ... +180 °F)
Line resistance	Max. 20 Ω (total from feeder and return conductor)
Noise rejection	50 and 60 Hz
Output	
Output signal	4 ... 20 mA, two-wire
Auxiliary power	8.5 ... 36 V DC (30 V for Ex ia and ib; 32 V for Ex nL/ic; 35 V for Ex nA)
Max. load	$(U_{aux}$ - 8.5 V)/0.023 A
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.84 ... 20.5 mA)
Error signal (following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default range: 3.6 mA or 22.8 mA)
Damping time	0 ... 30 s (default value: 0 s)
Protection	Against reversed polarity
Resolution	12 bit
Accuracy at 23 °C (73.4 °F)	< 0.1 % of span
Temperature effect	< 0.1 %/10 °C (0.1 %/18 °F)
Effect of auxiliary power	< 0.01 % of span/V
Effect of load impedance	< 0.025 % of max. span/100 Ω
Long-term drift	• < 0.025 % of the max. span in the first month • < 0.035 % of the max. span after one year • < 0.05 % of the max. span after 5 years
Ambient conditions	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	98 %, with condensation
Electromagnetic compatibility	According to EN 61326 and NAMUR NE21
Construction	
Weight	50 g
Dimensions	See dimensional drawing
Material	Molded plastic
Cross-section of cables	Max. 2.5 mm^2 (AWG 13)
Degree of protection to IEC 60529	
• Enclosure	IP40
• Terminals	IP00

Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	PTB 05 ATEX 2049X
• "Intrinsic gas safety" type of protection	II 1 G Ex ia IIC T6/T4 II (1) 2 G Ex ib [ia Ga] IIC T6/T4 Gb II (1) 3 G Ex ic [ia Ga] IIC T6/T4 Gc II 3 G Ex ic IIC T6/T4 Gc
• "Non-sparking" type of protection	II 3 G Ex nA IIC T6/T4 Gc II 3 G Ex nA[ic] IIC T6/T4 Gc
• "Intrinsic dust safety" type of protection	II 1 D Ex ia IIIC T115 °C Da
Explosion protection FM for USA **and** Canada ($_cFM_{US}$)	
• FM approval	PID 3024169
• Degree of protection	IS Cl I, II, III, Div 1, GP ABCDEFG T4/T5/T6 Cl I, ZN 0,1 AEx ia IIC T4/T5/T6 NI Cl I, II, III, Div 2, GP ABCDFG T4/T5/T6 Cl I, ZN 2, NI IIC T4/T5/T6
Other certificates	GOST, NEPSI, PESO
Software requirements for SIPROM T	
PC operating system	Windows ME, 2000, XP, Win 7 and Win 8; can also be used in connection with RS 232 modem under Windows 95, 98 and 98SE

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Selection and Ordering data

	Article No.
SITRANS TH100 temperature transmitters for Pt100 for installation in connection head, type B (DIN 43729), two-wire system, 4 ... 20 mA, programmable, without electrical isolation	
• Without explosion protection ► ⬟	**7NG3211-0NN00**
• With explosion protection "Intrinsic safety" type of protection and for zone 2	
- to ATEX ► ⬟	**7NG3211-0AN00**
- to FM ($_cFM_{US}$) ► ⬟	**7NG3211-0BN00**
Further designs Add "**-Z**" to Article No. and specify Order code(s)	Order code
Test report (5 measuring points)	**C11**
Customer-specific programming Add "**-Z**" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	**Y01**[1]
Measuring point no. (TAG), max. 8 characters	**Y17**[2]
Measuring point descriptor, max. 16 characters	**Y23**[2]
Pt100 (IEC) 2-wire, R_L = 0 Ω	**U02**[3]
Pt100 (IEC) 3-wire	**U03**[3]
Pt100 (IEC) 4-wire	**U04**[3]
Special differing customer-specific programming, specify in plain text	**Y09**[4]
Fail-safe value 3.6 mA (instead of 22,8 mA)	**U36**[2]
Accessories	Article No.
Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. SIPROM T parameterization software ► With USB connection	**7NG3092-8KU**
MiniDVD for temperature measuring instruments ► With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	**A5E00364512**
DIN rail adapters for head transmitters ► (Quantity delivered: 5 units)	**7NG3092-8KA**
Connecting cable 4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)	**7NG3092-8KC**

► Available ex stock.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
2) For this selection, Y01 or Y09 must also be selected.
3) For this selection, Y01 must also be selected.
4) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

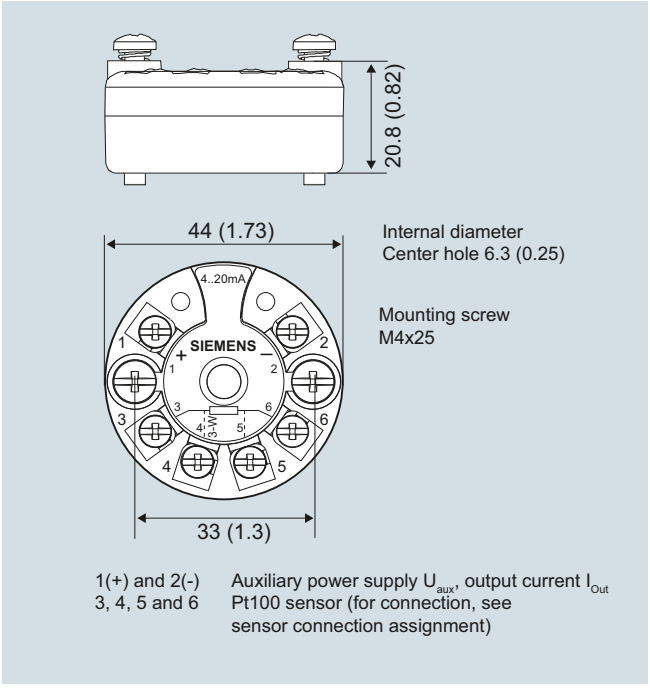
Ordering example

7NG3211-0NN00-Z Y01+Y23+U03
Y01: -10 ... +100 °C
Y23: TICA1234HEAT

Factory setting:

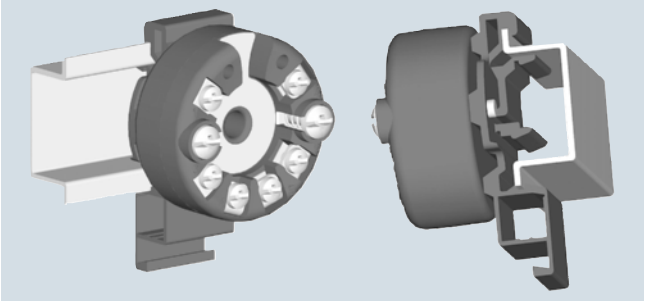
- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 … 100 °C (32 … 212 °C)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 C (0 °F)
- Damping 0.0 s

Dimensional drawings

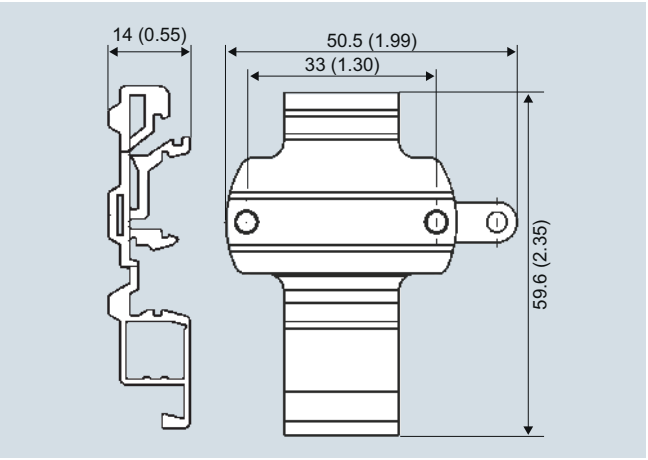


SITRANS TH100, dimensions in mm (inch)

Mounting on DIN rail



SITRANS TH100, mounting of transmitter on DIN rail



DIN rail adaptor, dimensions in mm (inch)

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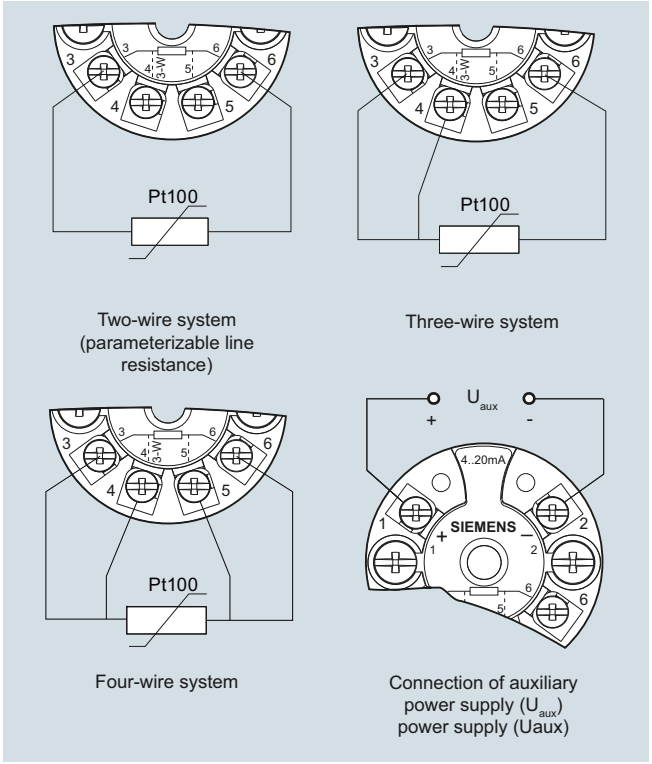
Schematics



SITRANS TH100, sensor connection assignment

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Overview

Ultra flexible - with the universal SITRANS TH200 transmitter

- Two-wire devices for 4 to 20 mA
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Configurable over PC

Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred type of installation
- Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring
  open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2 (with Order Code C20), SIL2/3 (with C23)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21

Application

SITRANS TH200 transmitters can be used in all industrial sectors. Due to their compact size they can be installed in the connection head type B (DIN 43729) or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic.

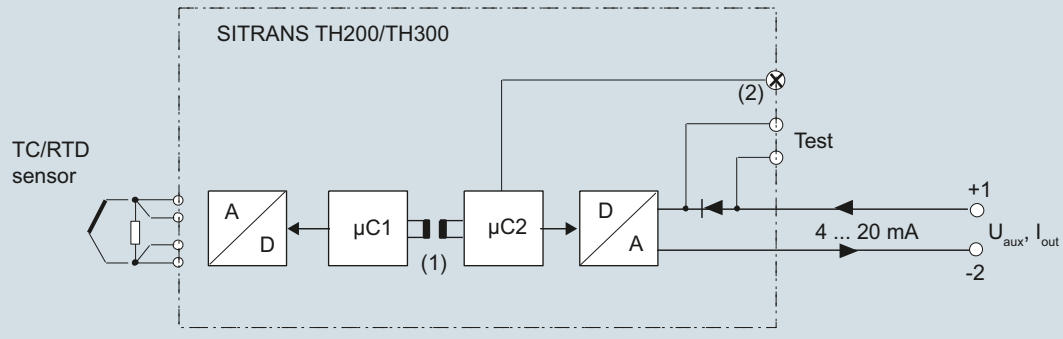
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX), as well as FM and CSA regulations.

Function

The SITRANS TH200 is configured over a PC. A USB or RS 232 modem is linked to the output terminals for this purpose. The configuration data can now be edited using the SIPROM T software tool. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



Input		Output			
A/D	Analog-digital converter	µC2	Microcontroller, primary circuit	(1)	Electrically isolated
Sensors	Resistance thermometer, thermocouple, resistance-based sensor, mV sensor	D/A	Digital-analog converter	(2)	LED
		U_{aux}	Auxiliary power supply		
µC1	Microcontroller, secondary circuit	I_{out}	Output current		

SITRANS TH200 function diagram

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Technical specifications

Input	
Resistance thermometer	
Measured variable	Temperature
Sensor type	
• to IEC 60751	Pt25 … Pt1000
• To JIS C 1604; a = 0.00392 K^{-1}	Pt25 … Pt1000
• to IEC 60751	Ni25 … Ni1000
• Special type	over special characteristic (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 identical resistance thermometers in 2-wire system for generation of average temperature
• Generation of difference	2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: ON)
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic
Resistance-based sensors	
Measured variable	Actual resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value
• Generation of difference	2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: OFF)
Measuring range	parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")
Min. measured span	5 Ω ... 25 Ω (see Table "Digital measuring errors")
Characteristic curve	Resistance-linear or special characteristic
Thermocouples	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
• Type C	W5 %-Re acc. to ASTM 988
• Type D	W3 %-Re acc. to ASTM 988
• Type E	NiCr-CuNi to DIN IEC 584
• Type J	Fe-CuNi to DIN IEC 584
• Type K	NiCr-Ni to DIN IEC 584
• Type L	Fe-CuNi to DIN 43710
• Type N	NiCrSi-NiSi to DIN IEC 584
• Type R	Pt13Rh-Pt to DIN IEC 584
• Type S	Pt10Rh-Pt to DIN IEC 584
• Type T	Cu-CuNi to DIN IEC 584
• Type U	Cu-CuNi to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Generation of average value	2 thermocouples (TC)
• Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60571 (2-wire or 3-wire connection)
• External fixed	Cold junction temperature can be set as fixed value
Measuring range	Parameterizable (see table "Digital measuring errors")
Min. measured span	Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")
Characteristic curve	Temperature-linear or special characteristic
mV sensor	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)
Units	mV
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off
Measuring range	-10 ... +70 mV-100 … +1100 mV

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Min. measured span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic
Output	
Output signal	4 ... 20 mA, 2-wire
Auxiliary power	11 ... 35 V DC ((to 30 V for Ex ia and ib; to 32 V for Ex nA / nL / ic)
Max. load	$(U_{aux} - 11\ V)/0.023\ A$
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.80 mA ... 20.5 mA)
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reversed polarity
Electrically isolated	Input against output (1 kV_{eff})
Measuring accuracy	
Digital measuring errors	See table "Digital measuring errors"
Reference conditions	
• Auxiliary power	24 V ± 1 %
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025 % of span
Error due to internal cold junction	< 0.5 °C (0.9 °F)
Influence of ambient temperature	
• Analog measuring error	0.02 % of span/10°C (18 °F)
• Digital measuring errors	
- with resistance thermometers	0.06 °C (0.11 °F)/10°C (18 °F)
- with thermocouples	0.6 °C (1.1 °F)/10°C (18 °F)
Auxiliary power effect	< 0.001 % of span/V
Effect of load impedance	< 0.002 % of span/100 Ω
Long-term drift	
• In the first month	< 0.02 % of span
• After one year	< 0.2 % of span
• After 5 years	< 0.3 % of span
Conditions of use	
Ambient conditions	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98 %, with condensation
Electromagnetic compatibility	acc. to EN 61326 and NE21
Construction	
Material	Molded plastic
Weight	50 g (0.11 lb)
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm² (AWG 13)
Degree of protection to IEC 60529	
• Enclosure	IP40
• Terminals	IP00

Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	PTB 05 ATEX 2040X
• "Intrinsic safety" type of protection	II 1 G Ex ia IIC T6/T4 II 2 (1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 1D Ex iaD 20 T115 °C
• "Operating equipment that is non-ignitable and has limited energy" type of protection	II 3 G Ex nL IIC T6/T4 II 3 G Ex nA IIC T6/T4
Explosion protection: FM for USA	
• FM approval	FM 3024169
• Degree of protection	IS / Cl I, II, III / Div 1 / GP ABCDEFG T6, T5, T4 Cl I / ZN 0 / AEx ia IIC T6, T5, T4 NI / Cl I / Div 2 / GP ABCDFG T6, T5, T4 NI / Cl I / ZN 2 / IIC T6, T5, T4
Explosion protection to FM for Canada ($_cFM_{US}$)	
• FM approval	FM 3024169C
• Degree of protection	IS / Cl I, II, III / Div 1/ GP ABCDEFG T6, T5, T4 NI / Cl I / DIV 2 / GP ABCD T6, T5, T4 NIFW / Cl I, II, III / DIV 2 / GP ABCDFG T6, T5, T4 DIP / Cl II, III / Div 2 / GP FG T6, T5, T4 Cl I / ZN 0 / Ex ia IIC T6, T5, T4 Cl I / ZN 2 / Ex nA nL IIC T6, T5, T4
Other certificates	GOST, NEPSI, PESO, IEC, EXPOLABS
Software requirements for SIPROM T	
PC operating system	Windows ME, 2000, XP, Win 7 and Win 8; can also be used in connection with RS 232 modem under Windows 95, 98 and 98SE

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

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Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. measured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 ... Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensors

Input	Measuring range	Min. measured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 ... 390	5	0.05
Resistance	0 ... 2200	25	0.25

Thermocouples

Input	Measuring range		Min. measured span		Digital accuracy
	°C/(°F)	°C	(°F)	°C	(°F)
Type B	0 ... 1820 (32 ... 3308)	100	(180)	2[1]	(3.60)[1]
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.60)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1[2]	(1.80)[2]
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.80)
Type J	-210 ... +1200 (-346 ... +2192)	50	(90)	1	(1.80)
Type K	-230 ... +1370 (-382 ... +2498)	50	(90)	1	(1.80)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.80)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.80)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.60)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.60)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.80)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.60)

[1] The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

[2] The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range	Min. measured span	Digital accuracy
	mV	mV	µV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

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Selection and Ordering data		Article No.
Temperature transmitter SITRANS TH200		
for installation in connection head, type B (DIN 43729), two-wire system, 4 ... 20 mA, programmable, with electrical isolation		
• Without explosion protection	▶ ⬟	**7NG3211-1NN00**
• With explosion protection		
- to ATEX	▶ ⬟	**7NG3211-1AN00**
- to FM ($_cFM_{US}$)	▶ ⬟	**7NG3211-1BN00**
Further designs		Order code
Add "**-Z**" to Article No. and specify Order code(s)		
With test protocol (5 measuring points)		**C11**
Functional safety SIL2		**C20**
Functional safety SIL2/3		**C23**
Customer-specific programming		
Add "**-Z**" to Article No. and specify Order code(s)		
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F		**Y01**[1]
Measuring point no. (TAG), max. 8 characters		**Y17**[2]
Measuring point descriptor, max. 16 characters		**Y23**[2]
Measuring point message, max. 32 characters		**Y24**[2]
Pt100 (IEC) 2-wire, R_L = 0 Ω		**U02**[3]
Pt100 (IEC) 3-wire		**U03**[3]
Pt100 (IEC) 4-wire		**U04**[3]
Thermocouple type B		**U20**[3][4]
Thermocouple type C (W5)		**U21**[3][4]
Thermocouple type D (W3)		**U22**[3][4]
Thermocouple type E		**U23**[3][4]
Thermocouple type J		**U24**[3][4]
Thermocouple type K		**U25**[3][4]
Thermocouple type L		**U26**[3][4]
Thermocouple type N		**U27**[3][4]
Thermocouple type R		**U28**[3][4]
Thermocouple type S		**U29**[3][4]
Thermocouple type T		**U30**[3][4]
Thermocouple type U		**U31**[3][4]
With TC: CJC external (Pt100, 3-wire)		**U41**
With TC: CJC external with fixed value, specify in plain text		**Y50**
Special differing customer-specific programming, specify in plain text		**Y09**[5]
Fail-safe value 3.6 mA (instead of 22,8 mA)		**U36**[2]
Cable extension Transmitter with installed cable extension 200 mm (7.81 inch), for Pt100 in four-wire system		**W01**

Accessories		Article No.
Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. SIPROM T parameterization software With USB connection	▶	**7NG3092-8KU**
MiniDVD for temperature measuring instruments With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	▶	**A5E00364512**
DIN rail adapters for head transmitters (Quantity delivered: 5 units)	▶	**7NG3092-8KA**
Connecting cable 4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)		**7NG3092-8KC**

▶ Available ex stock.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

2) For this selection, Y01 or Y09 must also be selected.

3) For this selection, Y01 must also be selected.

4) Internal cold junction compensation is selected as the default for TC.

5) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

Ordering example 1:

7NG3211-1NN00-Z Y01+Y17+U03
Y01: -10 ... +100 °C
Y17: TICA123

Ordering example 2:

7NG3211-1NN00-Z Y01+Y23+U25
Y01: -10 ... +100 °C
Y23: TICA1234HEAT

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 … 100 °C (32 … 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

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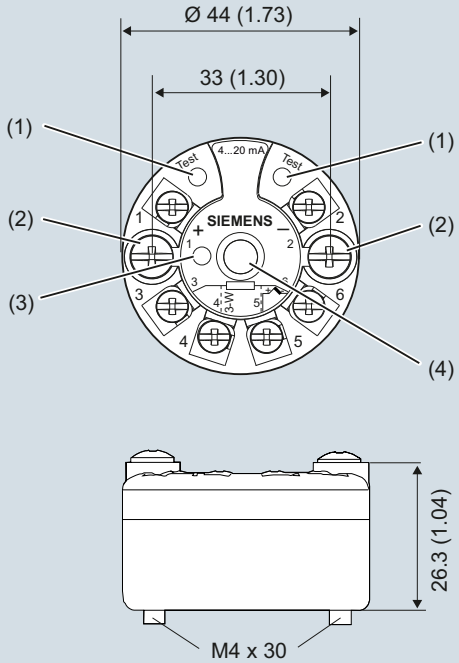
2

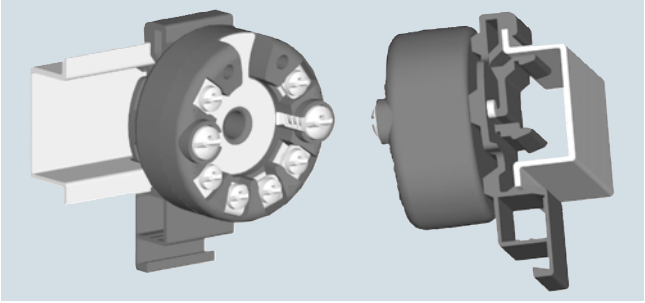
Dimensional drawings



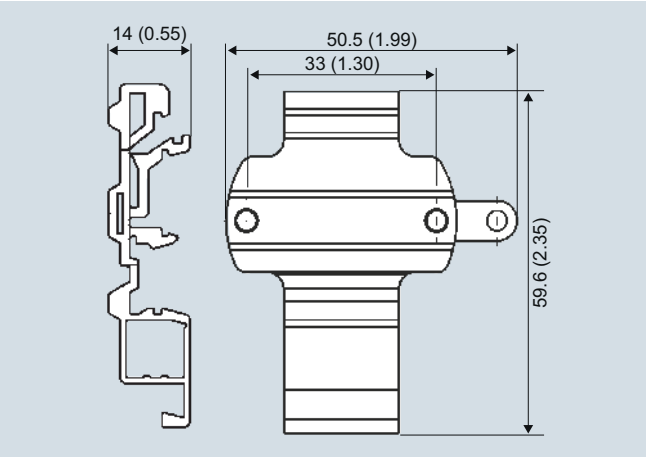
1(+) and 2(-)	Auxiliary power supply U_{aux}, output current I_{Out}
3, 4, 5 and 6	Pt100 sensor (for connections, see Sensor connection assignment)
Test (+), Test (-)	Measurement of the output current with a multimeter
(1)	Test terminal
(2)	Mounting screw M4x30
(3)	LED for operation indication
(4)	Internal diameter of center hole 6.3 (0.25)

SITRANS TH200, dimensions and pin assignment, dimensions in mm (inch)

Mounting on DIN rail



SITRANS TH200, mounting of transmitter on DIN rail



DIN rail adapter, dimensions in mm (inch)

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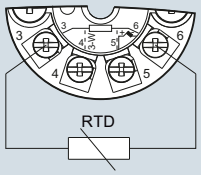
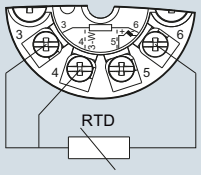
Schematics

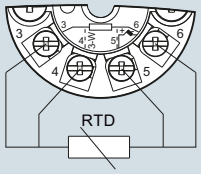
Resistance thermometer



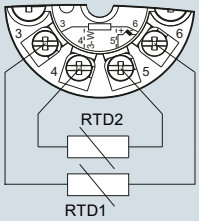
Two-wire system [1)]



Three-wire system

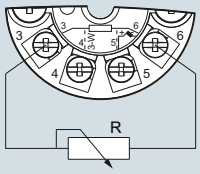


Four-wire system

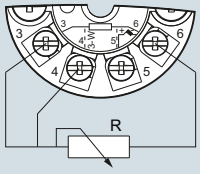


Generation of average value / difference [1)]

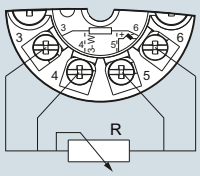
Resistance



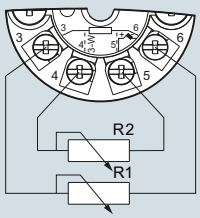
Two-wire system [1)]



Three-wire system

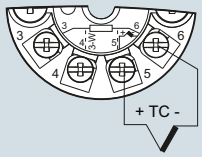


Four-wire system

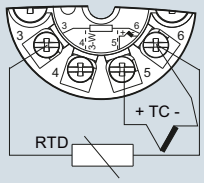


Generation of average value / difference [1)]

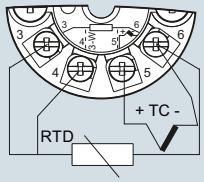
Thermocouple



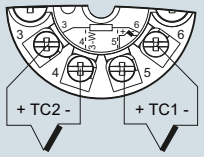
Cold junction compensation
Internal/fixed value



Cold junction compensation with external Pt100 in two-wire system [1)]



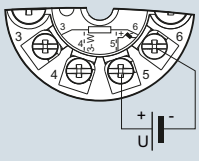
Cold junction compensation with external Pt100 in three-wire system



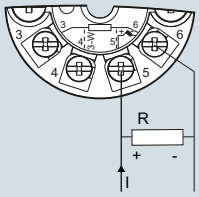
Generation of average value / difference with internal cold junction compensation

[1)] Programmable line resistance for the purpose of correction.

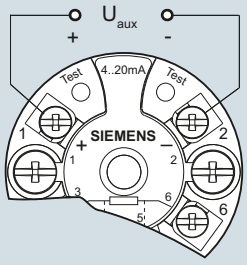
Voltage measurement



Current measurement



Connection of auxiliary power supply (U_{aux})



SITRANS TH200, sensor connection assignment

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SITRANS TH300 two-wire system, universal, HART

Overview

"HART" to beat - the universal SITRANS TH300 transmitter

- Two-wire devices for 4 to 20 mA, HART
- Mounting in the connection head of the temperature sensor
- Universal input for virtually any type of temperature sensor
- Configurable over HART

Benefits

- Compact design
- Flexible mounting and center hole allow you to select your preferred type of installation
- Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring
  open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- SIL2 (with Order Code C20), SIL2/3 (with C23)
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21

Application

SITRANS TH300 transmitters can be used in all industrial sectors. Due to their compact size they can be installed in the connection head type B (DIN 43729) or larger. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic, superimposed by the digital HART signal.

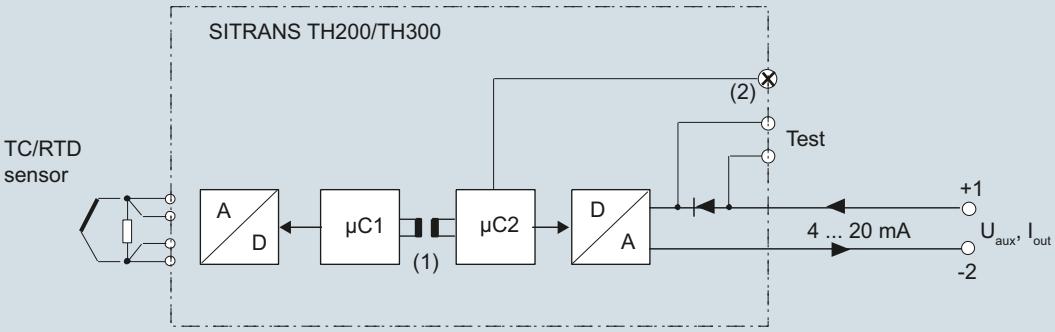
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX), as well as FM and CSA regulations.

Function

The SITRANS TH300 is configured over HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



Input		Output		(1)	Electrically isolated
A/D	Analog-digital converter	µC2	Microcontroller, primary circuit	(2)	LED
Sensors	Resistance thermometer, thermocouple, resistance-based sensor, mV sensor	D/A	Digital-analog converter		
		U_{aux}	Auxiliary power supply		
µC1	Microcontroller, secondary circuit	I_{out}	Output current		

SITRANS TH 300 function diagram

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Technical specifications

Input	
Resistance thermometer	
Measured variable	Temperature
Sensor type	
• to IEC 60751	Pt25 … Pt1000
• To JIS C 1604; a = 0.00392 K^{-1}	Pt25 … Pt1000
• to IEC 60751	Ni25 … Ni1000
• Special type	over special characteristic (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 identical resistance thermometers in 2-wire system for generation of average temperature
• Generation of difference	2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: ON)
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic
Resistance-based sensors	
Measured variable	Actual resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value
• Generation of difference	2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: OFF)
Measuring range	parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")
Min. measured span	5 ... 25 Ω (see table "Digital measuring errors")
Characteristic curve	Resistance-linear or special characteristic
Thermocouples	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
• Type C	W5 %-Re acc. to ASTM 988
• Type D	W3 %-Re acc. to ASTM 988
• Type E	NiCr-CuNi to DIN IEC 584
• Type J	Fe-CuNi to DIN IEC 584
• Type K	NiCr-Ni to DIN IEC 584
• Type L	Fe-CuNi to DIN 43710
• Type N	NiCrSi-NiSi to DIN IEC 584
• Type R	Pt13Rh-Pt to DIN IEC 584
• Type S	Pt10Rh-Pt to DIN IEC 584
• Type T	Cu-CuNi to DIN IEC 584
• Type U	Cu-CuNi to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Generation of average value	2 thermocouples (TC)
• Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60571 (2-wire or 3-wire connection)
• External fixed	Cold junction temperature can be set as fixed value
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")
Characteristic curve	Temperature-linear or special characteristic
mV sensor	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)
Units	mV
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off

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SITRANS TH300 two-wire system, universal, HART

Measuring range	-10 ... +70 mV -100 … +1100 mV
Min. measured span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic
Output	
Output signal	4 ... 20 mA, 2-wire with communication acc. to HART Rev. 5.9
Auxiliary power	11 ... 35 V DC (to 30 V for Ex ia and ib; to 32 V for Ex nA/nL/ic)
Max. load	$(U_{aux} - 11\ V)/0.023\ A$
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.80 mA ... 20.5 mA)
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reversed polarity
Electrically isolated	Input against output (1 kV_{eff})
Measuring accuracy	
Digital measuring errors	See Table "Digital measuring errors"
Reference conditions	
• Auxiliary power	24 V ± 1 %
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025 % of span
Error due to internal cold junction	< 0.5 °C (0.9 °F)
Influence of ambient temperature	
• Analog measuring error	0.02 % of span/10°C (18 °F)
• Digital measuring errors	
- with resistance thermometers	0.06 °C (0.11 °F)/10°C (18 °F)
- with thermocouples	0.6 °C (1.1 °F)/10°C (18 °F)
Auxiliary power effect	< 0.001 % of span/V
Effect of load impedance	< 0.002 % of span/100 Ω
Long-term drift	
• In the first month	< 0.02 % of span
• After one year	< 0.2 % of span
• After 5 years	< 0.3 % of span
Conditions of use	
Ambient conditions	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98 %, with condensation
Electromagnetic compatibility	acc. to EN 61326 and NE21

Construction	
Material	Molded plastic
Weight	50 g (0.11 lb)
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm^2 (AWG 13)
Degree of protection to IEC 60529	
• Enclosure	IP40
• Terminals	IP00
Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	PTB 05 ATEX 2040X
• "Intrinsic safety" type of protection	II 1 G Ex ia IIC T6/T4 II 2 (1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 1D Ex iaD 20 T115 °C
• "Operating equipment that is non-ignitable and has limited energy" type of protection	II 3 G Ex nL IIC T6/T4 II 3 G Ex nA IIC T6/T4
Explosion protection: FM for USA	
• FM approval	FM 3024169
• Degree of protection	IS / Cl I, II, III / Div 1 / GP ABCDEFG T6, T5, T4 Cl I / ZN 0 / AEx ia IIC T6, T5, T4 NI / Cl I / Div 2 / GP ABCDFG T6, T5, T4 NI / Cl I / ZN 2 / IIC T6, T5, T4
Explosion protection to FM for Canada ($_cFM_{US}$)	
• FM approval	FM 3024169C
• Degree of protection	IS / Cl I, II, III / Div 1/ GP ABCDEFG T6, T5, T4 NI / Cl I / DIV 2 / GP ABCD T6, T5, T4 NIFW / Cl I, II, III / DIV 2 / GP ABCDFG T6, T5, T4 DIP / Cl II, III / Div 2 / GP FG T6, T5, T4 Cl I / ZN 0 / Ex ia IIC T6, T5, T4 Cl I / ZN 2 / Ex nA nL IIC T6, T5, T4
Other certificates	GOST, NEPSI, PESO, IEC, EXPOLABS

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

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Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. measured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 to Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensors

Input	Measuring range	Min. measured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 ... 390	5	0.05
Resistance	0 ... 2200	25	0.25

Thermocouples

Input	Measuring range	Min. measured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
Type B	0 ... 1820 (32 ... 3308)	100	(180)	2[1]	(3.60)[1]
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.60)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1[2]	(1.80)[2]
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.80)
Type J	-210 ... +1200 (-346 ... +2192)	50	(90)	1	(1.80)
Type K	-230 ... +1370 (-382 ... +2498)	50	(90)	1	(1.80)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.80)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.80)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.60)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.60)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.80)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.60)

[1] The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

[2] The digital accuracy in the range 1750 to 2300 (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range	Min. measured span	Digital accuracy
	mV	mV	µV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

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SITRANS TH300 two-wire system, universal, HART

Selection and Ordering data	Article No.
Temperature transmitter SITRANS TH300	
for installation in connection head, type B (DIN 43729), two-wire system 4 ... 20 mA, communication capable to HART, with galvanic isolation	
• Without explosion protection ► ⬟	**7NG3212-0NN00**
• With explosion protection	
- to ATEX ► ⬟	**7NG3212-0AN00**
- to FM ($_{C}FM_{US}$) ► ⬟	**7NG3212-0BN00**
Further designs	Order code
Add "**-Z**" to Article No. and specify Order code(s)	
with test protocol (5 measuring points)	**C11**
Functional safety SIL2	**C20**
Functional safety SIL2/3	**C23**
Customer-specific programming	
Add "**-Z**" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	**Y01**[1]
Measuring point no. (TAG), max. 8 characters	**Y17**[2]
Measuring point descriptor, max. 16 characters	**Y23**[2]
Measuring point message, max. 32 characters	**Y24**[2]
Pt100 (IEC) 2-wire, R_L = 0 Ω	**U02**[3]
Pt100 (IEC) 3-wire	**U03**[3]
Pt100 (IEC) 4-wire	**U04**[3]
Thermocouple type B	**U20**[3][4]
Thermocouple type C (W5)	**U21**[3][4]
Thermocouple type D (W3)	**U22**[3][4]
Thermocouple type E	**U23**[3][4]
Thermocouple type J	**U24**[3][4]
Thermocouple type K	**U25**[3][4]
Thermocouple type L	**U26**[3][4]
Thermocouple type N	**U27**[3][4]
Thermocouple type R	**U28**[3][4]
Thermocouple type S	**U29**[3][4]
Thermocouple type T	**U30**[3][4]
Thermocouple type U	**U31**[3][4]
With TC: CJC external (Pt100, 3-wire)	**U41**
With TC: CJC external with fixed value, specify in plain text	**Y50**
Special differing customer-specific programming, specify in plain text	**Y09**[5]
Fail-safe value 3.6 mA (instead of 22,8 mA)	**U36**[2]
Cable extension Transmitter with installed cable extension 200 mm (7.87 inch), for Pt100 in four-wire system	**W01**

Accessories	Article No.
MiniDVD for temperature measuring instruments ►	**A5E00364512**
With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	
HART modem	
• With USB connection ►	**7MF4997-1DB**
SIMATIC PDM operating software	**See Section 8**
DIN rail adapters for head transmitters	**7NG3092-8KA**
(Quantity delivered: 5 units)	
Connecting cable	**7NG3092-8KC**
4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)	

► Available ex stock.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

2) For this selection, Y01 or Y09 must also be selected.

3) For this selection, Y01 must also be selected.

4) Internal cold junction compensation is selected as the default for TC.

5) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

Ordering example 1:

7NG3212-0NN00-Z Y01+Y17+U03
Y01: -10 ... +100 °C
Y17: TICA123

Ordering example 2:

7NG3212-0NN00-Z Y01+Y23+U25
Y01: -10 ... +100 °C
Y23: TICA1234HEAT

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

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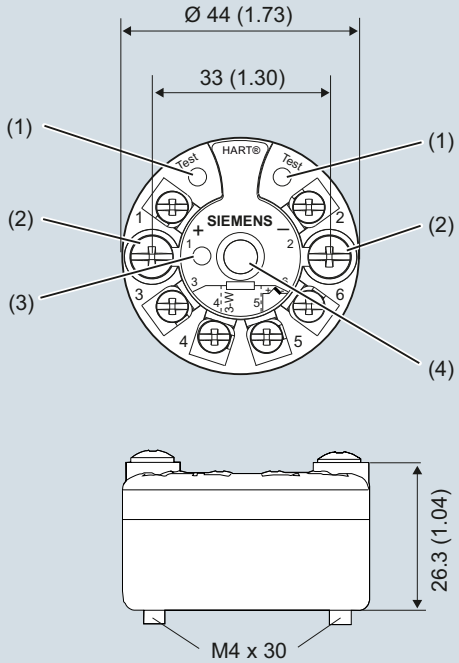
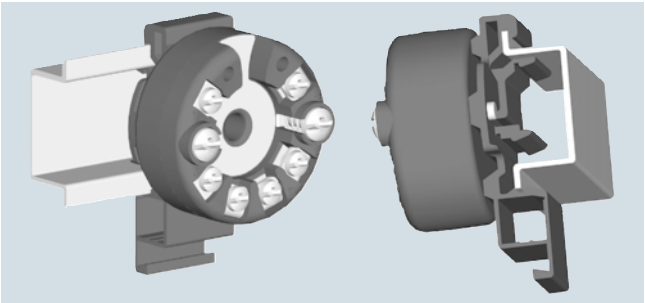
Dimensional drawings



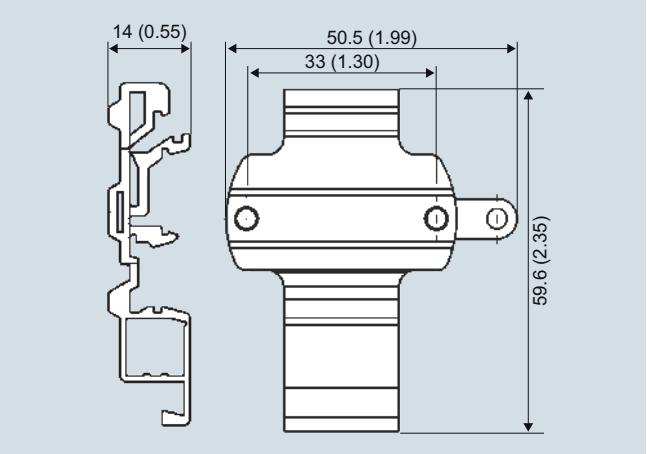
1(+) and 2(-)	Auxiliary power supply U_{aux}, output current I_{Out}
3, 4, 5 and 6	Pt100 sensor (for connections, see Sensor connection assignment)
Test (+), Test (-)	Measurement of the output current with a multimeter
(1)	Test terminal
(2)	Mounting screw M4x30
(3)	LED for operation indication
(4)	Internal diameter of center hole 6.3 (0.25)

SITRANS TH300, dimensions and pin assignment, dimensions in mm (inch)

Mounting on DIN rail



SITRANS TH300, mounting of transmitter on DIN rail



DIN rail adapter, dimensions in mm (inch)

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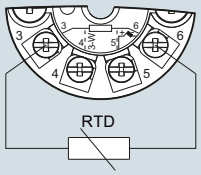
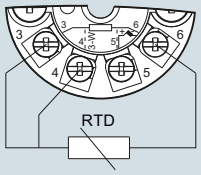
2

Schematics

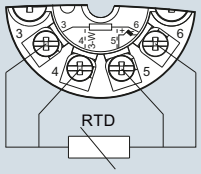
Resistance thermometer



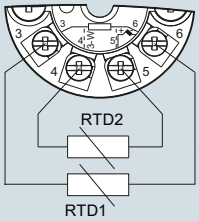
Two-wire system [1)]



Three-wire system

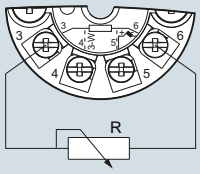


Four-wire system

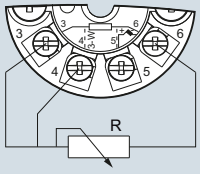


Generation of average value / difference [1)]

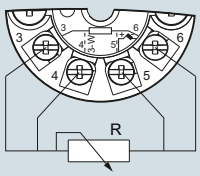
Resistance



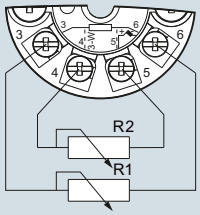
Two-wire system [1)]



Three-wire system

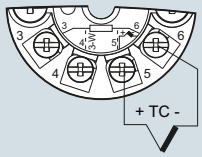


Four-wire system

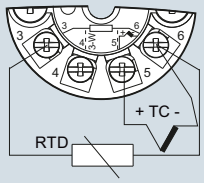


Generation of average value / difference [1)]

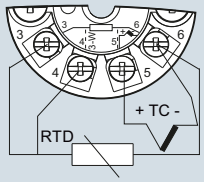
Thermocouple



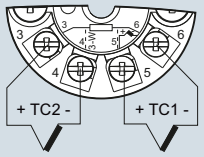
Cold junction compensation
Internal/fixed value



Cold junction compensation with external Pt100 in two-wire system [1)]



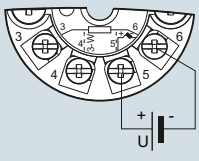
Cold junction compensation with external Pt100 in three-wire system



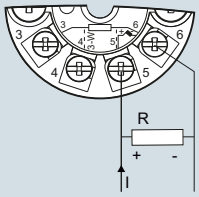
Generation of average value / difference with internal cold junction compensation

[1)] Programmable line resistance for the purpose of correction.

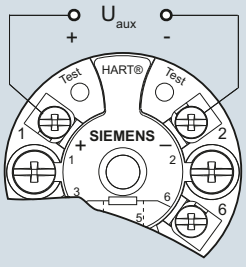
Voltage measurement



Current measurement



Connection of auxiliary power supply (U_{aux})



SITRANS TH300, sensor connection assignment

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Overview

SITRANS TH400 fieldbus transmitters

Versions:

- For FOUNDATION fieldbus
- For PROFIBUS PA

The SITRANS TH400 temperature transmitter is a small field bus transmitter for mounting in the connection head of form B. Extensive functionality enables the temperature transmitter to be precisely adapted to the plant's requirements. Operation is very simple in spite of the numerous setting options. Thanks to its universal concept it can be used in all industries and is easy to integrate in the context of Totally Integrated Automation applications.

Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX), as well as FM and CSA regulations.

Installing SITRANS TH400 in temperature sensors turns them into complete, bus-capable measuring points; compact - and in a single device.

Application

- Linearized temperature measurement with resistance thermometers or thermal elements
- Differential, mean-value or redundant temperature measurement with resistance thermometers or thermal elements
- Linear resistance and bipolar millivolt measurements
- Differential, mean-value or redundant resistance and bipolar millivolt measurements

Function

Features

- Mounting in connection head, type B, to DIN 43729, or larger
- Polarity-neutral bus connection
- 24-bit analog-digital converter for high resolution
- Electrically isolated
- Intrinsically-safe version for use in potentially explosive areas
- Special characteristic
- Sensor redundance

With PROFIBUS PA communication

- Function blocks: 2 x analog

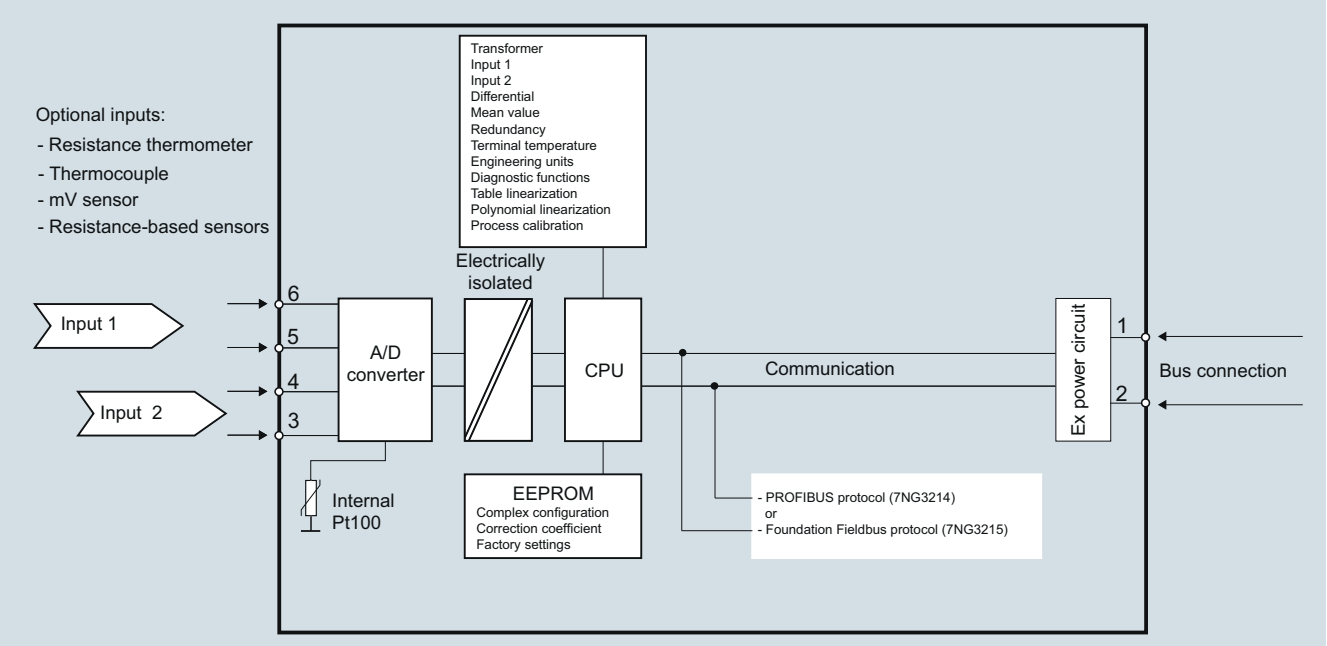
With FOUNDATION fieldbus communication

- Function blocks: 2 x analog and 1 x PID
- Functionality: Basic or LAS

Mode of operation

The following function diagram explains the mode of operation of the transmitter.

The only difference between the two versions of the SITRANS TH400 (7NG3214-... and 7NG3215-...) is the type of fieldbus protocol used (PROFIBUS PA or FOUNDATION fieldbus).



SITRANS TH400, function diagram

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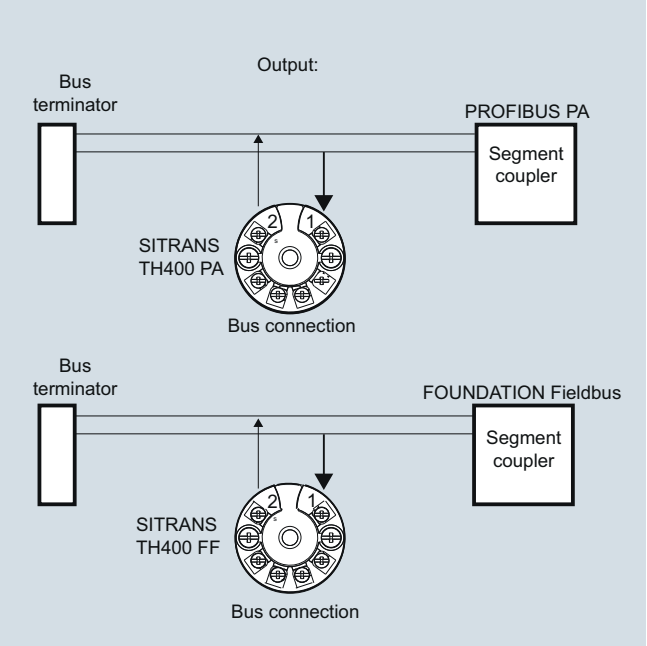
SITRANS TH400 fieldbus transmitter

System communication



SITRANS TH400, communication interface

Technical specifications

Input	
Analog-to-digital conversion	
• Measurement rate	< 50 ms
• Resolution	24-bit
Resistance thermometer	
Pt25 ... Pt1000 to IEC 60751/JIS C 1604	
• Measuring range	-200 ... +850 °C (-328 ... +1562 °F)
Ni25 ... Ni1000 to DIN 43760	
• Measuring range	-60 ... +250 °C (-76 ... +482 °F)
Cu10 ... Cu1000, α = 0.00427	
• Measuring range	-50 ... +200 °C (-58 ... +392 °F)
Line resistance per sensor cable	Max. 50 Ω
Sensor current	Nominal 0.2 mA
Sensor fault detection	
• Sensor break detection	Yes
• Sensor short-circuit detection	Yes, < 15 Ω
Resistance-based sensors	
Measuring range	0 Ω ... 10 kΩ
Line resistance per sensor cable	Max. 50 Ω
Sensor current	Nominal 0.2 mA
Sensor fault detection	
• Sensor break detection	Yes
• Sensor short-circuit detection	Yes, < 15 Ω
Thermocouple	
to IEC 584	Measuring range
• Type B	400 .. +1820 °C (752 ... 3308 °F)
• Type E	-100 ... +1000 °C (-148 ... +1832 °F)
• Type J	-100 ... +1000 °C (-148 ... +1832 °F)
• Type K	-100 ... +1200 °C (-148 ... +2192 °F)
• Type N	-180 ... +1300 °C (-292 ... +2372 °F)
• Type R	-50 ... +1760 °C (-58 ... +3200 °F)
• Type S	-50 ... +1760 °C (-58 ... +3200 °F)
• Type T	-200 ... +400 °C (-328 ... +752 °F)
to DIN 43710	
• Type L	-200 ... +900 °C (-328 ... +1652 °F)
• Type U	-200 ... +600 °C (-328 ... +1112 °F)
to ASTM E988-90	
• Type W3	0 ... 2300 °C (32 ... +4172 °F)
• Type W5	0 ... 2300 °C (32 ... +4172 °F)
External cold junction compensation	-40 ... +135 °C (-40 ... +275 °F)
Sensor fault detection	
• Sensor break detection	Yes
• Sensor short-circuit detection	Yes, < 3 mV
• Sensor current in the event of open-circuit monitoring	4 µA
mV sensor - voltage input	
Measuring range	-800 ... +800 mV
Input resistance	10 MΩ
Output	
Filter time (programmable)	0 ... 60 s
Update time	< 400 ms

Measuring accuracy

Accuracy is defined as the higher value of general values and basic values.

General values

Type of input	Absolute accuracy	Temperature coefficient
All	≤ ± 0.05 % of the measured value	≤ ± 0.002 % of the measured value/°C

Basic values

Type of input	Basic accuracy	Temperature coefficient
Pt100 and Pt1000	≤ ± 0.1 °C	≤ ± 0.002 °C/°C
Ni100	≤ ± 0.15 °C	≤ ± 0.002 °C/°C
Cu10	≤ ± 1.3 °C	≤ ± 0.02 °C/°C
Resistance-based sensors	≤ ± 0.05 Ω	≤ ± 0.002 Ω/°C
Voltage source	≤ ± 10 µV	≤ ± 0.2 % µV/°C
Thermocouple, type: E, J, K, L, N, T, U	≤ ± 0.5 °C	≤ ± 0.01 °C/°C
Thermocouple, type: B, R, S, W3, W5	≤ ± 1 °C	≤ ± 0.025 °C/°C
Cold junction compensation	≤ ± 0.5 °C	

Reference conditions	
Warming-up time	30 s
Signal-to-noise ratio	Min. 60 dB
Calibration condition	20 ... 28 °C (68 ... 82 °F)

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Conditions of use	
Ambient conditions	
Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Permissible storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	≤ 98 %, with condensation
Insulation resistance	
• Test voltage	500 V AC for 60 s
Mechanical testing	
• Vibrations (DIN class B) to	IEC 60068-2-6 and IEC 60068-2-64 4 g/2 ... 100 Hz
Electromagnetic compatibility	
EMC noise voltage influence	< ± 0.1 % of span
Extended EMC noise immunity: NAMUR NE 21, criterion A, Burst	< ± 1 % of span
EMC 2004/108/EC Emission and Noise Immunity to	EN 61326
Construction	
Material	Molded plastic
Weight	55 g (0.12 lb)
Dimensions	See Dimensional drawings
Cross-section of cables	Max. 2.5 mm^2 (AWG 13)
Degree of protection	
• Transmitter enclosure	IP40
• Terminal	IP00
Auxiliary power	
Power supply	
• Standard, Ex "nA", Ex "nL", NI	9.0 ... 32 V DC
• ATEX, FM, UL and CSA	9.0 ... 30 V DC
• In FISCO/FNICO installations	9.0 ... 17.5 V DC
Power consumption	< 11 mA
Max. increase in power consumption in the event of a fault	< 7 mA

Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	KEMA 06 ATEX 0264
• "Intrinsic safety" type of protection	II 1 G Ex ia IIC T4...T6 II 2(1) G Ex ib[ia] IIC T4...T6 II 1 D Ex iaD
EC type test certificate	KEMA 06 ATEX 0263 X
• Type of protection for "equipment is non-arcing"	II 3 GD Ex nA[nL] IIC T4...T6 II 3 GD Ex nL IIC T4...T6 II 3 GD Ex nA[ic] IIC T4...T6 II 3 GD Ex ic IIC T4...T6
Explosion protection: FM for USA	
• FM approval	FM 3027985
• Degree of protection	• IS Class I, Div 1, Groups A, B, C, D T4/T5/T6, FISCO • IS Class I, Zone 0, AEx ia, IIC T4/T5/T6, FISCO • NI Class I, Div 2, Groups A, B, C, D T4/T5/T6, FNICO
Explosion protection CSA for Canada	
• CSA approval	CSA 1861385
• Degree of protection	• IS Class I, Div 1, Groups A, B, C, D T4/T5/T6 • Ex ia IIC T4/T5/T6 and Ex ib [ia] IIC T4/T5/T6 • NI Class I, Div 2, Groups A, B, C, D T4/T5/T6 • Ex nA II T4/T5/T6
Other certificates	GOST, PESO
Communication	
Parameterization interface	
• PROFIBUS PA connection	
- Protocol	Profile 3.0
- Address (for delivery)	126
• FOUNDATION fieldbus connection	
- Protocol	FF protocol
- Functionality	Basic or LAS
- Version	ITK 4.6
- Function blocks	2 x analog and 1 x PID
Factory setting	
only for SITRANS TH400 PA	
Sensor	Pt100 (IEC)
Type of connection	3-wire circuit
Unit	°C
Failure mode	Last valid value
Filter time	0 s
PA address	126
PROFIBUS Ident No.	Manufacturer-specific
only for SITRANS TH400 FF	
Sensor	Pt100 (IEC)
Type of connection	3-wire circuit
Unit	°C
Failure mode	Last valid value
Filter time	0 s
Node address	22

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SITRANS TH400 fieldbus transmitter

Selection and Ordering data	Article No.
Temperature transmitter SITRANS TH400	
for installation in connection head, with electrical isolation, order operating instructions separately.	
• Bus-compatible to PROFIBUS PA	
- No explosion protection or Zone 2/Div 2 to ATEX/FM/CSA/IECEX/NEPSI ► ⬟	**7NG3214-0NN00**
- With explosion protection "Intrinsically safe to ATEX/FM/CSA/IECEX/NEPSI" ► ⬟	**7NG3214-0AN00**
• Bus-compatible to FOUNDATION Fieldbus	
- No explosion protection or Zone 2/Div 2 to ATEX/FM/CSA/IECEX/NEPSI ► ⬟	**7NG3215-0NN00**
- With explosion protection "Intrinsically safe to ATEX/FM/CSA/IECEX/NEPSI" ► ⬟	**7NG3215-0AN00**
Further designs	Order code
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
With test protocol (5 measuring points)	**C11**
Customer-specific programming	
Add "**-Z**" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	**Y01**[1]
Measuring point no. (TAG), max. 32 characters	**Y17**[2]
Measuring point descriptor, max. 32 characters	**Y23**[2]
Measuring point message, max. 32 characters	**Y24**[2]
Bus address, specify in plain text	**Y25**[2]
Pt100 (IEC) 2-wire, R_L = 0 Ω	**U02**[3]
Pt100 (IEC) 3-wire	**U03**[3]
Pt100 (IEC) 4-wire	**U04**[3]
Thermocouple type B	**U20**[3][4]
Thermocouple type C (W5)	**U21**[3][4]
Thermocouple type D (W3)	**U22**[3][4]
Thermocouple type E	**U23**[3][4]
Thermocouple type J	**U24**[3][4]
Thermocouple type K	**U25**[3][4]
Thermocouple type L	**U26**[3][4]
Thermocouple type N	**U27**[3][4]
Thermocouple type R	**U28**[3][4]
Thermocouple type S	**U29**[3][4]
Thermocouple type T	**U30**[3][4]
Thermocouple type U	**U31**[3][4]
With TC: CJC external (Pt100, 3-wire)	**U41**
With TC: CJC external with fixed value, specify in plain text	**Y50**
Special differing customer-specific programming, specify in plain text	**Y09**[5]

Accessories	Article No.
MiniDVD for temperature measuring instruments ►	**A5E00364512**
With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	
SIMATIC PDM operating software	**See Chapter 8**
DIN rail adapters for head transmitters	**7NG3092-8KA**
(Quantity delivered: 5 units)	
Connecting cable	**7NG3092-8KC**
4-wire, 150 mm, for sensor connections when using head transmitters in the high hinged cover (set with 5 units)	
for additional PA components	**See Catalog IK PI**

► Available ex stock.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

2) For this selection, Y01 or Y09 must also be selected.

3) For this selection, Y01 must also be selected.

4) Internal cold junction compensation is selected as the default for TC.

5) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Ordering example 1:

7NG3214-0NN00-Z Y01+Y17+U03
Y01: 0...100 °C
Y17: TICA1234HEAT

Ordering example 2:

7NG3214-0NN00-Z Y01+Y17+Y25+U25
Y01: 0...500 °C
Y17: TICA5678HEAT
Y25: 33

Factory setting:

- For SITRANS TH400 PA:
  - Pt100 (IEC 751) with 3-wire circuit
  - Unit: °C
  - Failure mode: Last valid value
  - Filter time: 0 s
  - PA address: 126
  - PROFIBUS Ident No.: Manufacturer-specific
- For SITRANS TH400 FF:
  - Pt100 (IEC 751) with 3-wire circuit
  - Unit: °C
  - Failure mode: Last valid value
  - Filter time: 0 s
  - Node address: 22

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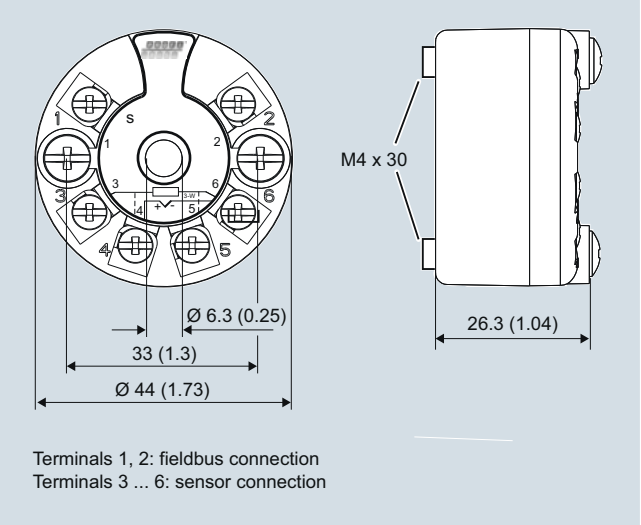
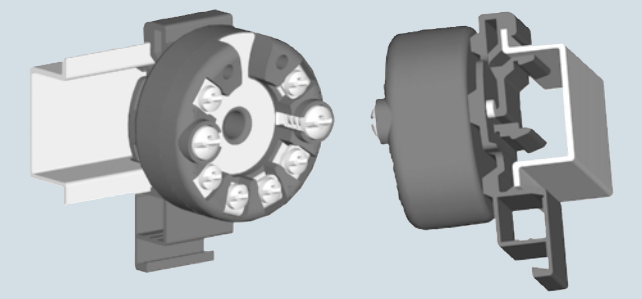
Dimensional drawings

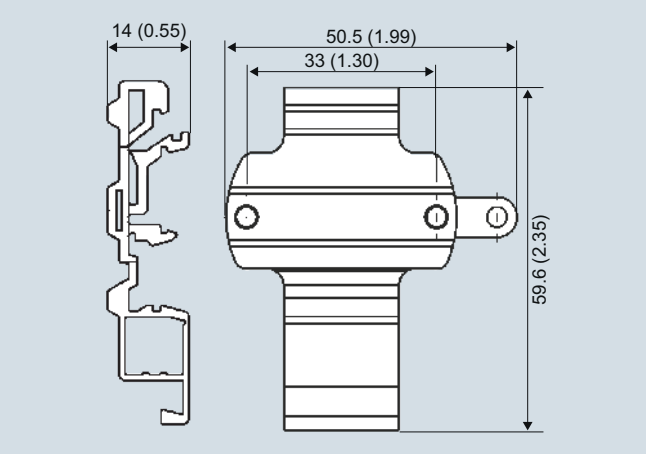


SITRANS TH400 dimensions in mm (inches) and connections

Mounting on DIN rail



SITRANS TH400, mounting of transmitter on DIN rail



DIN rail adaptor, dimensions in mm (inch)

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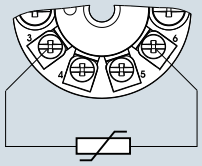
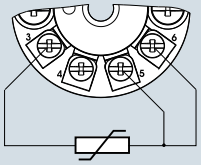
2

Schematics

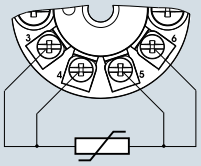
Resistance thermometer



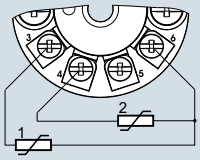
Two-wire system [1)]



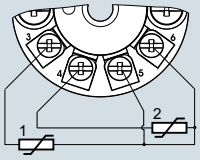
Three-wire system



Four-wire system

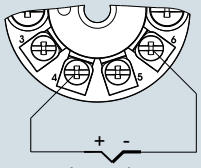


Mean-value/differential or redundancy generation
2 x two-wire system [1)]

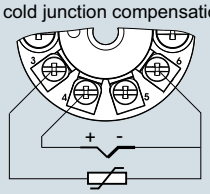


Mean-value/differential or redundancy generation
1 sensor in two-wire system [1)]
1 sensor in three-wire system

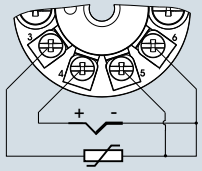
Thermocouple



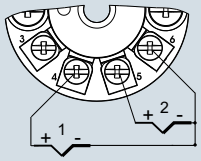
Internal
cold junction compensation



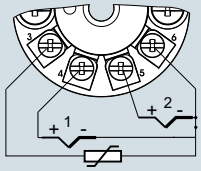
Cold junction compensation
with external Pt100 in two-wire system [1)]



Cold junction compensation
with external Pt100 in three-wire system

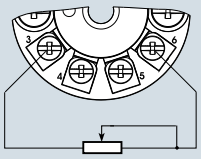


Mean value, differential or redundancy generation with internal cold junction compensation

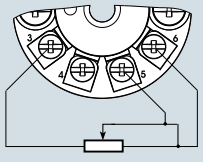


Mean value, differential or redundancy generation and cold junction compensation with internal Pt100 in two-wire system [1)]

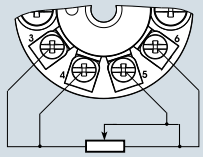
Resistance



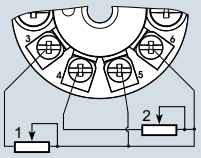
Two-wire system [1)]



Three-wire system

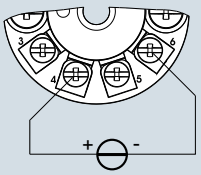


Four-wire system

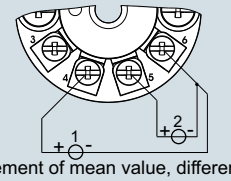


Mean value, differential or redundancy generation
1 resistor in two-wire system [1)]
1 resistor in three-wire system

Voltage measurement



One voltage source



Measurement of mean value, differential and redundancy with 2 voltage sources

[1)] Programmable line resistance for the purpose of correction.

SITRANS TH400, sensor connection assignment

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Overview

Ultra flexible - with the universal SITRANS TR200 transmitter

- Two-wire devices for 4 to 20 mA
- Enclosure for rail mounting
- Universal input for virtually any type of temperature sensor
- Configurable over PC

Benefits

- Compact design
- Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring
  open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21
- SIL2 (with Order Code C20), SIL2/3 (with C23)

Application

SITRANS TR200 transmitters can be used in all industrial sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic.

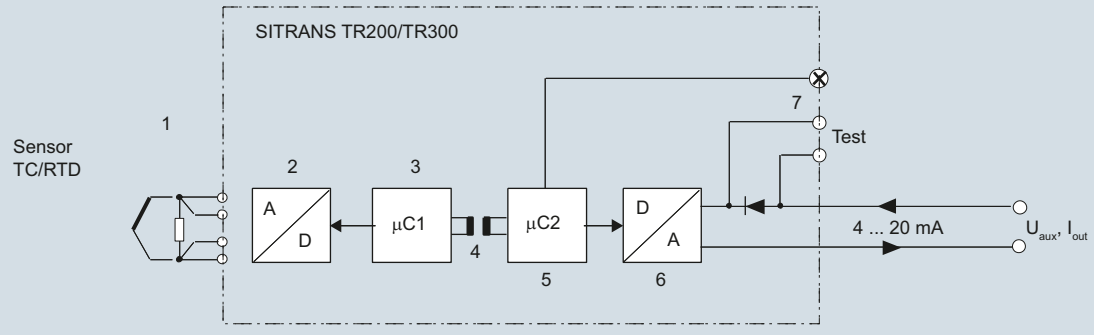
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX).

Function

The SITRANS TR200 is configured over a PC. A USB or RS 232 modem is linked to the output terminals for this purpose. The configuration data can now be edited using the SIPROM T software tool. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



1 Sensor such as resistance thermometer, thermocouple, resistance-based, sensor, mV sensor
2 Analog-digital converter
3 Microcontroller, secondary circuit
4 Electrical isolation
5 Microcontroller, primary circuit
6 Digital-analog converter
7 LED

U_{aux} Auxiliary power supply
I_{out} Output current
Test Test terminals for temporary connection of an amperemeter

SITRANS TR200 function diagram

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Technical specifications

Input	
Resistance thermometer	
Measured variable	Temperature
Sensor type	
• to IEC 60751	Pt25 … 1000
• to JIS C 1604; a=0.00392 K^{-1}	Pt25 … 1000
• to IEC 60751	Ni25 … 1000
• Special type	over special characteristic (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance thermometers in 2-wire system for generation of average temperature
• Generation of difference	2 resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time T_{63}	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: ON)
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic
Resistance-based sensors	
Measured variable	Actual resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value
• Generation of difference	2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time T_{63}	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: OFF)
Measuring range	parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")
Min. measured span	5 ... 25 Ω (see table "Digital measuring errors")
Characteristic curve	Resistance-linear or special characteristic
Thermocouples	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
• Type C	W5 %-Re acc. to ASTM 988
• Type D	W3 %-Re acc. to ASTM 988
• Type E	NiCr-CuNi to DIN IEC 584
• Type J	Fe-CuNi to DIN IEC 584
• Type K	NiCr-Ni to DIN IEC 584
• Type L	Fe-CuNi to DIN 43710
• Type N	NiCrSi-NiSi to DIN IEC 584
• Type R	Pt13Rh-Pt to DIN IEC 584
• Type S	Pt10Rh-Pt to DIN IEC 584
• Type T	Cu-CuNi to DIN IEC 584
• Type U	Cu-CuNi to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Generation of average value	2 thermocouples (TC)
• Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time T_{63}	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60571 (2-wire or 3-wire connection)
• External fixed	Cold junction temperature can be set as fixed value
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")
Characteristic curve	Temperature-linear or special characteristic
mV sensor	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)
Units	mV
Response time T_{63}	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off
Measuring range	parameterizable max. -100 … 1100 mV
Min. measured span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic

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Output	
Output signal	4 ... 20 mA, 2-wire
Auxiliary power	11 ... 35 V DC (to 30 V for Ex i/ic; to 32 V for Ex nA)
Max. load	$(U_{aux} - 11\ V)/0.023\ A$
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.84 mA ... 20.5 mA)
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reversed polarity
Electrically isolated	Input against output 2.12 kV DC (1.5 kV_{eff} AC)
Measuring accuracy	
Digital measuring errors	See Table "Digital measuring errors"
Reference conditions	
• Auxiliary power	24 V ± 1 %
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025 % of span
Error due to internal cold junction	< 0.5 °C (0.9 °F)
Influence of ambient temperature	
• Analog measuring error	0.02 % of span/10 °C (18 °F)
• Digital measuring errors	
- With resistance thermometer	0.06 °C (0.11 °F)/10 °C (18 °F)
- with thermocouples	0.6 °C (1.1 °F)/10 °C (18 °F)
Auxiliary power effect	< 0.001 % of span/V
Effect of load impedance	< 0.002 % of span/100 Ω
Long-term drift	
• In the first month	< 0.02 % of span in the first month
• After one year	< 0.2 % of span after one year
• After 5 years	< 0.3 % of span after 5 years
Conditions of use	
Ambient conditions	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98 %, with condensation
Electromagnetic compatibility	acc. to EN 61326 and NE21
Construction	
Material	Plastic, electronic module potted
Weight	122 g
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm^2 (AWG 13)
Degree of protection to IEC 60529	
• Enclosure	IP20

Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	PTB 07 ATEX 2032X
• "Intrinsic safety" type of protection	II 2(1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 3 G Ex ic IIC T6/T4 II 2(1) D Ex iaD/ibD 20/21 T115 °C
• Type of protection, "equipment is non-arcing"	II 3 G Ex nA IIC T6/T4
Other certificates	NEPSI
Software requirements for SIPROM T	
PC operating system	Windows ME, 2000, XP, Win 7 and Win 8; can also be used in connection with RS 232 modem under Windows 95, 98 and 98SE

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. measured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 to Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

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SITRANS TR200 two-wire system, universal

Resistance-based sensors

Input	Measuring range	Min. measured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 ... 390	5	0.05
Resistance	0 ... 2200	25	0.25

Thermocouples

Input	Measuring range	Min. measured span		Digital accuracy	
	°C/(°F)	°C	(°F)	°C	(°F)
Type B	0 ... 1820 (32 ... 3308)	100	(180)	2[1)]	(3.6)[1)]
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.6)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1[2)]	(1.8)[2)]
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.8)
Type J	-210 ... +1200 (-346 ... +2192)	50	(90)	1	(1.8)
Type K	-230 ... +1370 (-382 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.6)

[1)] The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

[2)] The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range	Min. measured span	Digital accuracy
	mV	mV	µV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

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Selection and Ordering data	Article No.
Temperature transmitter SITRANS TR200	
For mounting on a standard DIN rail, two-wire system, 4 to 20 mA, programmable, with electrical isolation, with documentation on MiniDVD	
• Without explosion protection ► ⬟	**7NG3032-0JN00**
• With explosion protection to ATEX ► ⬟	**7NG3032-1JN00**
Further designs	Order code
Please add "**-Z**" to Article No. with and specify Order codes(s).	
With test protocol (5 measuring points)	**C11**
Functional safety SIL2	**C20**
Functional safety SIL2/3	**C23**
Customer-specific programming	
Add "**-Z**" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	**Y01**[1]
Measuring point no. (TAG), max. 8 characters	**Y17**[2]
Measuring point descriptor, max. 16 characters	**Y23**[2]
Measuring point message, max. 32 characters	**Y24**[2]
Text on front label, max. 16 characters	**Y29**[2][3]
Pt100 (IEC) 2-wire, R_L = 0 Ω	**U02**[4]
Pt100 (IEC) 3-wire	**U03**[4]
Pt100 (IEC) 4-wire	**U04**[4]
Thermocouple type B	**U20**[4][5]
Thermocouple type C (W5)	**U21**[4][5]
Thermocouple type D (W3)	**U22**[4][5]
Thermocouple type E	**U23**[4][5]
Thermocouple type J	**U24**[4][5]
Thermocouple type K	**U25**[4][5]
Thermocouple type L	**U26**[4][5]
Thermocouple type N	**U27**[4][5]
Thermocouple type R	**U28**[4][5]
Thermocouple type S	**U29**[4][5]
Thermocouple type T	**U30**[4][5]
Thermocouple type U	**U31**[4][5]
With TC: CJC external (Pt100, 3-wire)	**U41**
With TC: CJC external with fixed value, specify in plain text	**Y50**
Special differing customer-specific programming, specify in plain text	**Y09**[6]
Fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**[2]

Accessories	Article No.
Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. SIPROM T parameterization software ► With USB connection	**7NG3092-8KU**
MiniDVD for temperature measuring instruments for ► With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	**A5E00364512**

► Available ex stock.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

2) For this selection, Y01 or Y09 must also be selected.

3) Text on front plate is not saved in the device.

4) For this selection, Y01 must also be selected.

5) Internal cold junction compensation is selected as the default for TC.

6) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

Ordering example 1:

7NG3032-0JN00-Z Y01+Y17+Y29+U03
Y01: -10 ... +100 °C
Y17: TICA123
Y29: TICA123

Ordering example 2:

7NG3032-0JN00-Z Y01+Y17+Y23+Y29+U25
Y01: -10 ... +100 °C
Y17: TICA123
Y23: TICA123HEAT
Y29: TICA123HEAT

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 … 100 °C (32 … 212 °F)
- Fault current: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

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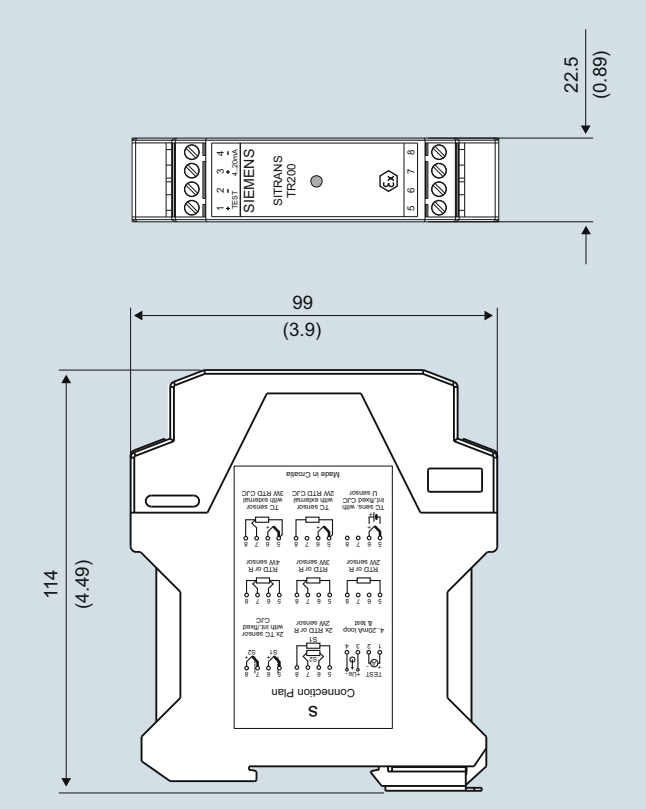
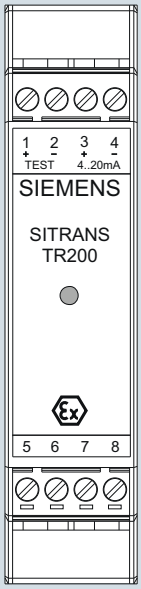
SITRANS TR200 two-wire system, universal

Dimensional drawings



SITRANS TR200, dimensions in mm (inch)

Schematics



Asssignments

1 (+) and 2 (-)	Test terminals (test) for measurement of the output current with a multimeter
3 (+) and 4 (-)	Power supply U_{aux}, output current I_{out}
5, 6, 7 and 8	Sensor assignment, see schematics

SITRANS TR200, pin assignment

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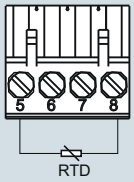
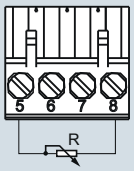
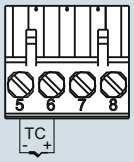
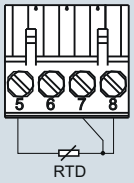
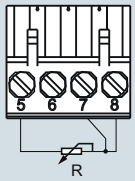
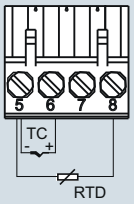
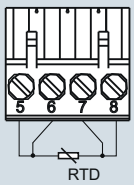
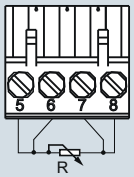
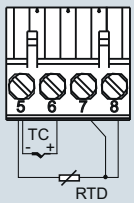
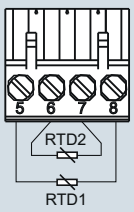
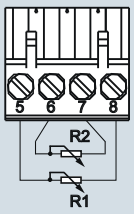
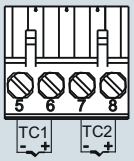
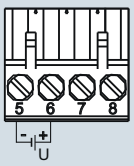
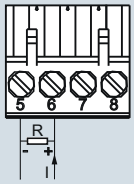
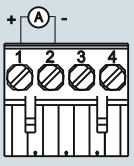
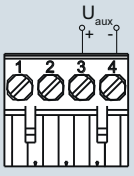
Resistance thermometer	Resistance	Thermocouple
 Two-wire system [1]	 Two-wire system [1]	 Cold junction compensation internal/fixed value
 Three-wire system	 Three-wire system	 Cold junction compensation with external Pt100 in two-wire system [1]
 Four-wire system	 Four-wire system	 Cold junction compensation with external Pt100 in three-wire system
 Generation of average value/difference [1]	 Generation of average value/difference [1]	 Generation of average value / difference with internal cold junction compensation

[1] Programmable line resistance for the purpose of correction.

Voltage measurement	Current measurement	Test terminals	Power supply/ 4 ... 20 mA (U_{aux})
			

SITRANS TR200, sensor connection assignment

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SITRANS TR300 two-wire system, universal, HART

Overview

"HART" to beat - the universal SITRANS TR300 transmitter

- Two-wire devices for 4 to 20 mA, HART
- Device for rail mounting
- Universal input for virtually any type of temperature sensor
- Configurable over HART

Benefits

- Compact design
- Electrically isolated
- Test sockets for multimeters
- Diagnostics LED (green/red)
- Sensor monitoring
  open circuits and short-circuits
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic
- Electromagnetic compatibility to EN 61326 and NE21
- SIL2 (with Order Code C20), SIL2/3 (with C23)

Application

SITRANS TR300 transmitters can be used in all industrial sectors. Their compact design enables simple mounting on standard DIN rails on-site in protective boxes or in control cabinets. The following sensors/signal sources can be connected over their universal input module:

- Resistance thermometers (2, 3 or 4-wire system)
- Thermocouples
- Resistance-based sensors and DC voltage sources

The output signal is a direct current from 4 to 20 mA in accordance with the sensor characteristic, superimposed by the digital HART signal.

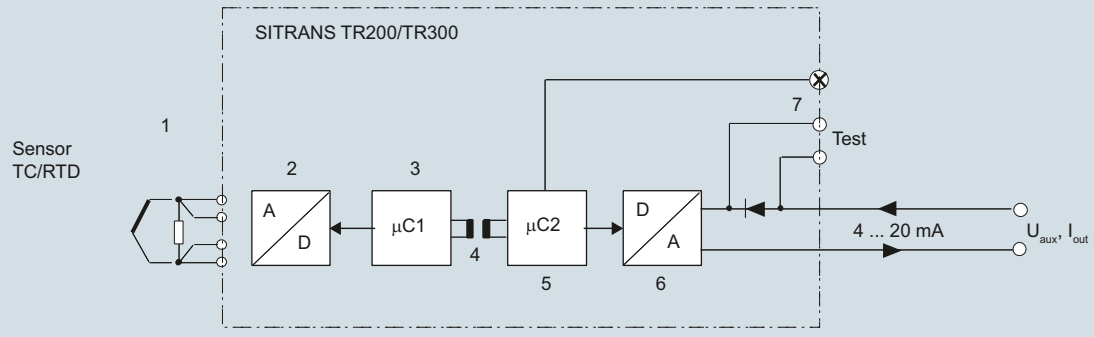
Transmitters of the "intrinsically safe" type of protection can be installed within potentially explosive atmospheres. The devices comply with the Directive 94/9/EC (ATEX).

Function

The SITRANS TR300 is configured over HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software. The configuration data are then permanently stored in the non-volatile memory (EEPROM).

Once the sensors and power supply have been correctly connected, the transmitter outputs a temperature-linear output signal and the diagnostics LED displays a green light. In the case of a sensor short-circuit, the LED flashes red, an internal device fault is indicated by a steady red light.

The test socket can be used to connect an ammeter at any time for monitoring purposes and plausibility checks. The output current can be read without any interruption, or even without opening the current loop.



1 Sensor such as resistance thermometer, thermocouple, resistance-based, sensor, mV sensor
2 Analog-digital converter
3 Microcontroller, secondary circuit
4 Electrical isolation
5 Microcontroller, primary circuit
6 Digital-analog converter
7 LED

U_{aux} Auxiliary power supply
I_{out} Output current
Test Test terminals for temporary connection of an amperemeter

SITRANS TR300 function diagram

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Technical specifications

Input	
Resistance thermometer	
Measured variable	Temperature
Sensor type	
• to IEC 60751	Pt25 … Pt1000
• to JIS C 1604; a=0.00392 K^{-1}	Pt25 … Pt1000
• to IEC 60751	Ni25 … Pt1000
• Special type	over special characteristic (max. 30 points)
Sensor factor	0.25 ... 10 (adaptation of the basic type, e.g. Pt100 to version Pt25 ... 1000)
Units	°C or °F
Connection	
• Standard connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 identical resistance thermometers in 2-wire system for generation of average temperature
• Generation of difference	2 identical resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time T_{63}	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be isabled)
Short-circuit monitoring	can be switched on/off (default value: ON)
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic
Resistance-based sensors	
Measured variable	Actual resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value
• Generation of difference	2 resistance thermometers in 2-wire system (R1 – R2 or R2 – R1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time T_{63}	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: OFF)
Measuring range	parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")
Min. measured span	5 ... 25 Ω (see table "Digital measuring errors")
Characteristic curve	Resistance-linear or special characteristic
Thermocouples	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
• Type C	W5 %-Re acc. to ASTM 988
• Type D	W3 %-Re acc. to ASTM 988
• Type E	NiCr-CuNi to DIN IEC 584
• Type J	Fe-CuNi to DIN IEC 584
• Type K	NiCr-Ni to DIN IEC 584
• Type L	Fe-CuNi to DIN 43710
• Type N	NiCrSi-NiSi to DIN IEC 584
• Type R	Pt13Rh-Pt to DIN IEC 584
• Type S	Pt10Rh-Pt to DIN IEC 584
• Type T	Cu-CuNi to DIN IEC 584
• Type U	Cu-CuNi to DIN 43710
Units	°C or °F
Connection	
• Standard connection	1 thermocouple (TC)
• Generation of average value	2 thermocouples (TC)
• Generation of difference	2 thermocouples (TC) (TC1 – TC2 or TC2 – TC1)
Response time T_{63}	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60571 (2-wire or 3-wire connection)
• External fixed	Cold junction temperature can be set as fixed value
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")
Characteristic curve	Temperature-linear or special characteristic
mV sensor	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)
Units	mV
Response time T_{63}	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off

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SITRANS TR300 two-wire system, universal, HART

Measuring range	parameterizable max. -100 … 1100 mV
Min. measured span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic
Output	
Output signal	4 ... 20 mA, 2-wire with communication acc. to HART Rev. 5.9
Auxiliary power	11 ... 35 V DC (to 30 V for Ex i/ic; to 32 V for Ex nA)
Max. load	(U_{aux} –11 V)/0.023 A
Overrange	3.6 ... 23 mA, infinitely adjustable (default range: 3.84 ... 20.5 mA)
Error signal (e.g. following sensor fault) (conforming to NE43)	3.6 ... 23 mA, infinitely adjustable (default value: 22.8 mA)
Sample cycle	0.25 s nominal
Damping	Software filter 1st order 0 ... 30 s (parameterizable)
Protection	Against reversed polarity
Electrical isolation	Input against output (1 kV_{eff})
Measuring accuracy	
Digital measuring errors	see table "Digital measuring errors"
Reference conditions	
• Auxiliary power	24 V ± 1 %
• Load	500 Ω
• Ambient temperature	23 °C
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025 % of span
Error due to internal cold junction	< 0.5 °C (0.9 °F)
Ambient temperature effect	
• Analog measuring errors of span	< 0.2 % of max. span/10 °C (18 °F)
• Digital measuring errors - at resistance thermometers - at thermocouples	 0.06 °C (0.11 °F)/10 °C (18 °F) 0.6 °C (1.1 °F)/10 °C (18 °F)
Auxiliary power effect	< 0.001 % of span/V
Effect of load impedance	< 0.002 % of span/100 Ω
Long-term drift	
• In the first month	< 0.02 % of span in the first month
• After one year	< 0.2 % of span after one year
• After 5 years	< 0.3 % of span after 5 years
Conditions of use	
Ambient conditions	
Ambient temperature range	-40 ... +85 °C (-40 ... +185 °F)
Storage temperature range	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	< 98 %, with condensation
Electromagnetic compatibility	acc. to EN 61326 and NE21
Design	
Material	Plastic, electronic module potted
Weight	122 g
Dimensions	See "Dimensional drawings"
Cross-section of cables	Max. 2.5 mm² (AWG 13)
Degree of protection to IEC 60529	
• Enclosure	IP20

Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	PTB 07 ATEX 2032X
• "Intrinsic safety" type of protection	II 2(1) G Ex ia/ib IIC T6/T4 II 3(1) G Ex ia/ic IIC T6/T4 II 3 G Ex ic IIC T6/T4 II 2(1) D Ex iaD/ibD 20/21 T115 °C
• Type of protection, "equipment is non-arcing"	II 3 G Ex nA IIC T6/T4
Other certificates	NEPSI

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

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Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. measured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 to Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensors

Input	Measuring range	Min. measured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 ... 390	5	0.05
Resistance	0 ... 2200	25	0.25

Thermocouples

Input	Measuring range	Min. measured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
Type B	0 ... 1820 (32 ... 3308)	100	(180)	2[1]	(3.6)[1]
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	2	(3.6)
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1[2]	(1.8)[2]
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.8)
Type J	-210 ... +1200 (-346 ... +2192)	50	(90)	1	(1.8)
Type K	-230 ... +1370 (-382 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type T	-200 ... +400 (-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.6)

[1] The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

[2] The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring range	Min. measured span	Digital accuracy
	mV	mV	µV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0,025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

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SITRANS TR300 two-wire system, universal, HART

Selection and Ordering data	Article No.
Temperature transmitter SITRANS TR300	
For mounting on a standard DIN rail, two-wire system, 4 … 20 mA, HART, with electrical isolation, with documentation on MIniDVD	
• Without explosion protection ► ⬟	**7NG3033-0JN00**
• With explosion protection to ATEX ► ⬟	**7NG3033-1JN00**
Further designs	Order code
Please add "**-Z**" to Article No. with and specify Order codes(s).	
With test protocol (5 measuring points)	**C11**
Functional safety SIL2	**C20**
Functional safety SIL2/3	**C23**
Customer-specific programming	
Add "**-Z**" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	**Y01**[1]
Measuring point no. (TAG), max. 8 characters	**Y17**[2]
Measuring point descriptor, max. 16 characters	**Y23**[2]
Measuring point message, max. 32 characters	**Y24**[2]
Text on front label, max. 16 characters	**Y29**[2][3]
Pt100 (IEC) 2-wire, R_L = 0 Ω	**U02**[4]
Pt100 (IEC) 3-wire	**U03**[4]
Pt100 (IEC) 4-wire	**U04**[4]
Thermocouple type B	**U20**[4][5]
Thermocouple type C (W5)	**U21**[4][5]
Thermocouple type D (W3)	**U22**[4][5]
Thermocouple type E	**U23**[4][5]
Thermocouple type J	**U24**[4][5]
Thermocouple type K	**U25**[4][5]
Thermocouple type L	**U26**[4][5]
Thermocouple type N	**U27**[4][5]
Thermocouple type R	**U28**[4][5]
Thermocouple type S	**U29**[4][5]
Thermocouple type T	**U30**[4][5]
Thermocouple type U	**U31**[4][5]
With TC: CJC external (Pt100, 3-wire)	**U41**
With TC: CJC external with fixed value, specify in plain text	**Y50**
Special differing customer-specific programming, specify in plain text	**Y09**[6]
Fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**[2]

Accessories	Article No.
MiniDVD for temperature measuring instruments ►	**A5E00364512**
With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	
HART modem	
• With USB connection ►	**7MF4997-1DB**
Simatic PDM operating software	**See Section 8**

► Available ex stock.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

2) For this selection, Y01 or Y09 must also be selected.

3) Text on front plate is not saved in the device.

4) For this selection, Y01 must also be selected.

5) Internal cold junction compensation is selected as the default for TC.

6) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Supply units see Chapter "Supplementary Components".

Ordering example 1:

7NG3033-0JN00-Z Y01+Y17+Y29+U03
Y01: -10 ... +100 °C
Y17: TICA123
Y29: TICA123

Ordering example 2:

7NG3033-0JN00-Z Y01+Y17+Y23+Y29+U25
Y01: -10 ... +100 °C
Y17: TICA123
Y23: TICA123HEAT
Y29: TICA123HEAT

Factory setting:

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

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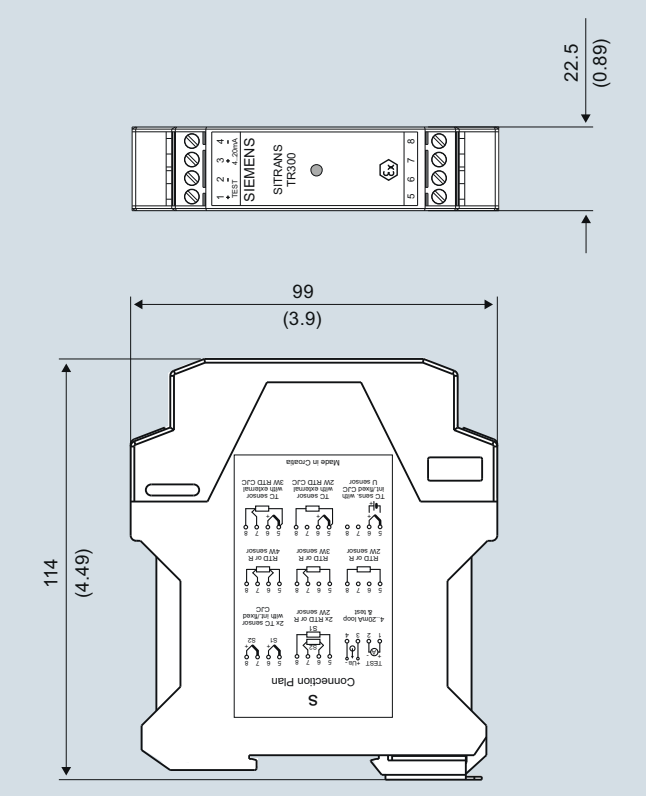
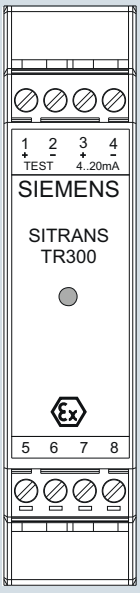
Dimensional drawings



SITRANS TR300, dimensions in mm (inch)

Schematics



Assignments

1 (+) and 2 (-)	Test terminals (Test) for measurement of the output current with a multimeter
3 (+) and 4 (-)	Power supply U_{aux}, Output current I_{out}
5, 6, 7 and 8	Sensor assignment, see schematics

SITRANS TR300, pin assignment

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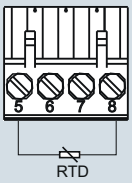
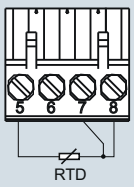
SITRANS TR300 two-wire system, universal, HART

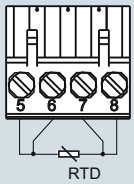
Resistance thermometer



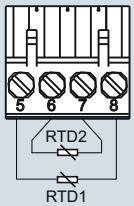
Two-wire system [1)]



Three-wire system

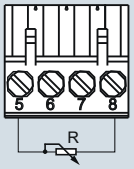


Four-wire system

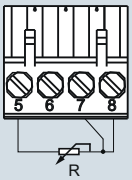


Generation of average value/difference [1)]

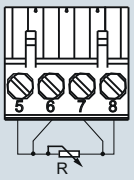
Resistance



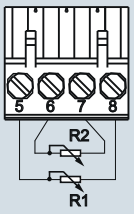
Two-wire system [1)]



Three-wire system

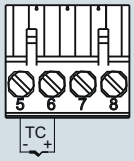


Four-wire system

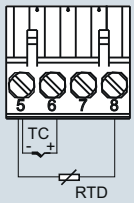


Generation of average value/difference [1)]

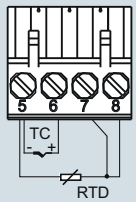
Thermocouple



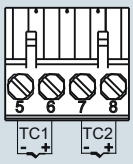
Cold junction compensation internal/fixed value



Cold junction compensation with external Pt100 in two-wire system [1)]



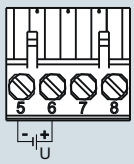
Cold junction compensation with external Pt100 in three-wire system



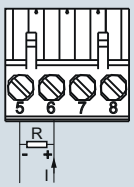
Generation of average value / difference with internal cold junction compensation

[1)] Programmable line resistance for the purpose of correction.

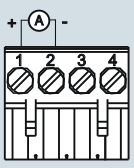
Voltage measurement



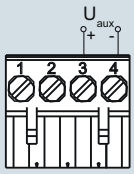
Current measurement



Test terminals



Power supply/ 4 ... 20 mA (U_{aux})



SITRANS TR300, sensor connection assignment

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Overview

The user-friendly transmitters for the control room

The SITRANS TW universal transmitter is a further development of the service-proven SITRANS T for the 4-wire system in a mounting rail housing. With numerous new functions it sets new standards for temperature transmitters.

With its diagnostics and simulation functions the SITRANS TW provides the necessary insight during commissioning and operation. And using its HART interface the SITRANS TW can be conveniently adapted with SIMATIC PDM to every measurement task.

All SITRANS TW control room devices are available in a non-intrinsically safe version as well as in an intrinsically safe version for use with the most stringent requirements.

Application

The SITRANS TW transmitter is a four-wire rail-mounted device with a universal input circuit for connection to the following sensors and signal sources:

- Resistance thermometer
- Thermocouples
- Resistance-based sensors/potentiometers
- mV sensors
- As special version:
  - V sources
  - Current sources

The 4-wire rail-mounted SITRANS TW transmitter wire is designed for control room installation. It must not be mounted in potentially explosive atmospheres.

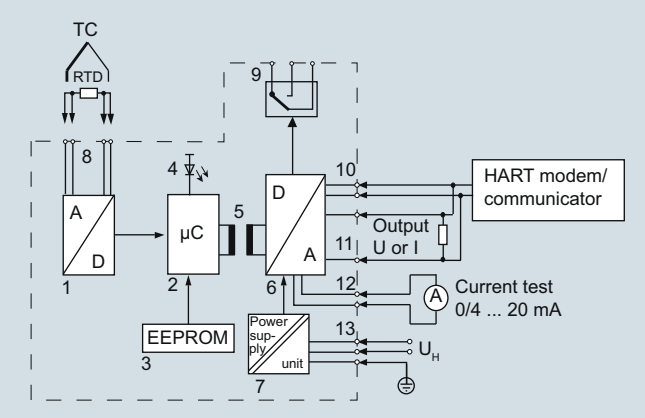
All SITRANS TW control room devices are available in a non-intrinsically safe version as well as in an intrinsically safe version for use with the most stringent requirements.

Function

Features

- Transmitter in four-wire system with HART interface
- Housing can be mounted on 35 mm rail or 32 mm G rail
- Screw plug connector
- All circuits electrically isolated
- Output signal: 0/4 to 20 mA or 0/2 to 10 V
- Power supplies: 115/230 V AC/DC or 24 V AC/DC
- Explosion protection [EEx ia] or [EEx ib] for measurements with sensors in the hazardous area
- Temperature-linear characteristic for all temperature sensors
- Temperature-linear characteristic can be selected for all temperature sensors
- Automatic correction of zero and span
- Monitoring of sensor and cable for open-circuit and short- circuit
- Sensor fault and/or limit can be output via an optional sensor fault/limit monitor
- Hardware write protection for HART communication
- Diagnostic functions
- Slave pointer functions
- SIL1

Mode of operation



The signal output by a resistance-based sensor (two-wire, three-wire, four-wire system), voltage source, current source or thermocouple is converted by the analog-to-digital converter (1, function diagram) into a digital signal. This is evaluated in the microcontroller (2), corrected according to the sensor characteristic, and converted by the digital-to-analog converter (6) into an output current (0/4 to 20 mA) or output voltage (0/2 to 10 V). The sensor characteristics as well as the electronics data and the data for the transmitter parameters are stored in the non-volatile memory (3).

AC or DC voltages can be used as the power supply (13). Any terminal connections are possible for the power supply as a result of the bridge rectifier in the power supply unit. The PE conductor is required for safety reasons.

A HART modem or a HART communicator permit parameterization of the transmitter using a protocol according to the HART specification. The transmitter can be directly parameterized at the point of measurement via the HART output terminals (10).

The operation indicator (4) identifies a fault-free or faulty operating state of the transmitter. The limit monitor (9) enables the signaling of sensor faults and/or limit violations. In the case of a current output, the current can be checked on a meter connected to test socket (12).

Diagnosis and simulation functions

The SITRANS TW comes with extensive diagnosis and simulation functions.

Physical values can be defined with the simulation function. It is thus possible to check the complete signal path from the sensor input to inside the control system without additional equipment. The slave pointer functions are used to record the minimum and maximum of the plant's process variable.

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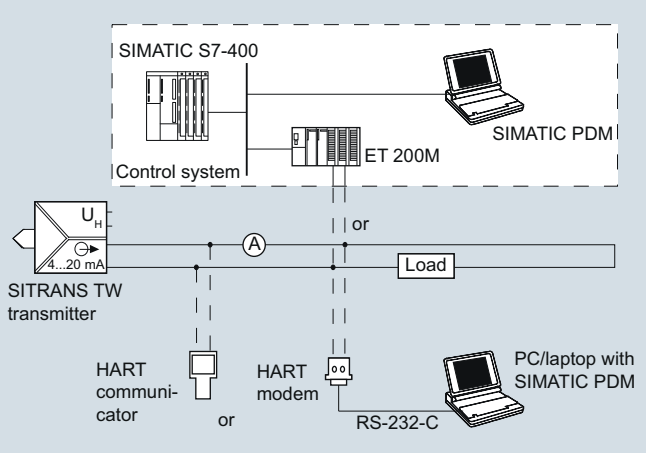
2

Integration

System configuration



Possible system configurations

The SITRANS TW transmitter as a four-wire rail-mounted device can be used in a number of system configurations: as a stand-alone version or as part of a complex system environment, e.g. with SIMATIC S7. All device functions are available via HART communication.

Communication options through the HART interface:

- HART communicator
- HART modem connected to PC/laptop on which the appropriate software is available, e.g. SIMATIC PDM
- HART-compatible control system (e.g. SIMATIC S7-400 with ET 200M)

Technical specifications

Input	
Selectable filters to suppress the line frequency	50 Hz, 60 Hz, also 10 Hz for special applications (line frequency filter is similar with measuring frequency)
Resistance thermometer	
Measured variable	Temperature
Measuring range	Parameterizable
Measuring span	min. 25 °C (45 °F) x 1/scaling factor
Sensor type	
• Acc. to IEC 751	Pt100 (IEC 751)
• Acc. to JIS C 1604-81	Pt100 (JIS C1604-81)
• to DIN 43760	Ni100 (DIN 43760)
• Special type ($R_{RTD} \leq 500\ \Omega$)	Multiples or parts of the defined characteristic values can be parameterized (e.g. Pt500, Ni120)
Characteristic curve	Temperature-linear, resistance-linear or customer-specific
Type of connection	• Normal connection • Sum or parallel connection • Mean-value or differential connection
Interface	2, 3 or 4-wire circuit
Measuring range limits	Depending on type of connected thermometer (defined range of resistance thermometer)
Sensor breakage monitoring	Monitoring of all connections for open-circuit (function can be switched off)
Sensor short-circuit monitoring	Parameterizable response threshold (function can be switched off)
Resistance-based sensor, potentiometer	
Measured variable	Actual resistance
Measuring range	Parameterizable
Measuring span	min. 10 Ω
Characteristic curve	Resistance-linear or customer-specific
Type of connection	• Normal connection • Differential connection • Mean-value connection
Interface	2, 3 or 4-wire circuit
Input range	0 ... 6000 Ω; with mean-value and difference circuits: 0 ... 3000 Ω
Sensor breakage monitoring	Monitoring of all connections for open-circuit (function can be switched off)
Sensor short-circuit monitoring	Parameterizable response threshold (function can be switched off)

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Thermocouples	
Measured variable	Temperature
Measuring range	Parameterizable
Measuring span	min. 50 °C (90 °F) x 1/scaling factor
Measuring range limits	Depend. on type of thermocouple element
Thermocouple element	Type B: Pt30 %Rh/Pt6 %Rh (DIN IEC 584)
	Type C: W5 %-Re (ASTM 988)
	Type D: W3 %-Re (ASTM 988)
	Type E: NiCr/CuNi (DIN IEC 584)
	Type J: Fe/CuNi (DIN IEC 584)
	Type K: NiCr/Ni (DIN IEC 584)
	Type L: Fe-CuNi (DIN 43710)
	Type N: NiCrSi-NiSi (DIN IEC 584)
	Type R: Pt13 %Rh/Pt (DIN IEC 584)
	Type S: Pt10 %Rh/Pt (DIN IEC 584)
	Type T: Cu/CuNi (DIN IEC 584)
	Type U: Cu/CuNi (DIN 43710)
	Special type (-10 mV ≤ UTC ≤ 100 mV)
Characteristic curve	Temperature-linear, voltage-linear or customer-specific
Type of connection	• Normal connection
	• Averaging connection
	• Mean-value connection
	• Differential connection
Cold junction compensation	None, internal measurement, external measurement or predefined fixed value
Sensor breakage monitoring	Function can be switched off
mV sensors	
Measured variable	DC voltage
Measuring range	Parameterizable
Measuring span	min. 4 mV
Input range	-120 ... +1000mV
Characteristic curve	Voltage-linear or customer-specific
Overload capacity of inputs	max. ± 3.5 V
Input resistance	≥ 1 MΩ
Sensor current	Approx. 180 µA
Sensor breakage monitoring	Function can be switched off
V sources	
Measured variable	DC voltage
Measuring range	Parameterizable
Characteristic curve	Voltage-linear or customer-specific
Input range/min. span	
• Devices with 7NG3242-xxxx**1** or 7NG3242-xxxx**0** with U/I plug	-1.2 ... + 10 V/0.04 V
• Devices with 7NG3242-xxxx**2**	-12 ... +100 V/0.4 V
• Devices with 7NG3242-xxxx**3**	-120 ... +140 V/4.0 V
Sensor breakage monitoring	Not possible

µA-, mA sources	
Measured variable	DC voltage
Measuring range	Parameterizable
Characteristic curve	Current-linear or customer- specific
Input range/min. span	
• Devices with 7NG3242-xxxx**4**	-12 ... +100 µA/0.4 µA
• Devices with 7NG3242-xxxx**5**	-120 ... +1000 µA/4 µA
• Devices with 7NG3242-xxxx**6**	-1.2 ... +10 mA/0.04 mA
• Devices with 7NG3242-xxxx**7** or 7NG3242-xxxx**0** with U/I plug	-12 ... +100 mA/0.4 mA
• Devices with 7NG3242-xxxx**8**	-120 ... +1000 mA/4 mA
Sensor breakage monitoring	Not possible
Output	
Output signal	Load-independent direct current 0/4 ... 20 mA, can be switched to load-independent DC voltage 0/2 ... 10 V using plug-in jumpers
Current 0/4 ... 20 mA	
• Overrange	-0.5 ... +23.0 mA, continuously adjustable
• Output range following sensor fault (conforming to NE43)	-0.5 ... +23.0 mA, continuously adjustable
• Load	≤ 650 Ω
• No-load voltage	≤ 30 V
Voltage 0/2 ... 10 V	
• Overrange	-0.25 ... +10.75 V, continuously adjustable
• Output range following sensor fault	-0.25 ... +10.75 V, continuously adjustable
• Load resistance	≥ 1 kΩ
• Load capacitance	≤ 10 nF
• Short-circuit current	≤ 100 mA (not permanently short-circuit-proof)
• Electrical damping	
- adjustable time constant T_{63}	0 ... 100 s, in steps of 0.1 s
• Current source/voltage source	Continuously adjustable within the total operating range
Sensor fault/limit signalling	By operation indicator, relay output or HART interface
Operation indicator	Flashing signal
• Limit violation	Flashing frequency 5 Hz
• Sensor fault monitoring	Flashing frequency 1 Hz
Relay outputs	Either as NO or NC contact with 1 changeover contact
• Switching capacity	≤ 150 W, ≤ 625 VA
• Switching voltage	≤ 125 V DC, ≤ 250 V AC
• Switching current	≤ 2.5 A DC
Sensor fault monitoring	Signalling of sensor or line breakage and sensor short-circuit
Limit monitoring	
• Operating delay	0 ... 10 s
• Monitoring functions of limit module	• Sensor fault (breakage and/or short-circuit) • Lower and upper limit • Window (combination of lower and upper limits) • Limit and sensor fault detection can be combined
• Hysteresis	Parameterizable between 0 and 100 % of measuring range

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SITRANS TW four-wire system, universal, HART

Auxiliary power	
Universal power supply unit	115/230 V AC/DC or 24 V AC/DC
Tolerance range for power supply	
• With 115/230 V AC/DC PSU	80 ... 300 V DC; 90 ... 250 V AC
• With 24 V AC/DC PSU	18 ... 80 V DC; 20.4 ... 55.2 V AC (in each case interruption-resistant up to 20 ms in the complete tolerance range)
Tolerance range for mains frequency	47 ... 63 Hz
Power consumption with	
• 230 V AC	≤ 5 VA
• 230 V DC	≤ 5 W
• 24 V AC	≤ 5 VA
• 24 V DC	≤ 5 W
Electrically isolated	
Electrically isolated circuits	Input, output, power supply and sensor fault/limit monitoring output are electrically isolated from one another. The HART interface is electrically connected to the output.
Working voltage between all electrically isolated circuits	The voltage U_{rms} between any two terminals must not exceed 300 V
Measuring accuracy	
Accuracy	
• Error in the internal cold junction	≤ 3 °C ± 0.1 °C / 10 °C (≤ 5.4 °F ± 0.18 °F / 18 °F)
• Error of external cold junction terminal 7NG3092-8AV	≤ 0.5 °C ± 0.1 °C / 10 °C (≤ 0.9 °F ± 0.18 °F / 18 °F)
• Digital output	See "Digital error"
• Analog output I_{AN} or U_{AN}	≤ 0.05 % of the span plus digital error
Influencing effects (referred to the digital output)	Compared to the max. span:
• Temperature drift	≤ 0.08 % / 10 °C (≤ 0.08 % /18 °F) ≤ 0.2 % in the range -10 ... +60 °C (14 ... 140 °F)
• Long-term drift	≤ 0.1 % / year
Influencing effects referred to the analog output I_{AN} or U_{AN}	Compared to the span:
• Temperature drift	≤ 0.08 % / 10°C (≤ 0.08 % / 18 °F) ≤ 0.2 % in the range -10 ... +60 °C (14 ... 140 °F)
• Power supply	≤ 0.05 % / 10 V
• Load with current output	≤ 0.05 % on change from 50 Ω to 650 Ω
• Load with voltage output	≤ 0.1 % on change in the load current from 0 mA to 10 mA
• Long-term drift (start-of-scale value, span)	≤ 0.03 % / month
Response time (T_{63} without electrical damping)	≤ 0.2 s
Electromagnetic compatibility	According to EN 61 326 and NAMUR NE21

Certificates and approvals	
ATEX	To DIN EN 50014: 1997, EN 50020: 1994
Intrinsic safety to EN 50 020	
• for 7NG3242-x**A**xxx	II (1) G D [EEx ia/ib] IIB
• for 7NG3242-x**B**xxx	II (1) G D [EEx ia/ib] IIC
EC type-examination certificate	TÜV (German Technical Inspectorate) 01 ATEX 1675
Other certificates	GOST, NEPSI
Conditions of use	
Installation conditions	
Location (for devices with explosion protection)	
• Transmitters	Outside the potentially explosive atmosphere
• Sensor	Within the potentially explosive atmosphere zone 1 (also in zone 0 in conjunction with the prescribed protection requirements for the sensor)
Ambient conditions	
Permissible ambient temperature	-25 ... +70 °C (-13 ... +158 °F)
Permissible storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Climatic class	
• Relative humidity	5 ... 95 %, no condensation
Design	
Weight	Approx. 0.24 kg (0.53 lb)
Enclosure material	PBT, glass-fibre reinforced
Degree of protection to IEC 529	IP20
Degree of protection to VDE 0100	Protection class I
Type of installation	35-mm DIN rail (1.38 inch) (EN 50022) or 32-mm G-type rail (1.26 inch) (EN 50035)
Electrical connection / process connection	Screw plug connectors, max. 2.5 mm^2 (0.01 $inch^2$)
Parameterization interface	
Protocol	HART, version 5.9
Load with connection of	
• HART communicator	230 ... 650 Ω
• HART modem	230 ... 500 Ω
Software for PC/laptop	SIMATIC PDM version V5.1 and later

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Digital error

Resistance thermometer

Input	Measuring range	Max. permissible line resistance	Digital error
	°C / (°F)	Ω	°C / (°F)
IEC 751			
• Pt10	-200 ... +850 (-328 ... +1562)	20	3.0 (5.4)
• Pt50	-200 ... +850 (-328 ... +1562)	50	0.6 (1.1)
• Pt100	-200 ... +850 (-328 ... +1562)	100	0.3 (0.5)
• Pt200	-200 ... +850 (-328 ... +1562)	100	0.6 (1.1)
• Pt500	-200 ... +850 (-328 ... +1562)	100	1.0 (1.8)
• Pt1000	-200 ... +850 (-328 ... +1562)	100	1.0 (1.8)
JIS C 1604-81			
• Pt10	-200 ... +649 (-328 ... +1200)	20	3.0 (5.4)
• Pt50	-200 ... +649 (-328 ... +1200)	50	0.6 (1.1)
• Pt100	-200 ... +649 (-328 ... +1200)	100	0.3 (0.5)
DIN 43760			
• Ni50	-60 ... +250 (-76 ... +482)	50	0.3 (0.5)
• Ni100	-60 ... +250 (-76 ... +482)	100	0.3 (0.5)
• Ni120	-60 ... +250 (-76 ... +482)	100	0.3 (0.5)
• Ni1000	-60 ... +250 (-76 ... +482)	100	0.3 (0.5)

Resistance-based sensors

Input	Measuring range	Max. permissible line resistance	Digital error
	Ω	Ω	Ω
Resistance (linear)	0 ... 24	5	0.08
	0 ... 47	15	0.06
	0 ... 94	30	0.06
	0 ... 188	50	0.08
	0 ... 375	100	0.1
	0 ... 750	100	0.2
	0 ... 1500	75	1.0
	0 ... 3000	100	1.0
	0 ... 6000	100	2.0

Thermocouples

Input	Measuring range	Digital error [1]
	°C / (°F)	°C (°F)
Type B	0 ... +1820 (+32 ... +3308)	3 (5.4)
Type C	0 ... +2300 (+32 ... +4172)	2 (3.6)
Type D	0 ... +2300 (+32 ... +4172)	1 (1.8)
Type E	-200 ... +1000 (-328 ... +1832)	1 (1.8)
Type J	-210 ... +1200 (-346 ... +2192)	1 (1.8)
Type K	-200 ... +1372 (-328 ... +2501)	1 (1.8)
Type L	-200 ... +900 (-328 ... +1652)	2 (3.6)
Type N	-200 ... +1300 (-328 ... +2372)	1 (1.8)
Type R	-50 ... +1760 (-58 ... +3200)	2 (3.6)
Type S	-50 ... +1760 (-58 ... +3200)	2 (3.6)
Type T	-200 ... +400 (-328 ... +752)	1 (1.8)
Type U	-200 ... +600 (-328 ... +1112)	2 (3.6)

[1] Accuracy data refer to the largest error in the complete measuring range

Voltage/current sources

Input	Measuring range	Digital error
mV sources (linear)	**mV**	**µV**
	-1 ... +16	35
	-3 ... +32	20
	-7 ... +65	20
	-15 ... +131	50
	-31 ... +262	100
	-63 ... +525	200
	-120 ... +1000	300
V sources (linear)	**V**	**mV**
	-1.2 ... +10	3
	-12 ... +100	30
	-120 ... +140	300
µA/mA sources (linear)	**µA/mA**	**µA**
	-12 ... +100 µA	0.05
	-120 ... +1000 µA	0.5
	-1.2 ... +10 mA	5
	-12 ... + 100 mA	50
	-120 ... +1000 mA	500

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Ordering examples

Desired transmitter	Parameter: Standard	Parameter: Special	Ordering design
Example 1:			
SITRANS TW, transmitter in four-wire system			7NG3242-1AA00 (stock item)
• with explosion protection ATEX			
• 230 V AC/DC power supply			
• current output			
• without sensor fault/limit monitor			
- Sensor PT100, three-wire circuit	X		
- Measuring range 0 ... 150 °C	X		
- Temperature-linear characteristic	X		
- Filter time 1 s	X		
- Output 4 ... 20 mA, line filter 50 Hz	X		
- Output driven to full-scale in event of like breakage	X		
Example 2:			
SITRANS TW, transmitter in four-wire system			7NG3242-0BB10-Z Y01 + S76 + A05 + Y30 + H10 Y01: see Order code Y30: MA=0; ME= 950; D=C
• without explosion protection			
• 24 V AC/DC power supply			
• Voltage output			
• Sensor fault/limit monitor			
- Rating plate in English		S76	
- Sensor NiCr/Ni, type K		A05	
- Cold junction internal	X		
- Measuring range 0 ... 950 °C		Y30	
- Temperature-linear characteristic	X		
- Filter time 1 s	X		
- Output 0 ... 10 V, line filter 50 Hz		H10	
- Output driven to full-scale in event of like breakage	X		
- Limit monitoring switched off	X		
Example 3:			
SITRANS TW, transmitter in four-wire system			7NG3242-0BA01-Z Y01 + A40 + Y32 + G07 + H11 + J03 Y01: see Order code Y32: MA=0; ME= 5; D=V
• without explosion protection			
• 24 V AC/DC power supply			
• Current output			
• without sensor fault/limit monitor			
- Voltage input, measuring range -1.2 V ... +10 V		A40	
- Measuring range 0 ... 5 V		Y32	
- Source-proportional characteristic	X		
- Filter time 10 s		G07	
- Output 0 ... 20 mA, line filter 60 Hz		H11	
- No monitoring for sensor fault	(X)	J03	

Ordering information

The article number structure shown below is used to specify a fully functioning transmitter. The selection of the operating data (type of source, measuring range, characteristic etc.) is made according to the following rules:

- Operating data already set in factory to default values:
  The default settings can be obtained from the list of parameterizable operating data (see "Special operating data"). The presets can be modified by the customer to match the requirements precisely.
- Operating data set on delivery according to customer requirements:
  Supplement the Article No. by "**-Z**" and add the Order code "Y01". The operating data to be set can be obtained from the list of parameterize operating data. The Order codes A■■ to K■■ for operating data to be set need only be specified in the order if they deviate from the default setting.
  The default setting is used if no Order code is specified for operating data.

The selected parameters are printed on the transmitter's rating plate.

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Selection and Ordering data		Article No.
SITRANS TW universal transmitter for rail mounting, in four-wire system (order instruction manual separately) ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	↗	**7NG3242-** ■■■■
Explosion protection		
Without	►⬟	**0**
For inputs [EEx ia] or [EEx ib]	►⬟	**1**
Power supply		
115/230 V AC/DC	►⬟	**A**
24 V AC/DC	►⬟	**B**
Output signal		
0/4 ... 20 mA (can be switched to 0/2 ... 10 V)	►⬟	**A**
0/2 ... 10 V (can be switched to 0/4 ... 20 mA)		**B**
Sensor fault/limit monitor		
Without (retrofitting not possible)	►⬟	**0**
Relay with changeover contact		**1**
Input for		
Temperature sensor, resistance-based sensor and mV sensor with measuring range -120 ... +1000 mV DC and with U/I plug	►⬟	**0**
Voltage input (V sources) [1] Measuring range:		
• -1.2 ... +10 V DC		**1**
• -12 ... +100 V DC (not Ex version)		**2**
• -120 ... +140 V DC (not Ex version)		**3**
Current input (µA, mA sources) [1] Measuring range:		
• -12 ... +100 µA DC		**4**
• -120 ... +1000 µA DC		**5**
• -1.2 ... +10 mA DC		**6**
• -12 ... +100 mA DC		**7**
• -120 ... +1000 mA DC		**8**
Further designs Please add "-**Z**" to Article No. and specify Order code(s) (see "List of parameterizable operating data").		Order code
Customer-specific setting of operating data (see "List of parameterizable operating data") **Note:** specify in plain text: „see Order code“		**Y01**
Meas. point description (max. 16 char.)		**Y23**
Text on front of device (max. 32 char.)		**Y24**
HART tag (max. 8 characters)		**Y25**
With test report		**P01**
With shorting plug to HART communication for 0 mA or 0 V		**S01**
With plug for external cold junction compensation		**S02**
With U/I plug (-1.2 ... +10 V DC or -12 ... +100 mA)		**S03**
Language of rating plate (together with Y01 Order Code only)		
• Italian		**S72**
• English		**S76**
• French		**S77**
• Spanish		**S78**

[1] Observe max. values with Ex version.

Selection and Ordering data		Article No.
Accessories		
MiniDVD for temperature measuring instruments With documentation in German, English, French, Spanish, Italian, Portuguese and SIPROM T parameterization software	►	**A5E00364512**
Instruction Manual for SITRANS TW		
German/English	►	**A5E00054075**
French/Italian/Spanish	►	**A5E00064515**
Cold junction terminal	►	**7NG3092-8AV**
U/I plug (-1.2 ... +10 V DC pr -12 ... +100 mA)	►	**7NG3092-8AW**
SIMATIC PDM operating software		**see Chapter 8**
HART modem		
With USB interface	►	**7MF4997-1DB**

► Available ex stock.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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List of parameterizable operating data (Order codes A ■■ + B ■■ ... E ■■)

Operating data acc. to default setting Article No. with Order code: 7NG3242 - ■■■■■ -Z Y01

Order codes: A ■■ ... E ■■ | ■■■ | + | ■■■ | + | ■■■ | + | ■■■ | + | ■■■

Sensor

Thermocouples

Type	Temperature range	
B: Pt30 %Rh/Pt6 %Rh	0 ... 1820 °C	A00
C:W5 %Re	0 ... 2300 °C	A01
D:W3 %Re	0 ... 2300 °C	A02
E:NiCr/CuNi	-200 ... +1000 °C	A03
J:Fe/CuNi (IEC)	-210 ... +1200 °C	A04
K:NiCr/Ni	-200 ... +1372 °C	A05
L: Fe/CuNi (DIN)	-200 ... +900 °C	A06
N:NiCrSi/NiSi	-200 ... +1300 °C	A07
R:Pt13 %Rh/Pt	-50 ... +1760 °C	A08
S:Pt10 %Rh/Pt	-50 ... +1760 °C	A09
T:Cu/CuNi (IEC)	-200 ... +400 °C	A10
U:Cu/CuNi (DIN)	-200 ... +600 °C	A11

Connection

Standard		B01
Sum n [1]	n = 2	B02
	...	...
	n = 10	B10
Difference [2]	Diff1	B31
	Diff2	B32
Mean-val. [2]	MW	B41

Cold junction compensation

None		C00
Internal		C10
Fixed val.	0 °C	C20
	20 °C	C22
	50 °C	C25
	60 °C	C26
	70 °C	C27
Special value [7]		Y10
External meas. (through Pt100 DIN IEC 751) [7]		Y11

Measuring ranges

-30 ... +60 °C	E00
-20 ... +20 °C	E01
0 ... 40 °C	E02
0 ... 60 °C	E03
0 ... 80 °C	E04
0 ... 100 °C	E05
0 ... 120 °C	E06
0 ... 150 °C	E07
0 ... 200 °C	E08
0 ... 250 °C	E09
0 ... 300 °C	E10
0 ... 350 °C	E11
0 ... 400 °C	E12
0 ... 450 °C	E13
0 ... 500 °C	E14
0 ... 600 °C	E15
0 ... 700 °C	E16
0 ... 800 °C	E17
0 ... 900 °C	E18
0 ... 1000 °C	E19
0 ... 1200 °C	E20
0 ... 1400 °C	E21
0 ... 1600 °C	E22
0 ... 1800 °C	E23
50 ... 100 °C	E24
50 ... 150 °C	E25
100 ... 200 °C	E26
100 ... 300 °C	E27
100 ... 400 °C	E28
200 ... 300 °C	E29
200 ... 400 °C	E30
200 ... 500 °C	E31
300 ... 600 °C	E32
500 ... 1000 °C	E33
600 ... 1200 °C	E34
800 ... 1600 °C	E35
Special range [7]	Y30

Resistance thermometer
(or max. permissible line resistance see „Technical specifications“)

Pt100 (DIN IEC)	-200 ... +850 °C	A20
Pt100 (JIS)	-200 ... +649 °C	A21
Ni100 (DIN)	-60 ... +250 °C	A22

Connection

Standard		B01
Sum n [4]	n = 2	B02
	...	...
	n = 10	B10
Parallel n [5]	n = 0.1	B21
	n= 0.2	B22
	n= 0.5	B25
Special value [6] [7]		Y00
Difference [2]	Diff1	B51
	Diff2	B52
Mean-val. [2]	MW	B61

Connection

2-wire-system	C32
3-wire-system	C33
4-wire-system	C34

Line resistance [3]

0 Ω	D00
10 Ω	D10
20 Ω	D20
50 Ω	D50
Special val. [7]	Y20

Resistance-based sensors, potentiometers
(or max. permissible line resistance see „Technical specifications“) — A30

Connection

Standard		B01
Difference [2]	Diff1	B51
	Diff2	B52
Mean val.[2]	MW	B61

Connection

2-wire-system	C32
3-wire-system	C33
4-wire-system	C34

Line resistance [3]

0 Ω	D00
10 Ω	D10
20 Ω	D20
50 Ω	D50
Special val. [7]	Y20

Measuring ranges

0 ... 100 Ω	E40
0 ... 200 Ω	E41
0 ... 500 Ω	E42
0 ... 1000 Ω	E43
0 ... 2500 Ω	E44
0 ... 5000 Ω [8]	E45
0 ... 6000 Ω [8]	E46
Special range [7]	Y31

mV, V and µA, mA sensors [9] — A40

Meas. range with Article No. 7NG 3242 - ■■■■■ -Z Y01

0	-120 ... +1000 mV	E50
1	-1,2 ... +10 V [10]	
2	-12 ... +100 V [10]	
3	-120 ... +140 V [10]	
4	-12 ... +100 µA [10]	
5	-120 ... +1000 µA [10]	
6	-1,2 ... +10 mA [10]	
7	-12 ... +100 mA [10]	
8	-120 ... +1000 mA [10]	
	Special range [7]	Y32

1) n = number of thermocouple elements to be connected in series
2) See „Circuit diagrams“ for meaning of type circuit
3) Line resistance of channels 1 and 2, for max. permissible line resistance see „Technical specifications“ (only with C32, not with C33 and C34)
4) n = number of resistance thermometers to be connected in series
5) 1/n = number of resistance thermometers to be connected in parallel
6) Combination of series and parallel connection of resistance thermometers
7) Operating data: see „Special operating data“
8) This range does not apply to mean-value and difference circuits.
9) The max. permissible currents and voltages according to conformity certificate must be observed in devices with explosion protection.
10) Without detection of line breakage

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List of parameterizable operating data (Order codes F ■■ ... K ■■)

Operating data according to default setting

Article No. with Order code: 7NG3242 - ■■■■■ -Z Y01

Order codes: F ■■ ... K ■■ | ■■■ | + | ■■■ | + | ■■■ | + | ■■■ | + | ■■■ | | ■■■

Sensor

Thermocouple elements

Type	Temperature range	
B: Pt30 %Rh/	0 ... 1820 °C	A 0 0
C:W5 %Re	0 ... 2300 °C	A 0 1
D:W3 %Re	0 ... 2300 °C	A 0 2
E:NiCr/CuNi	-200 ... +1000 °C	A 0 3
J:Fe/CuNi (IEC)	-210 ... +1200 °C	A 0 4
K:NiCr/Ni	-200 ... +1372 °C	A 0 5
L: Fe/CuNi (DIN)	-200 ... +900 °C	A 0 6
N:NiCrSi/NiSi	-200 ... +1300 °C	A 0 7
R:Pt13 %Rh/Pt	-50 ... +1760 °C	A 0 8
S:Pt10 %Rh/Pt	-50 ... +1760 °C	A 0 9
T:Cu/CuNi (IEC)	-200 ... +400 °C	A 1 0
U:Cu/CuNi (DIN)	-200 ... +600 °C	A 1 1

Voltage measurement

Temperature-linear	F 0 0
Voltage-linear	F 1 0

Filter time[1]

0 s	G 0 0
0.1 s	G 0 1
0.2 s	G 0 2
0.5 s	G 0 3
1 s	G 0 4
2 s	G 0 5
5 s	G 0 6
10 s	G 0 7
20 s	G 0 8
50 s	G 0 9
100 s	G 1 0
Special time[5]	Y 5 0

Output signal and line filter[2]

4 ... 20 mA/ 2 ... 10 V with line filter:	
50 Hz	H 0 0
60 Hz	H 0 1
10 Hz[4]	H 0 2
0 ... 20 mA/ 0 ... 10 V with line filter:	
50 Hz	H 1 0
60 Hz	H 1 1
10 Hz	H 1 2

Failure signal

with line breakage/fault:	
to full scale	J 0 0
to start of scale	J 0 1
hold last value	J 0 2
no monitoring	J 0 3
Safety value[5]	Y 6 0

Limit monitor[3]

Limit monitoring ineffective (but sensor fault signalling with closed-circuit operation)	K 0 0
Effective[5]	Y 7 0

Resistance thermometer
(max. permissible line resistances see „Technical specifications“)

Pt100 (DIN IEC)	-200 ... +850 °C	A 2 0
Pt100 (JIS)	-200 ... +649 °C	A 2 1
Ni100 (DIN)	-60 ... +250 °C	A 2 2

Voltage measurement

Temperature-linear	F 0 0
Resistance-linear	F 2 0

Filter time[1]
same as for thermocouple elements

Output signal and line filter[2]
same as for thermocouple elements

Failure signal

with line breakage/fault:	
to full scale	J 0 0
to start of scale	J 0 1
hold last value	J 0 2
no monitoring	J 0 3
Safety value[5]	Y 6 0
with line breakage or short-circuit/fault:	
to full scale	J 1 0
to start of scale	J 1 1
hold last value	J 1 2
no monitoring	J 1 3
Safety value[5]	Y 6 1

Limit monitor[3]
same as for thermocouple elements

Resistance-based sensors, potentiometers

(max. permissible line resistances see „Technical specifications“) A 3 0

Voltage measurement

Resistance-linear	F 2 0

Filter time[1]
same as for thermocouple elements

Output signal and line filter[2]
same as for thermocouple elements

Failure signal

with line breakage/fault:	
to full scale	J 0 0
to start of scale	J 0 1
hold last value	J 0 2
no monitoring	J 0 3
Safety value[5]	Y 6 0

Limit monitor[3]
same as for thermocouple elements

mV, V and µA, mA sources A 4 0

Voltage measurement

Source proportional	F 3 0

Filter time[1]
same as for thermocouple elements

Output signal and line filter[2]
same as for thermocouple elements

Limit monitor[3]
same as for thermocouple elements

1) Software filter to smooth the result
2) Filter to suppress line disturbances on the measured signal.
3) If signalling relay present
4) for special appliciations
5) Operating data: see „Special operating data“

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Special operating data

Order code	Plain text required	Options
Y00	N=□□.□□	Factor N for multiplication with the characteristic values of resistance thermometers Range of values: 0.10 to 10.00 1. Example: 3 x Pt500 parallel: N = 5/3 = 1.667; 2. Example: Ni120: N = 1.2
Y10	TV=□□□□.□□	Temperature TV of the fixed cold junction
	D=□	Dimension; range of values: C, K, F, R
Y11	RL=□□□.□□	Line resistance RL in Ω for compensation of cold junction line of external Pt100 DIN IEC 751 Range of values: 0.00 to 100.00
Y20	RL1=□□□.□□ RL2=□□□.□□	Line resistances RL of channel 1 (RL1) and channel 2 (RL2) in Ω if the resistance thermometer or the resistance-based sensor is connected in a two-wire system Range of values depending on type of sensor: 0.00 to 100.00
Y30	MA=□□□□.□□ ME=□□□□.□□	Start-of-scale value MA and full-scale value ME for thermocouples and resistance thermometers (Range of values depending on type of sensor)
	D=□	Dimension, range of values: C, K, F, R)
Y31	MA=□□□□.□□ ME=□□□□.□□	Start-of-scale value MA and full-scale value ME for resistance-based sensors or potentiometers in Ω Range of values: 0.00 to 6,000.00
Y32	MA=□□□□.□□ ME=□□□□.□□	Start-of-scale value MA and full-scale value ME for mV, V, µA and mA sources Range of values depending on type of sensor: -120.00 to 1,000.00
	D=□□	Dimension (mV entered as MV, V as V, µA as UA, mA as MA)
Y50	T63=□□□.□	Response time T63 of software filter in s Range of values: 0.0 to 100.0 Safety value S of signal output in mA or in V corresponding to the set type of output. Range of values - with current output: -0.50 to 23.00 - with voltage output: -0.25 to 10.75
Y60	S=□□.□□	Safety value S with line breakage of sensor
Y61	S=□□.□□	Safety value S with line breakage or short-circuit of sensor
Y70	UG=□□□□.□□	Lower limit value (dimension as defined by measuring range)
	OG=□□□□.□□	Upper limit value (dimension as defined by measuring range)
	H=□□□□.□□	Hysteresis (dimension as defined by measuring range)
	K=□	Switch on/off combination of limit function and sensor fault detection; J=on; N=off (standard: J)
	A=□	Type of relay output: A=open-circuit operation; R=closed-circuit operation (standard: R)
	T=□□.□	Switching delay T of relay output in s Range of values: 0.0 to 10.0 (standard: 0.0)

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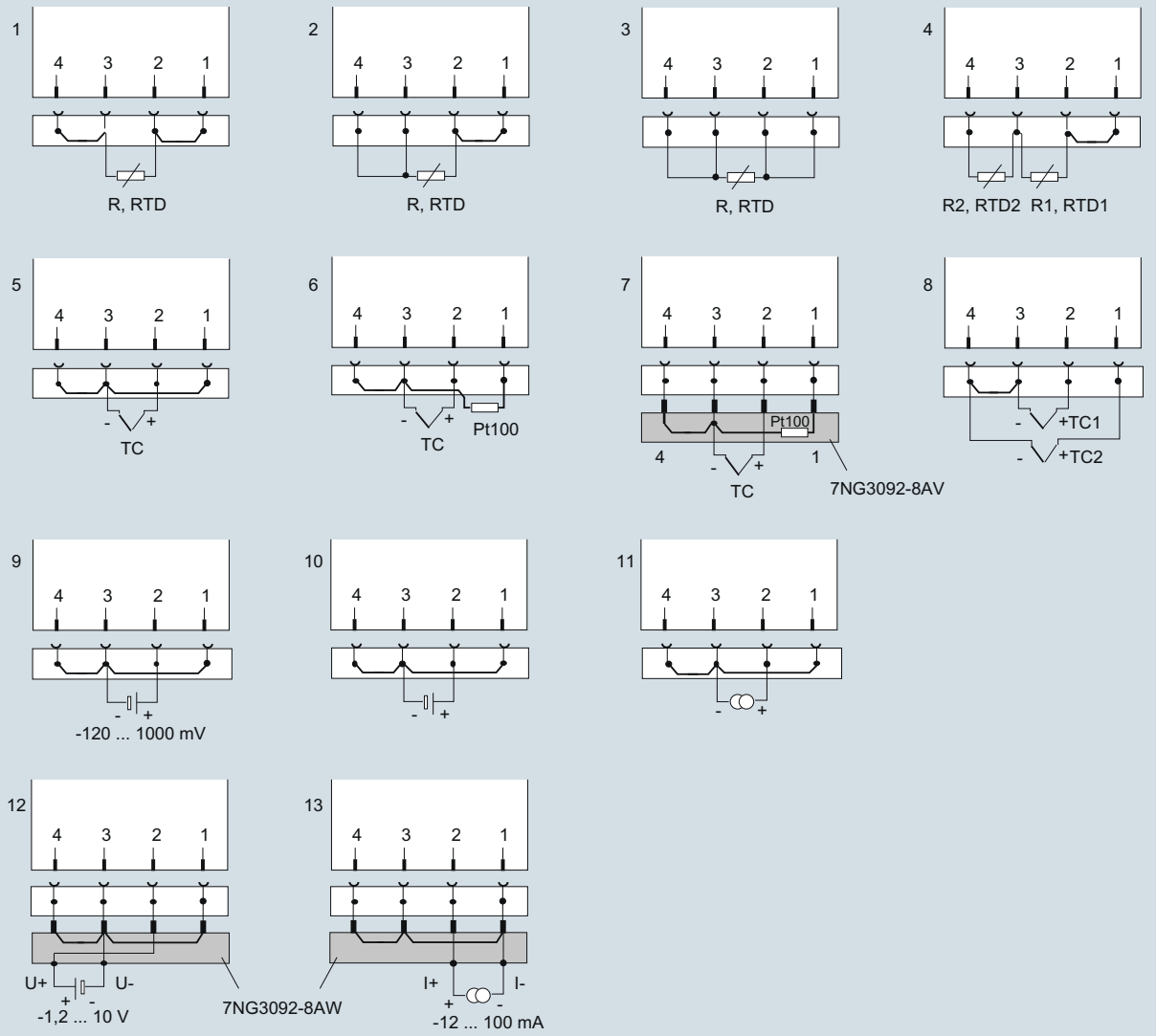
Schematics

Sensor input connections



Resistance thermometers, resistance-based sensors, potentiometers:

1 Two-wire system; resistance can be parameterized for line compensation

2 Three-wire system

3 Four-wire system

4 Difference/mean-value circuit; 2 resistors can be parameterized for line compensation

Thermocouples:

5 Determination of cold junction temperature using built-in Pt100 or fixed reference temperature

6 Determination of cold junction temperature using external Pt100; resistance can be parameterized for line compensation

7 Determination of cold junction temperature using cold junction terminal 7NG3092-8AV

8 Difference/mean-value circuit with internal cold junction temperature

Further sources:

9 mV sources with two-wire system (7NG3242-xxxx0)

10 V sources with two-wire system (7NG3242-xxxx[1-3])

11 mA/mA sources with two-wire system (7NG3242-xxxx[4-8])

12 Voltage measurement -1,2 to 10 V with U/I plug 7NG3092-8AW (7NG3242-xxxx0)

13 Current measurement -12 to 100 mA with U/I plug 7NG3092-8AW (7NG3242-xxxx0)

Connection diagram for the input signal

Channel 1 is the measured variable between the terminals 2 and 3 on the input plug. With a difference or mean-value circuit, the calculation of the measured value is defined by the type of measurement. Otherwise the measured value is determined via channel 1. The following code is used for the type of measurement:

type of measurement	Calculation of measured value
Single channel	Channel 1
Differential connection 1	Channel 1 - Channel 2
Differential connection 2	Channel 2 - Channel 1
Mean-value 1	½ · (Channel 1 + Channel 2)

The short-circuit jumpers shown in the circuits must be inserted in the respective system on site.

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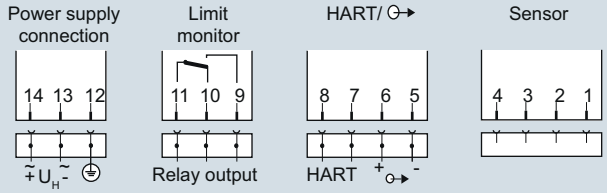
SITRANS TW four-wire system, universal, HART



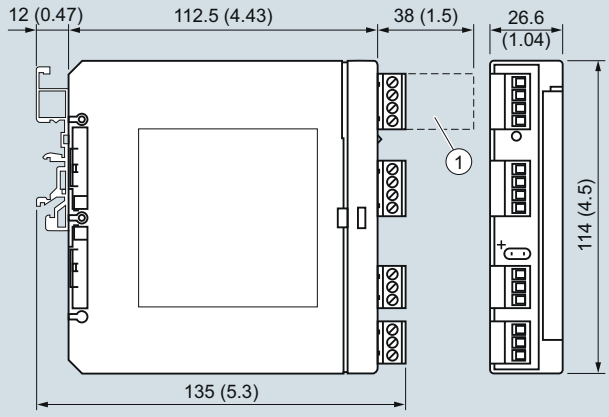
1 to 4	Signal input (see "sensor input connections" for possible types of connection)
5, 6	Analog output (U or I output parameterizable using plug-in jumpers)
7, 8	Connection with HART communication for local parameterization
9 to 11	Output for sensor fault/limit monitor as relay contact (see below for possible parameterization)
12	PE connection
13, 14	Power supply input (protected against reverse polarity)

Connection diagram for power supply, input and outputs

Relay outputs

	Connected terminals
Closed-circuit operation (relay opens when error)	
• Device switched off	10 and 11
• Device switched on and no error	9 and 11
• Device switched on and error	10 and 11
Open-circuit operation (relay closes when error)	
• Device switched off	10 and 11
• Device switched on and no error	10 and 11
• Device switched on and error	9 and 11

Dimensional drawings



(1) In devices with explosion protection

Dimensions for control room mounting, rail mounting in mm (inches)

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Overview

SITRANS TF280 for flexible and cost-effective temperature measurements

- Supports the WirelessHART standard (HART V 7.1)
- Very high security level for wireless data transmission
- Built-in local user interface (LUI) with 3-button operation
- Optimum representation and readability using graphical display (104 x 80 pixels) with integrated backlight
- Stand-by (deep sleep phase) mode can be turned on and off with push of a button
- Battery power supply
- Battery life time up to 5 years
- Extend battery life time with HART modem interface which can be switch off
- Optimized power consumption through new design, and increase in battery life time
- Simple configuration thanks to SIMATIC PDM
- Housing meets IP65 degree of protection
- Supports all Pt100 sensors as per IEC 751/DIN EN 60751

Benefits

The SITRANS TF280 is a temperature transmitter that features WirelessHART as the standard communication interface.

Also available is a wired interface to connect a HART modem:

- Flexible temperature measurement
- Save costs on wiring at difficult installation conditions. Wireless technology offers cost advantages in cases where extensive wiring costs would normally apply.
- It enables additional hitherto unfeasible measuring points, particularly for monitoring purposes
- Easy installation also on moveable equipment parts
- Enables cost-effective temporary measurements, for example for process optimizations.
- Optimum solution in addition to wired communication and for system solutions in process automation

Application

The SITRANS TF280 is a WirelessHART field device for temperature measurement with a Pt100 sensor.

This sensor can be installed directly on the field device, or connected at an offset with a cable connection. On the wireless communication side, the transmitter supports the WirelessHART standard. A HART modem can be connected to the transmitter particularly for initial parameterization. Alternatively the device can be commissioned comfortably by means of the local push-buttons w/o any additional handset devices.

It can be used in all industries and applications in non-explosive areas.

Design

The SITRANS TF280 has a robust aluminum enclosure and is suitable for outside use. It conforms with the IP65 safety class.

The operation temperature range is -40 to +80 °C (-40 to +176 °F). Power supply is provided through an integrated battery, which is available as an accessory. The device is only approved for operation with this battery.

The antenna features a rotatable joint which can be used for directional alignment. Wireless signals can thus be optimally received and transmitted.

A special highlight is the possibility to operate directly on the device with 3 push buttons. It perfectly matches the strategy of all new Siemens field devices.

Using the device's push buttons, it is easy to turn the HART modem interface of the device on and off. The device can be put to passive status and reactivated at any time. This helps to extend the life time of the battery.

The SITRANS TF280 transmitter features a cable gland or a Pt100 sensor including protective piping.

Function

The SITRANS TF280 can join to a WirelessHART network. It can be parameterized and operated through this network. Measured process values are transmitted via the network to the SIEMENS IE/WSN-PA LINK.

Field device data received by the IE/WSN-PA LINK is transmitted to the connected systems, for example the process control system SIMATIC PCS 7. For an introduction of WirelessHART, please see the FI 01 catalogue Sec. 8 or www.siemens.com/wirelesshart.

Detailed information on IE/WSN-PA LINK can be found in the FI 01 catalogue Sec. 7 or www.siemens.com/wirelesshart.

Integration

Connecting to SIMATIC PCS 7

The integration of field devices in SIMATIC PCS 7 and other process control systems can be now done seamlessly and cost-effectively with wireless technology, especially in situations where high wiring costs may be expected. Of particular interest are measuring points which are to be added and for which no wiring is available.

Where larger distances between the IE/WSN-PA LINK and control systems need to be overcome, this connection can also be implemented on a wireless and cost-effective basis using the SCALANCE W series of products. Siemens WirelessHART devices operate with optimum coexistence to SCALANCE W family products.

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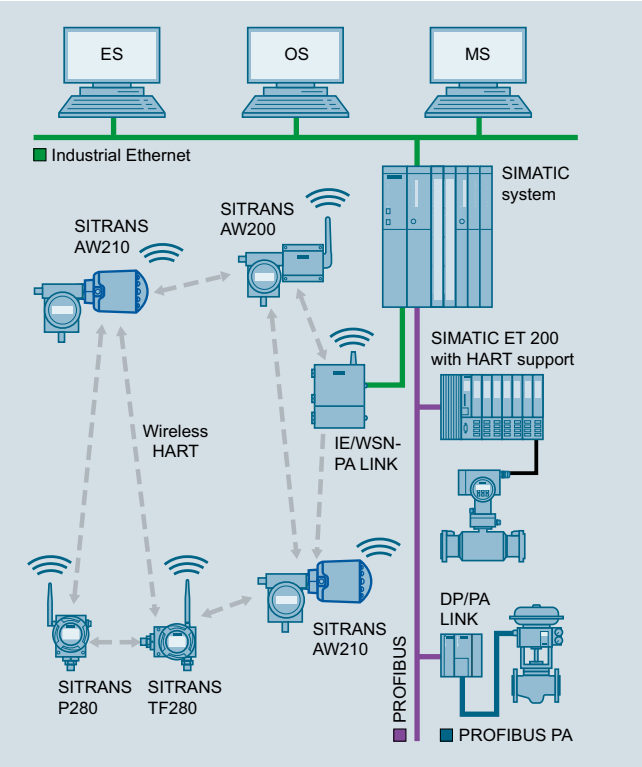

Integration of a meshed network into SIMATIC PCS 7

Configuration

Configuration of the SITRANS TF280 transmitter may be carried out as follows:

- Initial commissioning for the SITRANS TF280 with SIMATIC PDM is generally carried out via a HART modem or the integrated local user interface, since the network ID and join Key must be set up on the device before it can be accepted and integrated into the WirelessHART network.
- Once it is integrated into the network, the device can be conveniently operated with the WirelessHART network or onsite with a HART modem or via the local user interface.

Technical specifications

The SITRANS TF280 can be mechanically installed in two ways:

- Direct at the measuring point with a M20x1.5 thread.
  A connection to other threads can be done via the adapter.
- Remotely from the Pt100 sensor, which is connected to the transmitter via a cable.

The data in the following table refer to the transmitter only excluding a connected sensor, except as noted otherwise.

Input	
Sensor	
• Sensor type	Pt100 as per IEC 751/DIN EN 60751[1)]
• Connection	Two, three or four-wire system
• Measuring range	-200 ... +850 °C (-328 ... 1560 °F)
Cable length SITRANS TF280 and Pt100 sensor element	≤ 3 m
Measuring accuracy[2)]	
Accuracy	< 0.04 % of the measuring range
Long-term drift	< 0.035 % of the measuring range in first year
Ambient temperature effect	max. 0.1 °C/10 K
Rated conditions	
Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-40 ... +85 ° C (-40 ... +185 °F)
Relative humidity	< 95%
Climatic class	4K4H in accordance with EN 60721-3-4 (stationary use at locations not protected against weather)
Degree of protection	IP65/NEMA 4
Max. permissible temperature at transmitter for directly mounted Pt100	80 °C (176 °F)
Design	
Enclosure	Die-cast aluminum
Shock resistance	in accordance with DIN EN 60068-2-29 / 03.95
Resistance to vibration	DIN EN 60068-2-6/12.07
Weight	
• without battery	1.5 kg (3.3 lb)
• with battery	1.6 kg (3.5 lb)
Dimensions (W x H x D)	See "Dimensional drawing"
Thread for cable gland/ sensor connection	M20x1.5 other threads via adapter
Material of protective tubes and process connection (only for pre-mounted sensor pipe)	Stainless steel 1.4404 (AISI 316L, UNS S 31603, X2CrNiMo17-12-2)
Cable between transmitter and sensor element	≤ 3 m für two-, three- or four-wire connections Cable resistance < 1 Ω (setting range in mΩ 0...9999)
Sensor break	Recognized

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Displays and controls	
Display (with illumination)	
• Size of display	104 x 80 pixels
• Number of digits	Adjustable
• Number of spaces after comma	Adjustable
Setting options	• on site with 3 push buttons • with SIMATIC PDM or HART Communicator
Auxiliary power	
Battery	3.6 V DC
Communication	
Wireless standard	WirelessHART V7.1 conforming
Transmission frequency band	2.4 GHz (ISM-Band)
Range under reference conditions	Up to 250 m (line of sight) in outside areas Up to 50 m (greatly dependent on obstacles) in Inside areas
Communication interfaces	• HART communication with HART modem • WirelessHART
Certificates and approvals	
Wireless communication approvals	R&TTE, FCC
General Product Safety	$CSA_{US/C}$, CE, UL
Pressure equipment directive	This device is not included in the pressure device guideline; classification according to pressure device guideline (PED 97/23/EC), Directive 1/40; article 1, paragraph 2.1.4

1) Pre-mounted Pt100: Class A (maximum MES: 0.15 + 0.002*|t| °C)

2) Calculation for errors:
Probable total error = $\sqrt{(MES^2 + AET^2 + LTD^2 + ATE^2)}$
Max. error = MES + AET + LTD + ATE
|t|: Absolut value of measured temperature
MES: Measurement error of sensor
AET: Accuracy error transmitter
LTD: Long term drift
ATE: Ambient temperature drift

Selection and Ordering data

		Article No.
SITRANS TF280 WirelessHART Temperature transmitter ↗		**7MP1110-**
(Required battery not included with delivery, see accessories)		**0A ■■■ - 0 ■■ 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Connections/cable entry		
Cable gland M20x1.5[1]	▶ ⬟	**C**
Sensor pipe with Pt100, G½" male thread, pre-mounted and connected	▶ ⬟	**D**
Display		
Digital display, visible	▶ ⬟	**1**
Enclosure		
Die-cast aluminum	▶ ⬟	**1**
Explosion protection		
Not included	▶ ⬟	**A**
Antenna		
Variable, attached to device	▶ ⬟	**A**
Further designs		Order code
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.		
Measuring point number (TAG Nr.) max. 16 digits entered in plain text Y15:		**Y15**
Measuring point message max. 27 characters entered in plain text: Y16:		**Y16**
Accessories		Article No.
Lithium battery for SITRANS TF280/P280	▶	**7MP1990-0AA00**
Mounting bracket, steel		**7MF4997-1AC**
Mounting bracket, stainless steel	▶	**7MF4997-1AJ**
Cover, die-cast aluminum, without window	▶	**7MF4997-1BB**
Cover, die-cast aluminum, with window		**7MF4997-1BE**
Thread adapter M20x1.5 (male thread) on ½-14 NPT (female thread)	▶	**7MP1990-0BA00**
Thread adapter M20x1.5 (male thread) on G½ (female thread)	▶	**7MP1990-0BB00**
IE/WSN-PA Link		**see Sec. 7**
HART modem with USB interface	▶	**7MF4997-1DB**
SIMATIC PDM		**see Sec. 8**

▶ Available ex stock.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) Please order sensor separately.

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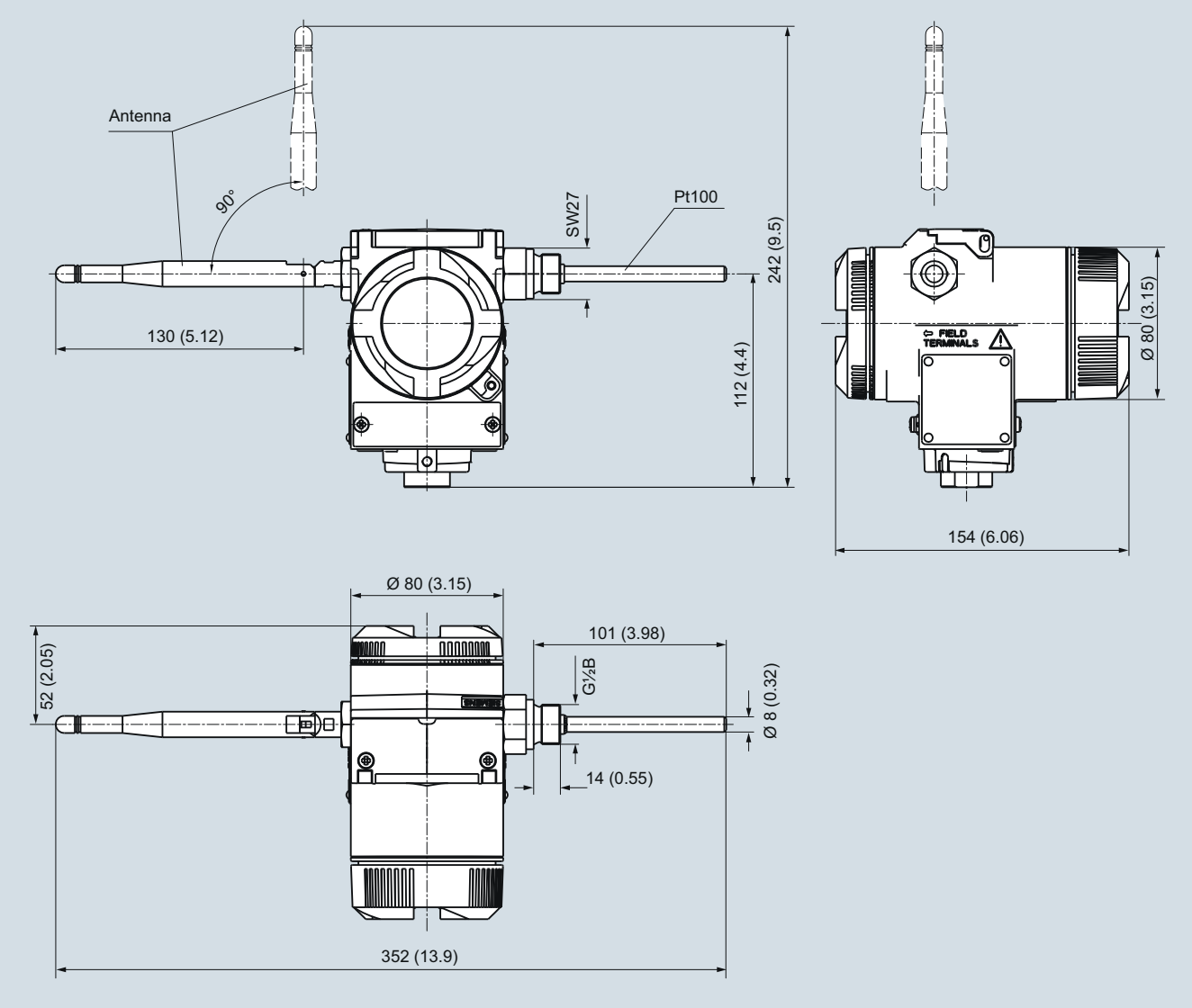
2

Dimensional drawings



SITRANS TF280 WirelessHART temperature transmitter with Pt100, dimensions in mm (inch).
Please see the dimensional drawing of the mounting bracket on page 1/171.

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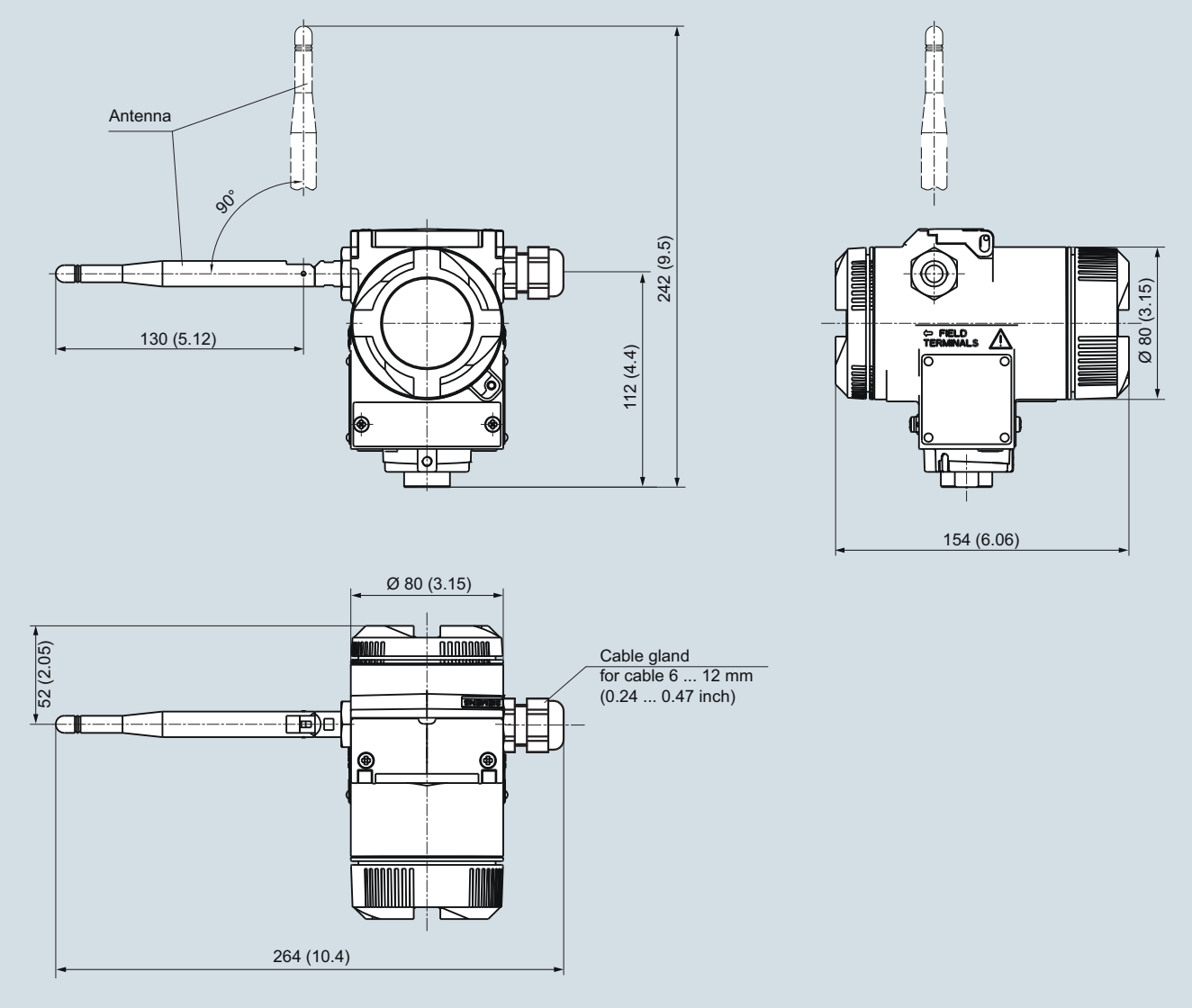

SITRANS TF280 WirelessHART temperature transmitter, dimensions in mm (inch)
Please see the dimensional drawing of the mounting bracket on page 1/171.

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SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Overview

Our field devices for heavy industrial use

- HART, Universal
- 4 to 20 mA, universal
- Field indicator for 4 to 20 mA signals

The temperature transmitter SITRANS TF works where others feel uncomfortable.

Benefits

- Universal use
  - as transmitter for resistance thermometer, thermocouple element, Ω or mV signal
  - as field indicator for any 4 to 20 mA signals
- Local sensing of measured values over digital display
- Rugged two-chamber enclosure in die-cast aluminium or stainless steel
- Degree of protection IP67
- Test terminals for direct read-out of the output signal without breaking the current loop
- Can be mounted elsewhere if the measuring point
  - is hard to access,
  - is subject to high temperatures,
  - is subject to vibrations from the system,
  - or if you want to avoid long neck tubes and/or protective tubes.
- Can be mounted directly on American-design sensors
- Wide range of approvals for use in potentially explosive atmospheres. "Intrinsically safe, non-sparking and flameproof" type of protections, for Europe and USA.
- SIL2 (with Order Code C20), SIL2/3 (with C23)

Application

SITRANS TF can be used everywhere where temperatures need to be measured under particularly adverse conditions, or where a convenient local display is ideal. Which is why users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive elements. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

Function

Configuration

The communication capability over the HART protocol V 5.9 of the SITRANS TF with an integrated SITRANS TH300 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

Parameterization is carried out using a PC for SITRANS TF with the integrated and programmable SITRANS TK. Available for this purpose are a special modem and the software tool SIPROM T.

Mode of operation

Mode of operation of SITRANS TF as temperature transmitter

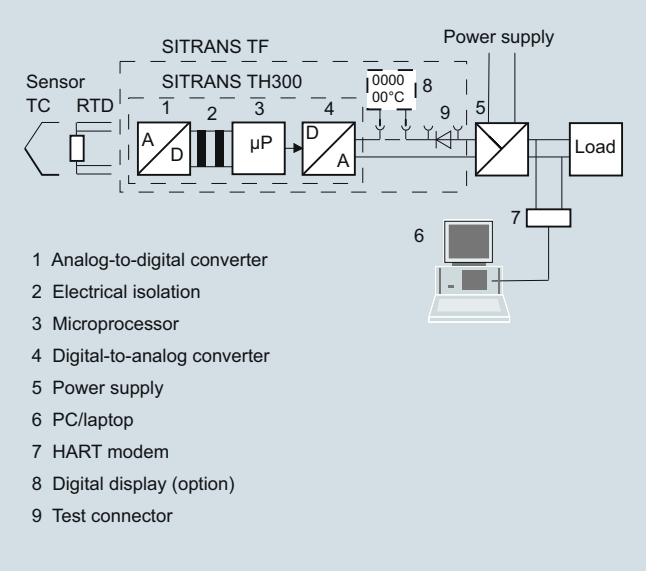
The sensor signal, whether resistance thermometer, thermocouple element or Ω or mV signal, is amplified and linearized. Sensor and output side are electrically isolated. An internal cold junction is integrated for measurements with thermocouple elements.

The device outputs a temperature-linear direct current of 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission and configuration.

SITRANS TF automatically detects when a sensor should be interrupted or is indicating a short-circuit. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.

Mode of operation of SITRANS TF as field indicator

Any 4 to 20 mA signal can be applied to the generous terminal block. As well as a range of predefined measurement units, the adjustable indicator also supports the input of customized units. This means that any 4 to 20 mA signal can be represented as any type of unit, e.g. pressure, flow rate, filling level or temperature.



Mode of operation: SITRANS TF with integrated transmitter and digital display

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Technical specifications

Input	
Resistance thermometer	
Measured variable	Temperature
Sensor type	
• to IEC 60751	Pt25 … Pt1000
• to JIS C 1604; a=0.00392 K-1	Pt25 … Pt1000
• to IEC 60751	Ni25 … Ni1000
Units	°C and °F
Connection	
• Normal connection	1 resistance thermometer (RTD) in 2-wire, 3-wire or 4-wire system
• Generation of average value	Series or parallel connection of several resistance thermometers in a two-wire system for the generation of average temperatures or for adaptation to other device types
• Generation of difference	2 resistance thermometers (RTD) in 2-wire system (RTD 1 – RTD 2 or RTD 2 – RTD 1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Always active (cannot be disabled)
Short-circuit monitoring	can be switched on/off (default value: ON)
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	10 °C (18 °F)
Characteristic curve	Temperature-linear or special characteristic
Resistance-based sensors	
Measured variable	Actual resistance
Sensor type	Resistance-based, potentiometers
Units	Ω
Connection	
• Normal connection	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system
• Generation of average value	2 resistance-based sensors in 2-wire system for generation of average value
• Generation of difference	2 resistance-based sensor in 2-wire system (R 1 – R 2 or R 2 – R 1)
Interface	
• Two-wire system	Parameterizable line resistance ≤ 100 Ω (loop resistance)
• Three-wire system	No balancing required
• Four-wire system	No balancing required
Sensor current	≤ 0.45 mA
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off
Short-circuit monitoring	Can be switched off (value is adjustable)
Measuring range	parameterizable max. 0 ... 2200 Ω (see table "Digital measuring errors")
Min. measured span	5 ... 25 Ω (see Table "Digital measuring errors")
Characteristic curve	Resistance-linear or special characteristic
Thermocouples	
Measured variable	Temperature
Sensor type (thermocouples)	
• Type B	Pt30Rh-Pt6Rh to DIN IEC 584
• Type C	W5 %-Re acc. to ASTM 988
• Type D	W3 %-Re acc. to ASTM 988
• Type E	NiCr-CuNi to DIN IEC 584
• Type J	Fe-CuNi to DIN IEC 584
• Type K	NiCr-Ni to DIN IEC 584
• Type L	Fe-CuNi to DIN 43710
• Type N	NiCrSi-NiSi to DIN IEC 584
• Type R	Pt13Rh-Pt to DIN IEC 584
• Type S	Pt10Rh-Pt to DIN IEC 584
• Type T	Cu-CuNi to DIN IEC 584
• Type U	Cu-CuNi to DIN 43710
Units	°C or °F
Connection	
• Normal connection	1 thermocouple (TC)
• Generation of average value	2 thermocouples (TC)
• Generation of difference	2 thermocouples (TC) (TC 1 – TC 2 or TC 2 – TC 1)
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off
Cold junction compensation	
• Internal	With integrated Pt100 resistance thermometer
• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
• External fixed	Cold junction temperature can be set as fixed value
Measuring range	parameterizable (see table "Digital measuring errors")
Min. measured span	Min. 40 ... 100 °C (72 ... 180 °F) (see table "Digital measuring errors")
Characteristic curve	Temperature-linear or special characteristic
mV sensor	
Measured variable	DC voltage
Sensor type	DC voltage source (DC voltage source possible over an externally connected resistor)
Units	mV
Response time	≤ 250 ms for 1 sensor with open-circuit monitoring
Open-circuit monitoring	Can be switched off
Measuring range	-10 ... +70 mV -100 ... +1100 mV
Min. measured span	2 mV or 20 mV
Overload capability of the input	-1.5 ... +3.5 V DC
Input resistance	≥ 1 MΩ
Characteristic curve	Voltage-linear or special characteristic

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SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Output	
Output signal	4 ... 20 mA, 2-wire
Communication with SITRANS TH300	acc. to HART Rev. 5.9
Digital display	
Digital display (optional)	In current loop
Display	Max. 5 digits
Digit height	9 mm (0.35 inch)
Display range	-99 999 ... + 99 999
Units	any (max. 5 char.)
Setting: Zero point, full-scale value and unit	with 3 buttons
Load voltage	2.1 V
Measuring accuracy	
Digital measuring errors	See table "Digital measuring errors"
Reference conditions	
• Auxiliary power	24 V ± 1 %
• Load	500 Ω
• Ambient temperature	23 °C (73.4 °F)
• Warming-up time	> 5 min
Error in the analog output (digital/analog converter)	< 0.025 % of span
Error due to internal cold junction	< 0.5 °C (0.9 °F)
Influence of ambient temperature	
• Analog measuring error	0.02 % of span/10 °C (18 °F)
• Digital measuring errors	
- with resistance thermometers	0.06 °C (0.11 °F)/10°C (18 °F)
- with thermocouples	0.6 °C (1.1 °F)/10°C (18 °F)
Auxiliary power effect	< 0.001 % of span/V
Effect of load impedance	< 0.002 % of span/100 Ω
Long-term drift	
• In the first month	< 0.02 % of span
• After one year	< 0.3 % of span
• After 5 years	< 0.4 % of span
Conditions of use	
Ambient conditions	
Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Condensation	Permissible
Electromagnetic compatibility	According to EN 61326 and NAMUR NE21
Degree of protection to EN 60529	IP67
Construction	
Weight	Approx. 1.5 kg (3.3 lb) without options
Dimensions	See "Dimensional drawings"
Enclosure material	Die-cast aluminum, low in copper, GD-AlSi 12 or stainless steel, polyester-based lacquer, stainless steel rating plate
Electrical connection, sensor connection	Screw terminals, cable inlet via M20 x 1.5 or ½-14 NPT screwed gland
Mounting bracket (optional)	Steel, galvanized and chrome-plated or stainless steel

Auxiliary power	
Without digital display	11 ... 35 V DC (30 V for Ex ib; 32 V for Ex ic and Ex nA)
With digital display	13.1 ... 5 V DC (30 V for Ex ib; 32 V for Ex ic and Ex nA)
Electrically isolated	Between input and output
• Test voltage	U_{eff} = 1 kV, 50 Hz, 1 min
Certificates and approvals	
Explosion protection ATEX	
• "Intrinsic safety" type of protection	with digital display: II 2 (1) G EEx ia IIC T4 without digital display: II 2 (1) G EEx ia IIC T6
- EC type test certificate	ZELM 11 ATEX 0471 X
• "Operating equipment that is non-ignitable and has limited energy for zone 2" type of protection	II 3G EEx nAL IIC T6/T4
- EC type test certificate	ZELM 11 ATEX 0471 X
• "Flame-proof enclosure" type of protection	II 2 G EEx d IIC T5/T6 II 1D Ex tD A20 IP65 T100 °C, T85 °C
- EC type test certificate	ZELM 11 ATEX 0472 X
Explosion protection to FM	Certificate of Compliance 3017742
• Identification (XP, DIP, NI, S)	• XP/I/1/BCD/T5 Ta = 85 °C (185 °F), T6 Ta = 50 °C (112 °F), Type 4X • DIP/II, III/1/EFG/T5 Ta = 85 °C (185 °F), T6 Ta = 50 °C (112 °F), Type 4X • NI/I/2/ABCD/T5 Ta = 85 °C (185 °F), T6 Ta = 50 °C (112 °F) , Type 4X • S/II, III/2/FG/T5 Ta = 85 °C (185 °F), T6 Ta = 50 °C (112 °F), Type 4X
Other certificates	IECEx, GOST, INMETRO, NEPSI, KOSHA
Hardware and software requirements	
• For the parameterization software SIPROM T for SITRANS TF with TH200	
- Personal computer	PC with CD-ROM drive and USB
- PC operating system	Windows 98, NT, 2000, XP, 7 and Win 8
• For the parameterization software SIMATIC PDM for SITRANS TH300	See chapter 8 "Software", "SIMATIC PDM"
Communication	
Load for HART connection	230 ... 1100 Ω
• Two-core shielded	≤ 3.0 km (1.86 mi)
• Multi-core shielded	≤ 1.5 km (0.93 mi)
Protocol	HART protocol, version 5.9

Factory setting (transmitter):

- Pt100 (IEC 751) with 3-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Error signal in the event of sensor breakage: 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

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Digital measuring errors

Resistance thermometer

Input	Measuring range	Min. measured span		Digital accuracy	
	°C / (°F)	°C)	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 ... +850 (-328 ... +1562)	10	(18)	0.3	(0.54)
Pt50	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +850 (-328 ... +1562)	10	(18)	0.1	(0.18)
Pt500	-200 ... +850 (-328 ... +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 ... +649 (-328 ... +1200)	10	(18)	0.3	(0.54)
Pt50	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt100 ... Pt200	-200 ... +649 (-328 ... +1200)	10	(18)	0.1	(0.18)
Pt500	-200 ... +649 (-328 ... +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 ... +350 (-328 ... +662)	10	(18)	0.15	(0.27)
Ni 25 to Ni1000	-60 ... +250 (-76 ... +482)	10	(18)	0.1	(0.18)

Resistance-based sensors

Input	Measuring range	Min. measured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 ... 390	5	0.05
Resistance	0 ... 2200	25	0.25

Thermocouples

Input	Measuring range	Min. measured span		Digital accuracy	
	°C / (°F)	°C	(°F)	°C	(°F)
Type B	0 ... 1820 (32 ... 3308)	100	(180)	2 [1]	(3.6) [1]
Type C (W5)	0 ... 2300 (32 ... 4172)	100	(180)	1 [2]	(1.8) [2]
Type D (W3)	0 ... 2300 (32 ... 4172)	100	(180)	1[2]	(1.8)[2]
Type E	-200 ... +1000 (-328 ... +1832)	50	(90)	1	(1.8)
Type J	-210 ... +1200 (-346 ... +2192)	50	(90)	1	(1.8)
Type K	-200 ... +1370 (-328 ... +2498)	50	(90)	1	(1.8)
Type L	-200 ... +900 (-328 ... +1652)	50	(90)	1	(1.8)
Type N	-200 ... +1300 (-328 ... +2372)	50	(90)	1	(1.8)
Type R	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type S	-50 ... +1760 (-58 ... +3200)	100	(180)	2	(3.6)
Type T	-20 ... +400 (-328 ... +752)	40	(72)	1	(1.8)
Type U	-200 ... +600 (-328 ... +1112)	50	(90)	2	(3.6)

[1] The digital accuracy in the range 0 to 300 °C (32 to 572 °F) is 3 °C (5.4 °F).

[2] The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

mV sensor

Input	Measuring span	Min. measured span	Digital accuracy
	mV	mV	µV
mV sensor	-10 ... +70	2	40
mV sensor	-100 ... +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

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SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Selection and Ordering data	Article No.
Temperature transmitter in field housing Two-wire system 4 ... 20 mA, with electrical isolation, with documentation on MiniDVD	↗ **7NG313-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Integrated transmitter	
SITRANS TH200, programmable	
• Without Ex protection	**50**
• With Ex ia	**51**
• With Ex nAL for zone 2	**52**
• Total device SITRANS TF Ex d[1]	**54**
• Total device SITRANS TF according to FM (XP, DIP, NI, S)[1]	**55**
SITRANS TH300, communication capability according to HART V 5.9	
• Without Ex-protection	**60**
• With Ex ia	**61**
• With Ex nAL for zone 2	**62**
• Total device SITRANS TF Ex d[1]	**64**
• Total device SITRANS TF according to FM (XP, DIP, NI, S)[1]	**65**
Enclosure	
Die-cast aluminium	**A**
Stainless steel precision casting	**E**
Connections/cable inlet	
Screwed glands M20x1.5	**B**
Screwed glands ½-14 NPT	**C**
Digital indicator	
Without	**0**
With	**1**
Mounting bracket and securing parts	
Without	**0**
Made of steel	**1**
Made of stainless steel	**2**
Further designs Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	Order code
Test protocol (5 measuring points)	**C11**
Functional safety SIL2	**C20**
Functional safety SIL2/3	**C23**
Explosion protection	
• Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG313.-1....)	**E25**
• Explosion protection Ex d to INMETRO (Brazil) (only with 7NG313.-4....)	**E26**
• Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG313.-2...)	**E27**
• Explosion protection Ex i to NEPSI (China) (only with 7NG313.-1...)	**E55**
• Explosion protection Ex d to NEPSI (China) (only with 7NG313.-4....)	**E56**
• Explosion protection Ex nA to NEPSI (China) (only with 7NG313.-2...)	**E57**
• Explosion protection Ex d to KOSHA (Korea) (only with 7NG313.-4...)	**E70**
• Two coats of lacquer on casing and cover (PU on epoxy)	**G10**
• Transient protection	**J01**
• Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included	**D57**
• Cable gland 1/2 NPT ADE 1F, cable diam. 6 ... 12 (CAPRI 818694 and 810534) included	**D58**
• Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included	**D59**
• Cable gland 1/2 NPT ADE 1F, cable diam. 4 ... 8.5 (CAPRI 818674 and 810534) included	**D60**

Selection and Ordering data	Order Code
Customer-specific programming Add "**-Z**" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	**Y01**[2]
Measuring point no. (TAG), max. 8 characters	**Y17**[3]
Meas. point descriptor, max. 16 characters	**Y23**[4]
Meas. point message, max. 32 characters	**Y24**[4]
Only inscription on measuring point label: specify in plain text: Measuring range	**Y22**[4]
Pt100 (IEC) 2-wire, R_L = 0 Ω	**U02**[5]
Pt100 (IEC) 3-wire	**U03**[5]
Pt100 (IEC) 4-wire	**U04**[5]
Thermocouple type B	**U20**[5][6]
Thermocouple type C (W5)	**U21**[5][6]
Thermocouple type D (W3)	**U22**[5][6]
Thermocouple type E	**U23**[5][6]
Thermocouple type J	**U24**[5][6]
Thermocouple type K	**U25**[5][6]
Thermocouple type L	**U26**[5][6]
Thermocouple type N	**U27**[5][6]
Thermocouple type R	**U28**[5][6]
Thermocouple type S	**U29**[5][6]
Thermocouple type T	**U30**[5][6]
Thermocouple type U	**U31**[5][6]
With TC: CJC external (Pt100, 3-wire)	**U41**
With TC: CJC external with fixed value, specify in plain text	**Y50**
Special differing customer-specific programming, specify in plain text	**Y09**[7]
Fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**[3]

Supply units see Chapter "Supplementary Components".

1) Without cable gland.

2) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

3) For this selection, Y01 or Y09 must also be selected.

4) If only Y22, Y23 or Y24 are ordered and the label only has to be on the tag plate, Y01 does not have to be specified.

5) For this selection, Y01 must also be selected.

6) Internal cold junction compensation is selected as the default for TC.

7) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

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Selection and Ordering data		Article No.
Accessories		
Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. parameterization software T with USB interface	►	**7NG3092-8KU**
MiniDVD for temperature measuring instruments with documentation in German, English, French, Spanish, Italian and Portuguese, and parameterization software SIPROM T (included in delivery with SITRANS TF)	►	**A5E00364512**
HART modem With USB interface	►	**7MF4997-1DB**
SIMATIC PDM parameterization software also for SITRANS TH300		**see chapter 8**
Mounting bracket and securing parts		
Made of steel for 7NG313.-..B..		**7MF4997-1AC**
Made of steel for 7NG313.-..C..		**7MF4997-1AB**
Made of stainless steel for 7NG313.-..B..	►	**7MF4997-1AJ**
Made of stainless steel for 7NG313.-..C..		**7MF4997-1AH**
Digital indicator[1)]		**7MF4997-1BS**
Connection board		**A5E02226423**

► Available ex stock.

Supply units see Chapter "Supplementary Components".

1) It is not possible to upgrade devices with Ex protection

Ordering example 1:

7NG3135-0AB11-Z Y01+Y23+U03
Y01: -10 ... +100 °C
Y23: TICA1234HEAT

Ordering example 2:

7NG3136-0AC11-Z Y01+Y23+Y24+U25
Y01: -10 ... +100 °C
Y23: TICA 1234 ABC
Y24: HEATING BOILER 56789

Factory setting (transmitter):

- Pt100 (IEC 751) with three-wire circuit
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current 22.8 mA
- Sensor offset: 0 °C (0 °F)
- Damping 0.0 s

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SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

2

Selection and Ordering data — Article No.

SITRANS TF field indicator for 4 ... 20 mA signals, with documentation on MiniDVD	↗	**7NG3130-**				
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.						
Without Ex-protection			**0**		**1**	
With Ex ia			**1**		**1**	
With Ex nAL for zone 2			**2**		**1**	
Total device SITRANS TF Ex d[1]			**4**		**1**	
Total device SITRANS TF according to FM (XP, DIP, NI, S)[1]			**5**		**1**	
Enclosure						
Die-cast aluminium				**A**		
Stainless steel precision casting				**E**		
Connections/cable inlet						
Screwed glands M20x1.5					**B**	
Screwed glands ½-14 NPT					**C**	
Digital indicator						
With					**1**	
Mounting bracket and securing parts						
Without						**0**
Made of steel						**1**
Made of stainless steel						**2**

Further designs Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	Order code
Test protocol (5 measuring points)	**C11**
Explosion protection	
• Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG313.-1....)	**E25**
• Explosion protection Ex d to INMETRO (Brazil) (only with 7NG313.-4....)	**E26**
• Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG313.-2...)	**E27**
• Explosion protection Ex i to NEPSI (China) (only with 7NG313.-1...)	**E55**
• Explosion protection Ex d to NEPSI (China) (only with 7NG313.-4....)	**E56**
• Explosion protection Ex nA to NEPSI (China) (only with 7NG313.-2...)	**E57**
• Explosion protection Ex d to KOSHA (Korea) (only with 7NG313.-4...)	**E70**
• Two coats of lacquer on casing and cover (PU on epoxy)	**G10**
• Transient protection	**J01**
• Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included	**D57**
• Cable gland 1/2 NPT ADE 1F, cable diam. 6 ... 12 (CAPRI 818694 and 810534) included	**D58**
• Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included	**D59**
• Cable gland 1/2 NPT ADE 1F, cable diam. 4 ... 8.5 (CAPRI 818674 and 810534) included	**D60**

Selection and Ordering data — Order Code

Customer-specific programming Add "**-Z**" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	**Y01**[2]
Only inscription on TAG plate: specify in plain text: Measuring range	**Y22**[3]
Only inscription on TAG plate: Measuring point descriptor, max. 16 characters	**Y23**[3]
Only inscription on TAG plate: Measuring point message, max. 27 characters	**Y24**[3]
Special differing customer-specific programming, specify in plain text	**Y09**[4]

Supply units see Chapter "Supplementary Components".

[1] Without cable gland.

[2] For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

[3] If only Y22, Y23 or Y24 are ordered and the label only has to be on the tag plate, Y01 does not have to be specified.

[4] For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Selection and Ordering data — Article No.

Accessories		
MiniDVD for temperature measuring instruments with documentation in German, English, French, Spanish, Italian and Portuguese, and parameterization software SIPROM T (included in delivery with SITRANS TF)	►	**A5E00364512**
Mounting bracket and securing parts		
Made of steel for 7NG313.-..B..		**7MF4997-1AC**
Made of steel for 7NG313.-..C..		**7MF4997-1AB**
Made of stainless steel for 7NG313.-..B..	►	**7MF4997-1AJ**
Made of stainless steel for 7NG313.-..C..		**7MF4997-1AH**
Digital indicator[1]		**7MF4997-1BS**
Connection board		**A5E02226423**

► Available ex stock.

[1] It is not possible to upgrade devices with Ex protection

Ordering example 1:

7NG3130-0AB10-Z Y01+Y23
Y01: -5...100 °C
Y23: TICA1234HEAT

Ordering example 2:

7NG3130-0AC10-Z Y01+Y23+Y24
Y01: 0 ... 20 BAR
Y23: PICA 1234 ABC
Y29: HEATING BOILER 67890

Factory setting (field indicator):

4 ... 20 mA

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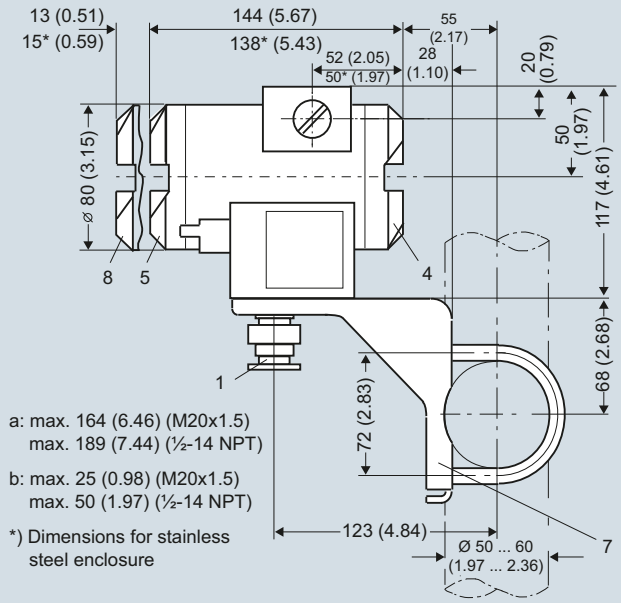
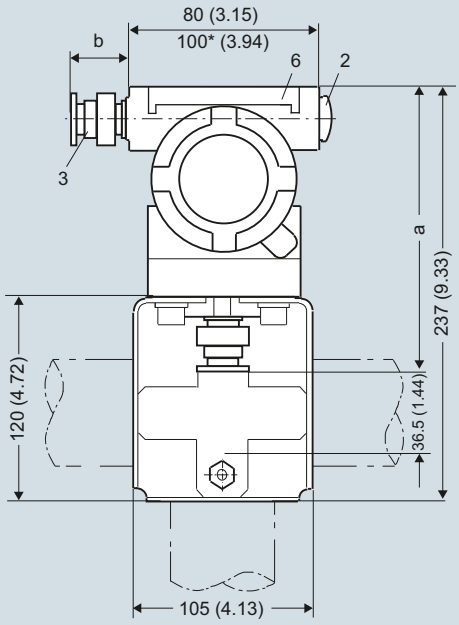
Dimensional drawings





1 Sensor connection (screwed gland M20x1.5 or ½-14 NPT)

2 Blanking plug

3 Electrical connection (screwed gland M20x1.5 or ½-14 NPT)

4 Terminal side, output signal

5 Terminal side, sensor

6 Protective cover (without function)

7 Mounting bracket (option) with clamp for securing to a vertical or horizontal pipe

8 Cover with window for digital display

SITRANS TF, dimensions in mm (inches)

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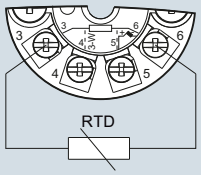
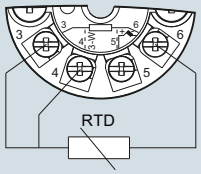
2

Schematics

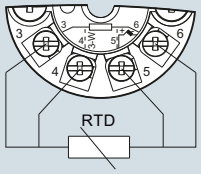
Resistance thermometer



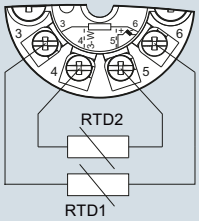
Two-wire system [1)]



Three-wire system

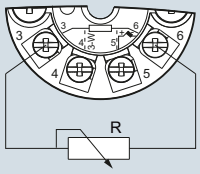


Four-wire system

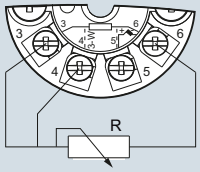


Generation of average value / difference [1)]

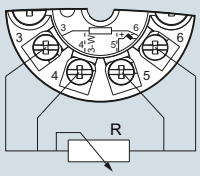
Resistance



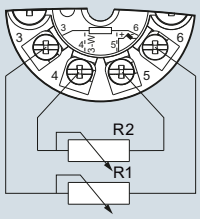
Two-wire system [1)]



Three-wire system

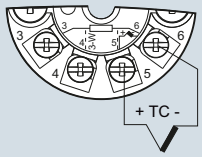


Four-wire system

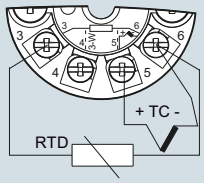


Generation of average value / difference [1)]

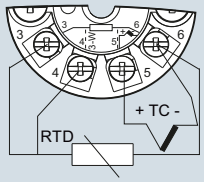
Thermocouple



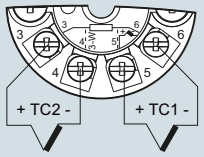
Cold junction compensation
Internal/fixed value



Cold junction compensation with external Pt100 in two-wire system [1)]



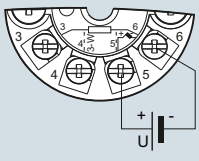
Cold junction compensation with external Pt100 in three-wire system



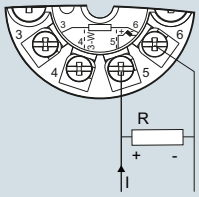
Generation of average value / difference with internal cold junction compensation

[1)] Programmable line resistance for the purpose of correction.

Voltage measurement



Current measurement



SITRANS TF, sensor connection assignment

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Overview

Our field devices for heavy industrial use

- FOUNDATION fieldbus
- PROFIBUS PA

The SITRANS TF temperature transmitter works where others can't cope.

Benefits

- For universal use as a transmitter for resistance thermometers, thermocouple elements, Ω or mV signals
- Rugged two-chamber enclosure in die-cast aluminium or stainless steel
- Degree of protection IP67
- Can be mounted elsewhere if the measuring point
  - is hard to access,
  - is subject to high temperatures,
  - is subject to vibrations from the system,
  - or if you want to avoid long neck tubes and/or protective tubes.
- Can be mounted directly on American-design sensors
- Wide range of approvals for use in potentially explosive atmospheres. "Intrinsically safe, non-sparking and flameproof" type of protection, for Europe and USA

Application

The SITRANS TF can be used everywhere where temperatures need to be measured under particularly harsh conditions. Which is why users from all industries have opted for this field device.

The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive elements.

The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

Function

Features

- Polarity-neutral bus connection
- 24-bit analog-digital converter for high resolution
- Electrically isolated
- Version for use in hazardous areas
- Special characteristic
- Sensor redundance

Transmitter with PROFIBUS PA communication

- Function blocks: 2 x analog

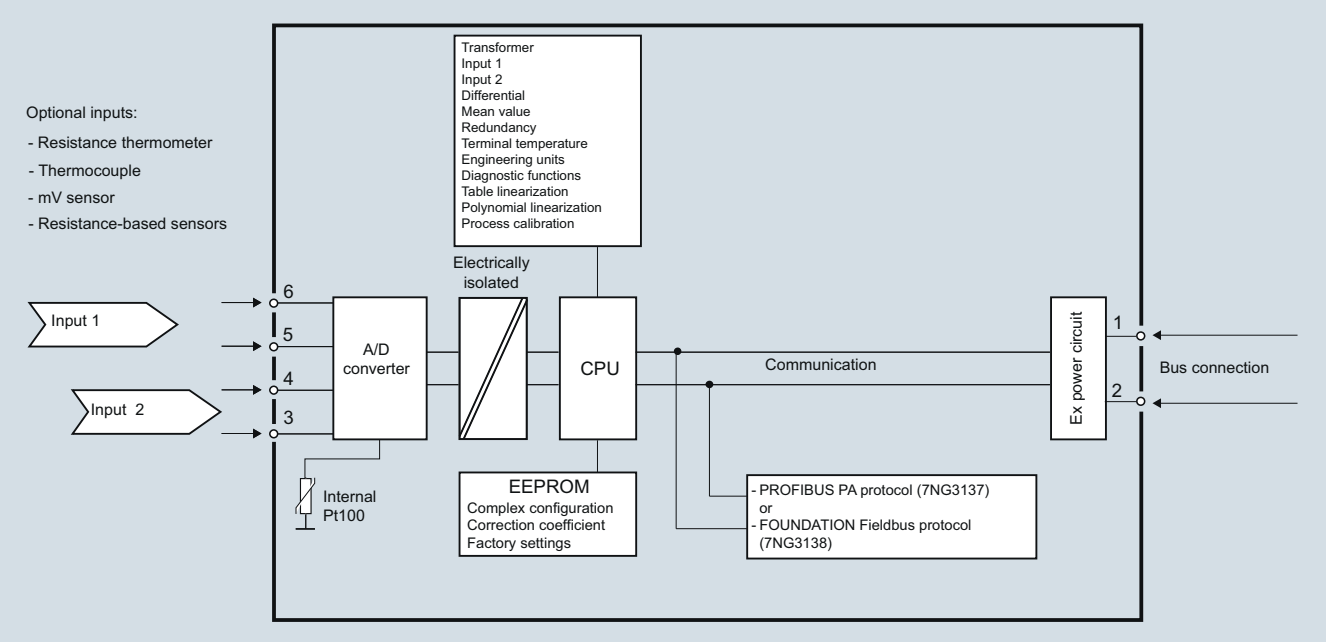
Transmitter with FOUNDATION fieldbus communication

- Function blocks: 2 x analog and 1 x PID
- Functionality: Basic or LAS

Mode of operation

The following function diagram explains the mode of operation of the transmitter.

The only difference between the two versions of the SITRANS TF (7NG3137-... and 7NG3138-...) is the type of field bus protocol used (PROFIBUS PA or FOUNDATION fieldbus).



SITRANS TF with TH400, function diagram

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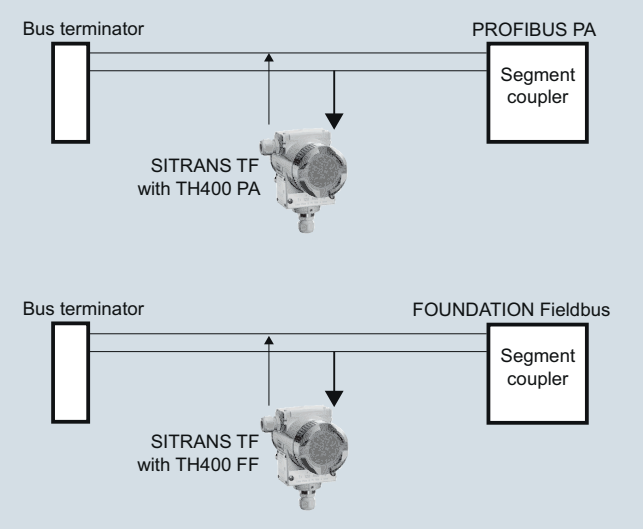
SITRANS TF fieldbus transmitter

System communication



SITRANS TF with TH400, communication interface

Technical specifications

Input	
Analog/digital conversion	
• Measurement rate	< 50 ms
• Resolution	24-bit
Resistance thermometer	
Pt25 ... 1000 to IEC 60751/JIS C 1604	
• Measuring range	-200 ... +850 °C (-328 ... +1562 °F)
Ni25 ... 1000 to DIN 43760	
• Measuring range	-60 ... +250 °C (-76 ... +482 °F)
Cu10 ... 1000, α = 0.00427	
• Measuring range	-50 ... +200 °C (-58 ... +392 °F)
Line resistance per sensor cable	Max. 50 Ω
Sensor current	Nominal 0.2 mA
Sensor fault detection	
• Sensor break detection	Yes
• Sensor short-circuit detection	Yes, < 15 Ω
Resistance-based sensors	
Measuring range	0 ... 10 kΩ
Line resistance per sensor cable	Max. 50 Ω
Sensor current	Nominal 0.2 mA
Sensor fault detection	
• Sensor break detection	Yes
• Sensor short-circuit detection	Yes, < 15 Ω
Thermocouple	
to IEC 584	Measuring range
• Type B	400 ... 1820 °C (752 ... 3308 °F)
• Type E	-100 ... +1000 °C (-148 ... +1832 °F)
• Type J	-100 ... +1000 °C (-148 ... +1832 °F)
• Type K	-100 ... +1200 °C (-148 ... +2192 °F)
• Type N	-180 ... +1300 °C (-292 ... +2372 °F)
• Type R	-50 ... +1760 °C (-58 ... +3200 °F)
• Type S	-50 ... +1760 °C (-58 ... +3200 °F)
• Type T	-200 ... +400 °C (-328 ... +752 °F)
to DIN 43710	
• Type L	-200 ... +900 °C (-328 ... +1652 °F)
• Type U	-200 ... +600 °C (-328 ... +1112 °F)
to ASTM E988-90	
• Type W3	0 ... 2300 °C (32 ... 4172 °F)
• Type W5	0 ... 2300 °C (32 ... 4172 °F)
External cold junction compensation	-40 ... +135 °C (-40 ... +275 °F)
Sensor fault detection	
• Sensor break detection	Yes
• Sensor short-circuit detection	Yes, < 3 mV
• Sensor current in the event of open-circuit monitoring	4 µA
mV sensor - voltage input	
Measuring range	-800 ... +800 mV
Input resistance	10 MΩ
Output	
Filter time (programmable)	0 ... 60 s
Update time	< 400 ms
Measuring accuracy	
Accuracy is defined as the higher value of general values and basic values.	

General values

Type of input	Absolute accuracy	Temperature coefficient
All	≤ ± 0.05 % of the measured value	≤ ± 0.002 % of the measured value/°C

Basic values

Type of input	Basic accuracy	Temperature coefficient
Pt100 and Pt1000	≤ ± 0.1 °C	≤ ± 0.002 °C/°C
Ni100	≤ ± 0.15 °C	≤ ± 0.002 °C/°C
Cu10	≤ ± 1.3 °C	≤ ± 0.02 °C/°C
Resistance-based sensors	≤ ± 0.05 Ω	≤ ± 0.002 Ω/°C
Voltage source	≤ ± 10 µV	≤ ± 0.2 µV/°C
Thermocouple, type: E, J, K, L, N, T, U	≤ ± 0.5 °C	≤ ± 0.01 °C/°C
Thermocouple, type: B, R, S, W3, W5	≤ ± 1 °C	≤ ± 0.025 °C/°C
Cold junction compensation	≤ ± 0.5 °C	

Reference conditions	
Warming-up time	30 s
Signal-to-noise ratio	Min. 60 dB
Calibration condition	20 ... 28 °C (68 ... 82 °F)

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Conditions of use	
Ambient conditions	
Permissible ambient temperature	-40 ... +85 °C (-40 ... +185 °F)
Permissible storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Relative humidity	≤ 98 %, with condensation
Insulation resistance	
• Test voltage	500 V AC for 60 s
• Continuous operation	50 V AC/75 V DC
Electromagnetic compatibility	
NAMUR	NE21
EMC 2004/108/EC Emission and Noise Immunity	EN 61326-1, EN 61326-2-5
Construction	
Weight	Approx. 1.5 kg (3.3 lb) without options
Dimensions	See "Dimensional drawings"
Enclosure materials	• Die-cast aluminum, low in copper, GD-AlSi 12 or stainless steel • Polyester-based lacquer for GD AlSi 12 enclosure • Stainless steel rating plate
Electrical connection, sensor connection	• screw terminals • Cable inlet via M20 x 1.5 or ½ -14 NPT screwed gland • Bus connection with M12 plug (optional)
Mounting bracket (optional)	Steel, galvanized and chrome-plated or stainless steel
Degree of protection	IP67 to EN 60529
Auxiliary power	
Power supply	
• Standard, Ex "d", Ex "nA", Ex "nL", XP, NI	10.0 ... 32 V DC
• Ex "ia", Ex "ib"	10.0 ... 30 V DC
• In FISCO/FNICO installations	10.0 ... 17.5 V DC
Power consumption	< 11 mA
Max. increase in power consumption in the event of a fault	< 7 mA
Certificates and approvals	
Explosion protection ATEX	
EC type test certificate	ZELM 11 ATEX 0471 X
• Type of protection "intrinsic safety i" (version: 7NG313x-1xxxx)	II 2(1) G Ex ia IIC T4/T6
Conformity statement	ZELM 11 ATEX 0471 X
• "Operating equipment that is non-ignitable and has limited energy" type of protection (version: 7NG313x-2xxxx)	II 3 G Ex nA [nL] IIC T4/T6 II 3 G Ex nL IIC T4/T6
EC type test certificate	ZELM 11 ATEX 0472 X
• "Flame-proof enclosure" type of protection (version: 7NG313x-4xxxx)	II 2 G Ex d IIC T5/T6 II 1D Ex tD A20 IP65 T100 °C, T85 °C
Explosion protection: FM for USA	
• FM approval	FM 3017742
• Type of protection XP, DIP, NI and S (version 7NG313x-5xxxx)	• XP / I / 1 / BCD / T5,T6; Type 4X • DIP / II, III / 1 / EFG / T5,T6; Type 4X • NI / I / 2 / ABCD / T5,T6; Type 4X • S / II, III / 2 / FG T5,T6; Type 4X
Other certificates	GOST, INMETRO, NEPSI, KOSHA

Communication	
Parameterization interface	
• PROFIBUS PA connection	
- Protocol	A&D profile, Version 3.0
- Protocol	EN 50170 Volume 2
- Address (for delivery)	126
- Function blocks	2 x analog
• FOUNDATION fieldbus connection	
- Protocol	FF protocol
- Protocol	FF design specifications
- Functionality	Basic or LAS
- Version	ITK 4.6
- Function blocks	2 x analog and 1 x PID
Factory setting	
for SITRANS TH400 PA	
Sensor	Pt100 (IEC)
Type of connection	3-wire circuit
Unit	°C
Failure mode	Last valid value
Filter time	0 s
PA address	126
PROFIBUS Ident No.	Manufacturer-specific
for SITRANS TH400 FF	
Sensor	Pt100 (IEC)
Type of connection	3-wire circuit
Unit	°C
Failure mode	Last valid value
Filter time	0 s
Node address	22

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SITRANS TF fieldbus transmitter

Selection and Ordering data	Article No.
Temperature transmitter in field enclosure ↗ with fieldbus communication and electrical isolation, with documentation on MiniDVD ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7NG313 - ■■■ 0 ■**
Integrated transmitter	
SITRANS TH400 with PROFIBUS PA	
• Without Ex protection	**7 0**
• With Ex ia (ATEX)	**7 1**
• With Ex nAL for zone 2 (ATEX)	**7 2**
• Total device SITRANS TF Ex d[1]	**7 4**
• Total device SITRANS TF according to FM (XP, DIP, NI, S)[1]	**7 5**
SITRANS TH400, with FOUNDATION fieldbus	
• Without Ex protection	**8 0**
• With Ex ia (ATEX)	**8 1**
• With Ex nAL for zone 2 (ATEX)	**8 2**
• Total device SITRANS TF Ex d[1]	**8 4**
• Total device SITRANS TF according to FM (XP, DIP, NI, S)[1]	**8 5**
Enclosure	
Die-cast aluminium	**A**
Stainless steel precision casting	**E**
Connections/cable inlet	
Screwed glands M20x1.5	**B**
Screwed gland s ½-14 NPT	**C**
Mounting bracket and fastening parts	
None	**0**
Made of steel	**1**
Stainless steel	**2**
Further designs Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	Order code
Test report (5 measuring points)	**C11**
Bus connection	
• M12 plug (metal), without mating connector	**M00**[2]
• M12 plug (metal), with mating connector	**M01**[2]
Explosion protection	
• Explosion protection Ex ia to INMETRO (Brazil) (only with 7NG313.-1....)	**E25**
• Explosion protection Ex d to INMETRO (Brazil) (only with 7NG313.-4....)	**E26**
• Explosion protection Ex nA to INMETRO (Brazil) (only with 7NG313.-2...)	**E27**
• Explosion protection Ex i to NEPSI (China) (only with 7NG313.-1...)	**E55**
• Explosion protection Ex d to NEPSI (China) (only with 7NG313.-4....)	**E56**
• Explosion protection Ex nA to NEPSI (China) (only with 7NG313.-2...)	**E57**
• Explosion protection Ex d to KOSHA (Korea) (only with 7NG313.-4...)	**E70**
• Two coats of lacquer on casing and cover (PU on epoxy)	**G10**
• Transient protection	**J01**
• Cable gland CAPRI 1/2 NPT ADE 4F, nickle-plated brass (CAPRI 848694 and 810634) included	**D57**
• Cable gland 1/2 NPT ADE 1F, cable diam. 6 ... 12 (CAPRI 818694 and 810534) included	**D58**
• Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included	**D59**
• Cable gland 1/2 NPT ADE 1F, cable diam. 4 ... 8.5 (CAPRI 818674 and 810534) included	**D60**

Selection and Ordering data	Order Code.
Customer-specific programming Add "**-Z**" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: ... to ... °C, °F	**Y01**[3]
Meas. point no. (TAG), max. 32 characters	**Y15**[4]
Meas. point descriptor, max. 32 characters	**Y23**[4]
Meas. point message, max. 32 characters	**Y24**[5]
Bus address, specify in plain text	**Y25**[4]
Pt100 (IEC) 2-wire, R_L = 0 Ω	**U02**[6]
Pt100 (IEC) 3-wire	**U03**[6]
Pt100 (IEC) 4-wire	**U04**[6]
Thermocouple type B	**U20**[6][7]
Thermocouple type C (W5)	**U21**[6][7]
Thermocouple type D (W3)	**U22**[6][7]
Thermocouple type E	**U23**[6][7]
Thermocouple type J	**U24**[6][7]
Thermocouple type K	**U25**[6][7]
Thermocouple type L	**U26**[6][7]
Thermocouple type N	**U27**[6][7]
Thermocouple type R	**U28**[6][7]
Thermocouple type S	**U29**[6][7]
Thermocouple type T	**U30**[6][7]
Thermocouple type U	**U31**[6][7]
With TC: CJC: external (Pt100, 3-wire)	**U41**
With TC: CJC: external with fixed value, specify in plain text	**Y50**
Special differing customer-specific programming, specify in plain text	**Y09**[8]

1) Without cable gland

2) Not available for explosion protection Ex d or XP.

3) For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.

4) If only Y15, Y23 or Y25 are ordered and the label only has to be on the tag plate, Y01 does not have to be specified.

5) For this selection, Y01 or Y09 must also be selected.

6) For this selection, Y01 must also be selected.

7) Internal cold junction compensation is selected as the default for TC.

8) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

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Selection and Ordering data		Article No.
Accessories		
MiniDVD for temperature measuring instruments	►	**A5E00364512**
with documentation in German, English, French, Spanish, Italian and Portuguese, and parameterization software SIPROM T (included in delivery with SITRANS TF)		
SIMATIC PDM parameterization software also for SITRANS TF with TH400 PA		**see Sec. 8**
Mounting bracket and fastening parts		
Made of steel for 7NG313.-..B..		**7MF4997-1AC**
Made of steel for 7NG313.-..C..		**7MF4997-1AB**
Made of stainless steel for 7NG313.-..B..	►	**7MF4997-1AJ**
Made of stainless steel for 7NG313.-..C..		**7MF4997-1AH**
Connection board		**A5E02391790**

► Available ex stock.

Ordering example 1:

7NG3137-0AB01-Z Y01+Y15+Y25+U03
Y01: -10 ... +100 °C
Y15: TICA1234HEAT
Y25: 33

Ordering example 2:

7NG3137-0AC01-Z Y01+Y15+Y25+U25
Y01: -10 ... +100 °C
Y15: TICA 1234 ABC 5678
Y25: 35

Factory setting:

- for SITRANS TH400 PA:
  - Pt100 (IEC) with 3-wire circuit
  - Unit: °C
  - Failure mode: last valid value
  - Filter time: 0 s
  - PA address: 126
  - PROFIBUS Ident No.: manufacturer-specific
- for SITRANS TH400 FF:
  - Pt100 (IEC) with 3-wire circuit
  - Unit: °C
  - Failure mode: last valid value
  - Filter time: 0 s
  - Node address: 22

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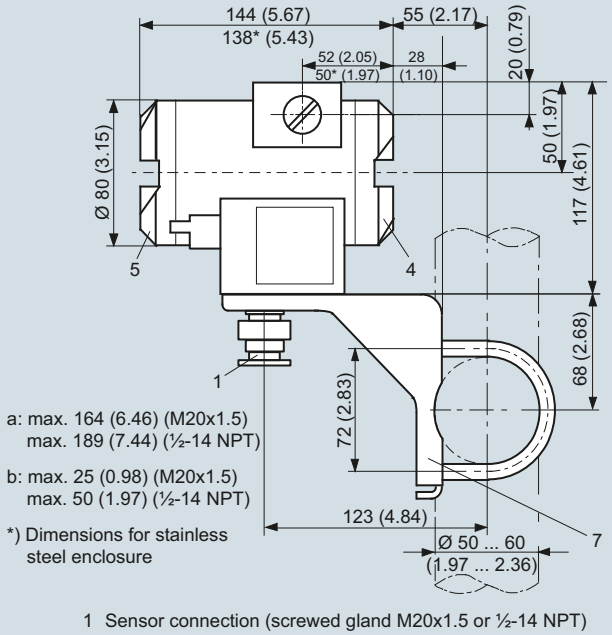
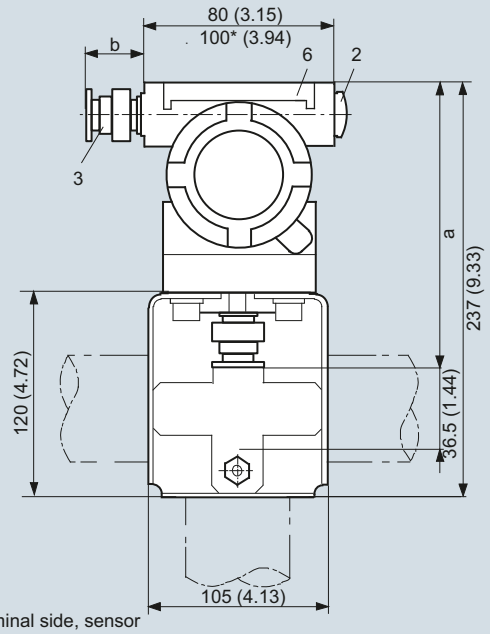
Dimensional drawings





1 Sensor connection (screwed gland M20x1.5 or ½-14 NPT)
2 Blanking plug
3 Electrical connection (screwed plug M20x1.5 orr ½-14 NPT), optional M12 plug
4 Terminal side, bus connection
5 Terminal side, sensor
6 Protective cover (without function)
7 Mounting bracket (optional) with clamp securing to a vertical or horizontal pipe

SITRANS TF with TH400, dimensions in mm (inches)

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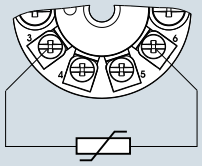
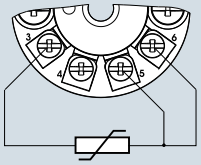
Schematics

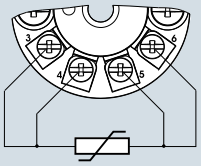
Resistance thermometer



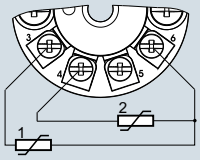
Two-wire system [1)]



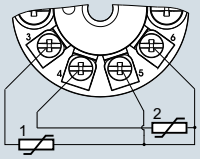
Three-wire system



Four-wire system

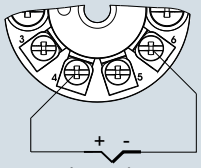


Mean-value/differential or redundancy generation
2 x two-wire system [1)]

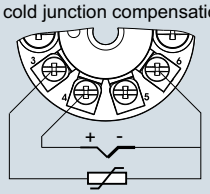


Mean-value/differential or redundancy generation
1 sensor in two-wire system [1)]
1 sensor in three-wire system

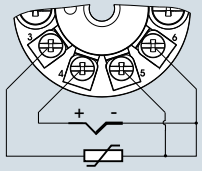
Thermocouple



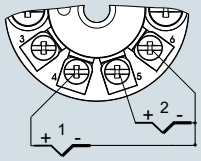
Internal
cold junction compensation



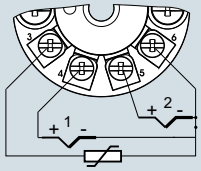
Cold junction compensation
with external Pt100 in two-wire system [1)]



Cold junction compensation
with external Pt100 in three-wire system

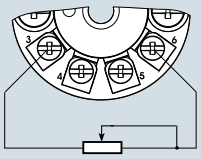


Mean value, differential or redundancy generation with internal cold junction compensation

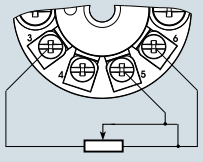


Mean value, differential or redundancy generation and cold junction compensation with internal Pt100 in two-wire system [1)]

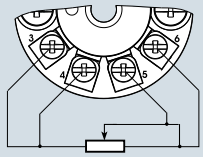
Resistance



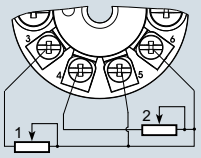
Two-wire system [1)]



Three-wire system

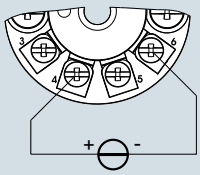


Four-wire system

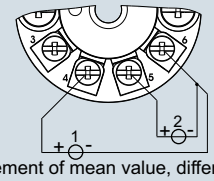


Mean value, differential or redundancy generation
1 resistor in two-wire system [1)]
1 resistor in three-wire system

Voltage measurement



One voltage source



Measurement of mean value, differential and redundancy with 2 voltage sources

[1)] Programmable line resistance for the purpose of correction.

SITRANS TF with TH400, sensor connection assignment

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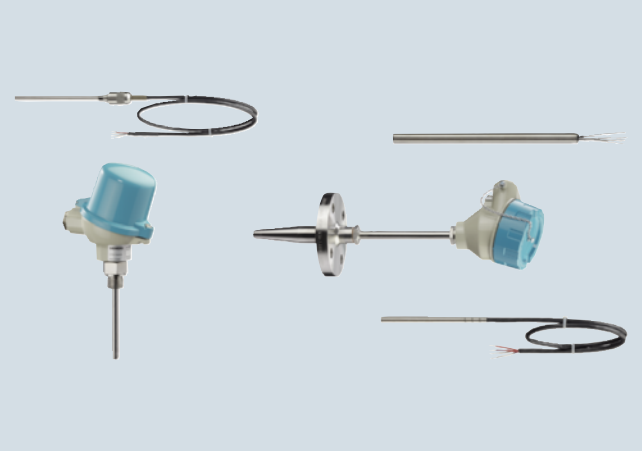
2

Overview



Temperature sensors of the SITRANS TS product family are used to measure temperatures in industrial equipment.

Siemens offers the following temperature sensors:

- SITRANS TS100
  - General use
  - Compact design with connection cable
- SITRANS TS200
  - General use
  - Compact design with plug/wire ends
- SITRANS TS300
  - Use n food, pharmaceuticals and biotechnology
  - Modular or clamp-on design
- SITRANS TS500
  - General use
  - Modular design with connection head and thermowell

Benefits

The modular design makes it possible to customize the temperature sensor for most applications, while still being able to use many standardized individual components.

Application

Depending on the specification, sensors can be combined with different connection heads, neck tubes and process connections. As a result, the sensors can be used in a large number of technical applications in the following industries:

- Chemical industry
- Petrochemical industry
- Power engineering
- Primary industry
- Pharmaceutical industry
- Biotechnology
- Food manufacturing

SITRANS TS100 and SITRANS TS200

Temperature sensors of the SITRANS TS100 series are cable thermometers with different electrical connection options (e.g. plug, soldered connections, connection cables)

The SITRANS TS200 series of compact thermometers is charcterized by a compact design. Both temperature sensor series are suitable for the following:

- Measurements of temperatures of solids, where additional thermowells are not required for replacements done during ongoing operations, e.g. bearing block temperature.
- Measurements which are particularly critical with regard to response times. The advantages offered by an additional thermowell are purposely omitted.
- Measuring points which must be easy to convert or relocate.
- Surface temperature measurements: The temperature sensor is used in conjunction with a surface connection piece.
- Cost-effective transport: The mineral-insulated design allows for economically feasible transport even at large lengths. From a length of 0.8 m (2.63 ft), the sensors can be delivered rolled up or bended.

SITRANS TS300 temperature sensors for food, pharmaceuticals and biotechnology

The temperature sensors of the SITRANS TS300 series are thermometers especially designed for measurements with high hygienic demands, such as in the food, pharmaceutical and biotechnology industries. The basic versions are:

- Thermometers in modular design with replaceable measuring insert and process connections usual in the industry
- Clamp-on thermometers for measurement of the pipe surface temperature without interrupting the process

SITRANS TS500 Temperature sensors as a module system

Due to their modular design, temperature sensors of the SITRANS TS500 series are well suited to a large number of applications.

The replaceable measuring insert makes it possible to conduct maintenance work even during ongoing operations. These devices are used particularly frequently in vessels and pipelines of the following industries:

- Power stations
- Chemical industry
- Petrochemical industry
- General process engineering
- Water, waste water

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Design

SITRANS TS100 7MC711xx

The following image illustrates the available designs for SITRANS TS100 temperature sensors:

SITRANS TS100, mineral-insulated (MIC)
IP54 at the transition sensor/cable, plug see table

Version	Degree of protection
Flying leads	IP00
LEMO coupling 1S	IP50
M12 plugs	IP54
Thermocouple coupling	IP20

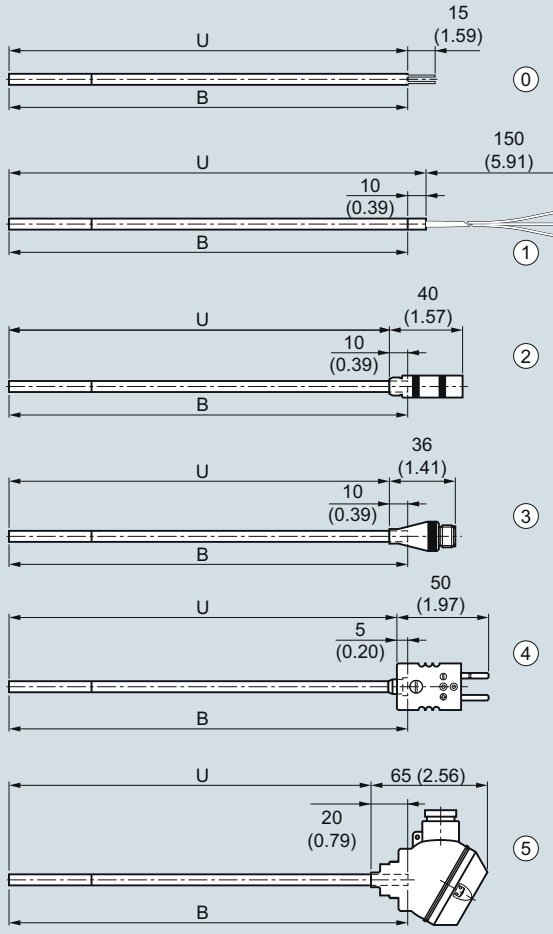
SITRANS TS100

The following types of process connections can be implemented:

- Compression fitting
- Spring-loaded compression fitting
- Soldering nipple
- Direct soldering/welding in

SITRANS TS200 7MC712xx

The following image illustrates the available designs for SITRANS TS200 temperature sensors:



B Measuring insert length
H Head height
U Insertion length

0	Basic sensor	**U = B**	IP00
1	Flying leads	**U = B + 10 (0.39)**	IP00
2	LEMO coupling 1S	**U = B - 10 (0.39)**	IP50
3	M12 plugs	U = B - 10 (0.39)	IP54
4	Thermocouple coupling	**U = B - 5 (0.20)**	IP20
5	Mini connection head	U = B - 20 (0.79)	IP54

SITRANS TS 200, dimensions in mm (inch)

The following types of process connections can be implemented:

- Compression fitting
- Spring-loaded compression fitting
- Soldering nipple
- Direct soldering/welding in

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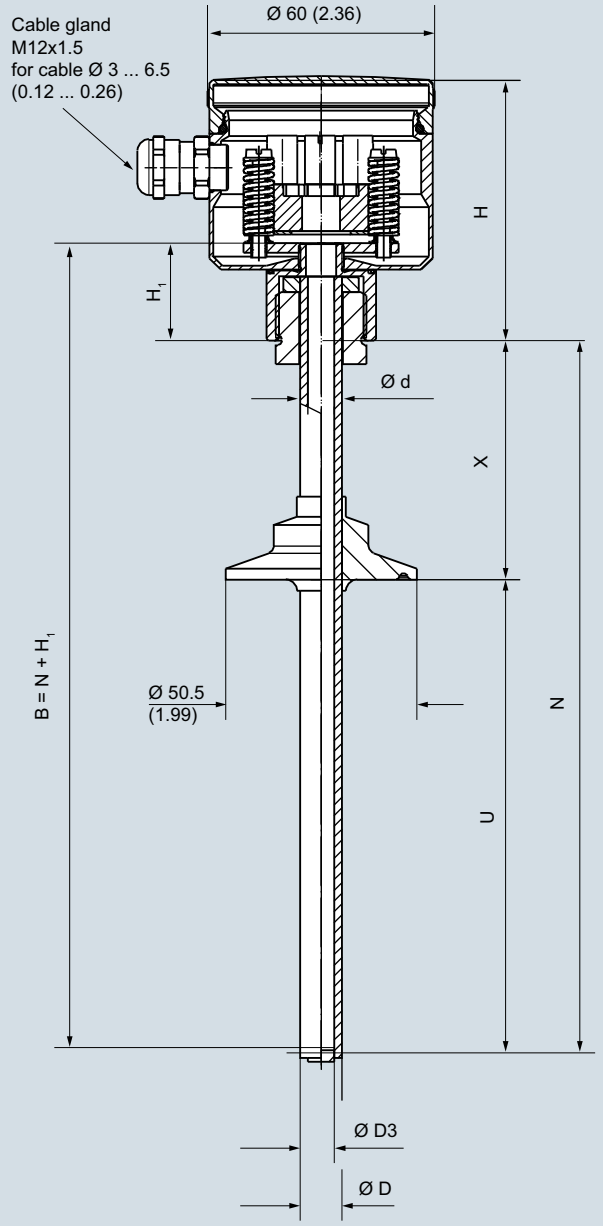
Technical description

SITRANS TS300

SITRANS TS300 modular design

The following figure shows the available versions and components of the SITRANS TS300 temperature sensors in modular design.



B	Measuring insert length
Ød	Measuring insert outer diameter (6 (0.24))
ØD	Process connection outer diameter
ØD3	Protective pipe inner diameter
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
N	Nominal length
U	Insertion length
X	Extension length

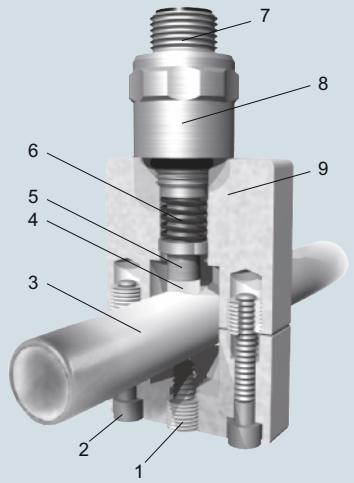
SITRANS TS modular design, dimensions in mm (inch)

SITRANS TS300 Clamp-on

Temperature measurement is carried out over a modified and quick-response Pt100 measuring element, which is positioned and insulated over a pipe collar made of heat-resistant plastic.

The measuring insert contains a special temperature sensor tip made of silver, which is pressed evenly onto the pipeline by means of a spring.

The compulsory guide of the replaceable measuring insert ensures even pressure contact on the pipeline, which ensures a reproducible measuring result.



Design	
Measuring insert	• Special measuring insert made of stainless steel; hygienic design • Measuring element made of silver, thermal decoupling through plastic insert Measuring insert screwed into collar with spring load. Use heat-conductive-compound (see accessories) prior to mounting the device.
Pipe collar	
• Material	Temperature resistant high-performance plastic with integrated insulating system in the hygienic design
• Ambient temperature influence	Approx. 0.2 %/10 K

The pipe diameter of the measuring tube is required for correct device selection. For special sizes, you start by selecting the matching collar size and entering the required size in plain text. Space-saving designs are available (latch fastener version) for installation in a limited space (e.g., tube bundles).

For correct assignment after recalibration, the collar as well as the measuring insert are identified with serial number and pipe diameter. This information can also be engraved.

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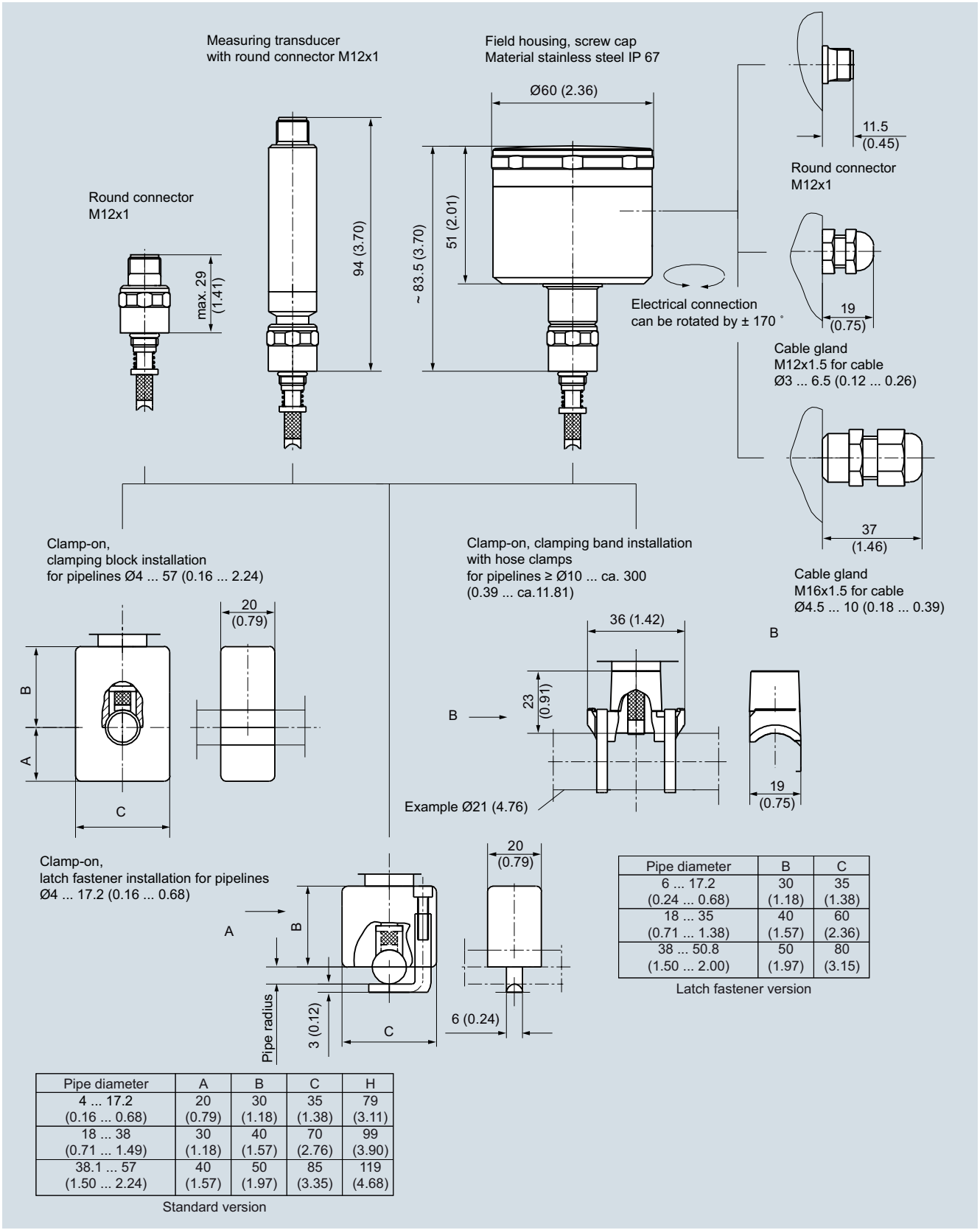
The following figure illustrates the available designs and components for SITRANS TS300 temperature sensors in clamp-on design:



Pipe diameter	B	C
6 ... 17.2 (0.24 ... 0.68)	30 (1.18)	35 (1.38)
18 ... 35 (0.71 ... 1.38)	40 (1.57)	60 (2.36)
38 ... 50.8 (1.50 ... 2.00)	50 (1.97)	80 (3.15)

Latch fastener version

Pipe diameter	A	B	C	H
4 ... 17.2 (0.16 ... 0.68)	20 (0.79)	30 (1.18)	35 (1.38)	79 (3.11)
18 ... 38 (0.71 ... 1.49)	30 (1.18)	40 (1.57)	70 (2.76)	99 (3.90)
38.1 ... 57 (1.50 ... 2.24)	40 (1.57)	50 (1.97)	85 (3.35)	119 (4.68)

Standard version

SITRANS TS300 clamp-on design, round connector, field enclosure, cable gland, versions, dimensions in mm (inch)

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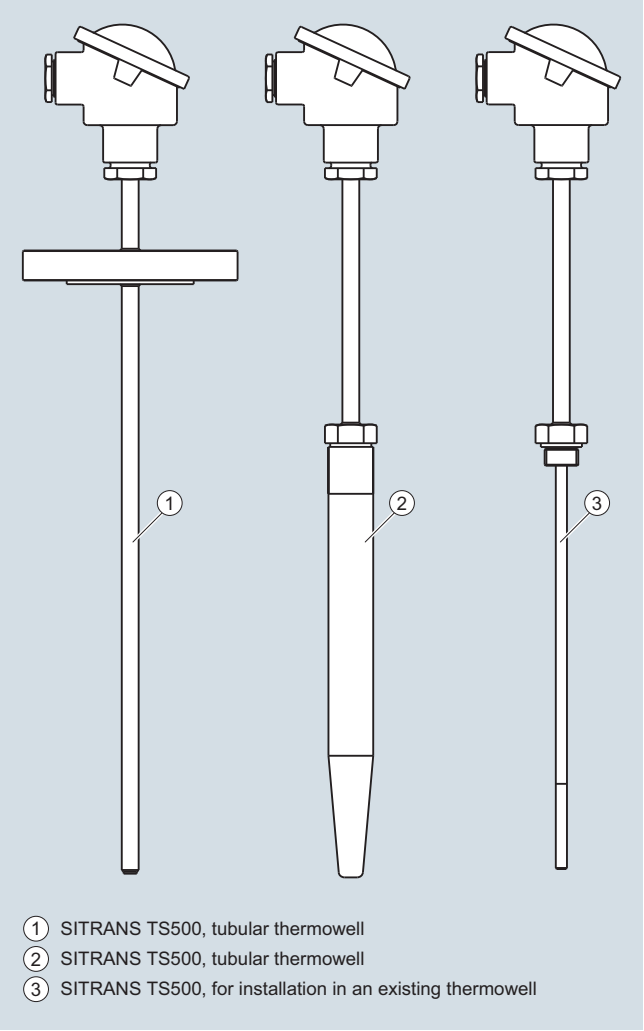
2

SITRANS TS500 7MC75xx

The following image illustrates the available designs for SITRANS TS500 temperature sensors:



(1) SITRANS TS500, tubular thermowell
(2) SITRANS TS500, tubular thermowell
(3) SITRANS TS500, for installation in an existing thermowell

SITRANS TS500 temperature sensors; the IP degree of protection depends on the connection head (see page 2/84)

The temperature sensors of the SITRANS TS500 series are available in three different designs:

Version	Description	Application	Process connection
1	• Tubular thermowell • Tubular thermowell and extension made of one pipe; closed at the tip with a welded bottom cap	Minimal to medium process load	• Welded connection with thread or flange • connection with compression fitting
2	• Barstock thermowell • Barstock thermowell, tubular extension, extension screwed into thermowell	Medium to highest process load	• Directly welded into pipeline • With welded flange • With male thread
3	• For installation into existing thermowells. • Tubular extension	Process load depends on thermowell design	Screwed into existing thermowell

Function

A complete measuring point consists of a measuring insert which contains the basic sensors, the protective fitting and an optional measurement value processor (transmitter).

The basic sensors are:

- Resistance thermometers:
  Temperature measurement is based on the temperature dependency of the installed measuring resistor.
- Thermocouples:
  Temperature measurement is based on the Seebeck effect. A thermocouple which subjected to a temperature drop produces thermoelectric voltage that can be measured.

Transmitters:

The optional Siemens transmitters assume the following functions:

- Optimum measurement processing
- Strengthening of weak sensor signals directly on site
- Transmits standardized signals
- Protects against electromagnetic interfrences
- Support enhanced diagnosis options

The resistance thermometer is intended for installation in containers and pipelines for hygienic requirements.

- Modular design consisting of protective pipe, measuring insert, connection head and optional transmitter for replacement during operation.
- Hygienic version, design according to recommendations of the EHEDG
- Transmitter can be integrated (4 to 20 mA, PROFIBUS PA or FOUNDATION Fieldbus)

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Configuration

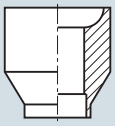
Components: Process connections

This catalog is limited to the standard versions. Special versions are available on request. The technical data is designed to assist the user. It is the responsibility of the ordering party to make the correct selection of suitable devices.

Welding

A welded thermowell provides a permanent, secure and highly resilient process connection. This advantage requires an adequate weld-in quality.

It is not possible to accidentally open the process conneciton. Additional gaskets are not required. If the tube is not thick enough to ensure a secure welding connection, the appropriate weldable sockets are used. With weldable sockets of matching length it is also possible to largely stadardize a plant's measuring points. Stocks of spare parts can therefore be reduced to a minimum

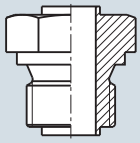


Weldable sockets

Thread

Type of installation: Welded threads

Welded threads of different thread types and sizes are firmly welded to the thermowell.



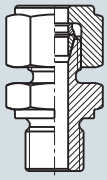
Welded threads

Type of installation: Compression fittings

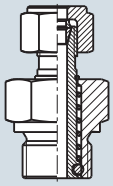
Compression fittings are available as accessories. They fit with the diameter of the thermowell and provide for flexible installation. The mounting length can be selected on site. When installed correctly, compression fittings are well suited for low and medium pressure.

The difference between a normal and spring-loaded design is as follows:

In the case of spring-loaded compression fitting, the sensor is pressed against the measured object or the tip of the thermowell, thus achieving outstanding heat contact.



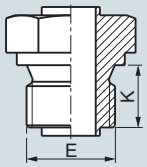
Compression fitting



Spring-loaded compression fitting

Thread type: Cylindrical thread

Cylindrical threads do not seal in the thread but due to an additional sealing face or seal. For example, threads with the short form "G" (as per ISO 228) feature a threat type with a defined screw gauge.

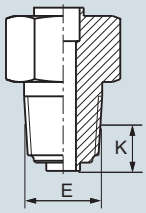


Cylindrical thread

The male threads of our G½ screw sockets fit with both female G½ as well as Rp½ threads.

Thread type: Tapered thread

Unlike cylindrical threads, tapered threads such as the American "NPT" seal metallically in the thread itself. The relevant length information in the catalog refers to the "torque point" of the thread, which cannot be precisely defined due to standardized tolerance levels. However, the spring unit of the measuring insert compensates for the differences in length.



NPT thread

Flanges

The different properties of the flanges are as follows:

- Standard series EN 1092, ASME 16.5,..
- Nominal pressure
- Nominal diameter
- Sealing face

This information is stamped into the flange, as well as the material code and batch number for "3.1 Material".

Industry-specific process connections

Special process connections have become popular in different industries. For example, hygiene technology: clamp connections, milk pipe unions and others.

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Components: Thermowell

Thermowells fulfill two basic functions:

- They protect the measuring insert from aggressive media
- They make it possible to replace units during ongoing operations

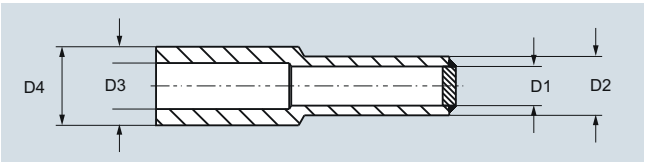
This catalog is limited to the standard versions. Special versions are available on request. The large number of available types can be classified as follows:

- Tubular thermowells
  Tubular thermowells are also described as "welded" or "multi-part" thermowells (not to be confused with "multi-part protective armatures"). They are suitable for low to medium process loads and can be manufactured on a cost-effective basis.
  Versions :
  - Form 2N similar to DIN 43772
    with straight tip and shortest possible extension length
    not adjustable connection head
  - Form 2 as per DIN 43772
    with straight tip and extension
    adjustable connection head
  - Form 2: with process connection
    Form 2G: Threaded connection
    Form 2F: Flange connection
  - Form 3 as per DIN 43772
    Design with tapered tip and extension
    adjustable connection head
    For these thermowells, thermowell tip is tapered by rotary swaging. This results in an excellent fit with the measuring insert and very good response times.
    Analogous to forms 2, versions 3/3G/3F are also available for form 3
- Barstock thermowells
  Where process loads are too high, or where thermowells with welded seams are not allowed, deep hole drilled barstock thermowells are used. Form 4 thermowells (as per DIN 43772) are very popular in this area. This thermowell type replaces the D1-D5 types of the predecessor standard DIN 43763:

DIN 43763 design invalid	DIN 43772 design 4 current	
	L	U
D1	140	65
D2	200	125
D4	200	65
D5	200	125

The following table shows the dimensions of the different thermowells.

	Tip		Process connection	
	Ø Inner [mm (inch)]	Ø Outer [mm (inch)]	Ø Inner [mm (inch)]	Ø Outer [mm (inch)]
Thermowell type, design	**D_1**	**D_2**	**D_3**	**D_4**
2N/2/2G/2F, tubular	7 (0.28)	9 (0.35)	7 (0.28)	9 (0.35)
2/2G/2F, tubular	7 (0.28)	12 (0.47)	7 (0.28)	12 (0.47)
3/3G/3F, tubular	6 (0.24) tolerance acc. to DIN 43772	9 (0.35)	7 (0.28)	12 (0.47)
4/4F, barstock	7 (0.28)	12,5 (0.49)	7 (0.28)	24 (0.94)
4/4F, fast response, barstock	3.5 (0.14)	9 (0.35)	3.5 (0.14)	18 (0.71)



Sizing of thermowells

Components: Extension (neck tube)

The extension is the section from the lower edge of the connection head to the fixed point of the process connection or thermowell. There is a variety of terms for this components, e.g. neck tube. For this reason the term extension has been selected as a standardized term for the different designs. Function is the deciding factor:

- Thermal decoupling of connection head from process temperature see image page 2/91
- Installation of connection head over existing insulation
- Simple standardization of measuring inserts: In general, the length of the extension may be freely selected. However, when using standardized insertion lengths, the option "Extension as per DIN 43 772" is recommended. This ensures that measuring inserts which are quickly available can be used. In case of special lengths, it is possible to standardize the measuring insert length through a clever combination with the respective special extension length. This allows customers to optimize their costs in purchasing and logistics.
- In the case of American-designed sensors, the extension also takes the spring load of the measuring unit.
- Depending on the design, the extension can also be used to achieve an alignment of the connection head.
- The form of the extension depends on the form of the thermowell:
  - Tubular thermowell
    The extension and thermowell usually consist of one continuous tube. The process connection is welded on. (= one-piece protective armature).
  - Barstock thermowells
    Extension and thermowell of two components which are welded together. The process connection is attached to the thermowell (= multi-piece protective armature).

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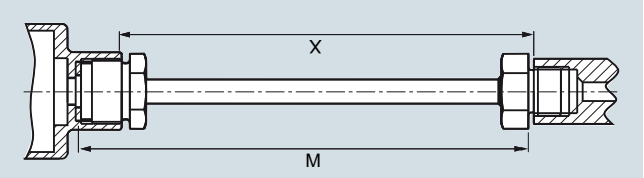
Thermowell type	X [mm (inch)]	M [mm (inch)]	Divisible
2G	129 (5.08)	145 (5.71)	No
2F	64 (2.52)	80 (3.15)	No
3G	131 (5.19)	147 (5.79)	No
3F	66 (2.60)	82 (3.23)	No
4 (only L=110)	139 (5.47)	155 (6.10)	Yes
4 (others)	149 (5.87)	165 (6.50)	Yes

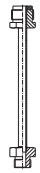
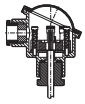
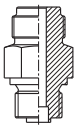
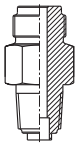
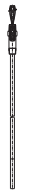


Extensions as per DIN 43772

Versions

With regard to their function, extensions can be classified into two types:

- Ajustable/not ajustable:
  Function on the neck tube to align the connection head to the desired direction
- Integrated measuring insert spring load:
  In the case of American-type sensors, the spring load of the measuring insert is integrated into the extension. Measuring insert and extension form one unit.

European type ajustable, cylindrical	European type ajustable, tapered	wihtout extension wihtout thread (optional gland)
		
European type not ajustable, cylindrical	**European type not ajustable, tapered**	**European type not ajustable, nipple**
		
European type ajustable nipple-union-nipple	**American type ajustable, nipple-union-nipple spring load**	**American type not ajustable nipple-union-nipple spring load**
		

Versions: particularly with heavy stainless steel connection heads in combination with vibration, a short extension length should be selected or external support should be provided.

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Technical description

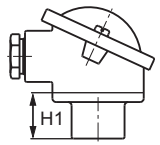
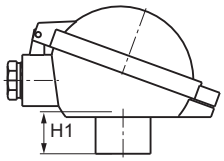
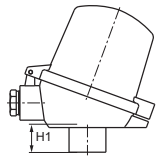
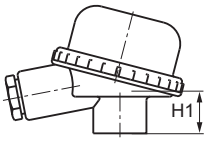
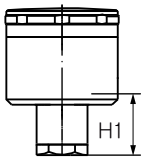
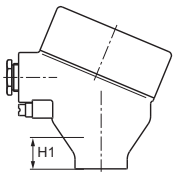
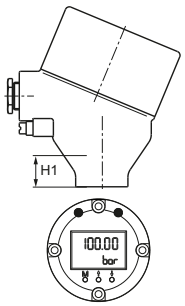
Components: Connection head

Connection head

The connection head protects the connection department.

The connection head features sufficient room for mounting a clamping base or transmitter.

Different connection heads are used depending on the application and preference:

Connection head	Type Material	Designation	Cable gland	Degree of protection	Transmitter installation	Connection height H1 [mm (inch)]	Explosion protection optional
	BA0 Aluminum	Flange lid	M20 x 1,5 brass	IP54	Measuring insert	26 (1.02)	Ex i
	BB0 Aluminum	Hinged cover low	M20 x 1,5 brass	IP65	Measuring insert	26 (1.02)	Ex i
	BC0 Aluminum BP0 Plastic	Hinged cover high	M20 x 1,5 BC0: brass BP0: polyamide	IP65	Measuring insert and/or hinged cover (tandard)	26 (1.02)	Ex i
	BM0 Plastic	Screw cover	M20 x 1,5 polyamide	IP65	Measuring insert	26 (1.02)	Ex i
	BS0 Stainless steel	Screw cover	M12 x 1,5 polyamide	IP67	Measuring insert	26 (1.02)	Ex i
	AG0 Aluminum AU0 Stainless steel	Screw cover, heavy-duty	M20 x 1,5 not Ex: plastic Ex i/Ex n: brass Ex d: without cable gland	IP66/68	Measuring insert	41 (1.61)	Ex i, Ex d
	AH0 Aluminum AV0 Stainless steel	Screw cover, sight glass, heavy-duty, with 4 ... 20 mA display	M20 x 1,5 not Ex: plastic Ex i/Ex n: brass Ex d: without cable gland	IP66/68	Measuring insert	41 (1.61)	Ex i, Ex d

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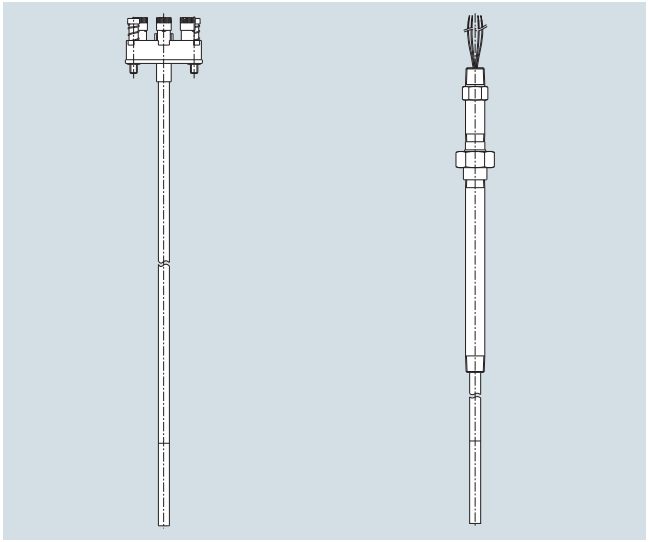
Components: Measuring insert

Measuring insert

The measuring insert of the temperature sensor is built into the protective armature (thermowell, extension and connection head). The sensor element is protected in the measuring insert. The spring load of the Siemens measuring inserts provide good thermal contact with the bottom of the thermowell, and vibration resistance is significantly increased. Only highly resistant mineral-insulated cables (so-called MIC) are used for the electrical connection between the sensor element and connection head. The highly compacted insulation of magnesium oxide achieves excellent level of vibration resistance. The following measuring insert designs are the most widely used on the world market:



European type American type

European type

European type measuring inserts can be replaced without having to dismantle the connection head. The springs are located either on the transmitter or the terminal block. This makes it possible to achieve a 8 to 10 mm spring range. If no transmitter is mounted, there is a ceramic base in its place. However, with the order option G01, a version with free wire ends instead of a ceramic base can be selected for mounting head-mounted transmitters.

American type

American-type measuring inserts feature a large spring range. These measuring inserts are ideal for use with NPT threads with the typical loose tolerances. In this configuration, the extension function is partially or fully integrated (nipple-union-nipple). Moreover it is also possible to directly attach field devices, e.g. SITRANS TF.

Components: Transmitters

SITRANS TH head transmitters process the weak non-linear sensor signals and transmit a stable and temperature-linear standard signal, thereby minimizing sensor signal disruptions.

The transmitters permanently monitor the temperature sensors and transmit diagnostic data to superordinate systems.

Because of the low energy feed of the SITRANS TH head transmitters, self-heating of the temperature sensors can be maintained at minimal levels.

The electrical isolation and integrated cold junction ensure that temperature sensors with thermocouples provide reliable measurements at a low cost.

SITRANS TH product family

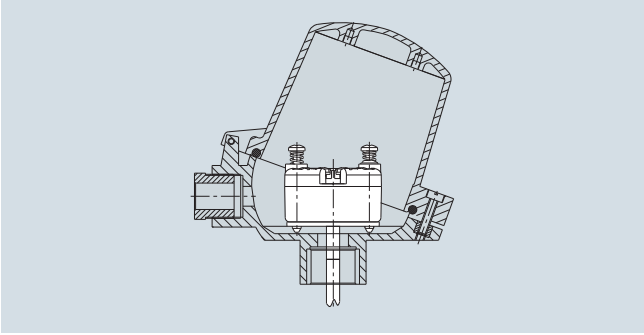
For detailed technical data on the SITRANS TH transmitters, please refer to the catalog FI 01.

- TH100 - the basic device
  - Output 4 to 20mA
  - for Pt100
  - can be configured using simple software
- TH200 - the universal device
  - Output 4 to 20mA
  - Resistance thermometer, thermocouples
  - can be configured using simple software
- TH300 - HART universal
  - Output 4 to 20 mA/HART
  - Resistance thermometer, thermocouples
  - HART conforming
  - Diagnostic functions
- TH400 - Fieldbus PA and FF
  - Output PROFIBUS PA or FOUNDATION Fieldbus
  - Resistance thermometer, thermocouples
  - Diagnostic functions; for detailed technical description of the SITRANS TH transmitter please refer to the related chapter of this catalog.

Installation types

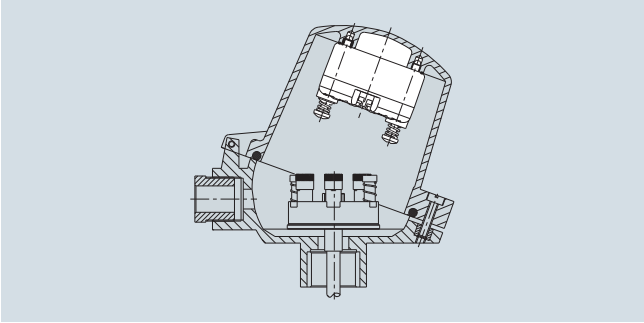
All SITRANS TH transmitters can be installed in type B connection heads. The following installation forms are used:

- Measuring insert installation
  Our standard version offers the following advantages
  - Small vibrating masses and compact design
  - Insert-transmitter unit can be replaced quickly



Installation of measuring insert

- Hinged cover installation
  - Standard for head type BC0 and BP0
  - Advantage: Measuring insert and transmitter can be repaired/maintained separately (recalibration).



Hinged cover installation

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Technical description

Measuring technology: Sensor elements

The diverse application spectrum for industrial temperature measuring technology requires different sensor technologies.

Resistance thermometer

Sensor elements made of other basic materials with different nominal resistances or different underlying standards are available on request. Resistance thermometers can be classified as follows:

- Basic design:
  The sensor element is built with thin layer technology. The resistance material is applied in the form of a thin layer on a ceramic carrier material.
- Versions featuring increased vibration-resistance:
  In addition to the basic design, the vibration resistance is improved through extra measures.
- Versions with expanded measuring range:
  Elements in wire-wound design. The wire winding is embedded in a ceramic body.

Thermocouples

Other thermocouples based on other thermo couples or underlying standards are available upon request.

The most common base metal thermocouples include:

- Type N (NiCrSi-NiSi) high degree of stability even in upper temperature range.
- Type K (NiCr-Ni) more stable than type J, but drifts in upper range.
- Type J (Fe-CuNi) narrow application band

Measuring technology: Measuring range

The measuring range describes the temperature limits within which the thermometer can be used in a way that is meaningful for measurement purposes. Depending on the loads present, the thermowell materials and the desired accuracy levels, the actual application range for the thermometer may be smaller.

Resistance thermometer [°C (°F)]	
Basic version and increased vibration resistance	-50 ... +400 (-58 ... +752)
Expanded measuring range	-196 ... +600 (-320.8 ... +1112)

Thermocouple [°C (°F)]	
Type N	-40 ... +1100 (-40 ... +2112)
Type K	-40 ... +1000 (-40 ... +1132)
Type J	-40 ... +750 (-40 ... +1382)

Measuring technology: Measuring accuracy

Resistance thermometer

The tolerance classes of the resistance thermometers correspond with IEC 751/EN 60751:

Tolerance	**Δt**
Basic accuracy, Class B	±(0.30 °C +0.0050|t[°C]|) ±(0.54 °F +0.0050|t [°F]-32|)
Increased accuracy, Class A	±(0.15 °C +0.0020|t[°C]|) (±(0.27 °F +0.0020|t [°F]-32|))
High degree of accuracy, Class AA (1/3 B)	±(0.10 °C +0.0017|t[°C]|) (±(0.18 °F +0.0017|t [°F]-32|))

The following tables provide an overview of the scope of these tolerances. If you exceed the specified limits with a resistance thermometer, the values of the next lower accuracy class apply:

Resistance thermometer Basic version [°C (°F)]	
Tolerance	**Range**
Basic accuracy, Class B	-50 ... +400 (-58 ... +752)
Increased accuracy, Class A	-30 ... +300 (-22 ... +572)
High degree of accuracy Class AA (1/3 B)	0 ... 150 (32 ... 302)

Resistance thermometer Increased vibration-resistance [°C (°F)]	
Tolerance	**Range**
Basic accuracy, Class B	-50 ... +400 (-58 ... +752)
Increased accuracy, Class A	-30 ... +300 (-22 ... +572)
High degree of accuracy Class AA (1/3 B)	0 ... 150 (32 ... 302)

Resistance thermometer Expanded measuring range [°C (°F)]	
Tolerance	**Range**
Basic accuracy, Class B	-196 ... +600 (-321 ... +1112)
Increased accuracy, Class A	-100 ... +450 (-148 ... +842)

Thermocouples

The tolerance classes of the thermocouples correspond with IEC 584/EN 60584:

Catalog versions

Type	**Basic accuracy, Class 2**	**Increased accuracy, Class 1**
N	-40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F) 333 °C ... 1100 °C ±0.0075x|t[°C]| (631 °F ... 2012 °F ±0.0075x|t[°F]-32|)	-40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F) 375 °C ... 1000 °C ±0.004x|t[°C]| (707 °F ... 1832 °F ±0.004x|t[°F]-32|)
K	-40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F) 333 °C ... 1000 °C ±0.0075x|t[°C]| (631 °F ... 1832 °F ±0.0075x|t[°F]-32|)	-40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F) 375 °C ... 1000 °C ±0.004x|t[°C]| (707 °F ... 1832 °F ±0.004x|t[°F]-32|)
J	-40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F) 333 °C ... 750 °C ±0.0075x|t[°C]| (631 °F ... 1382 °F ±0.0075x|t[°F]-32|)	-40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F) 375 °C ... 750 °C ±0.004x|t[°C]| (707 °F ... 1382 °F ±0.004x|t[°F]-32|)

Other thermocouples, ignoble

Type	**Basic accuracy, Class 2**	**Increased accuracy, Class 1**
T	-40 °C ... 133 °C ±1 °C (-40 °F ... +271 °F ±1.8 °F) 133 °C ... 350 °C ±0.0075x|t[°C]| (271 °F ... 662 °F ±0.0075x|t[°F]-32|)	-40 °C ... +125 °C ±0.5 °C (-40 °F ... +257 °F ±0.9 °F) 125 °C ... 350 °C ±0.004x|t[°C]| (257 °F ... 662 °F ±0.004x|t[°F]-32|)
E	-40 °C ... +333 °C ±2.5 °C (-40 °F ... +631 °F ±4.5 °F) 333 °C ... 900 °C ±0.0075x|t[°C]| (631 °F ... 1652 °F ±0.0075x|t[°F]-32|)	-40 °C ... +375 °C ±1.5 °C (-40 °F ... +707 °F ±2.7 °F) 375 °C ... 800 °C ±0.004x|t[°C]| (707 °F ... 1472 °F ±0.004x|t[°F]-32|)

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Other thermocouples. noble

Type	Basic accuracy, Class 2	Increased accuracy. Class 1
R and S	0 °C ... 600 °C±1.5 °C (32 °F ... 1112 °F±2.7 °F) 600 °C ... 1600 °C±0.0025 x |t| (1112 °F ... 2912 °F±0.0025 x |t|)	0 °C ... 1100 °C±1 °C (32 °F ... 2012 °F±1.8 °F) 1100 °C ... 1600 °C±[1 + 0.003 (t - 1100)] °C (2112 °F ... 2912 °F±[1.8 + 0.003 (t - 212)] °F)
B	600 °C ... 1700 °C±0.0025 x |t| (1112 °F ... 3092 °F±0.0025 x |t|)	

SITRANS TS300 Clamp-on

Measuring accuracy	
Reference conditions	
• Pipeline	13 x 1.5 mm (0.51 x 0.06 inch) made of stainless steel using using thermal paste
• Ambient temperature	20 °C (68 °F)
• Medium	Water, 120 °C (248 °F)
• Flow speed	3 m/s (9.84 ft/s)
Measuring accuracy using thermal paste (The accuracy depends on the geometry of the pipeline, the medium and the ambient conditions. T_M = process temperature; T_A = ambient temperature)	Process-optimized for steam sterilization
• Application, process-optimized for steam sterilization	for 100 ... 150 °C (212 ... 302 °F) $(T_A-T_M) \times 0.01$
• Application, alternative class A as per IEC 60751	-40 ... +150 °C (-40 ... 302 °F) $(T_A-T_M) \times 0.02$

Measuring technology: Response times

Response time describes the speed of the measurement system in the case of a temperature change, and is typically indicated as T0.5 or T0.9. The values indicate the time in which a measured value has increased to 50% or 90% of the actual temperature increase.

The main variables which affect response time are as follows:

- Ideal thermowell geometry includes:
  - smallest possible material at the tip
  - use of conductive material
- Thermal connection of measuring insert to thermowell:
  Due to the optimized design of the Siemens inserts (small gap width, spring system), they feature very good response behavior. Because of the good fit, additional contact materials are not usually required except in certain applications e.g. attachment of a surface sensor.
- Size of temperature increase
- Medium and flow rate

Resistance thermometer

Typical values as per EN 60751 in water at 0.4m/s can be found in the following table.

Thermowell form	Diameter [mm (inch)]	T0.5	T0.9
None	6 (0.24)	6	15
Straight (2)	9 (0.35)	34	90
	12 (0.47)	45	143
Tapered (3)	12 (0.47)	15	31
Barstock (4) U=65	24 (0.95)	40	100
Barstock (4)] U=125	24 (0.95)	45	110

Thermocouples

Typical values as per EN 60751 in water at 0.4m/s can be found in the following table.

Thermowell form	Diameter [mm (inch)]	T0.5	T0.9
None	6 (0.24)	2	4
Straight (2)	9 (0.35)	20	63
	12 (0.47)	19	66
Tapered (3)	12 (0.47)	7	22
Barstock (4) U=65	24 (0.95)	22	73
Barstock (4)] U=125	24 (0.95)	20	53

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Measuring technology: Mounting depth

Measuring insert

Type	Temperature-sensitive length (TSL [mm (inch)]	Non-bendable length [mm (inch)]
Basic	50 (1.97)	30 (1.82)
Increased vibration resistance	50 (1.97)	30 (1.82)
Expanded measuring range	50 (1.97)	60 (2.36)
Thermocouple	20 (0.79)	5 (0.20)

Immersion depth/contact with media

Ambient conditions (temperature/climate/insulation) and the design of the thermowell, process connection and piping result in so-called "heat transmission errors".

To prevent such an error, the submersion depth and diameter of the thermowell tip will be defined. The temperature-sensitive length (TSL) of the thermowell must also be taken into account. The following rule of thumb can be used:

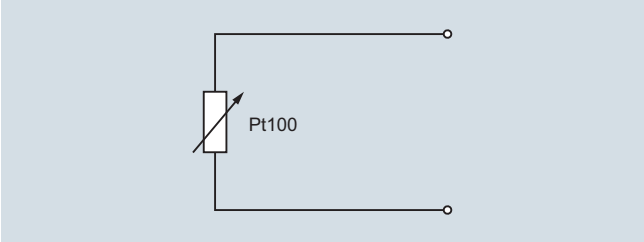
- Water
  Submersion depth ≥ TSL + 5 x Ø of thermowell
- Air
  Submersion depth ≥ TSL + 10 ... 15 x Ø of thermowell
- Recommendations
  - Select largest possible submersion depth
  - Select measuring location with higher flow velocity
  - Thermal insulation for outer thermometer components
  - Smallest possible surface for outer components
  - Insertion in pipe bends
  - Direct measurements without additional thermowell if no suitable solution can be found using other measures.

Measuring technology: Connection types

In the case of resistance thermometers, the type of sensor connection directly affects the level of accuracy:

Two-wire system

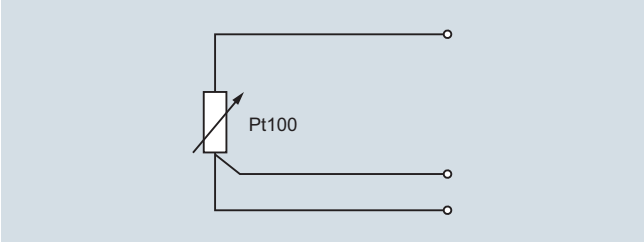
The resistance of sensor lines are included in the measurement result as an error. Adjustments are recommended in this case.



Pt100 Two-wire system

Three-wire system

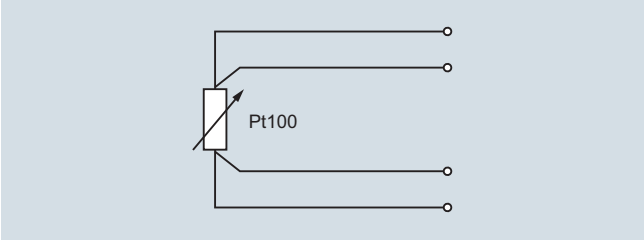
Line resistance is not included in the measurement result. Requirements: all terminal and line resistances (corrosion) are at the same level, and terminals are at the same temperature level.



Pt100 Three-wire system

Four-wire system

Line resistance is not included in the measurement result. This type of connection is the most secure and most accurate.



Pt100 Four-wire system

Siemens measuring inserts can be used to implement all types of connections for 1 x Pt100 devices. In the case of 2 x Pt100 versions, two- and three-wire systems are also possible. For measurement-related reasons, we always recommend a 1 x four-wire or 2 x 3-wire connection.

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Temperature influence

At the connection head TS500[1)]

	Without transmitter [°C (°F)]	With transmitter [°C (°F)]
Aluminum or stainless steel	-40 ... +100 (-40 ... +212)	-40 ... +85 (-40 ... +185)
Plastic	-40 ... +85 (-40 ... +185)	-40 ... +85 (-40 ... +185)

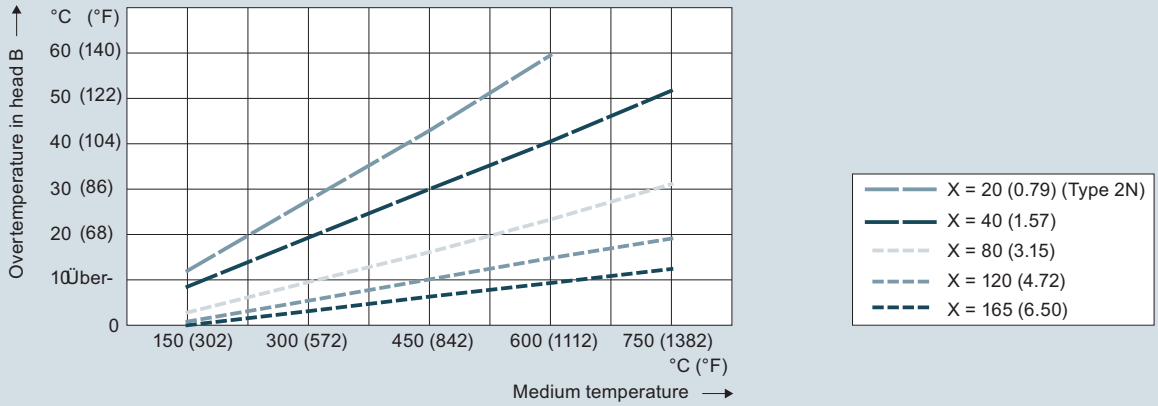
1) Notice manual at Ex-applications, please

At the TS100/200 connector/cable connection point:

The specified measuring range is valid for the hot end of the sensor. At the cold end, the maximum permitted temperature depends on the cables and plugs used. < 80 °C (176 °F) is uncritical for all types

Influence of extension

The illustration below assists you in selecting the right length for the neck tube. In this case, the following applies: Connection head temperature = Ambient temperature + Overtemperature. The temperature in the connection head can thus be assessed as follows:



Extension length X, effect on temperature, dimensions in mm (inch)

Please note that guidance values may change due to local conditions. Please consider these potential changes particularly with respect to explosion protection.

Also note that the accuracy of the transmitter also depends on the temperature in the connection head.

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Technical description

SITRANS TS300 Clamp-on

Design	
Measuring insert	• Special measuring insert made of stainless steel; hygienic design • Measuring element made of silver, thermal decoupling through plastic insert Measuring insert screwed into collar with spring load. Use heat-conductive-compound (see accessories) prior to mounting the device.
Pipe collar	
• Material	Temperature resistant high-performance plastic with integrated insulating system in the hygienic design
• Ambient temperature influence	Approx. 0.2 %/10 K

Process connection/Thermowell

When selecting a process connection, the process parameters sometimes only allow a specific technology. In addition, regional standard-related and customer-specific requirements must be observed. The range of products therefore includes a broad selection of standard connections.

In the case of redesigned or newly designed facilities, it is possible to achieve cost savings by implementing various measures:

- Use of standard lengths through clever selection of screw, weld or flange sockets
- Moveable compression fittings

The temperature resistance of a material for process connections and thermowells also limits the application area of the temperature sensor. The temperature range indicated on the type plate always refers to the measuring insert, not the material which comes into contact with media. Two aspects must be considered when assessing temperature stability:

- What maximum temperature may the material reach without a load?
- What is the behavior under load?

Process load

Because of the large variety of possible applications and variables, it is not possible to make general binding statements regarding the resilience of components which comes into contact with media. The load diagrams below can be used for common applications. However, where operating conditions vary significantly, please contact our technical support team.

Load on the thermowell and remedies:

The process itself	**Correction options**
Temperature	Material selection
Pressure	Thermowell type
Flow velocity	Insertion length, thermowell type
Viscosity	Insertion length, thermowell type
Vibration	Support against vibration
Corrosiveness	Material selection, coating
Abrasion (e.g. carbon dust)	Sensing rod, coating

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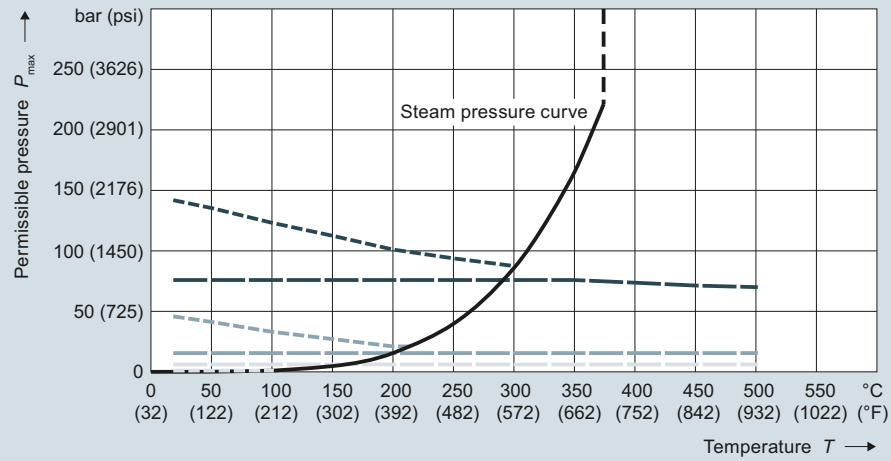
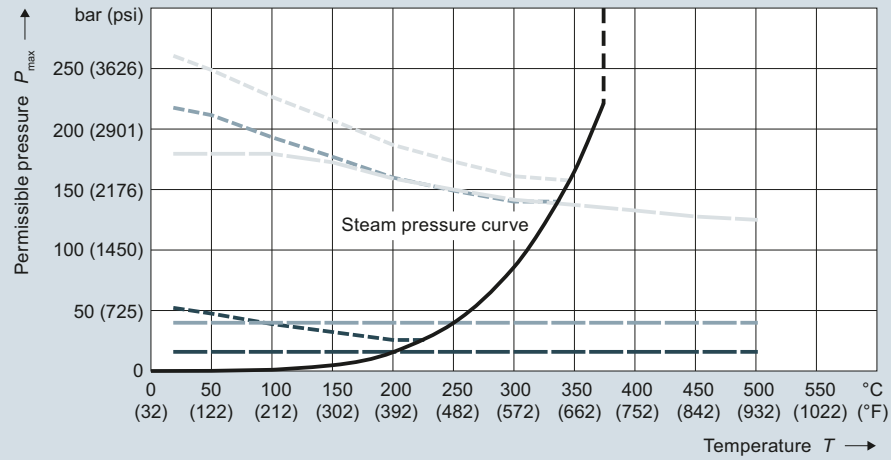
Load diagrams



Form 2/2G/2N/2F Ø9x1 (0.35x0.04)
Material No. 1.4571

	U	Speed v
– – –	140 (5.51)	v_W = 3 m/s (9.84 ft/s)
– – –	315 (12.40)	
– – –	510 (20.08)	
———	140 (5.51)	v_L = 25 m/s (82.02 ft/s)
———	315 (12.40)	
———	510 (20.08)	

Thermowells with Ø 9 x 1 mm (0.35 x 0.04 inch), dimensions in mm (inch)



Form 2/2G/2N/2F Ø12x2.5 (0.47x0.10)
Material No. 1.4571

	U	Speed v
– – –	140 (5.51)	v_W = 3 m/s (9.84 ft/s)
– – –	315 (12.40)	
– – –	510 (20.08)	
———	140 (5.51)	v_L = 25 m/s (82.02 ft/s)
———	315 (12.40)	
———	510 (20.08)	

Thermowells with Ø 12 x 2.5 mm (0.47 x 0.10 inch), dimensions in mm (inch)

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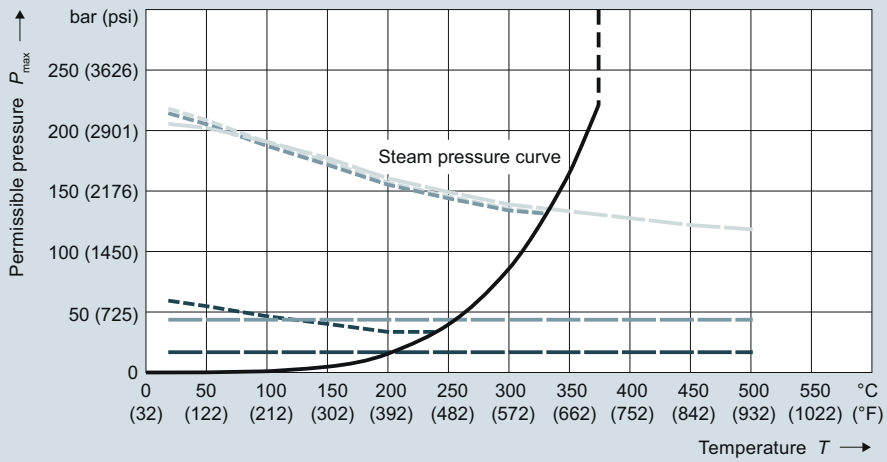
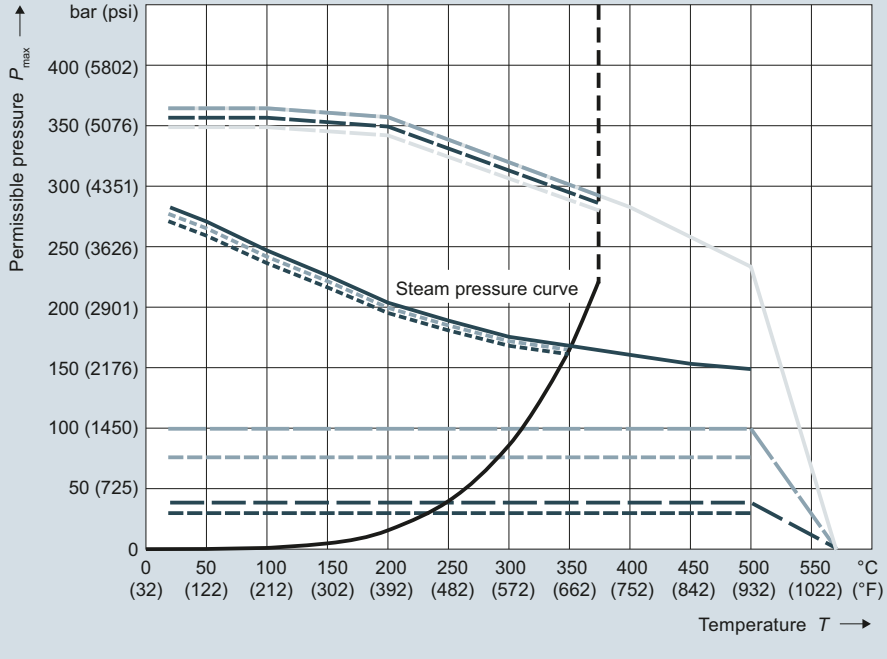


Form 3/3G/3F Ø12x2.5 (0.47x0.10)
Material No. 1.4571

	U	Speed v
	140 (5.51) 315 (12.40) 510 (20.08)	v_W = 3 m/s (9.84 ft/s)
	140 (5.51) 315 (12.40) 510 (20.08)	v_L = 25 m/s (82.02 ft/s)

Thermowells with Ø 12 x 2.5 mm (0.47 x 0.10 inch), Ø 14 x 2.5 mm (0.55 x 0.10 inch), dimensions in mm (inch)



Form 4/4F Ø24 (0.94); C=65 (2.56)
Material No. 1.4571

	U	Speed v
	140/510 (5.51/20.08) 315 (12.40)	v_W = 5 m/s (16.40 ft/s)
	140 (5.51) 315 (12.40) 510 (20.08)	v_L = 40 m/s (131.20 ft/s)

Form 4/4F Ø24 (0.94); C=65 (2.56)
Material No. 1.7335

	U	Speed v
	140 (5.51) 315 (12.40) 510 (20.08)	v_W = 5 m/s (16.40 ft/s)
	140 (5.51) 315 (12.40) 510 (20.08)	v_L = 40 m/s (131.20 ft/s)

Thermowells with Ø 24 mm (0.95 inch), C= 65 mm (2.60 inch), dimensions in mm (inch)

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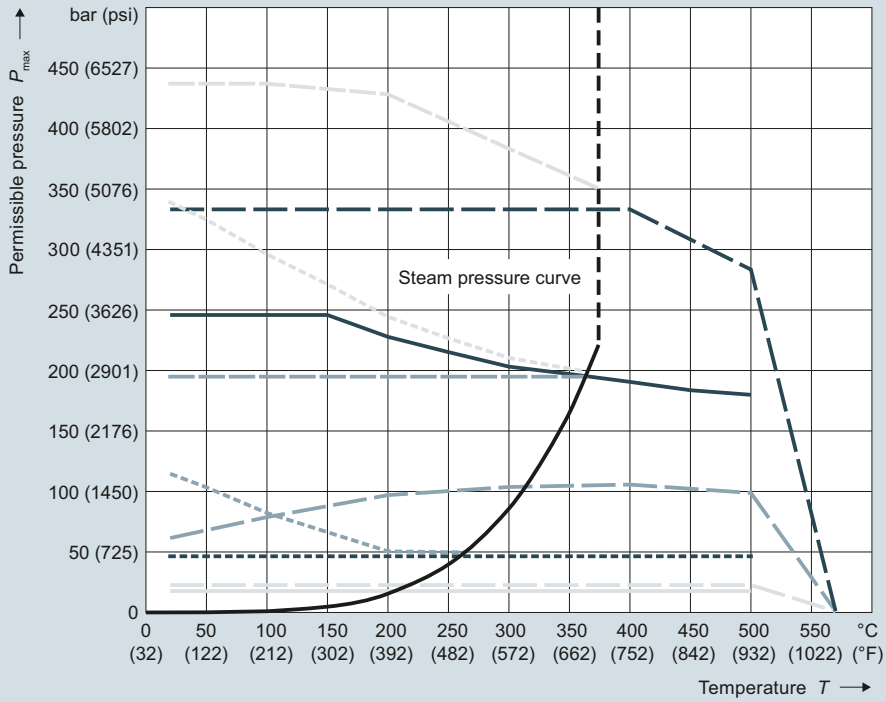


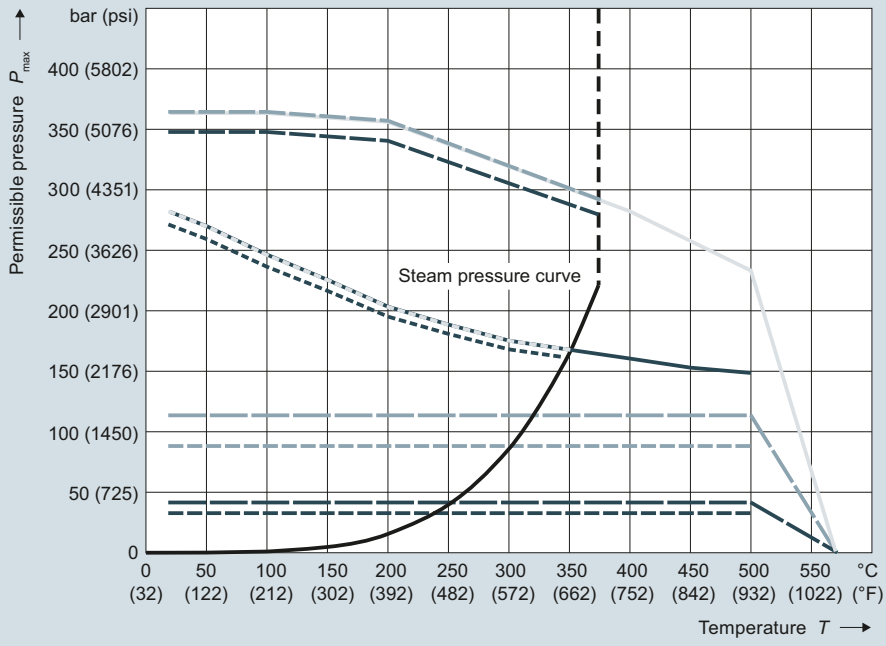
Form 4/4F Ø18 (0.71); C=65 (2.56)
Material No. 1.4571

	U	Speed v
	140/315 (5.51/12.40) 510 (20.08)	v_W = 5 m/s (16.40 ft/s)
	140 (5.51) 315 (12.40) 510 (20.08)	v_L = 40 m/s (131.20 ft/s)

Form 4/4F Ø18 (0.71); C=65 (2.56)
Material No. 1.7335

	U	Speed v
	140/315 (5.51/12.40) 510 (20.08)	v_W = 5 m/s (16.40 ft/s)
	140 (5.51) 315 (12.40) 510 (20.08)	v_L = 40 m/s (131.20 ft/s)

Thermowells with Ø 18 mm (0.71 in), C= 65 mm (2.60 inch), dimensions in mm (inch)



Form 4/4F Ø24 (0.94); C=125 (4.92)
Material No. 1.4571

	U	Speed v
	140/315 (5.51/12.40) 510 (20.08)	v_W = 5 m/s (16.40 ft/s)
	140 (5.51) 315 (12.40) 510 (20.08)	v_L = 40 m/s (131.20 ft/s)

Form 4/4F Ø24 (0.94); C=125 (4.92)
Material No. 1.7335

	U	Speed v
	140/315 (5.51/12.40) 510 (20.08)	v_W = 5 m/s (16.40 ft/s)
	140 (5.51) 315 (12.40) 510 (20.08)	v_L = 40 m/s (131.20 ft/s)

Thermowells with Ø 24 mm (0.95 inch), C= 125 in (4.92 in), dimensions in mm (inch)

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Technical description

Thermowell calculation

Properly applied load diagrams will provide a sufficient degree of safety for the most common thermowell configurations.

However, there are cases in which operating conditions deviate too greatly from standard parameters. In this case, a customized thermowell calculation may be required.

Another reason for doing this calculation is the fact that flowing media can create turbulence at the tip of the thermowell under certain conditions. The thermowell will then vibrate and may even be destroyed if not configured correctly. This is the most frequent cause of thermowell bailure.

SIEMENS offers the two recognized methods for calculating the thermowell:

- DIN/Dittrich method
- ASME/Murdock method
  This method also takes into account turbulence formation on a mathematical level.

Both methods provide a high degree of safety with regard to thermowell configuration, however, they do not provide a guarantee against breakdowns.

Materials

Material descriptions/Standards comparison				**Max. temperature [°C (°F)] (unloaded)**	**Properties**	**Applications**
Mat. No.:	AISI/Trade name:	EN 10028-2:	Description			
1.4404 or 1.4435	AISI 316 L	X2CrNiMo17-12-2	Austenitic stainless steel	600 (1112)	Good acid resistance, resistant against grain boundary corrosion	Chemical industry, waste treatment, paper and cellulose industry, food industry
1.4571	AISI 316 Ti	X6CrNiMoTi 17 12-2	Austenitic stainless steel	800 (1472)	Good acid resistance, resistant against grain boundary corrosion (supported by Ti portion)	Chemical industry, textile industry, paper and cellulose industry, water supply, food and pharmaceuticals
1.5415	A 204 size A	16Mo3	Carbon steel, high-alloy	500 (932)	Resistant at higher temperatures, well suited for welding	Steam turbines, steam lines, water pipes
1.7335	A 182 F11	13CrMo4-5	Carbon steel, high-alloy	540 (1004)	Resistant at higher temperatures, well suited for welding	Steam turbines, steam lines, water pipes
1.4841	SS 314	X15CrNiSi25-20	Austenitic heat-resistant stainless steel	1150 (2102)	Resistant at high temperatures, also resistant against low-O_2 and nitrogen-containing gases.	Flue gas, petrochemical industry, chemicals industry, power plants
1.4762	446	X10CrAl24	Ferritic heat-resistant steel	1150 (2102)	Resistant at high temperatures, in oxidizing and reducing sulphur-containing atmosphere	Chemical industry, power plants, steel industry, waste gas treatment
2.4816	Inconel 600	NiCr15Fe	Nickel-Chrome alloy	1150 (2102)	Resistant at high temperatures, resistant against chlorine-induced cold crack corrosion	Chemical industry, petrochemical industry, food industry
1.4876	Incoloy 800	X10NiCrAlTi32-21	Austenitic heat-resistant stainless steel	1100 (2012)	Excellent resistance against oxidation and carbonization at high temperatures, good corrosion resistance	O&G industry, waste gas treatment, power plants (steam boiler, heat exchanger), applications using aggressive fluids
2.4819	Hastelloy C 276	NiMo16Cr15W	Nickel-Chrome-Molybdenum alloy	1100 (2012)	Resistant at high temperatures, in oxidizing and reducing atmosphere, resistant against pitting and crevice corrosion, good corrosion resistance after welding	Chemicals industry, paper and cellulose industry, waste treatment, waste incinerators, emissions controls, shipbuilding and offshore industry
2.4360	Monel 400	NiCu30Fe	Nickel-Copper alloy	500 (932)	Excellent corrosion resistance, particularly against chlorine-induced cold crack corrosion	Chemical industry, offshore industry, nuclear technology, petrochemical industry

Where cost-intensive materials are used with flange thermowells, cost savings can be achieved by using a so-called flanged wheel. A thin disc of the material which comes into contact with media is applied prior to the flange (ordinary stainless steel).

Materials sensor tube/measuring inserts:

- SITRANS TSinsert, TS100, TS200
  - Resistance thermometer Cr-Ni-Mo
  - Thermocouples 2.4816/Inconel600

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Vibration resistance of measuring insert, cable sensor

Similar to the thermowell, inner (Karman vortices) and outer (plant) vibrations also affect the measuring insert. For this reason, a special assembly of measurement elements is required. Other than a few exceptions for cable and compact thermometers, Siemens only produces sensors based on a mineral-insulated cable. Together with precautions taken when installing the measuring element, the Siemens basic version already exceeds EN 60751 by more than a factor of 3. Pursuant to the measurement methods of this standard, the following values are obtained (tip-tip):

- 10 g: Basic version and expanded measuring range
- 60 g: Increased vibration-resistance and thermocouple

Bending ability of measuring insert/cable sensor

All Siemens measuring inserts SITRANS TSinsert are made with a mineral-insulated cable (MIC). The same applies to a portion of the cable and compact thermometer. In addition to the properties already described, another advantage of the MIC is its bending ability. This makes it possible to install these thermometers even in difficult to access areas. Please ensure that you are not below the following bending radius:

Ø MIC [mm (inch)]	R_{min} = 4x Ø MIC [mm (inch)]
3 (0.12)	12 (0.48)
6 (0.24)	24 (0.95)

Where a smaller bending radius is required due to installation conditions, subsequent testing of the insulation resistance is recommended.

Electrical stability

Insulation resistance

The insulation resistance between each measuring circuit and the fitting is tested at a voltage of 500 V DC at room temperature.

$R_{iso} \geq 100\ M\Omega$

Due to the property of the mineral-insulated cable, the insulation resistance decreases as temperature increases. Because of the special production method, it is, however, possible to achieve very good values even at high temperatures.

Line resistance

When connected to two-wire systems, the line resistance is included in the measurement result. The following rule of thumb can be used:

- ∅ Measuring insert 3 mm (0.12 inch) 5 Ω/m or 12.8 °C (55.04 °F)
- ∅ Measuring insert 6 mm (0.24 in) 2.8 Ω/m or 44.78 (44.78)

For this reason a connection to three- or four-wire systems is highly recommended.

Pressure equipment directive:

This device is not included in the pressure device guideline; classification according to pressure device guideline (PED 97/23/EC), Directive 1/40; article 1, paragraph 2.1.4

In addition, statutory, standards-based or operating specifications also require additional testing. The results are certified in certificates as per EN 10204:

- As per EN 10204-2.1, order conformity (C35)
  Certificate in which Siemens confirms that the delivered products correspond with the requirements of the order, without indicating test results. The testing does not have to be carried out on the delivered devices.
- As per EN 10 204-3.1
  Certificate in which Siemens confirms that the delivered products meet the requirements set out in the order, with indication of the specific test results. Testing is carried out by an organization which is independent of production. The inspection certificate 3.1 replaces 3.1.B of the previous edition.
- Material certificate for parts which come into contact with media (C12)
  This certificate confirms the properties of the material and warrants traceability up to the melting batch.
- Pressure-resistant (C31)
  Hydrostatic pressure test on thermowell as per customer specifications. Where operating pressure is not specified, testing is carried out using the nominal pressure of the process connection.
- Helium leak test (C32)
  This test can be used to detect even the smallest leaks in thermowells and welded seams.
- Dye penetration test (C33)
  The dye penetration method can detect cracks and other surface defects.
- Comparative test (calibration) (Y33)
  The test object is measured in at an equalized temperature level against a highly precise thermometer, and the measured values of test object and normal values are documented. However, calibration requires the measuring insert to be of a certain minimum length.
  Measuring inserts can be calibrated together with the associated transmitter. Calibration values can be stored in the transmitter in order to increase the accuracy of the system.
- As per EN 10204-3.2
  This acceptance certificate can be prepared on request, together with an acceptance representative of the ordering party or a representative indicated as per official requirements (e.g. TÜV) It confirms that the delivered products meet the requirements set out in the order; it also contains the test results.

Approvals

Explosion protection according to ATEX and IECEx:

Designator	Addition	Type of protection	Ex-identifier	For zone
TSinsert	E01	Intrinsic safety "ia", "ic"	II 1 D Ex ia IIIC T 200 °C Da II 1 G Ex ia IIC T6/T4…T1 Ga II 3 G Ex ic IIC T6/T4…T1 Gc	20 0 2
	E02	-		
	E03	for SITRANS TS500 with protection type Ex d		
	E04	-		
TS100	E01	Intrinsic safety "ia", "ic"	II 1 D Ex ia IIIC T 200 °C Da II 1 G Ex ia IIC T6/T4…T1 Ga II 3 G Ex ic IIC T6/T4…T1 Gc	20 0 2
	E02, E03, E04	-		
TS200	E01	Intrinsic safety "ia", "ic"	II 1 D Ex ia IIIC T 200 °C Da II 1 G Ex ia IIC T6/T4…T1 Ga II 3 G Ex ic IIC T6/T4…T1 Gc	20 0 2
	E02, E03, E04	-		
TS500	E01	Intrinsic safety "ia", "ic"	II 1/2 D Ex ia/ib IIIC T200 °C Da/Db II 1/2 G Ex ia/ib IIC T6/T4…T1 Ga/Gb II 3 G Ex ic IIC T6/T4…T1 Gc	20*/21 0*/1 2
	E02	-		
	E03	Flameproof enclosure "d" Dust protection by enclosure "t" only in combination with connection heads code AG0, AH0, AU0, AV0, without cable gland	II 1/2 G Ex d IIC T6,T4,T3 II 1/2 D Ex tD A21 IP65 T85, 100, 150 °C	0*/1 20*/21
	E04	Non-sparking "n"	II 3 G Ex nA IIC T6/T4…T1 Gc	2

* Up to process connection

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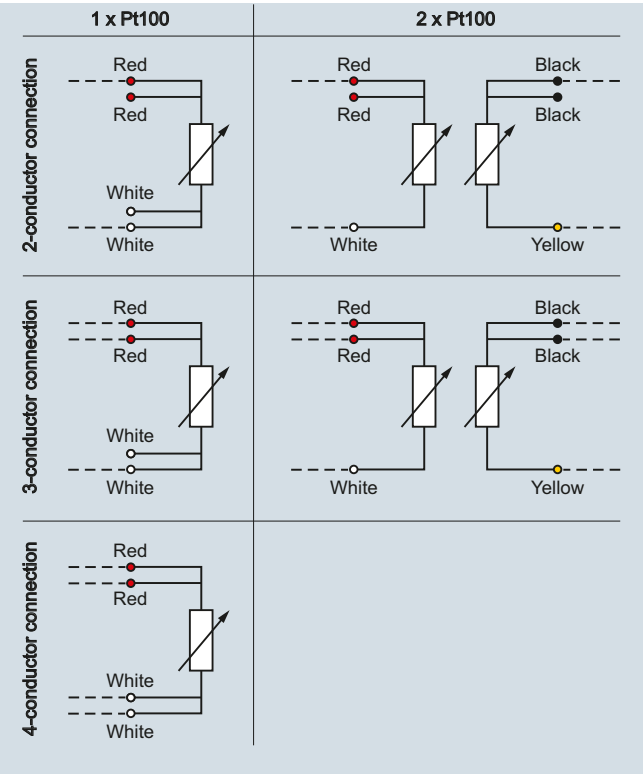
2

Schematics

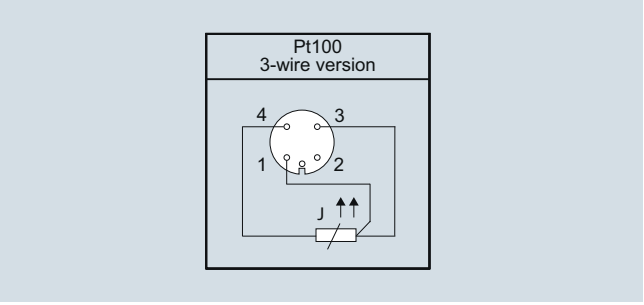
Resistance thermometer

SITRANS TSinsert measuring inserts are designed as a four-wire system for single Pt100 if not mentioned differently. This makes it possible to implement all of the aforementioned connection types.

Double Pt100 measuring inserts (for 6 mm OD only) are designed as a three-wire system.

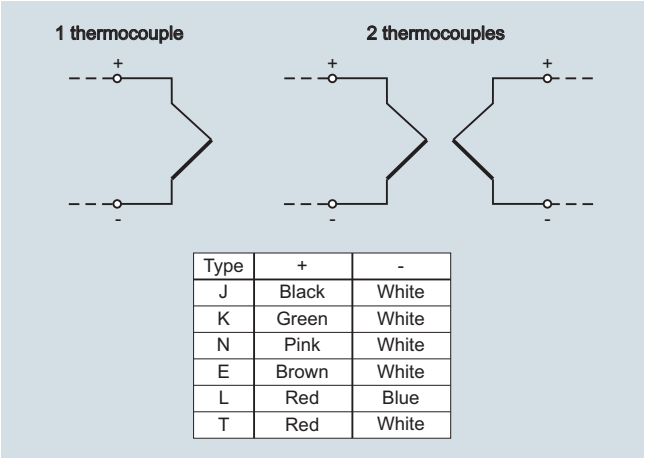


Schematics 1 x Pt100-2W up to 2 x Pt100-4W



Connection diagram for round connector M12 x 1, 4-pole

Thermocouples



Type	+	-
J	Black	White
K	Green	White
N	Pink	White
E	Brown	White
L	Red	Blue
T	Red	White

Circuit diagram for thermocouple

Where thermocouples are used, the use of head transmitters offers particular advantages: The cold junction is already integrated into the universal transmitter. There is no need for expensive thermo or extension cable. This also removes a number of possible error sources. The weak millivolt signal of the thermocouple is already converted into a stable and temperature-linear DC or bus signal on site. This drastically reduces the effects of electromagnetic factors on the measurement result.

If a head transmitter is not installed, the sensor feed line consists either of the appropriate thermo or extension leads. The thermo line is made from the thermo material of the relevant thermocouple, while the extension lead uses a cost-effective substitute material. The extension cable behaves similar to a thermo line at an electrical level, within a limited temperature range of up to 200°C.

A wide spectrum of color coding is available for thermocouples on an international level. This must be taken into account during the electrical connecting.

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Country	International/ Germany			North America			UK/ Czech Republic		
Standard	Not intrinsically safe[1]			Extension lead[2]			BS 1843		
	Jacket	+	-	Jacket	+	-	Jacket	+	-
N	PN	PN	WH	OG	OG	RD	OG	OG	BU
K	GN	GN	WH	YE	YE	RD	RD	BR	BU
J	BK	BK	WH	BK	WH	RD	BK	YE	BU
T	BR	BR	WH	BU	BU	RD	BU	WH	BU
E	VT	VT	WH	VT	VT	RD	BR	BR	BU
R+S	OG	OG	WH		BK	RD	GN	WH	BU
B	GY	GY	WH	GY	GY	RD	-	-	-

1) With an intrinsically safe line as per IEC 584-3, the sheath is always blue.
2) For thermo lines as per ANSI MC96, the sheath is always blue.

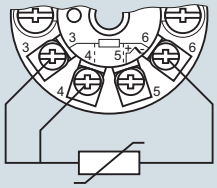
Country	Netherlands			Japan			France		
Standard	DIN 43714			ISC 1610-198			NF C42-323		
	Jacket	+	-	Jacket	+	-	Jacket	+	-
N	GN	RD	GN	BU	RD	WH	VT	VT	YE
K	BU	RD	BU	YE	RD	WH	BK	BK	YE
J	BR	RD	BR	BR	RD	WH	BU	BU	YE
T	BK	RD	BK	VT	RD	WH	OG	OG	YE
E	WH	RD	WH	BK	RD	WH	GN	GN	YE
R+S	GY	RD	GY	GY	RD	WH	-	-	-
B	GN	RD	GN	BU	RD	WH	VT	VT	YE

Abbreviation for colors				
BK: black	BR: brown	BU: blue	GD: gold	GN: green
GY: gray	OG: orange	PN: pink	RD: red	SR: silver
TQ: turquoise	VT: violet	WH: white	YE: yellow	

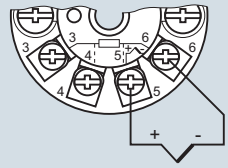
Transmitters

Where SITRANS TH transmitters are used in the connection head of the temperature sensor, connection takes place according to the following pattern

SITRANS TH100/TH200/TH300

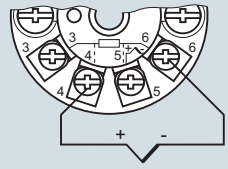


Resistance thermometer

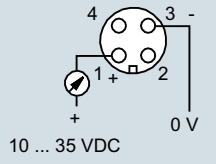


Thermocouples

SITRANS TH400



SITRANS TH100SLIM



In addition, our transmitters also allow for a large number of other possible connections (e.g. difference, average, two sensors). More information can be obtained at:
http://www.siemens.com/temperature

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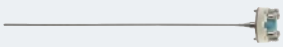
Detailed product overview

Type	TSinsert	TS100	TS200
Description	Measuring insert	Temperature sensors in cable version	Temperature sensors in compact version
Application	Replaceable	Universal use	Universal use
Version	Mineral-insulated version	Mineral-insulated version	Mineral-insulated version
Type	in European or American type	For unfavorable space conditions	For unfavorable space conditions
Image			
Catalog page	2/162	2/110	2/114
Order	Nr. 7MC70*	7MC711*	7MC72*
Wetted material	Cr-Ni-Mo (RTD): 2.4816 (TC) (Cr-Ni-Mo; Inconnel600)	Cr-Ni-Mo (RTD); 2.4816 (TC) (Cr-Ni-Mo; Inconnel600)	Cr-Ni-Mo (RTD); 2.4816 (TC) (Cr-Ni-Mo; Inconnel600)
Thermowell types	To order separately	Without/with separate thermowell	Without/with separate thermowell
Process connections	-	Compression fittings • Soldering nipple: - G ¼, G ½ - ½ NPT - M 8x1, M18x1.5 • Surface connection piece for installation on surfaces/tubes	Compression fittings • Soldering nipple: - G ¼, G ½ - ½ NPT - M 8x1, M18x1.5 • Surface connection piece for installation on surfaces/tubes
Sensor elements	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire
Sensor accuracy	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2
Connection heads	Type B (Type A flameproof)	Cable, optional with misc. plugs	• flying leads • misc. plugs
Explosion protection, (ATEX IECEx)	Intrinsic safety "ia", "ic" for TS500 in Ex d	Intrinsic safety "ia", "ic"	Intrinsic safety "ia", "ic"
Output signal	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal	Sensor signal
Application	Spare parts	• Machinery and equipment • Bearing temperature • Surfaces	• Machinery and equipment • Bearing temperature • Surfaces
Limit temperat.[1] [°C (°F)]	• Pt100 basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)	• Pt100 basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)	• Pt100 basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)
Max. nominal pressure[1] (static pressure at 20°C)	-	Compression fitting max. 5 bar (145 psi)	Compression fitting max. 5 bar (145 psi)
Min. response time $t_{0.5}$	2 … 6 s	2 … 6 s	2 … 6 s
Degree of protection	IP54	See drawing page 2/79	See drawing page 2/79

[1] Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowell-materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

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Type	TS300 Modular	TS300 Clamp-on
Description	Temperature sensors for food, pharmaceuticals and biotechnology	Temperature sensors for food, pharmaceuticals and biotechnology
Application	Measurements submersed in medium (pipelines and vessels)	Clamp-on measurement of pipe surface temperature
Version	Protective pipe similar to DIN 43772, Type 2F and tapered design	Protective pipe similar to DIN 43772, Type 2F and tapered design
Type		For unfavorable space conditions
Image		
Catalog page	2/118	2/122
Order	7MC8005*	7MC8016
Wetted material	1.4404 or1.4435 (316L)	1.4404 or 1.4435 (316L)
Thermowell types	Similar to 2F	Similar to 2F
Process connections	DIN 11851, clamp connection (Triclamp/ISO 2852/DIN 32676), Varivent, Ingold connection (Fermenter connection), Neumo Biocontrol, ball weld sleeve, (gaskets are not included in scope of delivery)	Clamp-on connections suitable for the following pipe diameters: • Collar 4 ... 57 mm (0.16 ... 2.24 inch) • Tensioning 6 ... 50,8 mm (0.24 ... 2.00 inch) • Tensioning 50 ... 200 mm (1.97 ... 7.87 inch)
Sensor elements	Pt100	Pt100
Sensor connection	• 1x4 wire • 2x3 wire	• 1x3 wire
Sensor accuracy	• Class A	• Class A • Process-optimized design
Connection heads	Typ B	• Typ B
Explosion protection, (ATEX IECEx)	-	-
Output signal	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 ... 20 mA TH100slim • HART (TH300) • PA (TH400) • FF (TH400)
Application	Surface roughness: Standard applications Ra < 1.5 µm (5.9 10^{-5} inch)	Surface roughness: Standard applications Ra < 1.5 µm (5.9 10^{-5} inch)
Limit temperat. [1] [°C (°F)]	-20 ... +400 °C (-4 ... +752 °F)	-40 ... +150 °C (-40 ... +302 °F)
Max. nominal pressure [1] (static pressure at 20°C)	0 ... 150 (0 ... 5.91) 50 bar 150 ... 300 (5.91 ... 11.81) 40 bar	No pressure load due to clamp-on principle
Min. response time $t_{0.5}$	20 ... 34 s	4 s (See "Reference conditions SITRANS TS300 Clamp-on" page 2/89)
Degree of protection	IP54 ... IP67 dep. to connection head, see page 2/86	IP65 for pipe collar, IP67 for elektrical connection

[1] Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowell-materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

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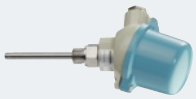
Detailed product overview

Type	TS500 for installation	TS500 Type 2	TS500 Type 2N
Description	Temperature sensors for the process industry (vessels and pipings)	Temperature sensors for the process industry (vessels and pipings)	Temperature sensors for the process industry (vessels and pipings)
Application	Temperature sensors for the installation of existing thermowells	Tubular version for minimal to medium stress	Tubular version for minimal to medium stress
Version	Suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001	Thermowell as per DIN43722, Type 2 without process connection	Thermowell Type 2N similar to DIN 43772, screwed in
Type	With extension • European type • American type	• Without extension, plug-in • Use with moveable compression fittings	Without extension
Image			
Catalog page	2/158	2/126	2/130
Article No.	Nr. 7MC750*	7MC751*-0*(A/B)**-0***	7MC751*-1****-0***
Wetted material	None: Measuring insert made of 1.4571, 1.4404 or 1.4435 (RTD); 2.4816 (TC) (316L; Inconnel600)	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)
Thermowell types	To order separately	Form 2	Form 2N (similar to form 2)
Process connections	Connection to thermowell: • M14x1.5 • M18x1.5 • G ½ • ½ NPT	Compression fittings • G ½ • ½ NPT	• G ½ • ½ NPT
Insertion length	• 110 mm (4.33 inch) 2.5 inch 15 inch • 140 mm (5.51 inch) 4 inch 18 inch • 200 mm (7.87 inch) 6 inch 24 inch • 260 mm (10.24 inch) 9 inch • 410 mm (16.14 inch) 12 inch	Variable	• 100 mm (3.94 inch) • 160 mm (6.30 inch) • 230 mm (9.06 inch) • 360 mm (14.17 inch) • 510 mm (20.08 inch)
Neck tube length	as per DIN 43772	as per DIN 43772	not adjustable X=20 mm (0.79 inch)
Sensor elem.	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire
Sensor accuracy	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2
Conn. heads	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)
Explosion protection, (ATEX IECEx)	• Intrinsic safety "ia", "ic" • Flameproof enclosure "d" • Non sparking "n"	• Intrinsic safety "ia", "ic" • Flameproof enclosure "d" • Non sparking "n"	• Intrinsic safety "ia", "ic" • Flameproof enclosure "d" • Non sparking "n"
Output signal	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)
Application	Pressure vessel and piping	Pressure vessel and piping	Pressure vessel and piping
Limit temperature[1] [°C (°F)]	• Pt100 Basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)	• Pt100 Basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)	• Pt100 Basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)
Max. nominal pressure[1] (static pressure at 20°C), dimensions in mm (inch)	s. thermowell	Tube Ø9 (0.35): • 0 ... 150 (0 ... 5.91) 50 bar • 150 ... 300 (5.91 ... 11.81) 40 bar • Compression fitting 5 bar Tube Ø12 (0.47): • 0 ... 150 (0 ... 5.91) 75 bar • 150 ... 300 (5.91 ... 11.81) 60 bar • Compression fitting 5 bar	Tube Ø9 (0.35): • 0 ... 150 (0 ... 5.91) 50 bar • 150 ... 300 (5.91 ... 11.81) 40 bar
Min. response time $t_{0.5}$	s. thermowell	20 … 45 s	20 … 34 s
Degree of prot.	IP54 ... IP67 dep. on connection head see page 2/86	IP54 ... IP67 dep. on connection head see page 2/86	IP54 ... IP67 dep. on connection head see page 2/86

[1] Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowell materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

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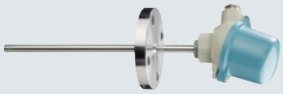
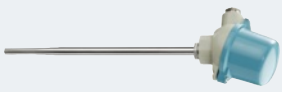
Type	TS500 Type 2G	TS500 Type 2F	TS500 Type 3
Description	Temperature sensors for the process industry (vessels and pipings)	Temperature sensors for the process industry (vessels and pipings)	Temperature sensors for the process industry (vessels and pipings) **quicker than form 2**
Application	Pipe version for minimal to medium stress	Pipe version for minimal to medium stress	Pipe version for minimal to medium stress
Version	Thermowell as per DIN 43722, Type 2G, screwed in	Thermowell as per DIN 43722, Type 2F with flange	Thermowell as per DIN 43722, Type 3 without process connection, improved response time
Type	with extension	with extension	• Without extension, plug-in • Use with moveable compression fittings
Image			
Catalog page	2/134	2/138	2/142
Article No.	7MC751*-1*(A/B)**-1***	7MC751*-2*(A/B)**-1***	7MC751*-0*K**-0***
Wetted mater.	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)
Therm. types	Form 2G	Form 2F	Form 3
Process connections	Welded threads: • G 1 • G ½ • ½ NPT	Welded flange • DN 25, PN 40 • 1RF150 • 1.5RF150 • 1.5RF300	Compression fittings • G ½ • ½ NPT
Insertion length	• 160 mm (6.30 inch) • 250 mm (9.84 inch) • 400 mm (15.75 inch)	• 225 mm (8.86 inch) • 315 mm (12.40 inch) • 465 mm (18.31 inch)	• 225 mm (8.86 inch) • 315 mm (12.40 inch) • 465 mm (18.31 inch)
Neck tube length	As per DIN 43772	As per DIN 43772	As per DIN 43772
Sensor elements	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire
Sensor accuracy	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2
Connection heads	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)
Explosion protection, (ATEX IECEx)	• Intrinsic safety "ia", "ic" • Flameproof enclosure "d" • Non sparking "n"	• Intrinsic safety "ia", "ic" • Flameproof enclosure "d" • Non sparking "n"	• Intrinsic safety "ia", "ic" • Flameproof enclosure "d" • Non sparking "n"
Output signal	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)
Application	Pressure vessel and piping	Pressure vessel and piping	Pressure vessel and piping
Limit temperat.[1] [°C (°F)]	• Pt100 Basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)	• Pt100 Basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)	• Pt100 Basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)
Max. nominal pressure[1] (static pressure at 20°C), dimensions in mm (inch)	Tube Ø9 (0.35): • 0 ... 150 mm (0 ... 5.91 inch) 50 bar • 150 ... 300 (5.91 ... 11.81) 40 bar • Compression fitting 5 bar Tube Ø12 (0.47): • 0 ... 150 (0 ... 5.91) 75 bar • 150 ... 300 (5.91 ... 11.81) 60 bar	Tube Ø9 (0.35): • 0 ... 150 mm (0 ... 5.91 inch) 50 bar • 150 ... 300 (5.91 ... 11.81) 40 bar Tube Ø12 (0.47): • 0 ... 150 (0 ... 5.91) 75 bar • 150 ... 300 (5.91 ... 11.81) 60 bar Note restriction imposed by PN of the flange	Tube Ø12 (0.47): • 0 ... 200 (0 ... 7.87) 75 bar • 200 ... 300 mm (7.87 ... 11.81) 60 bar • Compression fitting 5 bar
Min. response time $t_{0.5}$	20 … 34 s	20 … 34 s	7 … 15 s
Degr. of protec.	IP54 ... IP67 dep. on connection head see page 2/86	IP54 ... IP67 dep. on connection head see page 2/86	IP54 ... IP67 dep. on connection head see page 2/86

[1] Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowell materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

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Detailed product overview

Type	TS500 Type 3G	TS500 Type 3F	TS500 Type 4/4F
Description	Temperature sensors for the process industry (vessels and pipings) **faster as form 2**	Temperature sensors for the process industry (vessels and pipings) **faster as form 2**	Temperature sensors for the process industry (vessels and pipings) **Quick-respone version available**
Applic. area	Tubular version for minimal to medium stress	Tubular version for minimal to medium stress	Tubular version for medium to highest stress
Version	Thermowell as per DIN 43722, Type 3G, screwed in	Thermowell as per DIN 43722, Type 3F with flange	Thermowell to DIN 43722: • Type 4 for weld-in • Type 4F with flange
Type	with extension	with extension	with extension
Image			
Catalog page	2/146	2/150	2/154
Article No.	7MC751*-1*K**-1***	7MC751*-2*K**-1***	7MC752*
Wetted material	1.4404 or 1.4435; 1.4571 (316L; 316TI)	1.4404 or 1.4435; 1.4571 (316L; 316TI)	Form 4F: 1.4404 or 1.4435; 1.4571 (316L; 316TI) Additional Form 4: 1.7335; 1.5415(A 182 F11; A 204 Size A)
Thermowell types	Form 3G	Form 3F	• Form 4 • Form 4F
Process connections	Welded threads: • G 1 • G ½ • ½ NPT	Welded flange • DN 25, PN 40 • 1RF150 • 1.5RF150 • 1.5RF300	For 4 for welding in, Form 4F with flange: • DN 25, PN 40 • 1RF150 • 1RF300 • 1.5RF150 • 1.5RF300
Insertion length	• 160 mm (6.30 inch) • 220 mm (8.66 inch) • 280 mm (11.02 inch)	• 225 mm (8.86 inch) • 285 mm (11.22 inch) • 345 mm (13.58 inch)	Form 4F: as per customer-specification Form 4: • 110 mm (4.33 inch) fast • 140 mm (5.51 inch) fast/normal • 200 mm (7.87 inch) fast/normal • 260 mm (10.23 inch) normal
Neck tube length	As per DIN 43772	As per DIN 43772	As per DIN 43772
Sensor elem.	Pt100 + thermocouples	Pt100 + thermocouples	Pt100 + thermocouples
Sensor connection	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire	• 1 x 4 wire • 2 x 3 wire
Sensor accuracy	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2	• Class AA • Class A • Class B • Class 1 • Class 2
Conn. heads	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)	Type B (Type A for Ex d versions)
Explosion prot., Europe	• Intrinsic safety "ia", "ic" • Flameproof enclosure "d" • Non sparking "n"	• Intrinsic safety "ia", "ic" • Flameproof enclosure "d" • Non sparking "n"	• Intrinsic safety "ia", "ic" • Flameproof enclosure "d" • Non sparking "n"
Output signal	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)	Sensor signal: • 4 ... 20 mA (TH100/TH200) • HART (TH300) • PA (TH400) • FF (TH400)
Application	Vessels and pipings	Vessels and pipings	Vessels and pipings
Limit temperat.[1] [°C (°F)]	• Pt100 Basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 °C (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)	• Pt100 Basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 °C (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)	• Pt100 Basis: -50 ... +400 (-58 ... +752) • Pt100 ext. measuring range: -196 ... +600 °C (-321 ... +1112) • Thermocouple: -40 ... +1100 (-40 ... +2012) (depends on type)
Max. nominal pressure[1] (static pressure at 20°C), dimensions in mm (inch)	Pipe Ø12 (0.47): • 0 ... 200 75 bar • 200 ... 300 60 bar	Pipe Ø12 (0.47): • 0 ... 200 75 bar • 200 ... 300 60 bar Note restriction imposed by PN of the flange	Mat. (1.4404; 1.4571) : • 65 450 bar • 125 350 bar Mat. (1.7335; 1.5415) : • 65 500 bar • 125 400 bar Form 4F: Note restriction imposed by PN of the flange
Min. response time $t_{0.5}$	7 … 15 s	7 … 15 s	Ø24 mm (0.95 inch): 20 … 45 s
Deg. of protect.	IP54 ... IP67 dep. on connection head, see page 2/86	IP54 ... IP67 dep. on connection head, see page 2/86	IP54 ... IP67 dep. on connection head, see page 2/86

[1] Load combinations (temperature, flow, vibration, pressure) can at times significantly restrict these values. Other temperature limits result from e.g. thermowell materials with lower limit values [e.g. 1.4571 pressure resilient, 450 ... 550 °C (842 ... 1022 °F), limit temperature 800 °C (1472 °F)].

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Old	Length	Material	Number of sensors + Ex		Connection head		New	Material		PA weights	PA characteristic	Thermowell form	Length of 1st digit	Length of 2nd digit	-	Neck tube	Connection side	Sensor type	Number of sensors			Ex protection
7MC1006-	■	D	■	1	■		**7MC751**	1	-	1	C	A	■	■	-	0	■	A	■			
	1												0	1								
	2												0	4								
	3												1	0								
	4												2	0								
	5												3	1								
			A																1			
			B																5			
			E																1		-Z	E01
			F																5		-Z	E01
					1												A					
					4												B					
					6												C					
					7												-					
7MC1007-	■	D	■	1	■		**7MC751**	1	-	1	C	A	■	■	-	1	■	C	■			
	5												0	4								
	6												1	2								
	7												2	2								
			A																1			
			B																5			
			E																1		-Z	E01
			F																5		-Z	E01
					1												A					
					4												B					
					6												C					
					7												-					
7MC1008-	■	D	■	1	■		**7MC751**	1	-	1	E	B	■	■	-	1	■	C	■			
	6												0	4								
	7												1	2								
			A																1			
			B																5			
					1												A					
					4												B					
					6												C					
					7												-					

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Old	Length	Material	Number of sensors + Ex		Connection head		New	Material		PA weights	PA characteristic	Thermowell form	Length of 1st digit	Length of 2nd digit	-	Neck tube	Connection side	Sensor type	Number of sensors			Ex protection
7MC1010-	■	■	■	2	*		**7MC752**	■	-	0	N	■	■	0	-	■	■	C	■			
	1											A	0			1						
	2											A	0			9						N2D: X45 {Y45:209 mm}
	3											A	0			9						N2D: X45 {Y45:179 mm}
	4											B	0			1						
	5											B	0			9						N2D: X45 {Y45:179 mm}
	6											D	0			1						
	7											D	0			9						N2D: X45 {Y45:179 mm}
	8											E	0			9						N1D: X45 {Y45:119 mm}
		G						3														
		F						1														
			A																1			
			B																5			
			E																1		-Z	E01
			F																5		-Z	E01
					1												A					
					4												B					
					6												C					
					7												-					
7MC1017-	■	F	■	1	■		**7MC751**	1	-	2	A	B	■	■	-	9	■	C	■			N2D: X45 {Y45:129 mm}
	1												0	4								
	2												1	2								
			A																1			
			B																5			
			E																1		-Z	E01
			F																5		-Z	E01
					1												A					
					4												B					
					6												C					
					7												-					
7MC1041-	■	F	■	0	■		**7MC751**	1	-	2	A	K	■	■	-	1	■	C	■			
	1												1	1								
	2												1	4								
	3												1	7								
		A	A																1			
		A	B																5			
		E	A																1		-Z	E01
		E	B																5		-Z	E01
					1												A					
					4												B					
					6												C					
					7												-					

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Old	Length		Number of sensors		Connection head		New	Diameter		Measuring insert type	Sensor	Number of sensors	Length of 1st digit	Length of 2nd digit								Ex protection
7MC1900-	■	E	A				**7MC701**	8	-	1	C	A	■	■								
	1												3	3								
	2												4	1								
	3												4	7							-Z	Y44: B=1025 mm
	4												4	7							-Z	Y44: B=1425 mm
7MC1910-	■	J	■				**7MC701**	6	-	1	C	■	■	■								
	1												1	3								
	2												1	7								
	3												2	1								
	4												2	3								
	5												2	5								
	6												2	7								
	7												3	5								
	8												2	0								
			A									A										
			B									D										
7MC1913-	■	A	■	■	2		**7MC701**	6	-	1	C	■	■	■								-Z	E01
	1												1	3								
	2												1	7								
	3												2	1								
	4												2	3								
	5												2	5								
	6												2	7								
	7												2	0								
	8												3	5								
			A	2								A										
			B	1								D										

Old	Length	Type of cable		External diameter of sheath			New			External diameter of sheath	Nominal length	Sensor	Number of sensors	Connection side								Ex-protection
7MC2027-	■	■	A	■	0		**7MC711**	1	-	■	■	K	1	1	-	0	A	A	0			
	1										B											
	2										D										-Z	Y44: U=300 mm
	3										D											
		A																			-Z	J03
		B																			-Z	S03
		C																			-Z	L03
				1						-												
				2						-												
				3						-												
				4						-												

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Old	External diameter of sheath	Material of sheath	Type + number of sensor		Length		New			External diameter of sheath	Length	Sensor type	Number									Ex-protection
7MC2021-	■	■	■	-Z			7MC721	2	-	■	■	■	■	5	-	0	A	A	0			
	2									3												
	4									6												
		C																				
		L																				
			E									J	1									
			F									J	4									
			A									-	-									
			B									-	-									
			C									K	1									
			D									K	4									
					A01					C										-Z		Y44: U=250 mm
					A02					F												
					A03					M												
					A04					T												

Old	Length		Number of sensors	External diameter of sheath	Material of sheath		New			External diameter of sheath	Length	Sensor type	Number									Ex-protection
7MC2028-	■	A	■	■	■		7MC721	2	-	■	■	K	■	4	-	0	A	A	0			
	1										D										-Z	Y44: U=300 mm
	2										D											
			C										1									
			D										4									
				1						-												
				2						-												
				3						3												
				4						6												
					1																	
					2																	

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Connection head, Form B	Old	New
• Made of cast light alloy, with 1 cable bushing and		
- Screw cover	1	A
- Standard hinged cover	4	B
- Hinged cover high	6	C
• Made of stainless steel, with 1 cable bushing and screw cover	7	-
Measuring insert, single	A	1
Measuring insert, single, explosion protection	E	1 and additional E01
Measuring insert, double	B	5
Measuring insert, double, explosion protection	F	5 and additional E01

More information

Ordering examples for SITRANS TS100/200

Desired features	Article No.
SITRANS TS100	**7MC7111**
Sensor diameter	**6**
Standard length 200 mm (scope of sensor length 101 ... 250 mm)	**C**
Sensor	**A1**
flying leads	**1**
Enclosed compression fitting	**A41**
Connection cable PVC, 10 m	**J10**
TAG plate	**Y15: TTSA5458**

Full article no.:

7MC7111-6CA11-Z A41+J10+Y15
Y15: TTSA5458

Desired features	Article No.
SITRANS TS100	**7MC7111**
Sensor diameter	**6**
Standard length 200 mm (scope of sensor length 101 ... 250 mm)	**C**
Sensor	**A1**
flying leads	**1**
Enclosed compression fitting	**A41**
Connection cable PVC, 10 m	**J10**
TAG plate	**Y15: TTSA5458**
Customer-specific length 211 mm	**Y44: 211 mm**

Full article no.:

7MC7111-6CA11-Z A41+J10+Y15+Y44
Y15: TTSA5458
Y44: 211 mm

Ordering example for SITRANS TS500

Desired features	Article No.
SITRANS TS500	**7MC751**
Material	**1**
Process connection	**1E**
Thermowell form	**A**
Insertion length U Standard 250 mm (insertion length customer-specific 220 mm)	**12**
Extension X customer-specific	**9**
Head	**C**
Sensor	**A**
Sensor number/Accuracy	**1**
Extension X customer-specific	**N2D**
Insertion length U customer-specific	**Y44: 220 mm**
Extension length X customer-specific	**Y45: 200 mm**
Plant calibration per 3-point	**Y33: 0°C** **Y33: 50°C** **Y33: 150°C**

Full article no.:

7MC7511-1EA12-9CA1-Z N2D+Y44+Y45 +Y33+Y33+Y33
Y44: 220 mm
Y45: 200 mm
Y33: 0°C
Y33: 50°C
Y33: 150°C

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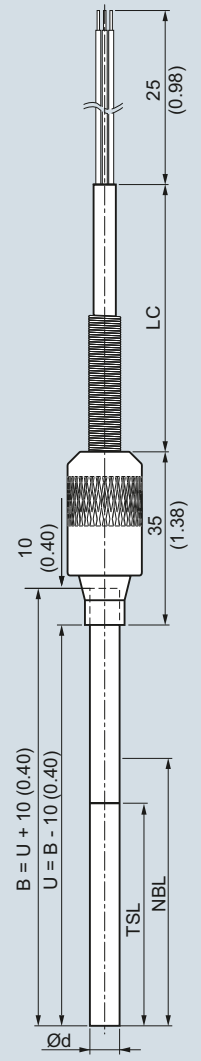
2

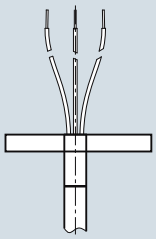
Dimensional drawings



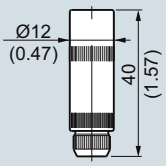
B	Measuring insert length
Ød	Measuring insert outer diameter (6 (0.24))
LC	Cable length
NBL	Non-bending length
TSL	Temperature-sensitive length
U	Insertion length

SITRANS TS100, temperature sensors in cable version, universal use, mineral-insulated version, for unfavorable space conditions, IP54 at sensor/cable transition, dimensions in mm (inch)

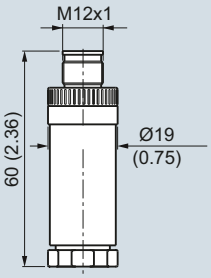
Design of connection side



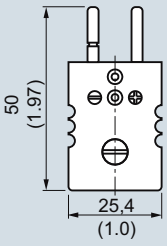
Flying leads, IP00, dimensions in mm (inch)



Coupling LEMO 1S, IP50, dimensions in mm (inch)



M12 plug, IP54, dimensions in mm (inch)



Thermocouple plug, IP20, dimensions in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TS100 ↗	**7MC7111-**
Temperature sensors in cable version, universal use, mineral-insulated version, for unfavorable space conditions	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Sensor diameter	
6 mm (0.24 inch)	**6**
Length of sensor element B, effective length U = B-10; see dimensional drawings page 2/110	
200 mm (7.87 inch)	**C**
500 mm (19.68 inch)	**D**
750 mm (29.53 inch)	**E**
Customer-specific length of sensor element B, effective length U = B-10; see dimensional drawings page 2/110	
enter customer specific length with Y44, see Order Codes below	
70 ... 100 mm (2.76 ... 3.94 inch) Initial: 100 mm (3.94 inch)	**B**
101 ... 250 mm (3.98 ... 9.84 inch) Initial: 200 mm (7.87 inch)	**C**
251 ... 500 mm (9.88 ... 19.68 inch) Initial: 500 mm (19.68 inch)	**D**
501 ... 750 mm (19.72 ... 29.53 inch) Initial: 750 mm (29.53 inch)	**E**
751 ... 1 000 mm (19.72 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	**F**
1 001 ... 1500 mm (39.4 ... 59.00 inch) Initial: 1 500 mm (59.00 inch)	**G**
Sensor	
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88	
Pt100, basis, -50 ... +400 °C (-58 ... +752 °F)	**A**
Pt100, vibration-resitant, -50 ... +400 °C (-58 ... +752 °F)	**B**
Pt100, expanded range, -196 ... 600 °C (-320.8 ... 1 112 °F)	**C**
Thermocouple Type K, -40 ... +1000 °C (-40 .... +1 832 °F)	**K**
Thermocouple Type J, only class 2, -40 ... +750 °C (-40 ... +1 382 °F)	**J**
Sensor number/Accuracy	
Single, basic accuracy (Class 2/Class B)	**1**
Single, increased accuracy (Class 1/Class A)	**2**
Single, highest accuracy (Class AA)	**3**
Double, basic accuracy (Class 2/Class B)	**4**
Double, increased accuracy (Class 1/Class A)	**5**
Double, highest accuracy (Class AA)	**6**
Design of connection side	
Flying leads	**1**
LEMO coupling 1S	**2**
M12 connector, not for double Pt100	**3**
Thermocouple coupling, from TC-material (2xTC on request)	**4**

Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Customer-specific length of sensor element B, effective length U = B-10 Select range, enter desired length in plain text (No entry = standard length)	**Y44**
Options	
Add "**-Z**" to Article No., add options, separate extensions with "+".	
Connection cable, type and length Cable type = 1st letter, Length 1 ... 99 m (3.28 ... 324.80 ft) = 2nd + 3rd place e.g.: 34 m (111.55 ft) connection cable PVC (PVC code is J34)	
with ?? meters connection cable (JJ) PVC/PVC, Operating temperature (-10...+105°C) (14 ... 221 °F)	**J01 ... J99**
with ?? meters connection cable (SLFP) Silicone/Fluorpolymer, operating temperature -10 ... +80 °C (-14 ... +356 °F)	**S01 ... S99**
with ?? meters connection cable (TGLV) PTFE/glass fiber/reinforced with stainless steel), Operating temperature (-100...+205°C (148 ... 401°F))	**L01 ... L99**

Additional configurations on page after next page!

You find ordering examples on page 2/109.

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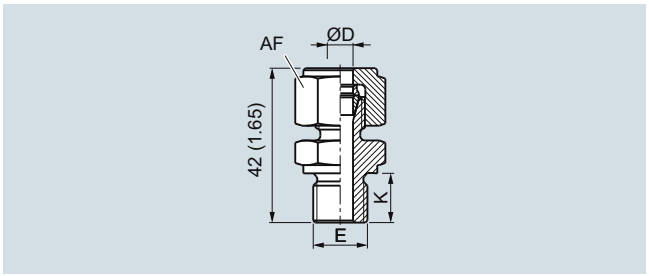
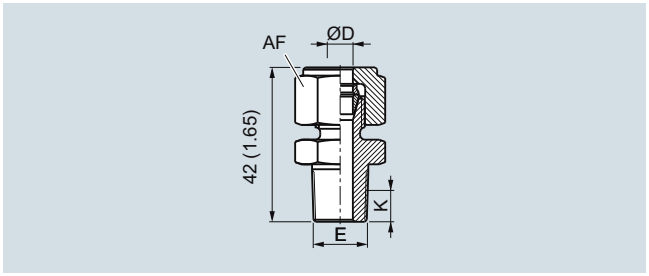
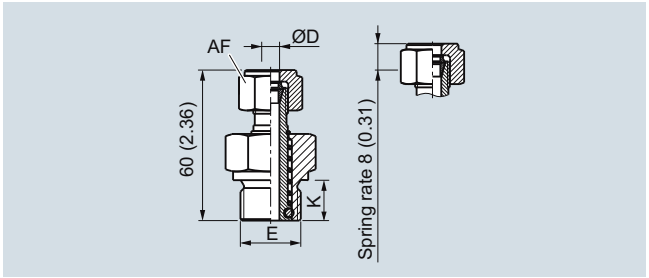


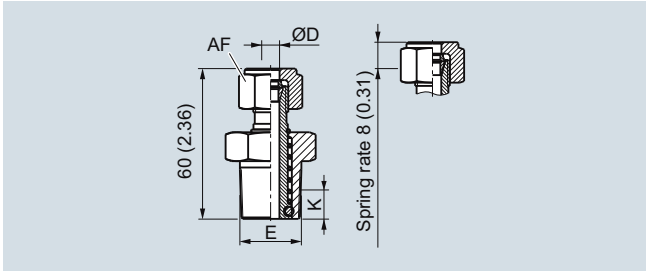
Compression fitting, dimensions in mm (inch)



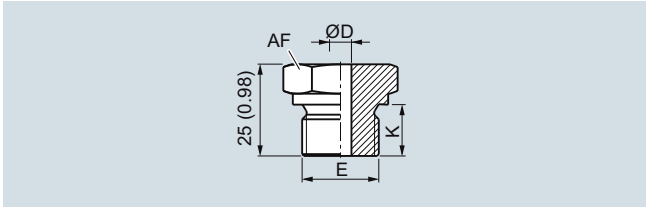
Compression fitting NPT, dimensions in mm (inch)



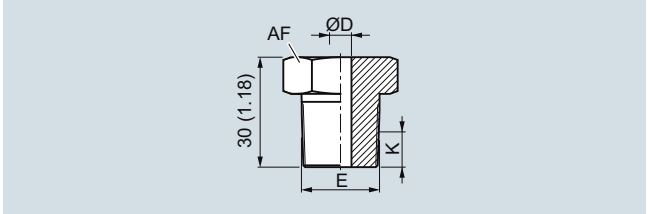
Spring-loaded compression fitting, dimensions in mm (inch)



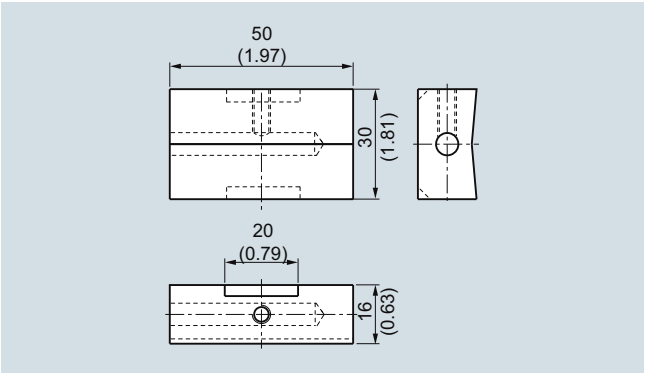
Spring-loaded compression fitting NPT, dimensions in mm (inch)



Soldering nipple, metric, dimensions in mm (inch)



Soldering nipple NPT, dimensions in mm (inch)



Surface connection piece, dimensions in mm (inch)

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Selection and Ordering data	Order code
Options	
Add "**-Z**" to Article No., add options, separate extensions with "+".	
Process connection	
Soldering nipple G¼", enclosed	**A20**
Soldering nipple G½", enclosed	**A21**
Soldering nipple NPT½", enclosed	**A22**
Soldering nipple M18x1.5, enclosed	**A23**
Compression fitting G¼", enclosed	**A30**
Compression fitting G½", enclosed	**A31**
Compression fitting NPT ½", enclosed	**A32**
Surface connection piece, enclosed (non Ex)	**A50**
Explosion protection	
Intrinsic safety "ia", "ic"	**E01**
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate visual: measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**
Further options	
Stainless steel TAG plate , Enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text, Attention: For devices with built-in head transmitters, select test points within the set measurement range	**Y33**

You find ordering examples on page 2/109.

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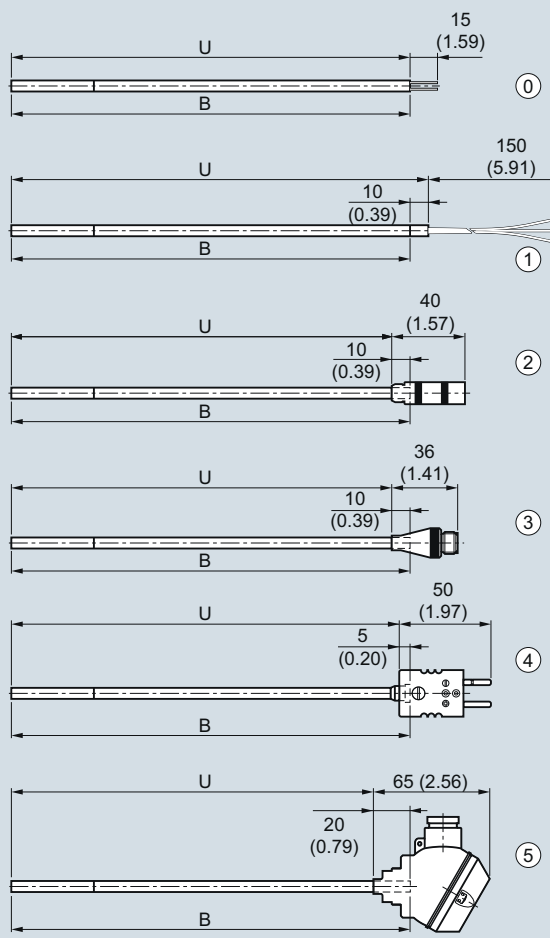
Dimensional drawings



B Measuring insert length
H Head height
U Insertion length

0	Basic sensor	**U = B**	IP00
1	Flying leads	**U = B + 10 (0.39)**	IP00
2	LEMO coupling 1S	**U = B - 10 (0.39)**	IP50
3	M12 plugs	U = B - 10 (0.39)	IP54
4	Thermocouple coupling	**U = B - 5 (0.20)**	IP20
5	Mini connection head	U = B - 20 (0.79)	IP54

SITRANS TS200, temperature sensors in cable version, universal use, mineral-insulated version, for unfavorable space conditions, dimensions in mm (inch)

© Siemens AG 2015

Selection and Ordering data	Article No.
SITRANS TS200 ↗	**7MC7212-**
Temperature sensors in compact version, universal use, mineral-insulated version, for unfavorable space conditions	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Sensor diameter	
6 mm (0.24 inch)	**6**
Length of sensor element B, effective length U see dimensional drawing on page 2/114	
200 mm (7.87 inch)	**C**
500 mm (19.68 inch)	**D**
750 mm (29.53 inch)	**E**
Customer-specific length of sensor element B, effective length U see dimensional drawing on page 2/114	
enter customer specific length with Y44, see Order Codes below	
70 ...100 mm (2.76 ... 3.94 inch) Initial: 100 mm (3.94 inch)	**B**
101 ... 250 mm (3.98 ... 9.84 inch) Initial: 200 mm (7.87 inch)	**C**
251 ... 500 mm (9.88 ... 19.68 inch) Initial: 500 mm (19.68 inch)	**D**
501 ... 750 mm (19.72 ... 29.53 inch) Initial: 750 mm (29.53 inch)	**E**
751 ... 1 000 mm (29.57 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	**F**
1 001 ... 1 500 mm (39.4 ... 59.00 inch) Initial: 1 500 mm (59.00 inch)	**G**
Sensor	
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88	
Pt100, basis, -50 ... +400 °C (-58 ... +752 °F)	**A**
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)	**B**
Pt100, expanded range, -196 ... +600 °C (-320.8 ... +1 112 °F)	**C**
Thermocouple Type K, -40 ... +1 000 °C (-40 ... +1 832 °F)	**K**
Thermocouple Type J, only class 2, -40 ... +750 °C (-40 ... +1 382 °F)	**J**
Number/Accuracy	
Single, basic accuracy (Class 2/Class B)	**1**
Single, increased accuracy (Class 1/Class A)	**2**
Single, highest accuracy (Class AA)	**3**
Double, basic accuracy (Class 2/Class B)	**4**
Double, increased accuracy (Class 1/Class A)	**5**
Double, highest accuracy (Class AA)	**6**
Design of connection side	
Solid wire ends (sensor element)	**0**
Flying leads	**1**
LEMO coupling 1S	**2**
M12 connector, not for double Pt100	**3**
Thermocouple coupling, from TC-material (2xTC on request)	**4**
Mini connection head, aluminum, not for double Pt100	**5**

Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Customer-specific length of sensor element B, effective length, U see dimensional drawing on page 2/114 Select range, enter desired length in plain text (No entry = standard length)	**Y44**

Additional configurations on page after next page!

You find ordering examples on page 2/109.

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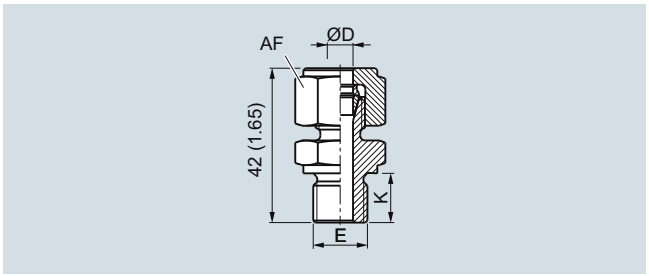
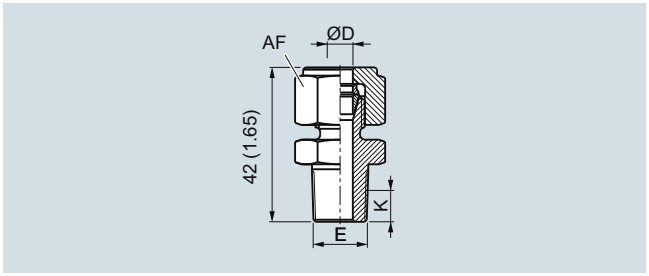
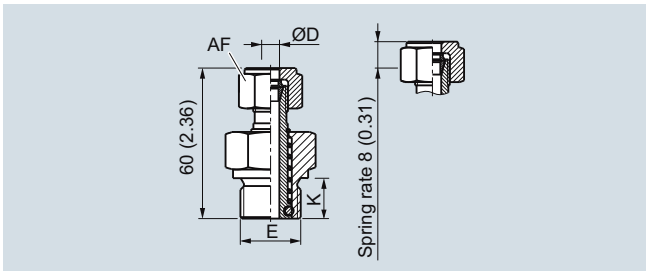


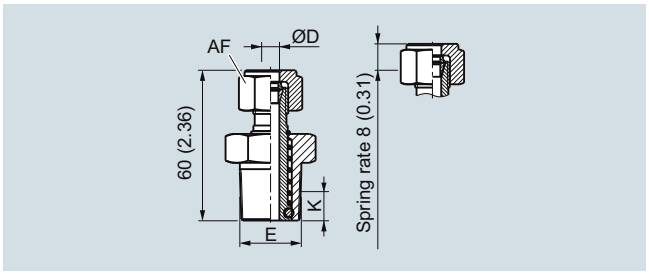
Compression fitting, dimensions in mm (inch)



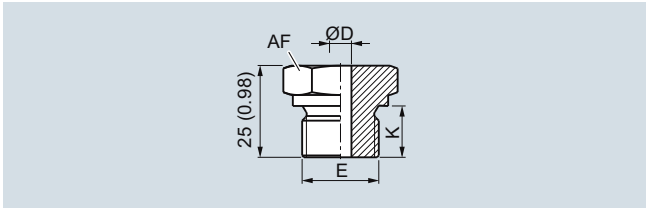
Compression fitting NPT, dimensions in mm (inch)



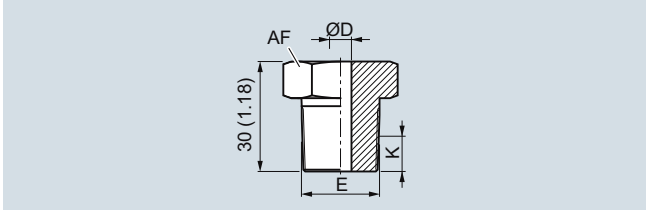
Spring-loaded compression fitting, dimensions in mm (inch)



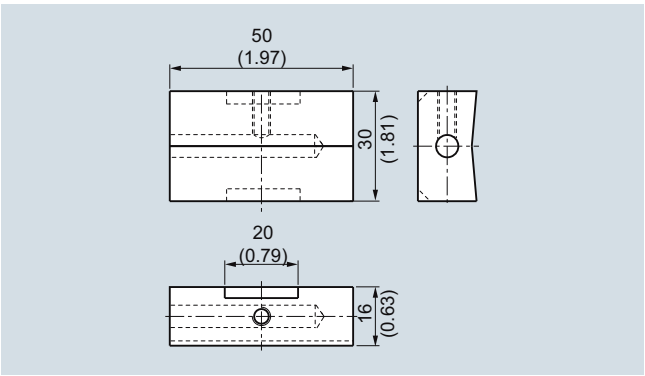
Spring-loaded compression fitting NPT, dimensions in mm (inch)



Soldering nipple, metric, dimensions in mm (inch)



Soldering nipple NPT, dimensions in mm (inch)



Surface connection piece, dimensions in mm (inch)

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Selection and Ordering data	Order code
Options	
Add "**-Z**" to Article No., add options, separate extensions with "+".	
Process connection	
Soldering nipple G¼", enclosed	**A20**
Soldering nipple G½", enclosed	**A21**
Soldering nipple NPT½", enclosed	**A22**
Soldering nipple M18x1.5, enclosed	**A23**
Compression fitting G¼", enclosed	**A30**
Compression fitting G½", enclosed	**A31**
Compression fitting NPT½", enclosed	**A32**
Surface connection piece, enclosed (non Ex)	**A50**
Explosion protection	
Intrinsic safety "ia", "ic"	**E01**
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**
Setting, designation, calibration	
Stainless steel TAG plate , Enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text. Attention: For devices with built-in head transmitters, select test points within the set measurement range	**Y33**

You find ordering examples on page 2/109.

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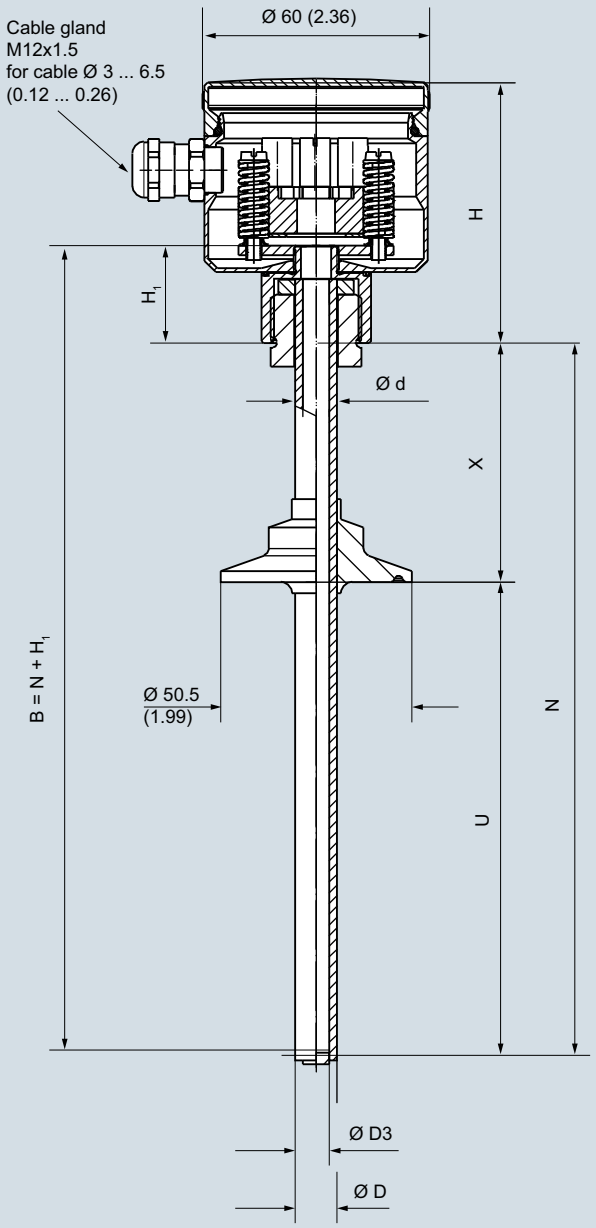
2

Dimensional drawings



B	Measuring insert length
Ød	Measuring insert outer diameter (6 (0.24))
ØD	Process connection outer diameter
ØD3	Protective pipe inner diameter
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
N	Nominal length
U	Insertion length
X	Extension length

SITRANS TS300 modular design

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Selection and Ordering data

Article No. 7MC8005- | Order code

SITRANS TS300 for food, pharmaceuticals and biotechnology, modular design for installation in pipelines and vessels — 0 - 0

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Head

		Order code
Stainless steel head, BS0, screw cover (Standard version)	5	
Aluminum head, BA0, flange cover standard	1	
Plastic cover, BM0, srew cover	2	
Aluminum head, BB0, hinged cover low	3	
Aluminum head, BC0, hinged cover high	4	
Special version: (add Order code and plain text)	9	H 1 Y

Process connection, material 1.4404 or 1.4435/316L

Milk pipe union to DIN 11851 with slotted union nut and nominal diameter/pressure

DN 25/PN 40	A A	
DN 32/PN 40	A B	
DN 40/PN 40	A C	
DN 50/PN 25	A D	

Clamp connection:

ISO 2852	DIN 32676	Tri-Clamp	Outer diameter D	
–	–	½“/ ¾“	25.0 mm	C A
DN 25/ 33.7/38	DN 25/32/40	1“, 1½“	50.5 mm	C B
DN 40/51	DN 50	2“	64.0 mm	C C
DN 63.5	–	2½“	77.5 mm	C D
DN 88.9	DN 80	–	106.0 mm	C E

Varivent connection (Tuchenhagen)		
∅ D_6 = 50 mm (1.97 inch), for Varivent housing DN 25 and DN 1"	K U	
∅ D_6 = 68 mm (2.68 inch), for Varivent housing DN 40 ... 125 and 1½" ... 6"	K V	
NEUMO/BioControl		
Size 25	B A	
Size 50	B B	
Size 65	B C	
Ingold flange		
DN 25 with hexagon union nut G 1¼", mounting length 40 mm (1.57"), diameter 24.8 mm (0.98") incl. O-ring	J A	
Welding piece (sphere diameter 30 x 40 mm (1.2 x 1.6 inch) long)	L A	
Special version: Type of screwed gland and nominal diameter (add Order code and plain text)	Z A	J 1 Y

Protective tube	Measuring insert		Order code
Ø D = 6 mm (0.24 inch)	Ø 3/3.2 mm, (0.12/0.13 inch) miner. insul.	1	
Ø D =9 mm (0.35 inch)	Ø 6 mm (0.24 inch)	2	
Ø D =9 mm (0.35 inch)	Ø 6 mm (0.24 inch) miner. insul.	3	
Ø D =9 mm (0.35 inch) tapered tip D_2 =5 Ø x 20 mm (0.2 x 0.79 inch)	Ø 3/3.2 mm, (0.12/0.12 inch) miner. insul.	4	
Special version: (add Order code and plain text)		9	L 1 Y

Selection and Ordering data

Article No. 7MC8005- | Order code

SITRANS TS300 for food, pharmaceuticals and biotechnology, modular design for installation in pipelines and vessels — 0 - 0

Neck tube length X

		Order code
65 mm (2.56 inch) [M = 80 mm (3.15 inch)]	1	
130 mm (5.12 inch) [M = 145 mm (5.71 inch)]	2	
Special version: (add Order code and plain text)	9	N 1 Y

Insertion length

Enter customer specific length with Y44, see Order Codes below

		Order code
15 mm (0.59 inch)	B	
16 ... 35 mm (0.63 ...1.38 inch) Initial: 35 mm (1.38 inch)	C	
36 ... 50 mm (1.42 ... 1.97 inch) Initial: 50 mm (1.97 inch)	D	
51 ... 100 mm (2.01 ... 3.94 inch) Initial: 100 mm (3.94 inch)	E	
101 ... 160 mm (3.98 ... 6.30 inch) Initial: 160 mm (6.30 inch)	F	
161 ... 250 mm (6.34 ... 9.84 inch) Initial: 250 mm (9.84 inch)	G	
251 ... 400 mm (9.88 ... 15.75 inch) Initial: 400 mm (15.75 inch)	H	
1 ... 4 inch, Initial: 4 inch	J	
4 ... 6 inch, Initial: 6 inch	K	
6 ... 9 inch, Initial: 9 inch	L	
Special version: (add Order code and plain text)	Z	P 1 Y

Sensor

		Order code
Thin-film technology: measuring range -50 ... +400 °C (-58 ... +752 °F)		
2 x Pt100, class A, three-wire	G	
1 x Pt100, class A, four-wire	H	
Special version: (add Order code and plain text)	Z	Q 1 Y

Further designs Add "**-Z**" to Article No. and add Order code	Order code
Process connection completely electropolished	P01
Hygiene version (R_a < 0.8 µm (3.1 x 10^{-5} inch))	H01
Certificates	
• Roughness depth measurement R_a certified by factory certificate to EN 10204-3.1	C18
• Material certificate to EN 10204-3.1	C12
TAG plate made of stainless steel specify TAG No. in plain text	Y15
Test report (at 0, 50 and 100%) specify measuring range in plain text If optional head transmitters are integrated, please note that all calibration points are located in the set measuring range. If the points are located outside the standard measuring range, a Y01 addition is always required.	Y33
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	Y44

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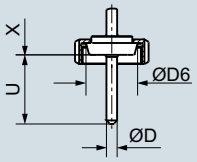
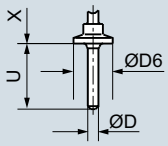
Dimensional drawings

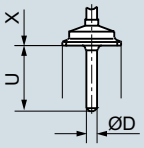
Conical connection with union nut according acc. to DIN 11851



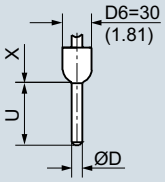
Tri-Clamp-connection



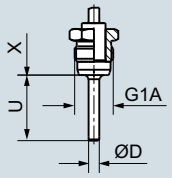
Clamp- connection acc. to DIN 32676 or ISO 2852



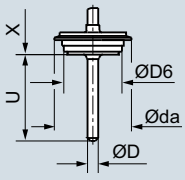
Ball weld sleeve Ball 30 x 40 (1.18 x 1.58)



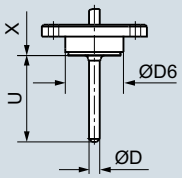
G1A without dead space due to conical metal cone



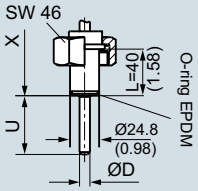
Varivent connection



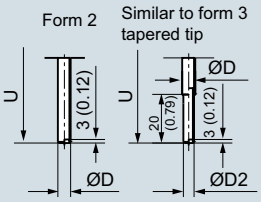
NEUMO BioControl



Ingold connection DN 25 with union nut



Protective pipe design based on DIN 43772



Process connections, dimensions in mm (inch)

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Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Built-in head transmitter Measuring range to be set must be specified with plain text data "Y11".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, universal	**T20**
SITRANS TH200 Ex i(ATEX), 4 ... 20 mA, universal	**T21**
SITRANS TH300, HART, universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, universal	**T31**
SITRANS TH400 PA, universal	**T40**
SITRANS TH400 PA Ex i, universal	**T41**
SITRANS TH400 FF, universal	**T45**
SITRANS TH400 FF Ex i, universal	**T46**
Transmitter options	
Transmitter, enter complete setting in plain text (Y11:+/-NNNN ... +/-NNNN C,F)	**Y11**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Option not found?	
Specify special version in plain text	**Y98**
Process number for the special version	**Y99**

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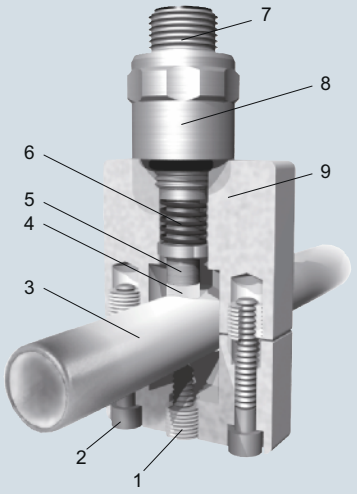
Dimensional drawings



1 Vibration-locking-screw
2 Mounting screws
3 Process pipeline
4 Temperature sensor
5 Thermal decoupling
6 Spring load
7 Electrical connection M12
8 Replaceable measuring insert
9 Heat insulated pipe collar

Resitance thermometer with protection pipe in Clamp-on design, dimensions in mm (inch)

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Selection and Ordering data

Article No. 7MC8016- ▢▢▢▢ 0 ▢▢▢

Ord. code

SITRANS TS300

for food, pharmaceuticals and biotechnology
Clamp-on design for the measuring of the pipe surface temperature

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Design

Acc. to IEC 60751, class A [-40 ... +150 °C (-40 ... +302 °F)]	1
Process optimized for steam sterilization [100 ... 150 °C (212 ... 302 °F)]	0

Type of connection

Round connector M12 x 1	A
connection head form B, stainless steel	B
4 ... 20 mA compact transmitter SITRANS TH100slim (standard measuring range 0 ... 100 °C (32 ... 212 °F))	C

Mounting with pipe collar

Pipe outer-Ø mm (inch)	Collar size mm (inch)	
4 (0.16)	50 x 35 x 20 (1.97 x 1.38 x 0.79)	A1
6 (0.24)		B1
6.35 (0.25)		C1
8 (0.31)		D1
9.35 (0.37)		E1
10 (0.39)		F1
10.2 (0.40)		G1
10.3 (0.41)		H1
12 (0.47)		J1
12.7 (0.50)		K1
13 (0.51)		L1
13.5 (0.53)		M1
13.7 (0.54)		N1
14 (0.55)		P1
15.88 (0.62)		Q1
16 (0.63)		R1
17.2 (0.68)		S1
18.0 (0.71)	70 x 70 x 20 (2.76 x 2.76 x 0.79)	A2
19.0 (0.74)		B2
19.05 (0.75)		C2
20.0 (0.79)		D2
21.3 (0.84)		E2
22.0 (0.87)		F2
23.0 (0.90)		G2
24.0 (0.94)		H2
25.0 (0.98)		J2
25.4 (1.00)		K2
26.7 (1.05)		L2
26.9 (1.06)		M2
28.0 (1.10)		N2
29.0 (1.14)		P2
30.0 (1.18)		Q2
31.8 (1.25)		R2
32.0 (1.26)		S2
33.4 (1.31)		T2
33.7 (1.33)		U2
34.0 (1.34)		V2
35.0 (1.38)		W2
36.0 (1.42)		X2
38.0 (1.49)		Y2

Selection and Ordering data

Article No. 7MC8016- ▢▢▢▢ 0 ▢▢▢

Ord. code

SITRANS TS300

for food, pharmaceuticals and biotechnology
Clamp-on design for the measuring of the pipe surface temperature

38.1 (1.50)	90 x 85 x 20 (3.54 x 3.35 x 0.79)	A3
41.0 (1.61)		B3
42.4 (1.67)		C3
44.5 (1.75)		D3
48.3 (1.90)		E3
50.8 (2.00)		F3
53.0 (2.09)		G3
54.0 (2.13)		H3
57.0 (2.24)		J3
Special size[1]		Z0 K1 Y

[1] Special sizes for pipe outer diameters: In order to process "Z0" special sizes, the following two additional items of information are essential:
- the required diameter specified in plain text under "K1Y"
- Selection of the corresponding pipe collar, clamping band or clamping bracket size (Order codes "S11" to "S35")

Recommended for all versions: Heat-conductive-compound, silicone-free, syringe 3 g, Order Code: L15 (see page 2/125)

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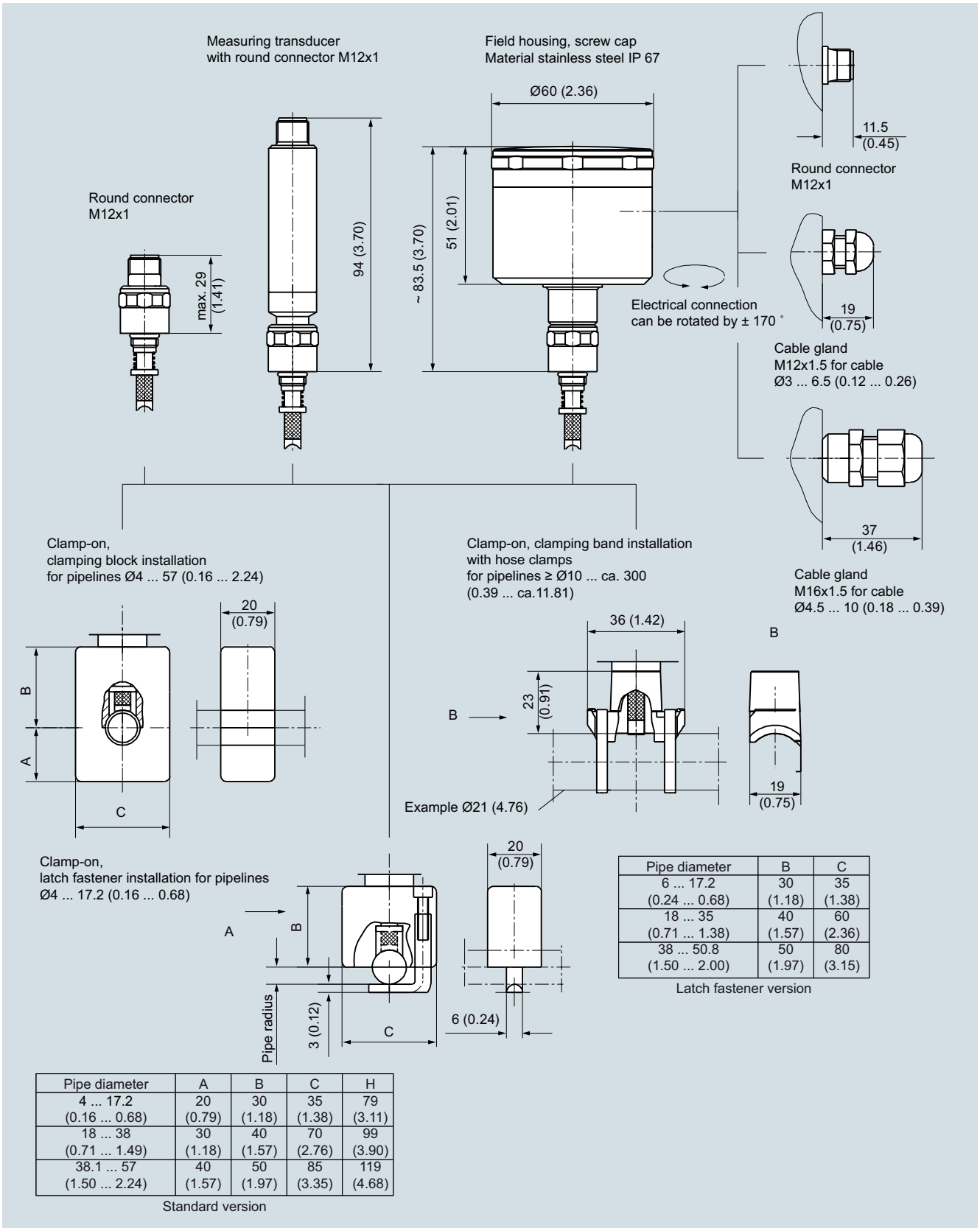
Dimensional drawings



Pipe diameter	A	B	C	H
4 ... 17.2 (0.16 ... 0.68)	20 (0.79)	30 (1.18)	35 (1.38)	79 (3.11)
18 ... 38 (0.71 ... 1.49)	30 (1.18)	40 (1.57)	70 (2.76)	99 (3.90)
38.1 ... 57 (1.50 ... 2.24)	40 (1.57)	50 (1.97)	85 (3.35)	119 (4.68)

Standard version

Pipe diameter	B	C
6 ... 17.2 (0.24 ... 0.68)	30 (1.18)	35 (1.38)
18 ... 35 (0.71 ... 1.38)	40 (1.57)	60 (2.36)
38 ... 50.8 (1.50 ... 2.00)	50 (1.97)	80 (3.15)

Latch fastener version

SITRANS TS300 Clamp-on design, round connector, field housing, cable gland, variants, dimensions in mm (inch)

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Selection and Ordering data		Order code
Further designs		
Add "**-Z**" to Article No. and specify Order Code.		
Built in head transmitter		
Measuring range to be set must be specified with plain text data "Y11".		
SITRANS TH100, 4 ... 20 mA, Pt100		**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100		**T11**
SITRANS TH200, 4 ... 20 mA, universal		**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA, universal		**T21**
SITRANS TH300, HART, universal		**T30**
SITRANS TH300 Ex i (ATEX), HART, universal		**T31**
SITRANS TH400 PA, universal		**T40**
SITRANS TH400 PA Ex i, universal		**T41**
SITRANS TH400 FF, universal		**T45**
SITRANS TH400 FF Ex i, universal		**T46**
Transmitter options		
Transmitter, enter complete setting in plain text (Y11:+/-NNNN ... +/-NNNN C,F)		**Y11**
Enter measuring point (max. 8 characters) in plain text		**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text		**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text		**Y24**
Transmitter, enter bus address in plain text		**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)		**U36**
Transmitter with a SIL 2 conformity		**C20**
Transmitter with a SIL 2/3 conformity		**C23**
Transmitter test protocol (5 points)		**C11**
Other cable gland (only for connection head)		
Polyamide for cable diameter 4.5 … 10 mm (0.18 … 0.39 inch)		**K02**
Stainless steel for cable diameter 3 … 6,5 mm (0.12 … 0.25 inch)		**K03**
Round connector M12 x 1		**K11**
Deviating pipe; mm (inch)	**Collar size; mm (inch)**	
4 … 17.2 (0.16 … 0.68)	50 x 35 (1.97 x 1.38)	**S11**
18 … 38 (0.71 … 1.49)	70 x 70 (2.76 x 2.76)	**S12**
38.1 … 57 (1.5 … 2.24)	90 x 85 (3.54 x 3.35)	**S13**
Larger nominal diameters on request		**S19**
Space-saving mounting (latch fastening)		
Outer pipe; mm (inch):		
4 … 17.2 (0.16 … 0.68)		**S21**
18 … 35 (0.71 … 1.38) (Clamping band version recommended, see below)		**S22**
38 … 50.8 (1.45 … 2.00) (Clamping band version recommended, see below)		**S23**
Clamping band fastening (specify external tube diameter same as for standard collar)		
Outer pipe; mm (inch):		
10 ... 57 (0.39 ... 2.24)		**S31**
58 ... 220 (2.28 ... 8.66)		**S32**
Without clamping band		**S35**

Selection and Ordering data	Order code
Further Options	
Assignment marking, engraving instead of adhesive label (Serial number and pipe diameter on plug and plastic block)	**L11**
2 mm drain hole	**L12**
Sensor 4-wire connection	**L14**
Heat-conductive-compound, silicone-free, syringe 3 g	**L15**
Suffixes	
Add "**-Z**" to Article No. and specify Order code and plain text.	
TAG plate made of stainless steel (specify TAG No. in plain text)	**Y15**
Test report at 50 % and 100 % (specify the measuring range in plain text) If optional head transmitters are integrated, please note that all calibration points are located in the set measuring range. If the points are located outside the standard measuring range, a Y01 addition is always required.	**Y33**
Special version, specify in plain text	**Y98**
Process number for special version	**Y99**

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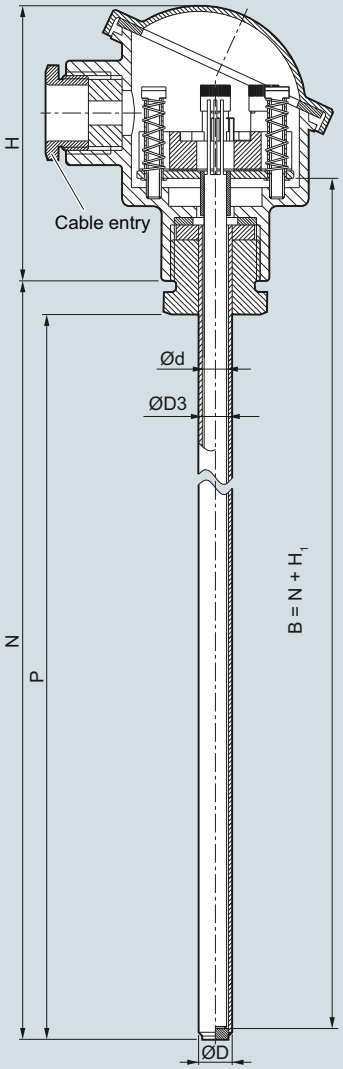
Type 2, tubular version without process connection

Dimensional drawings



B	Measuring insert length
Ød	Measuring insert outer diameter (6 (0.24))
ØD	Process connection outer diameter
ØD3	Thermowell internal diameter
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
N	Nominal length
P	Space for process connection P ~ N - 9 (0.35)

SITRANS TS500, temperature sensors for vessels and pipings, tubular version for minimal to medium stress, without process connection, without extension, plug-in or use with moveable compression fittings, dimensions in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TS500 ↗	**7MC751-**
Pipe version for minimal to medium stress, as per thermowell DIN 43722, Type 2, without process connection, without extension, plug-in or use with moveable compression fittings	- - -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Material, in contact with media	
316Ti (1.4571)	**1**
316L (1.4404 or 1.4435)	**2**
Process connection	
Without process connection (for compression fitting) N=U	**0 N**
Thermowell form	
2; 9 mm (0.35 inch)	**A**
2; 12 mm (0.47 inch)	**B**
Insertion length U (=N), Standard	
160 mm (6.3 inch)	**0 4**
250 mm (9.84 inch)	**1 2**
400 mm (15.75 inch)	**2 2**
Insertion length U (=N), customer-specific	
enter customer specific length with Y44, see Order Codes on page 2/129	
80 ... 100 mm (3.15 ... 3.94 inch) Initial: 100 mm (3.94 inch)	**0 1**
101 ... 120 mm (3.98 ... 4.72 inch) Initial: 120 mm (4.72 inch)	**0 2**
121 ... 140 mm (4.76 ... 5.51 inch) Initial: 140 mm (5.51 inch)	**0 3**
141 ... 160 mm (5.55 ... 6.30 inch) Initial: 160 mm (6.3 inch)	**0 4**
161 ... 180 (6.34 ... 7.09 inch) Initial: 180 mm (7.09)	**0 5**
181 ... 200 (7.13 ... 7.87 inch) Initial: 200 mm (7.87 inch)	**0 6**
201 ... 220 (7.91 ... 8.66 inch) Initial: 220 mm (8.66 inch)	**0 7**
221 ... 240 (8.7 ... 9.45 inch) Initial: 225 mm (8.86 inch)	**1 1**
241 ... 260 (9.48 ... 10.24 inch) Initial: 250 mm (9.84 inch)	**1 2**
261 ... 280 (10.28 ... 11.02 inch) Initial: 280 mm (11.02 inch)	**1 3**
281 ... 300 (11.02 ... 11.81 inch) Initial: 285 mm (11.22 inch)	**1 4**
301 ... 320 (11.85 ... 12.6 inch) Initial: 315 mm (12.4 inch)	**1 5**
321 ... 340 (12.64 ... 13.39 inch) Initial: 340 mm (13.39 inch)	**1 6**
341 ... 360 (13.43 ... 14.17 inch) Initial: 360 mm (14.17 inch)	**2 0**
361 ... 380 (14.21 ... 14.96 inch) Initial: 380 mm (14.96 inch)	**2 1**
381 ... 400 (15 ... 15.75 inch) Initial: 400 mm (15.75 inch)	**2 2**
401 ... 420 (15.79 ... 16.54 inch) Initial: 420 mm (16.54 inch)	**2 3**
421 ... 440 (16.57 ... 17.32 inch) Initial: 440 mm (17.32 inch)	**2 4**
441 ... 460 (17.36 ... 18.11 inch) Initial: 460 mm (18.11 inch)	**2 5**
461 ... 480 (18.15 ... 18.90 inch) Initial: 465 mm (18.30 inch)	**2 6**
481 ... 500 (18.94 ... 19.68 inch) Initial: 500 mm (19.68 inch)	**2 7**
501 ... 550 (19.72 ... 21.65 inch) Initial: 510 mm (20.08 inch)	**3 1**
551 ... 600 (21.69 ... 23.62 inch) Initial: 600 mm (23.62 inch)	**3 2**
601 ... 650 (23.66 ... 25.59 inch) Initial: 650 mm (25.59 inch)	**3 3**

Selection and Ordering data	Article No.
SITRANS TS500	**7MC751-**
Pipe version for minimal to medium stress, as per thermowell DIN 43722, Type 2, without process connection, without extension, plug-in or use with moveable compression fittings	- - -
651 ... 700 (25.63 ... 27.56 inch) Initial: 700 mm (27.56 inch)	**3 4**
701 ... 750 (27.6 ... 29.53 inch) Initial: 750 mm (29.53 inch)	**3 5**
751 ... 800 (29.57 ... 31.50 inch) Initial: 800 mm (31.50 inch)	**3 6**
801 ... 850 (31.5 ... 33.47 inch) Initial: 850 mm (33.47 inch)	**3 7**
851 ... 900 (33.5 ... 35.43 inch) Initial: 900 mm (35.43 inch)	**4 1**
901 ... 950 (35.47 ... 37.4 inch) Initial: 950 (37.4 inch)	**4 2**
951 ... 1 000 (37.44 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	**4 3**
1001 ... 1 100 (39.4 ... (43.30 inch) Initial: 1 100 (43.30 inch)	**4 4**
1 101 ... 1 200 (43.35 ... 47.24 inch) Initial: 1 200 mm (47.24 inch)	**4 5**
1 201 ... 1 300 (47.28 ... 51.18 inch) Initial: 1 300 mm (51.18 inch)	**4 6**
1 301 ... 1 400 (51.22 ... 55.11 inch) Initial: 1400 mm (55.11 inch)	**4 7**
1 401 ... 1 500 (55.15 ... 59.05 inch) Initial: 1 500 mm (59.05 inch)	**5 1**
Extension X	
Standard length for Type 2 as per DIN 43722 (without extension N=U)	**0**

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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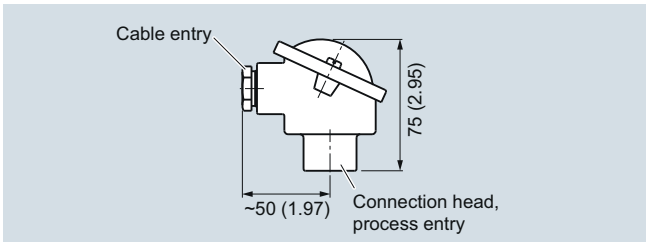
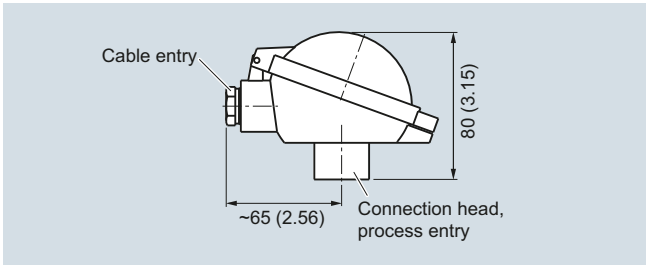
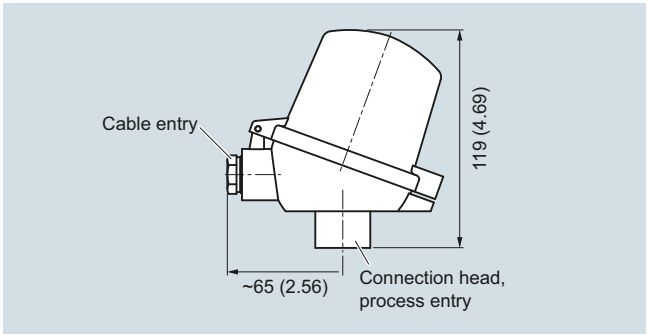
Type 2, tubular version without process connection



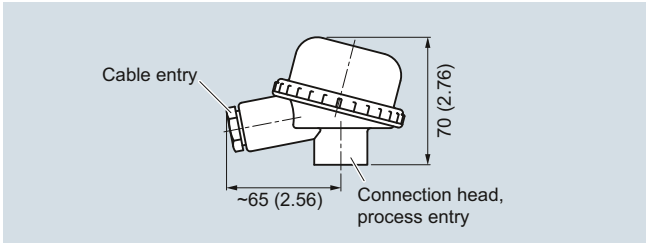
Connection head, aluminum, Type BA0, dimensions in mm (inch)



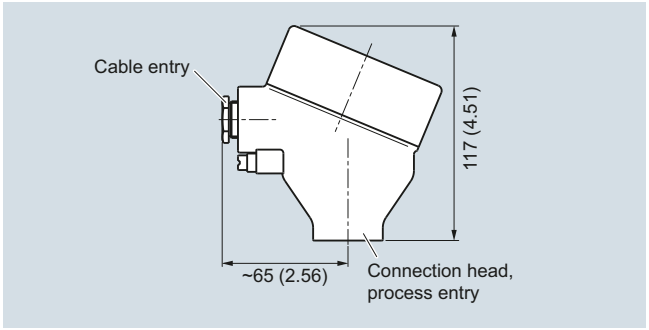
Connection head, aluminum, Type BB0, dimensions in mm (inch)



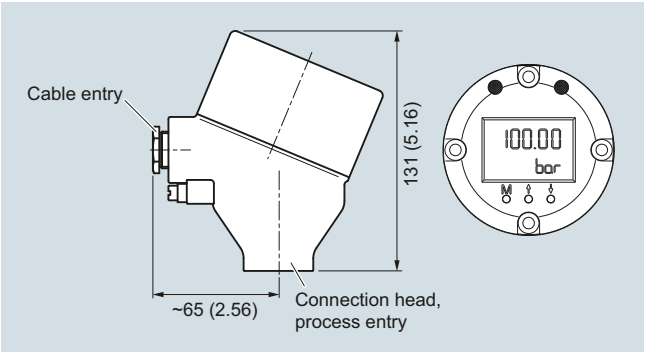
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TS500 **Tubular version for minimal to medium stress, as per thermowell DIN 43722, Type 2, without process connection, without extension, plug-in or use with moveable compression fittings**	**7MC751-** ■ - ■■■■■■ - ■■■
Head	
Aluminum head, BA0, flange cover, Standard	**A**
Aluminum head, BB0, low hinged cover, screw connection	**B**
Aluminum head, BC0, high hinged cover, screw connection	**C**
Aluminum head, AG0, screw cover, suitable for suitable for Ex d	**G**
Aluminum head, AH0, screw cover, suitable for Ex d, display	**H**
Plastic head, BM0, screw cover	**M**
Plastic head, BP0, high hinged cover, screw connection	**P**
Stainless steel head, AU0, screw cover, suitable for Ex d	**U**
Stainless steel head, AV0, screw cover, suitable for Ex d, display	**V**
Sensor Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88	
Pt100, basis, -50 ... +400 °C (-58 ... +752 °F)	**A**
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)	**B**
Pt100, expanded range, -196 ... +600 °C (-321 ... +1 112 °F)	**C**
Thermocouple Type K, -40 ... +1 000 °C (-40 ... +1 832 °F)	**K**
Thermocouple Type J, -40 ... +750 °C (-40 ... +1 382 °F)	**J**
Thermocouple Type N, -40 ... +1 000 °C (-40 ... +1 832 °F)	**N**
Sensor number/Accuracy	
Single, basic accuracy (Class 2/Class B)	**1**
Single, increased accuracy (Class 1/Class A)	**2**
Single, highest accuracy (Class AA)	**3**
Double, basic accuracy (Class 2/Class B)	**5**
Double, increased accuracy (Class 1/Class A)	**6**
Double, highest accuracy (Class AA)	**7**

Selection and Ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order Code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y44**

Selection and Ordering data	Order code
Options Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA, Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
Non sparking "n"	**E04**
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate for hydrostatic pressure test	**C31**
EN10204-3.1 Inspection certificate for helium leak test	**C32**
EN10204-3.1 Inspection certificate for surface tear test	**C33**
EN10204-3.1Inspection certificate: visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Harting plug Han 7 D (Non Ex, without mating connector)	**G13**
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	**G20**
with outer earth screw for heads AG0, AH0, AU0 and AV0	**A02**
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	**A03**
Compression fitting G½", enclosed	**A31**
Compression fitting NPT½", enclosed	**A32**

You find ordering examples on page 2/109!

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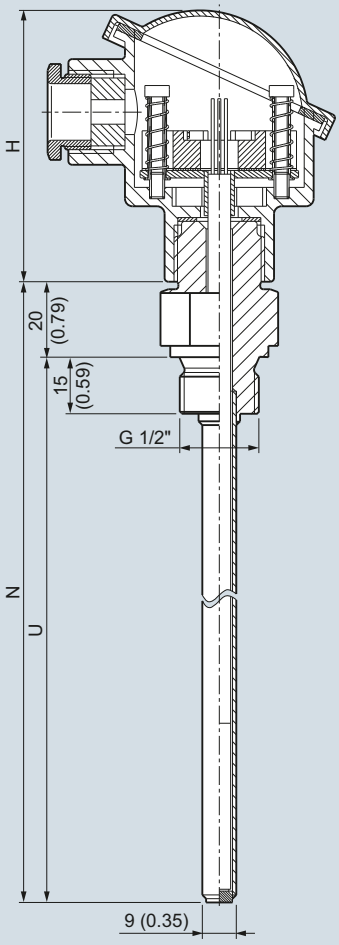
Type 2N, tubular version with screw socket

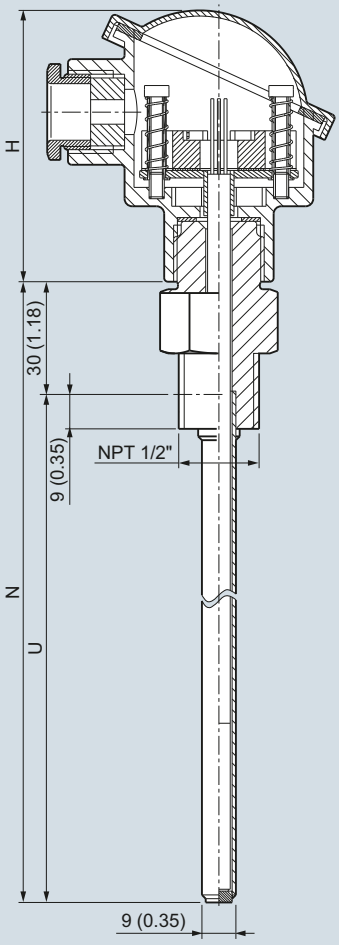
Dimensional drawings

SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to medium stress, thermowell Type 2N similar to DIN 43722, screwed in, without extension, non-alignable connection head.



H Head height
N Nominal length
U Insertion length

Connection type "G", dimensions in mm (inch)



H Head height
N Nominal length
U Insertion length

Connection type "NPT", dimensions in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TS500 ↗	**7MC751-**
Tubular thermowell, minimal to medium stress, Type 2N similar to DIN 43722, screwed in, without extension, for maximum process temperatures of 100 °C	- -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Material, in contact with media	
316Ti (1.4571)	1
316L (1.4404 or 1.4435)	2
Process connection	
G ½" (½"BSPF)	1 C
½" NPT	1 J
Thermowell form	
2N, 9 mm (0.35 inch)	A
Standard insertion length	
100 mm (3.97 inch)	0 1
160 mm (6.30 inch)	0 4
230 mm (9.06 inch)	1 0
360 mm (14.17 inch)	2 0
510 mm (20.08 inch)	3 1
Customer-specific insertion length enter customer specific length with Y44, see page 2/133 Order Codes	
80 ... 100 mm (3.15 ... 3.94 inch) Initial: 100 mm (3.94 inch)	0 1
101 ... 120 mm (3.98 ... 4.72 inch) Initial: 120 mm (4.72 inch)	0 2
121 ... 140 mm (4.76 ... 5.51 inch) Initial: 140 mm (5.51 inch)	0 3
141 ... 160 mm (5.55 ... 6.30 inch) Initial: 160 mm (6.30 inch)	0 4
161 ... 180 mm (6.34 ... 7.09 inch) Initial: 180 mm (7.09 inch)	0 5
181 ... 200 mm (7.13 ... 7.87 inch) Initial: 200 mm (7.87 inch)	0 6
201 ... 220 mm (7.91 ... 8.66 inch) Initial: 220 mm (8.66 inch)	0 7
221…240 mm (8.70 ... 9.45 inch) Initial: 230 mm (9.06 inch)	1 0
241…260 mm (9.49 ... 10.24 inch) Initial: 250 mm (9.84 inch)	1 2
261…280 mm (10.28 ...11.02 inch) Initial: 280 mm (11.02 inch)	1 3
281…300 mm (11.06 ... 11.81 inch) Initial: 285 mm 11.22 inch)	1 4
301…320 mm (11.85 ... 13.00 inch) Initial: 315 mm (12.40 inch)	1 5
321…340 mm (12.64 ... 13.39 inch) Initial: 340 mm (13.39 inch)	1 6
341…360 mm (13.43 ... 14.17 inch) Initial: 360 mm (14.17 inch)	2 0
361…380 mm (14.21 ... 14.96 inch) Initial: 380 mm (14.96 inch)	2 1
381…400 mm (14.99 ... 15.75 inch) Initial: 400 mm (15.75 inch)	2 2
401…420 mm (15.79 ... 16.54 inch) Initial: 420 mm (16.54 inch)	2 3
421…440 mm (16.57 ... 17.32 inch) Initial: 440 mm (17.32 inch)	2 4
441…460 mm (17.36 ... 18.11 inch) Initial: 460 mm (18.11 inch)	2 5
461…480 mm (18.15 ... 18.90 inch) Initial: 465 mm (18.30 inch)	2 6
481…500 mm (18.94 ... 19.69 inch) Initial: 500 mm (19.69 inch)	2 7

Selection and Ordering data	Article No.
SITRANS TS500	**7MC751-**
Tubular thermowell, minimal to medium stress, Type 2N similar to DIN 43722, screwed in, without extension, for maximum process temperatures of 100 °C	- -
501…550 mm (19.72 ... 21.65 inch) Initial: 510 mm (20.08 inch)	3 1
551…600 mm (21.69 ... 23.62 inch) Initial: 600 mm (23.62 inch)	3 2
601…650 mm (23.66 ... 25.59 inch) Initial: 650 mm (25.59 inch)	3 3
651…700 mm (25.63 ... 27.56 inch) Initial: 700 mm (27.56 inch)	3 4
701…750 mm (27.60 ... 29.53 inch) Initial: 750 mm (29.53 inch)	3 5
751…800 mm (29.57 ... 31.50 inch) Initial: 800 mm (31.50 inch)	3 6
801…850 mm (31.54 ... 33.46 inch) Initial: 850 mm (33.46 inch)	3 7
851…900 mm (33.50 ... 35.43 inch) Initial: 900 mm (35.43 inch)	4 1
901…950 mm (35.47 ... 37.40 inch) Initial: 950 mm (37.40 inch)	4 2
951…1 000 mm (37.44 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	4 3
1 001…1 100 mm (39.41 ... 43.31 inch) Initial: 1 100 mm (43.31 inch)	4 4
1 101…1 200 mm (43.35 ... 47.24 inch) Initial: 1 200 mm (47.24 inch)	4 5
1 201…1 300 mm (47.28 ... 51.18 inch) Initial: 1 300 mm (51.18 inch)	4 6
1 301…1 400 mm (51.22 ... 55.12 inch) Initial: 1400 mm (55.12 inch)	4 7
1 401…1 500 mm (55.16 ... 59.05 inch) Initial: 1 500 mm (59.05 inch)	5 1
Extension X	
without neck tube, (not adjustable)	0

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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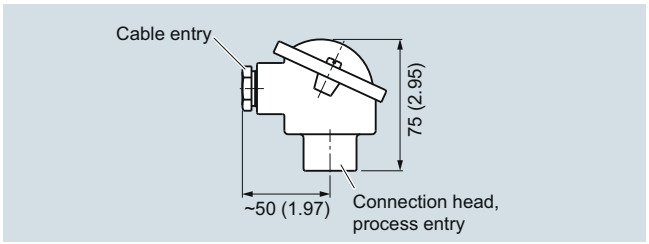
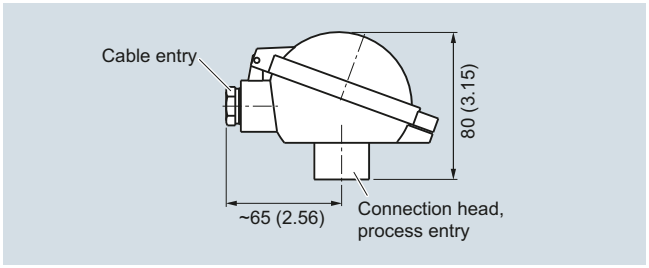
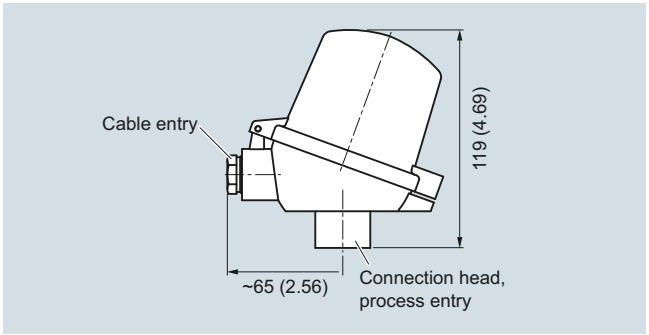
Type 2N, tubular version with screw socket



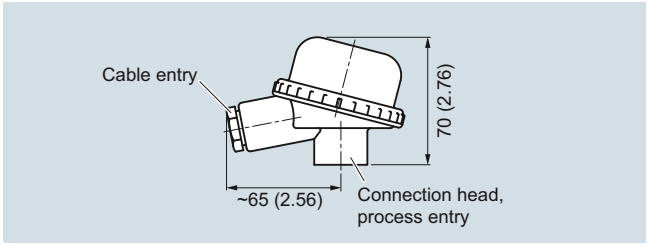
Connection head, aluminum, Type BA0, dimensions in mm (inch)



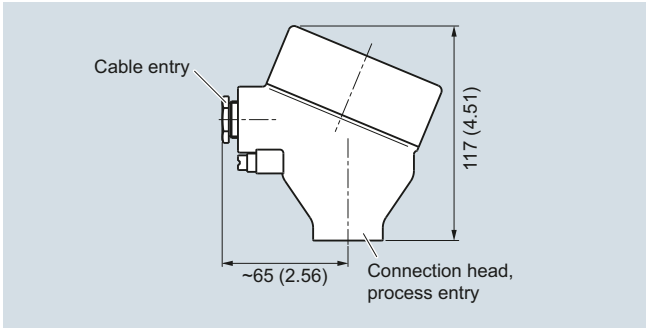
Connection head, aluminum, Type BB0, dimensions in mm (inch)



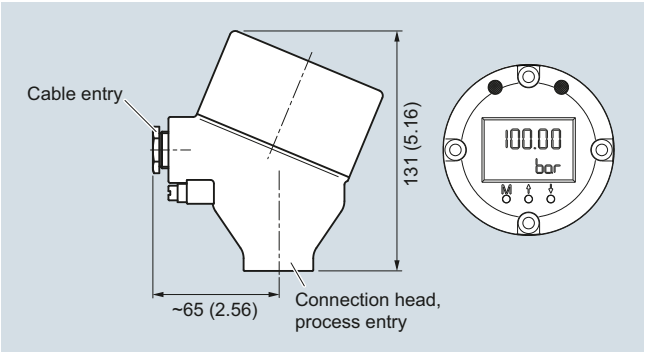
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TS500 **Tubular thermowell, minimal to medium stress, Type 2N similar to DIN 43722, screwed in, without extension, for maximum process temperatures of 100 °C**	**7MC751-** ☐☐☐☐☐☐-☐☐☐☐
Head	
Aluminum head, BA0, flange cover, Standard	**A**
Aluminum head, BB0, low hinged cover, screw connection	**B**
Aluminum head, BC0, high hinged cover, screw connection	**C**
Aluminum head, AG0, screw cover, suitable for Ex d	**G**
Aluminum head, AH0, screw cover, suitable for Ex d, display	**H**
Plastic head, BM0, screw cover	**M**
Plastic head, BP0high hinged cover, screw connection	**P**
Stainless steel head, AU0, screw cover, suitable for Ex d	**U**
Stainless steel head, AV0, screw cover, suitable for Ex d, display	**V**
Sensor Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88	
Pt100, basis, -50 ... +400 °C (-58 ... +752 °F)	**A**
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)	**B**
Pt100, expanded range, -196 ... +600 °C (-321 ... +1 112 °F)	**C**
Thermocouple Type K, -40 ... +1 000 °C (-40 ... +1 832 °F)	**K**
Thermocouple Type J, -40 ... +750 °C (-40 ... +1 382 °F)	**J**
Thermocouple Type N, -40 ... +1 000 °C (-40 ... +1 832 °F)	**N**
Sensor number/Accuracy	
Single, basic accuracy (Class 2/Class B)	**1**
Single, increased accuracy (Class 1/Class A)	**2**
Single, highest accuracy (Class AA)	**3**
Double, basic accuracy (Class 2/Class B)	**5**
Double, increased accuracy (Class 1/Class A)	**6**
Double, highest accuracy (Class AA)	**7**

Selection and Ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order Code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y44**

Selection and Ordering data	Order code
Options Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA,Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
Non sparking "n"	**E04**
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate for hydrostatic pressure test	**C31**
EN10204-3.1 Inspection certificate for helium leak test	**C32**
EN10204-3.1 Inspection certificate for surface tear test	**C33**
EN10204-3.1 Inspection certificate: visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Harting plug Han 7 D (Non Ex, without mating connector)	**G13**
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	**G20**
with outer earth screw for heads AG0, AH0, AU0 and AV0	**A02**
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	**A03**

You find ordering examples on page 2/109!

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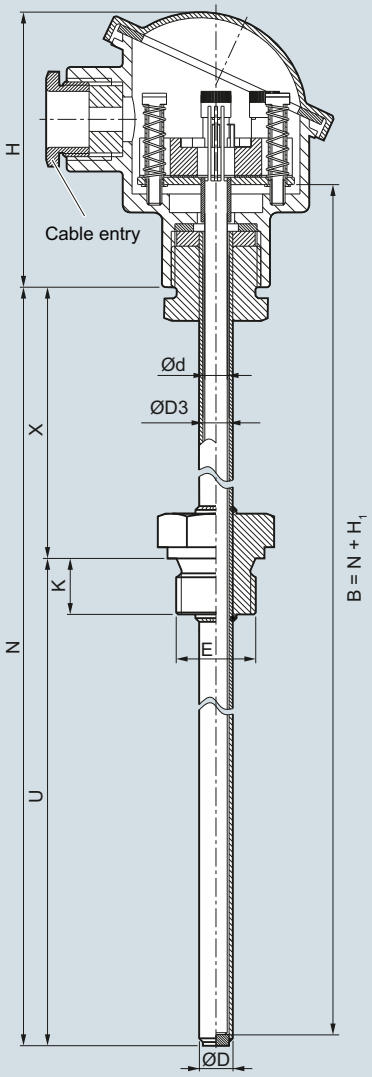
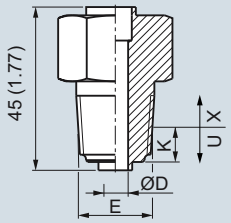
Type 2G, tubular version with screw socket and extension

Dimensional drawings



B	Measuring insert length
Ød	Measuring insert outer, diameter (6 (0.24))
ØD	Process connection, outer diameter
ØD3	Thermowell internal diameter
E	Process connection, thread size
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
K	Screw depth
N	Nominal length
U	Insertion length
X	Extension length

SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to minimum to medium stress, thermowell as per DIN 43722, Type 2G, screwed in, with extension, dimensions in mm (inch)



Tapered process connection, dimensions in mm (inch)

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Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500 ↗	**7MC751-**	
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2G, screwed in, with extension	-	-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Material, in contact with media		
316Ti (1.4571)	**1**	
316L (1.4404 or 1.4435)	**2**	
Process connection		
Cylindrical: G½ " (½ "BSPF)	**1 C**	
Cylindrical: G1 " (1 "BSPF)	**1 E**	
Tapered: NPT½ "	**1 J**	
Thermowell form		
2G, 9 mm (0.35 inch)	**A**	
2G, 12 mm (0.47 inch)	**B**	
Insertion length U standard		
160 mm (6.30 inch)	**0 4**	
250 mm (9.84 inch)	**1 2**	
400 mm (15.75 inch)	**2 2**	
Insertion length U customer-specific		
enter customer specific length with Y44, see page 2/137 Order Codes		
80 ... 100 mm (3.15 ... 3.94 inch) Initial: 100 mm (3.94 inch)	**0 1**	
101 ... 120 mm (3.98 ... 4.72 inch) Initial: 120 mm (4.72 inch)	**0 2**	
121 ... 140 mm (4.76 ... 5.51 inch) Initial: 140 mm (5.51 inch)	**0 3**	
141 ... 160 mm (5.55 ... 6.30 inch) Initial: 160 mm (6.30 inch)	**0 4**	
161 ... 180 mm (6.34 ... 7.09 inch) Initial: 180 mm (7.09 inch)	**0 5**	
181 ... 200 mm (7.13 ... 7.87 inch) Initial: 200 mm (7.87 inch)	**0 6**	
201 ... 220 mm (7.91 ... 8.66 inch) Initial: 220 mm (8.66 inch)	**0 7**	
221…240 mm (8.70 ... 9.45 inch) Initial: 225 mm (8.86 inch)	**1 1**	
241…260 mm (9.49 ... 10.24 inch) Initial: 250 mm (9.84 inch)	**1 2**	
261…280 mm (10.28 ...11.02 inch) Initial: 280 mm (11.02 inch)	**1 3**	
281…300 mm (11.06 ... 11.81 inch) Initial: 285 mm 11.22 inch)	**1 4**	
301…320 mm (11.85 ... 13.00 inch) Initial: 315 mm (12.40 inch)	**1 5**	
321…340 mm (12.64 ... 13.39 inch) Initial: 340 mm (13.39 inch)	**1 6**	
341…360 mm (13.43 ... 14.17 inch) Initial: 360 mm (14.17 inch)	**2 0**	
361…380 mm (14.21 ... 14.96 inch) Initial: 380 mm (14.96 inch)	**2 1**	
381…400 mm (14.99 ... 15.75 inch) Initial: 400 mm (15.75 inch)	**2 2**	
401…420 mm (15.79 ... 16.54 inch) Initial: 420 mm (16.54 inch)	**2 3**	
421…440 mm (16.57 ... 17.32 inch) Initial: 440 mm (17.32 inch)	**2 4**	
441…460 mm (17.36 ... 18.11 inch) Initial: 460 mm (18.11 inch)	**2 5**	
461…480 mm (18.15 ... 18.90 inch) Initial: 465 mm (18.30 inch)	**2 6**	
481…500 mm (18.94 ... 19.69 inch) Initial: 500 mm (19.69 inch)	**2 7**	

Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500	**7MC751-**	
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2G, screwed in, with extension	-	-
501…550 mm (19.72 ... 21.65 inch) Initial: 510 mm (20.08 inch)	**3 1**	
551…600 mm (21.69 ... 23.62 inch) Initial: 600 mm (23.62 inch)	**3 2**	
601…650 mm (23.66 ... 25.59 inch) Initial: 650 mm (25.59 inch)	**3 3**	
651…700 mm (25.63 ... 27.56 inch) Initial: 700 mm (27.56 inch)	**3 4**	
701…750 mm (27.60 ... 29.53 inch) Initial: 750 mm (29.53 inch)	**3 5**	
751…800 mm (29.57 ... 31.50 inch) Initial: 800 mm (31.50 inch)	**3 6**	
801…850 mm (31.54 ... 33.46 inch) Initial: 850 mm (33.46 inch)	**3 7**	
851…900 mm (33.50 ... 35.43 inch) Initial: 900 mm (35.43 inch)	**4 1**	
901…950 mm (35.47 ... 37.40 inch) Initial: 950 mm (37.40 inch)	**4 2**	
951…1 000 mm (37.44 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	**4 3**	
1 001…1 100 mm (39.41 ... 43.31 inch) Initial: 1 100 mm (43.31 inch)	**4 4**	
1 101…1 200 mm (43.35 ... 47.24 inch) Initial: 1 200 mm (47.24 inch)	**4 5**	
1 201…1 300 mm (47.28 ... 51.18 inch) Initial: 1 300 mm (51.18 inch)	**4 6**	
1 301…1 400 mm (51.22 ... 55.12 inch) Initial: 1 400 mm (55.12 inch)	**4 7**	
1 401…1 500 mm (55.16 ... 59.05 inch) Initial: 1 500 mm (59.05 inch)	**5 1**	
Extension X		
Standard length for Type 2G DIN 43772 (X=129 mm (5.08 inch))	**1**	
Extension length X - customer specific		
enter customer specific length with Y45, see page 2/137 Order Codes		
45 ...150 mm (1.77 ... 5.91 inch) Initial: 150 mm (5.91 inch)	**9**	**N 1 D**
151 ... 300 mm (5.95 ... 11.81 inch) Initial: 300 mm (11.81 inch)	**9**	**N 2 D**
301 ... 450 mm (11.85 ... 17.72 inch) Initial: 450 mm (17.72 inch)	**9**	**N 3 D**

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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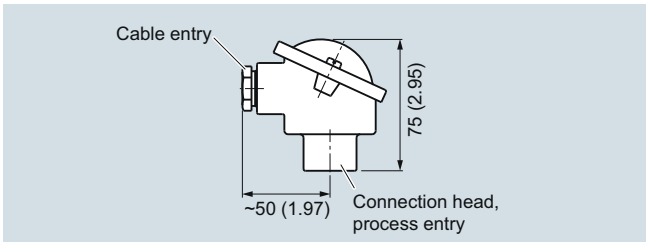
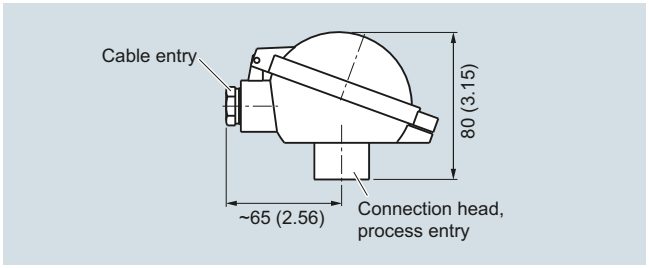
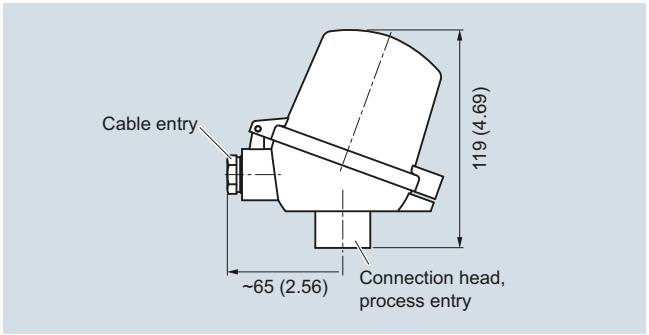
Type 2G, tubular version with screw socket and extension



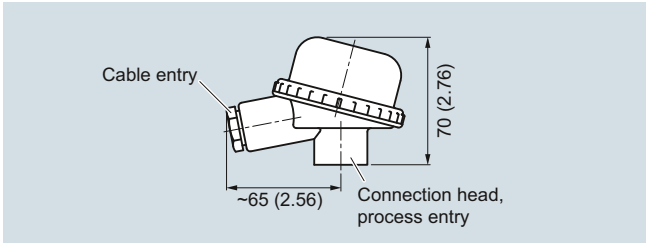
Connection head, aluminum, Type BA0, dimensions in mm (inch)



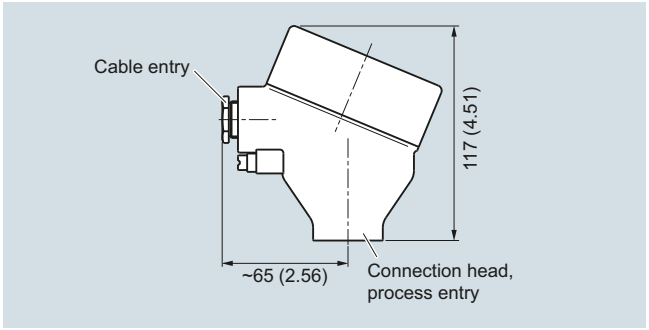
Connection head, aluminum, Type BB0, dimensions in mm (inch)



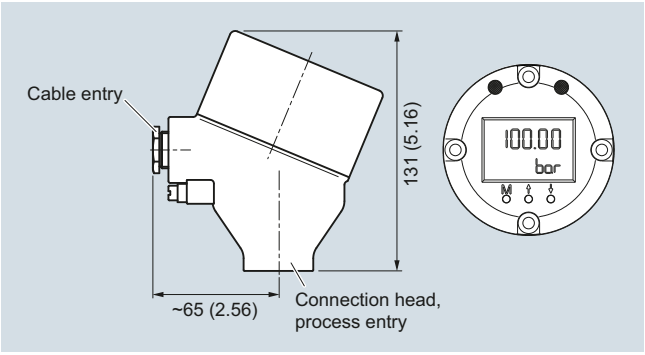
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

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Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500	**7MC751-**	
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2G, screwed in, with extension	■ - ■■■■■ -	■■■
Head		
Aluminum head, BA0, flange cover, Standard		**A**
Aluminum head, BB0, low hinged cover, screw connection		**B**
Aluminum head, BC0, high hinged cover, screw connection		**C**
Aluminum head, AG0, screw cover, suitable for Ex d		**G**
Aluminum head, AH0, screw cover, suitable for Ex d, display		**H**
Plastic head, BM0, screw cover		**M**
Plastic head, BP0high hinged cover, screw connection		**P**
Stainless steel head, AU0, screw cover, suitable for Ex d		**U**
Stainless steel head, AV0, screw cover, suitable for Ex d, display		**V**
Sensor		
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88		
Pt100, Basis, -50 ... +400 °C (-58 ... +752 °F)		**A**
Pt100, vibration resistant, -50 ... +400 °C (-58 ... +752 °F)		**B**
Pt100, expanded range, -196 ... +600 °C (-321 ... +1 112 °F)		**C**
Thermocouple Type K, -40 ... +1 000 °C (-40 ... +1 832 °F)		**K**
Thermocouple Type J, -40 ... +750 °C (-40 ... +1 382 °F)		**J**
Thermocouple Type N, -40 ... +1 000 °C (-40 ... +1 832 °F)		**N**
Sensor number/Accuracy		
Single, basic accuracy (Class 2/Class B)		**1**
Single, increased accuracy (Class 1/Class A)		**2**
Single, highest accuracy (Class AA)		**3**
Double, basic accuracy (Class 2/Class B)		**5**
Double, increased accuracy (Class 1/Class A)		**6**
Double, highest accuracy (Class AA)		**7**

Selection and Ordering data	Order Code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y44**
Extension X length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y45**

Selection and Ordering data	Order Code
Options	
Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA, Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
Non sparking "n"	**E04**
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate for hydrostatic pressure test	**C31**
EN10204-3.1 Inspection certificate for helium leak test	**C32**
EN10204-3.1 Inspection certificate for surface tear test	**C33**
EN10204-3.1 Inspection certificate: visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Harting plug Han 7 D (Non Ex, without mating connector)	**G13**
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	**G20**
with outer earth screw for heads AG0, AH0, AU0 and AV0	**A02**
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	**A03**

You find ordering examples on page 2/109!

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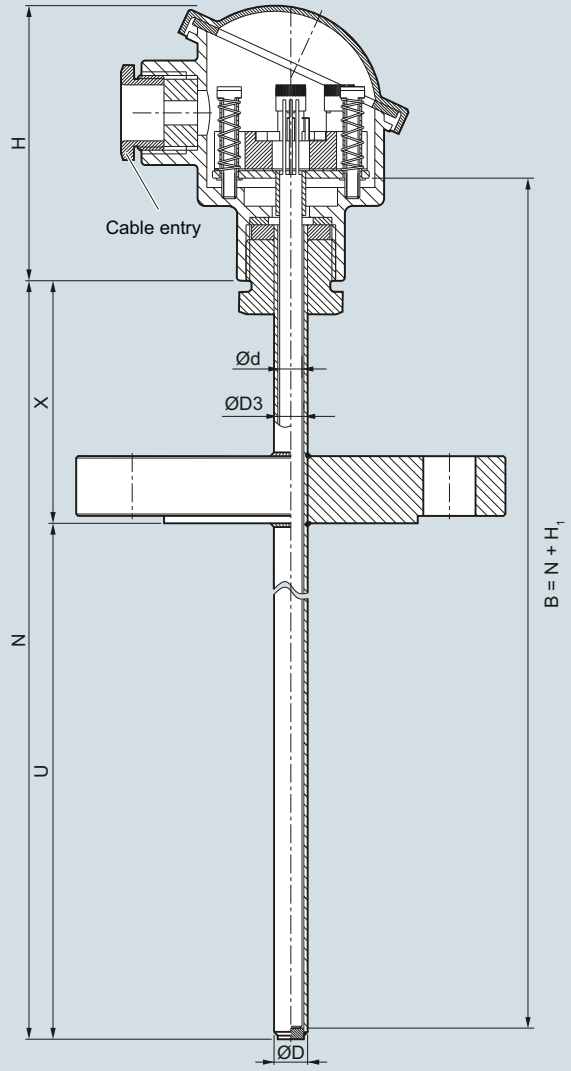
Type 2F, tubular version with flange and extension

Dimensional drawings



B	Measuring insert length
Ød	Measuring insert outer diameter (6 (0.24))
ØD	Process connection outer diameter
ØD3	Thermowell internal diameter
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
N	Nominal length
U	Insertion length
X	Extension length

SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to minimum to medium stress, thermowell as per DIN 43722, Type2F, with flange, with extension, dimensions in mm (inch)

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Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500 ↗	**7MC751-**	
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2F, with flange, with extension	-	-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Material, in contact with media		
316Ti (1.4571)	**1**	
316L (1.4404 or 1.4435)	**2**	
Process connection		
Flange EN, DN25PN40 B1	**2 A**	
Flange ASME, 1"RF150	**2 E**	
Flange ASME, 1"RF300	**2 F**	
Flange ASME, 1.5"RF150	**2 G**	
Flange ASME, 1.5"RF300	**2 H**	
Thermowell form		
2F, 9 mm (0.35 inch)	**A**	
2F, 12 mm (0.47 inch)	**B**	
Insertion U standard		
225 mm (8.86 inch)	**1 1**	
315 mm (12.40 inch)	**1 5**	
465 mm (18.31 inch)	**2 6**	
Insertion length U customer-specific enter customer specific length with Y44, see page 2/141 Order codes		
80 ... 100 mm (3.15 ... 3.94 inch) Initial: 100 mm (3.94 inch)	**0 1**	
101 ... 120 mm (3.98 ... 4.72 inch) Initial: 120 mm (4.72 inch)	**0 2**	
121 ... 140 mm (4.76 ... 5.51 inch) Initial: 140 mm (5.51 inch)	**0 3**	
141 ... 160 mm (5.55 ... 6.30 inch) Initial: 160 mm (6.30 inch)	**0 4**	
161 ... 180 mm (6.34 ... 7.09 inch) Initial: 180 mm (7.09 inch)	**0 5**	
181 ... 200 mm (7.13 ... 7.87 inch) Initial: 200 mm (7.87 inch)	**0 6**	
201 ... 220 mm (7.91 ... 8.66 inch) Initial: 220 mm (8.66 inch)	**0 7**	
221…240 mm (8.70 ... 9.45 inch) Initial: 225 mm (8.86 inch)	**1 1**	
241…260 mm (9.49 ... 10.24 inch) Initial: 250 mm (9.84 inch)	**1 2**	
261…280 mm (10.28 ...11.02 inch) Initial: 280 mm (11.02 inch)	**1 3**	
281…300 mm (11.06 ... 11.81 inch) Initial: 285 mm 11.22 inch)	**1 4**	
301…320 mm (11.85 ... 13.00 inch) Initial: 315 mm (12.40 inch)	**1 5**	
321…340 mm (12.64 ... 13.39 inch) Initial: 340 mm (13.39 inch)	**1 6**	
341…360 mm (13.43 ... 14.17 inch) Initial: 360 mm (14.17 inch)	**2 0**	
361…380 mm (14.21 ... 14.96 inch) Initial: 380 mm (14.96 inch)	**2 1**	
381…400 mm (14.99 ... 15.75 inch) Initial: 400 mm (15.75 inch)	**2 2**	
401…420 mm (15.79 ... 16.54 inch) Initial: 420 mm (16.54 inch)	**2 3**	
421…440 mm (16.57 ... 17.32 inch) Initial: 440 mm (17.32 inch)	**2 4**	
441…460 mm (17.36 ... 18.11 inch) Initial: 460 mm (18.11 inch)	**2 5**	
461…480 mm (18.15 ... 18.90 inch) Initial: 465 mm (18.30 inch)	**2 6**	
481…500 mm (18.94 ... 19.69 inch) Initial: 500 mm (19.69 inch)	**2 7**	

Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500	**7MC751-**	
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2F, with flange, with extension	-	-
501…550 mm (19.72 ... 21.65 inch) Initial: 510 mm (20.08 inch)	**3 1**	
551…600 mm (21.69 ... 23.62 inch) Initial: 600 mm (23.62 inch)	**3 2**	
601…650 mm (23.66 ... 25.59 inch) Initial: 650 mm (25.59 inch)	**3 3**	
651…700 mm (25.63 ... 27.56 inch) Initial: 700 mm (27.56 inch)	**3 4**	
701…750 mm (27.60 ... 29.53 inch) Initial: 750 mm (29.53 inch)	**3 5**	
751…800 mm (29.57 ... 31.50 inch) Initial: 800 mm (31.50 inch)	**3 6**	
801…850 mm (31.54 ... 33.46 inch) Initial: 850 mm (33.46 inch)	**3 7**	
851…900 mm (33.50 ... 35.43 inch) Initial: 900 mm (35.43 inch)	**4 1**	
901…950 mm (35.47 ... 37.40 inch) Initial: 950 mm (37.40 inch)	**4 2**	
951…1 000 mm (37.44 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	**4 3**	
1 001…1 100 mm (39.41 ... 43.31 inch) Initial: 1 100 mm (43.31 inch)	**4 4**	
1 101…1 200 mm (43.35 ... 47.24 inch) Initial: 1 200 mm (47.24 inch)	**4 5**	
1 201…1 300 mm (47.28 ... 51.18 inch) Initial: 1 300 mm (51.18 inch)	**4 6**	
1 301…1 400 mm (51.22 ... 55.12 inch) Initial: 1 400 mm (55.12 inch)	**4 7**	
1 401…1 500 mm (55.16 ... 59.05 inch) Initial: 1 500 mm (59.05 inch)	**5 1**	
Extension X		
Standard length for Type 2F DIN 43772 (X=64 mm (2.52 inch))		**1**
Extension length X - customer specific enter customer specific length with Y45, see page 2/141 Order codes		
45 ...150 mm (1.77 ... 5.91 inch) Initial: 150 mm (5.91 inch)		**9** **N 1 D**
151 ... 300 mm (5.95 ... 11.81 inch) Initial: 300 mm (11.81 inch)		**9** **N 2 D**
301 ... 450 mm (11.85 ... 17.72 inch) Initial: 450 mm (17.72 inch)		**9** **N 3 D**

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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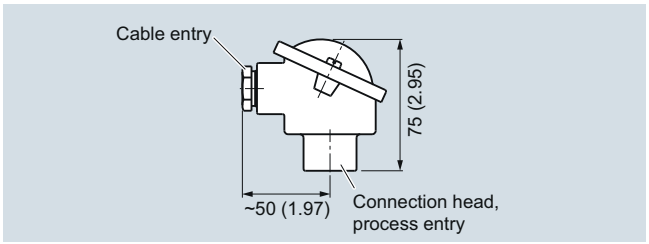
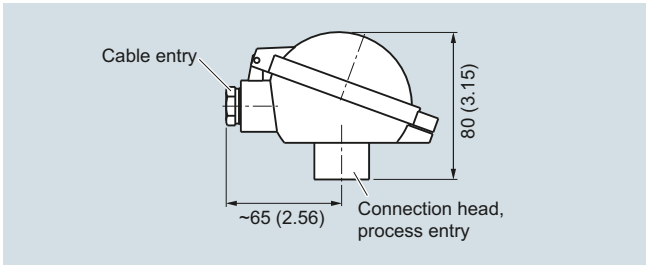
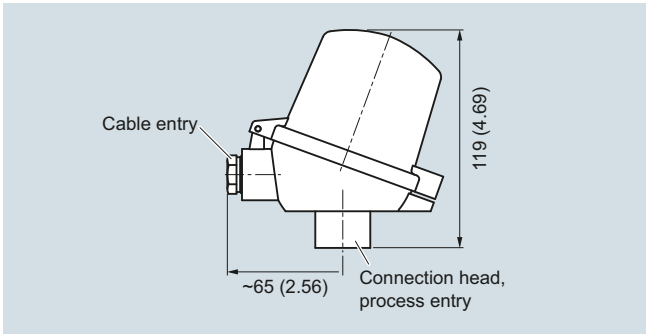
Type 2F, tubular version with flange and extension



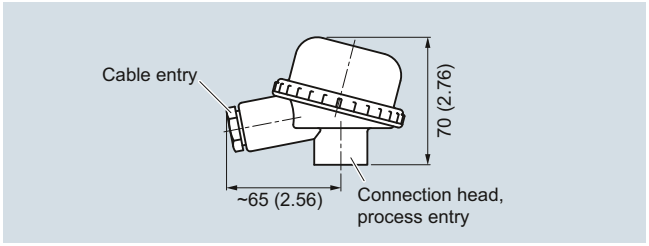
Connection head, aluminum, Type BA0, dimensions in mm (inch)



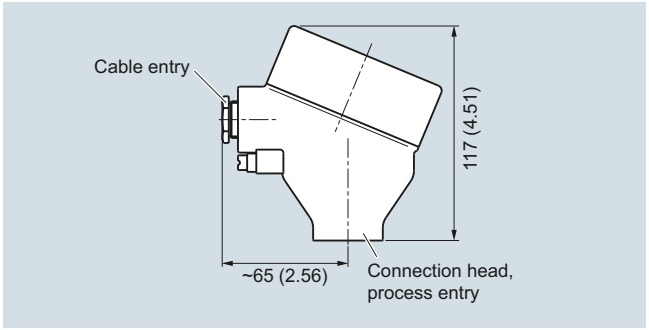
Connection head, aluminum, Type BB0, dimensions in mm (inch)



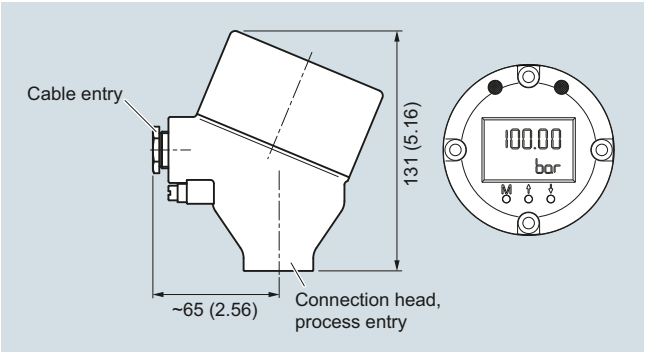
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TS500	**7MC751-**
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 2F, with flange, with extension	- -
Head	
Aluminum head, BA0, flange cover, Standard	A
Aluminum head, BB0, low hinged cover, screw connection	B
Aluminum head, BC0, high hinged cover, screw connection	C
Aluminum head, AG0, screw cover, suitable for Ex d	G
Aluminum head, AH0, screw cover, suitable for Ex d, display	H
Plastic head, BM0, screw cover	M
Plastic head, BP0high hinged cover, screw connection	P
Stainless steel head, AU0, screw cover, suitable for Ex d	U
Stainless steel head, AV0, screw cover, suitable for Ex d, display	V
Sensor	
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88	
Pt100, Basis, -50 ... +400 °C (-58 ... +752 °F)	A
Pt100, vibration resistant, -50 ... +400 °C (-58 ... +752 °F)	B
Pt100, expanded range, -196 ... +600 °C (-321 ... +1 112 °F)	C
Thermocouple Type K, -40 ... +1 000 °C (-40 ... +1 832 °F)	K
Thermocouple Type J, -40 ... +750 °C (-40 ... +1 382 °F)	J
Thermocouple Type N, -40 ... +1 000 °C (-40 ... +1 832 °F)	N
Sensor number/Accuracy	
Single, basic accuracy (Class 2/Class B)	1
Single, increased accuracy (Class 1/Class A)	2
Single, highest accuracy (Class AA)	3
Double, basic accuracy (Class 2/Class B)	5
Double, increased accuracy (Class 1/Class A)	6
Double, highest accuracy (Class AA)	7

Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Insertionlength customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y44**
Extension X length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y45**

Selection and Ordering data	Order code
Options	
Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA, Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
Non sparking "n"	**E04**
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate for hydrostatic pressure test	**C31**
EN10204-3.1 Inspection certificate for helium leak test	**C32**
EN10204-3.1 Inspection certificate for surface tear test	**C33**
EN10204-3.1 Inspection certificate: visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Harting plug Han 7 D (Non Ex, without mating connector)	**G13**
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	**G20**
with outer earth screw for heads AG0, AH0, AU0 and AV0	**A02**
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	**A03**

You find ordering examples on page 2/109!

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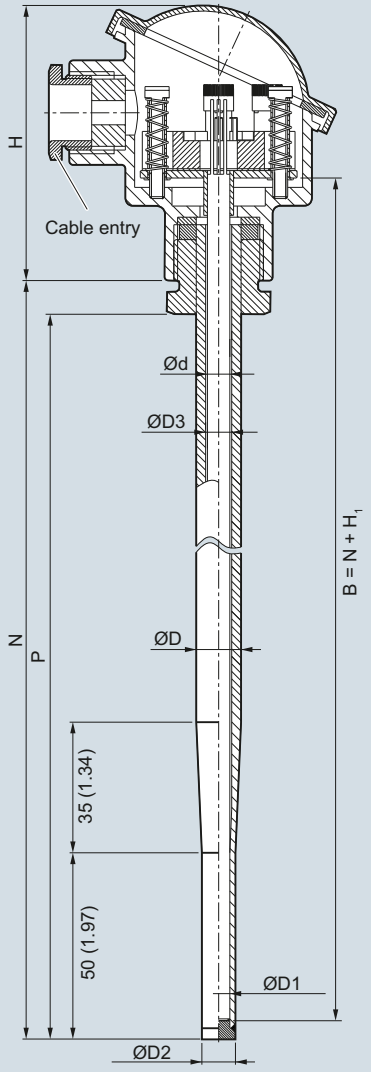
Type 3, tubular quick without process connection

Dimensional drawings



B	Measuring insert length
Ød	Measuring insert outer diameter (6 (0.24))
ØD	Process connection outer diameter
ØD1	Tip internal diameter
ØD2	Tip outer diameter
ØD3	Thermowell diameter
H	Head height
H_1	Type Axx> 41 (1.61) Type Bxx> 26 (1.02)
N	Nominal length
P	Space for process connection

SITRANS TS500, temperature sensors for vessel and pipings, tubular version for minimum to medium stress, without process connection, without extension, plug-in or use with moveable compression fitting, dimension in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TS500 ↗	**7MC751-**
Tubular version for minimal to medium stress, thermowell per DIN 43722, Type 3, without process connection, improved response time, plug-in or use with moveable compression fittings	-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Material, in contact with media	
316Ti (1.4571)	**1**
316L (1.4404 or 1.4435)	**2**
Process connection	
Without process connection (for compression joints) N=U	**0 N**
Thermowell form	
3, 12/9 mm (0.47/0.35 inch)	**K**
Insertion length U (=N), Standard	
160 mm (6.3 inch)	**0 4**
220 mm (8.66 inch)	**0 7**
280 mm (11.02 inch)	**1 3**
Insertion length U (=N), customer-specific enter customer specific length with Y44, see page 2/145 Order Codes	
121 ... 140 mm (4.76 ... 5.51 inch) Initial: 140 mm (5.51 inch)	**0 3**
141 ... 160 mm (5.55 ... 6.30 inch) Initial: 160 mm (6.3 inch)	**0 4**
161 ... 180 (6.34 ... 7.09 inch) Initial: 180 mm (7.09)	**0 5**
181 ... 200 (7.13 ... 7.87 inch) Initial: 200 mm (7.87 inch)	**0 6**
201 ... 220 (7.91 ... 8.66 inch) Initial: 220 mm (8.66 inch)	**0 7**
221 ... 240 (8.7 ... 9.45 inch) Initial: 225 mm (8.86 inch)	**1 1**
241 ... 260 (9.48 ... 10.24 inch) Initial: 250 mm (9.84 inch)	**1 2**
261 ... 280 (10.28 ... 11.02 inch) Initial: 280 mm (11.02 inch)	**1 3**
281 ... 300 (11.02 ... 11.81 inch) Initial: 285 mm (11.22 inch)	**1 4**
301 ... 320 (11.85 ... 12.6 inch) Initial: 315 mm (12.4 inch)	**1 5**
321 ... 340 (12.64 ... 13.39 inch) Initial: 340 mm (13.39 inch)	**1 6**
341 ... 360 (13.43 ... 14.17 inch) Initial: 360 mm (14.17 inch)	**2 0**
361 ... 380 (14.21 ... 14.96 inch) Initial: 380 mm (14.96 inch)	**2 1**

Selection and Ordering data	Article No.
SITRANS TS500	**7MC751-**
Tubular version for minimal to medium stress, thermowell per DIN 43722, Type 3, without process connection, improved response time, plug-in or use with moveable compression fittings	-
381 ... 400 (15 ... 15.75 inch) Initial: 400 mm (15.75 inch)	**2 2**
401 ... 420 (15.79 ... 16.54 inch) Initial: 420 mm (16.54 inch)	**2 3**
421 ... 440 (16.57 ... 17.32 inch) Initial: 440 mm (17.32 inch)	**2 4**
441 ... 460 (17.36 ... 18.11 inch) Initial: 460 mm (18.11 inch)	**2 5**
461 ... 480 (18.15 ... 18.90 inch) Initial: 465 mm (18.30 inch)	**2 6**
481 ... 500 (18.94 ... 19.68 inch) Initial: 500 mm (19.68 inch)	**2 7**
501 ... 550 (19.72 ... 21.65 inch) Initial: 510 mm (20.08 inch)	**3 1**
551 ... 600 (21.69 ... 23.62 inch) Initial: 600 mm (23.62 inch)	**3 2**
601 ... 650 (23.66 ... 25.59 inch) Initial: 650 mm (25.59 inch)	**3 3**
651 ... 700 (25.63 ... 27.56 inch) Initial: 700 mm (27.56 inch)	**3 4**
701 ... 750 (27.6 ... 29.53 inch) Initial: 750 mm (29.53 inch)	**3 5**
751 ... 800 (29.57 ... 31.50 inch) Initial: 800 mm (31.50 inch)	**3 6**
801 ... 850 mm (31.53 ... 33.46 inch) Initial: 850 mm (33.46 inch)	**3 7**
851 ... 900 mm (33.50 ... 35.43 inch) Initial: 900 mm (35.43 inch)	**4 1**
901 ... 950 mm (35.47 ... 37.40 inch) Initial: 950 mm (37.40 inch)	**4 2**
951 ... 1 000 mm (37.44 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	**4 3**
1 001 ... 1 100 mm (39.41 ... 43.31 inch) Initial: 1 100 mm (43.31 inch)	**4 4**
Extension	
Standard length for Type 2 as per DIN 43722 (without extension N=U)	**0**

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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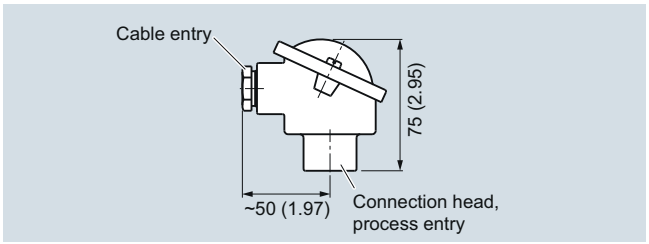
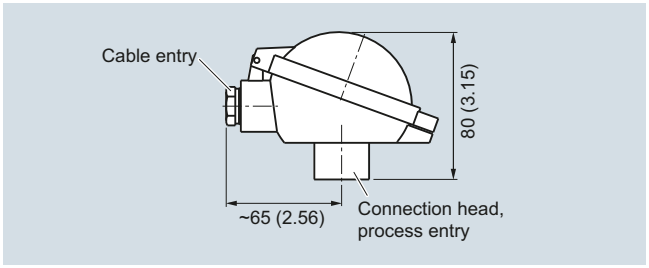
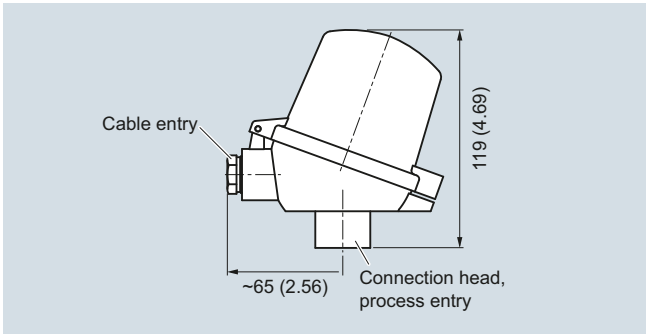
Type 3, tubular quick without process connection



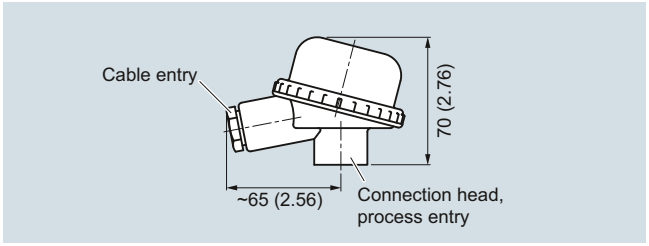
Connection head, aluminum, Type BA0, dimensions in mm (inch)



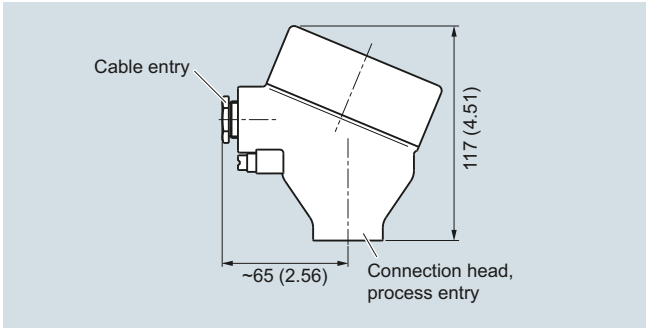
Connection head, aluminum, Type BB0, dimensions in mm (inch)



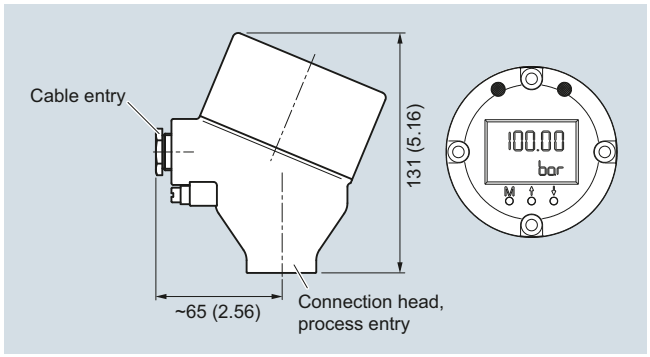
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TS500	**7MC751-**
Tubular version for minimal to medium stress, thermowell as per DIN 43722, Type 3, without process connection, improved response time, plug-in or use with moveable compression fittings	■ - ■■■■■ - ■■■■
Head	
Aluminum head, BA0, flange cover, Standard	A
Aluminum head, BB0, low hinged cover, screw connection	B
Aluminum head, BC0, high hinged cover, screw connection	C
Aluminum head, AG0, screw cover, suitable for Ex d	G
Aluminum head, AH0, screw cover, suitable for Ex d, display	H
Plastic head, BM0, screw cover	M
Plastic head, BP0high hinged cover, screw connection	P
Stainless steel head, AU0, screw cover, Ex d	U
Stainless steel head, AV0, screw cover, suitable for Ex d, display	V
Sensor	
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88	
Pt100, basis, -50 ... +400 °C (-58 ... +752 °F)	A
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)	B
Pt100, expanded range, -196 ... +600 °C (-321 ... +1112 °F)	C
Thermocouple Type J, only class 2, -40 ... +750 °C (-40 ... +1 382 °F)	J
Thermocouple Type K, -40 .. . +1 000 °C (-40 ... +1 832 °F)	K
Thermocouple Type N, -40 ... +1 000 °C (-40 ... +1 832 °F)	N
Sensor number/Accuracy	
Single, basic accuracy (Class 2/Class B)	1
Single, increased accuracy (Class 1/Class A)	2
Single, highest accuracy (Class AA)	3
Double, basic accuracy (Class 2/Class B)	5
Double, increased accuracy (Class 1/Class A)	6
Double, highest accuracy (Class AA)	7

Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y44**

Selection and Ordering data	Order code
Options	
Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA, Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
Non sparking "n"	**E04**
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate for hydrostatic pressure test	**C31**
EN10204-3.1 Inspection certificate for helium leak test	**C32**
EN10204-3.1 Inspection certificate for surface tear test	**C33**
EN10204-3.1 Inspection certificate: visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Harting plug Han 7 D (Non Ex, without mating connector)	**G13**
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	**G20**
with outer earth screw for heads AG0, AH0, AU0 and AV0	**A02**
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	**A03**
Compression joint G½", enclosed	**A31**
Compression joint NPT½", enclosed	**A32**

You find ordering examples on page 2/109!

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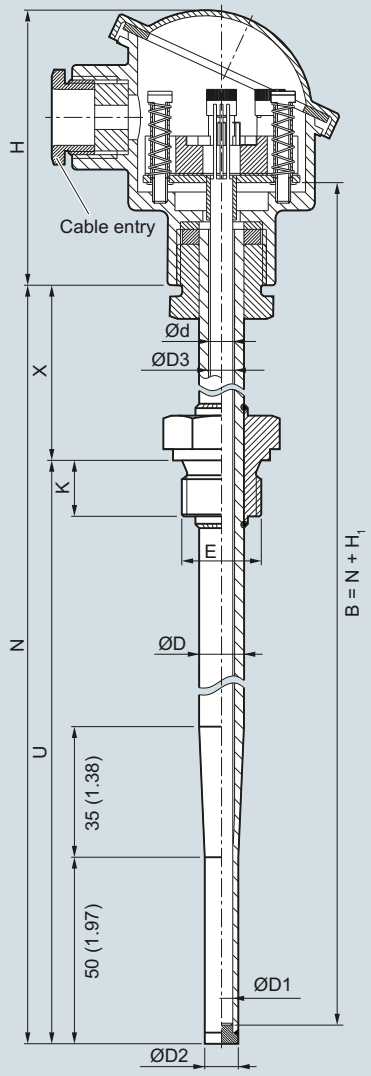
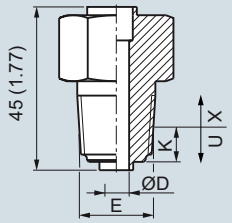
Type 3G, tubular quick with screw socket and extension

Dimensional drawings



B	Measuring insert length
Ød	Measuring insert outer diameter (6 (0.24))
ØD	Process connection outer diameter
ØD1	Tip internal diameter
ØD2	Tip outer diameter
ØD3	Thermowell internal diameter
E	Process connection, thread size
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
K	Screw depth
N	Nominal length
U	Insertion length
X	Extension length

SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to minimum to medium stress, thermowell as per DIN 43722, Type 3G, screwed in, with extension, dimensions in mm (inch)



Tapered process connection, dimensions in mm (inch)

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Selection and Ordering data

Article No. — Ord. Code

SITRANS TS500 ↗ **7MC751-**

Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3G, screwed in, with extension

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Material, in contact with media
316Ti (1.4571) **1**
316L (1.4404 or 1.4435) **2**

Process connection
Cylindrical: G½" inch (½" BSPF) **1 C**
Cylindrical: G1" inch (1" BSPF) **1 E**
Tapered: NPT½" **1 J**

Thermowell form
3G, 12/9 mm (0.47/0.35 inch) **K**

Insertion length U standard
160 mm (6.30 inch) **0 4**
220 mm (8.66 inch) **0 7**
280 mm (11.02 inch) **1 3**

Insertion length U customer-specific
enter customer specific length with Y44, see page 2/149 Order Codes
121 ... 140 mm (4.76 ... 5.51 inch) **0 3**
Initial: 140 mm (5.51 inch)
141 ... 160 mm (5.55 ... 6.30 inch) **0 4**
Initial: 160 mm (6.30 inch)
161 ... 180 mm (6.34 ... 7.09 inch) **0 5**
Initial: 180 mm (7.09 inch)
181 ... 200 mm (7.13 ... 7.87 inch) **0 6**
Initial: 200 mm (7.87 inch)
201 ... 220 mm (7.91 ... 8.66 inch) **0 7**
Initial: 220 mm (8.66 inch)
221…240 mm (8.70 ... 9.45 inch) **1 1**
Initial: 225 mm (8.86 inch)
241…260 mm (9.49 ... 10.24 inch) **1 2**
Initial: 250 mm (9.84 inch)
261…280 mm (10.28 ...11.02 inch) **1 3**
Initial: 280 mm (11.02 inch)
281…300 mm (11.06 ... 11.81 inch) **1 4**
Initial: 285 mm 11.22 inch)
301…320 mm (11.85 ... 13.00 inch) **1 5**
Initial: 315 mm (12.40 inch)
321…340 mm (12.64 ... 13.39 inch) **1 6**
Initial: 340 mm (13.39 inch)
341…360 mm (13.43 ... 14.17 inch) **2 0**
Initial: 360 mm (14.17 inch)
361…380 mm (14.21 ... 14.96 inch) **2 1**
Initial: 380 mm (14.96 inch)
381…400 mm (14.99 ... 15.75 inch) **2 2**
Initial: 400 mm (15.75 inch)
401…420 mm (15.79 ... 16.54 inch) **2 3**
Initial: 420 mm (16.54 inch)
421…440 mm (16.57 ... 17.32 inch) **2 4**
Initial: 440 mm (17.32 inch)
441…460 mm (17.36 ... 18.11 inch) **2 5**
Initial: 460 mm (18.11 inch)
461…480 mm (18.15 ... 18.90 inch) **2 6**
Initial: 465 mm (18.30 inch)
481…500 mm (18.94 ... 19.69 inch) **2 7**
Initial: 500 mm (19.69 inch)

Selection and Ordering data

Article No. — Ord. Code

SITRANS TS500 **7MC751-**

Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3G, screwed in, with extension

501 ... 550 mm (19.72 ... 21.65 inch) **3 1**
Initial: 510 mm (20.08 inch)
551 ... 600 mm (21.69 ... 23.62 inch) **3 2**
Initial: 600 mm (23.62 inch)
601 ... 650 mm (23.66 ... 25.59 inch) **3 3**
Initial: 650 mm (25.59 inch)
651 ... 700 mm (25.63 ... 27.56 inch) **3 4**
Initial: 700 mm (27.56 inch)
701 ... 750 mm (27.6 ... 29.53 inch) **3 5**
Initial: 750 mm (29.53 inch)
751 ... 800 mm (29.57 ... 31.50 inch) **3 6**
Initial: 800 mm (31.50 inch)
801 ... 850 mm (31.53 ... 33.46 inch) **3 7**
Initial: 850 mm (33.46 inch)
851 ... 900 mm (33.50 ... 35.43 inch) **4 1**
Initial: 900 mm (35.43 inch)
901 ... 950 mm (35.47 ... 37.40 inch) **4 2**
Initial: 950 mm (37.40 inch)
951 ... 1 000 mm (37.44 ... 39.37 inch) **4 3**
Initial: 1 000 mm (39.37 inch)

Extension X
Standard length for Type 2G DIN 43772 (X=131 mm (5.08 inch)) **1**

Extension length - customer specific
enter customer specific length with Y45, see page 2/149 Order Codes
55 ...150 mm (2.17 ... 5.91 inch) **9** **N 1 D**
Initial: 150 mm (5.91 inch)
151 ... 300 mm (5.95 ... 11.81 inch) **9** **N 2 D**
Initial: 300 mm (11.81 inch)

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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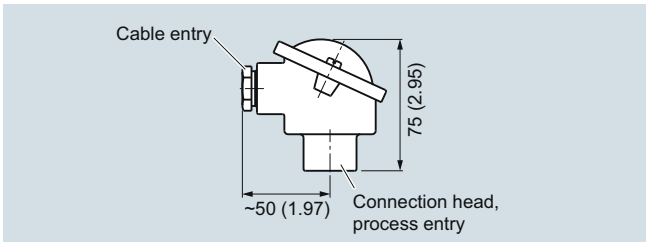
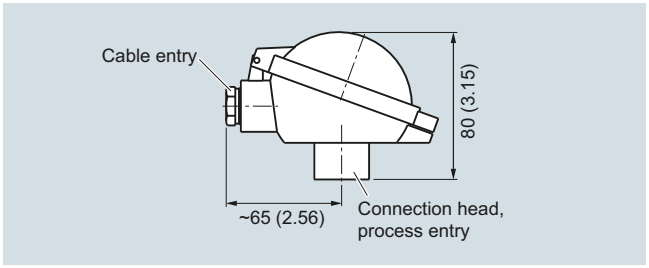
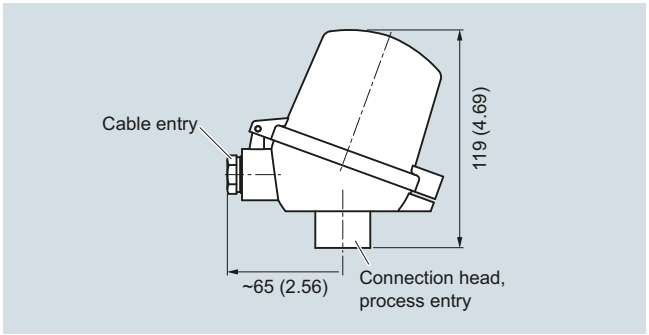
Type 3G, tubular quick with screw socket and extension



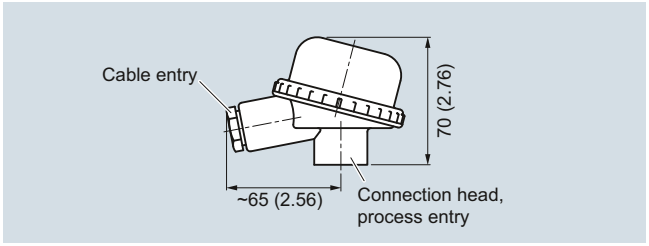
Connection head, aluminum, Type BA0, dimensions in mm (inch)



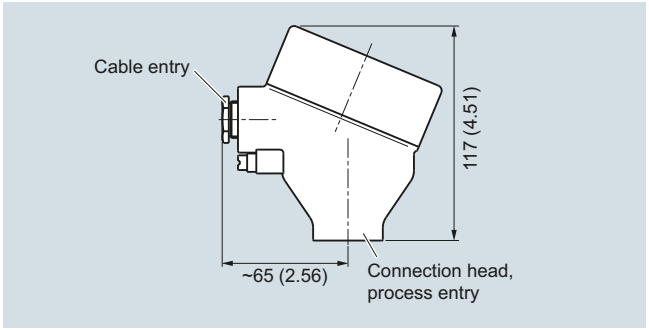
Connection head, aluminum, Type BB0, dimensions in mm (inch)



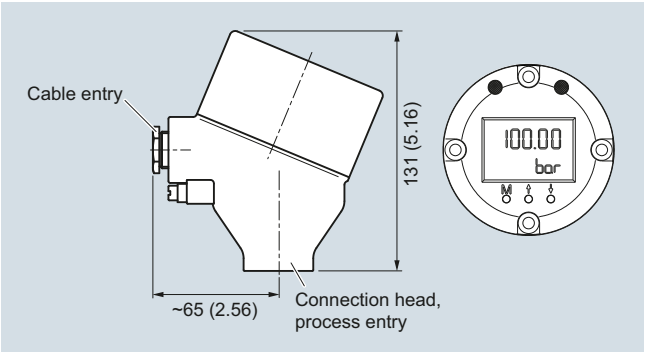
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TS500	**7MC751-**
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3G, screwed in, with extension	- -
Head	
Aluminum head, BA0, flange cover, Standard	**A**
Aluminum head, BB0, low hinged cover, screw connection	**B**
Aluminum head, BC0, high hinged cover, screw connection	**C**
Aluminum head, AG0, screw cover, suitable for Ex d	**G**
Aluminum head, AH0, screw cover, suitable for Ex d, display	**H**
Plastic head, BM0, screw cover	**M**
Plastic head, BP0high hinged cover, screw connection	**P**
Stainless steel head, AU0, screw cover, Ex d	**U**
Stainless steel head, screw cover, Ex d, display	**V**
Sensor	
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88	
Pt100, basis, -50 ... +400 °C (-58 ... +752 °F)	**A**
Pt100, vibration resistant, -50 ... +400 °C (-58 ... +752 °F)	**B**
Pt100, expanded range, -196 ... +600 °C (-321 ... 1112 °F)	**C**
Thermocouple Type J, only class 2, -40 ... +750 °C (-40 ... +1 382 °F)	**J**
Thermocouple Type K, -40 .. . +1 000 °C (-40 ... +1 832 °F)	**K**
Thermocouple Type N, -40 ... + 000 °C (-40 ... +1 832 °F)	**N**
Sensor number/Accuracy	
Single, basic accuracy (Class 2/Class B)	**1**
Single, increased accuracy (Class 1/Class A)	**2**
Single, highest accuracy (Class AA)	**3**
Double, basic accuracy (Class 2/Class B)	**5**
Double, increased accuracy (Class 1/Class A)	**6**
Double, highest accuracy (Class AA)	**7**

Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y44**
Extension length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y45**

Selection and Ordering data	Order code
Options	
Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA, Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
Non sparking "n"	**E04**
Certificates and approvals	
EN10204-3.1 Inspeciton certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate for hydrostatic pressure test	**C31**
EN10204-3.1 Inspection certificate for helium leak test	**C32**
EN10204-3.1 Inspection certificate for surface tear test	**C33**
EN10204-3.1 Inspectiont certificate: visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Harting plug Han 7 D (Non Ex, without mating connector)	**G13**
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	**G20**
with outer earth screw for heads AG0, AH0, AU0 and AV0	**A02**
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	**A03**

You find ordering examples on page 2/109!

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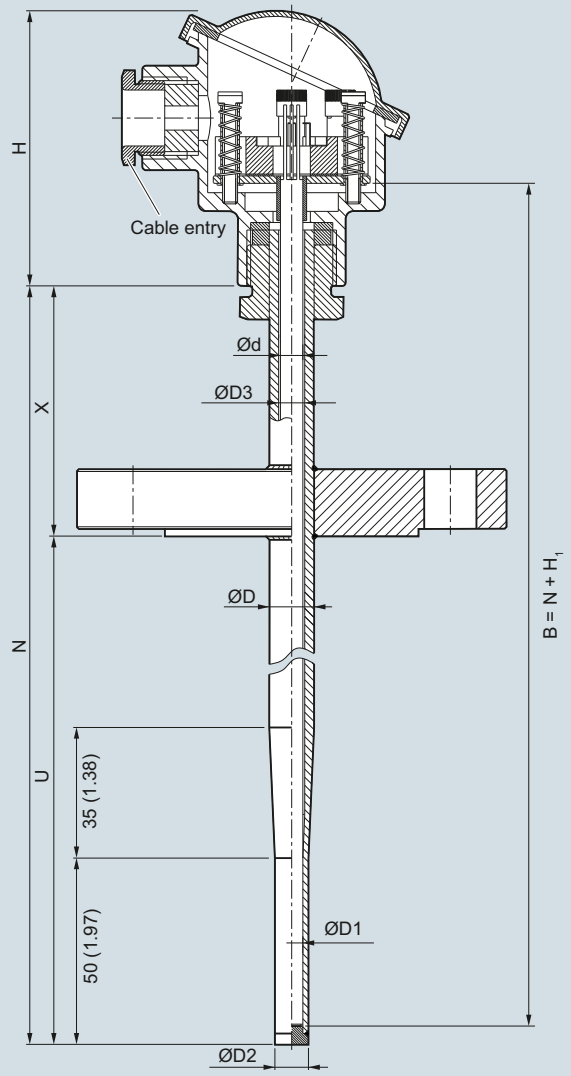
Type 3F, tubular quick with flange and extension

Dimensional drawings



B	Measuring insert length
Ød	Measuring insert outer diameter (6 (0.24))
ØD	Process connection outer diameter
ØD1	Tip internal diameter
ØD2	Tip outer diameter
ØD3	Thermowell internal diameter
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
N	Nominal length
U	Insertion length
X	Extension length

SITRANS TS500, temperature sensors for vessels and pipelines, tubular version for minimal to minimum to medium stress, thermowell as per DIN 43722, Type 3F, with flange, with extension, dimensions in mm (inch)

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Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500 ↗	**7MC751-**	
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3F, with flange, with extension	-	-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Material, in contact with media		
316Ti (1.4571)	1	
316L (1.4404 or 1.4435)	2	
Process connection		
Flange EN; DN25PN40 B1	2 A	
Flange ASME; 1"RF150	2 E	
Flange ASME; 1"RF300	2 F	
Flange ASME; 1.5"RF150	2 G	
Flange ASME; 1.5"RF300	2 H	
Thermowell form		
3F; 12/9 mm (0.47/0.35 inch)	K	
Insertion length U standard		
225 mm (8.86 inch)	1 1	
285 mm (11.22 inch)	1 4	
345 mm (13.58 inch)	1 7	
Insertion length U customer-specific enter customer specific length with Y44, see page 2/153 Order Codes		
121 ... 140 mm (4.76 ... 5.51 inch) Initial: 140 mm (5.51 inch)	0 3	
141 ... 160 mm (5.55 ... 6.30 inch) Initial: 160 mm (6.3 inch)	0 4	
161 ... 180 (6.34 ... 7.09 inch) Initial: 180 mm (7.09)	0 5	
181 ... 200 (7.13 ... 7.87 inch) Initial: 200 mm (7.87 inch)	0 6	
201 ... 220 (7.91 ... 8.66 inch) Initial: 220 mm (8.66 inch)	0 7	
221 ... 240 (8.7 ... 9.45 inch) Initial: 225 mm (8.86 inch)	1 1	
241 ... 260 (9.48 ... 10.24 inch) Initial: 250 mm (9.84 inch)	1 2	
261 ... 280 (10.28 ... 11.02 inch) Initial: 280 mm (11.02 inch)	1 3	
281 ... 300 (11.02 ... 11.81 inch) Initial: 285 mm (11.22 inch)	1 4	
301 ... 320 (11.85 ... 12.6 inch) Initial: 315 mm (12.4 inch)	1 5	
321 ... 340 (12.64 ... 13.39 inch) Initial: 340 mm (13.39 inch)	1 6	
341 ... 360 (13.43 ... 14.17 inch) Initial: 345 mm (13.58 inch)	1 7	
361 ... 380 (14.21 ... 14.96 inch) Initial: 380 mm (14.96 inch)	2 1	
381 ... 400 (15 ... 15.75 inch) Initial: 400 mm (15.75 inch)	2 2	
401 ... 420 (15.79 ... 16.54 inch) Initial: 420 mm (16.54 inch)	2 3	
421 ... 440 (16.57 ... 17.32 inch) Initial: 440 mm (17.32 inch)	2 4	
441 ... 460 (17.36 ... 18.11 inch) Initial: 460 mm (18.11 inch)	2 5	
461 ... 480 (18.15 ... 18.90 inch) Initial: 465 mm (18.30 inch)	2 6	
481 ... 500 (18.94 ... 19.68 inch) Initial: 500 mm (19.68 inch)	2 7	
501 ... 550 mm (19.72 ... 21.65 inch) Initial: 510 mm (20.08 inch)	3 1	
551 ... 600 mm (21.69 ... 23.62 inch) Initial: 600 mm (23.62 inch)	3 2	
601 ... 650 mm (23.66 ... 25.59 inch) Initial: 650 mm (25.59 inch)	3 3	
651 ... 700 mm (25.63 ... 27.56 inch) Initial: 700 mm (27.56 inch)	3 4	
701 ... 750 mm (27.6 ... 29.53 inch) Initial: 750 mm (29.53 inch)	3 5	
751 ... 800 mm (29.57 ... 31.50 inch) Initial: 800 mm (31.50 inch)	3 6	
801 ... 850 mm (31.53 ... 33.46 inch) Initial: 850 mm (33.46 inch)	3 7	
851 ... 900 mm (33.50 ... 35.43 inch) Initial: 900 mm (35.43 inch)	4 1	
901 ... 950 mm (35.47 ... 37.40 inch) Initial: 950 mm (37.40 inch)	4 2	
951 ... 1 000 mm (37.44 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	4 3	
1 001 ... 1 100 mm (39.41 ... 43.31 inch) Initial: 1 100 mm (43.31 inch)	4 4	
Extension		
Standard length for Type 2G DIN 43772 (X=66 mm (2.60 inch))	1	
Extension length - customer specific enter customer specific length with Y45, see page 2/153 Order Codes		
55 ...150 mm (2.17 ... 5.91 inch) Initial: 150 mm (5.91 inch)	9	N 1 D
151 ... 300 mm (5.95 ... 11.81 inch) Initial: 300 mm (11.81 inch)	9	N 2 D

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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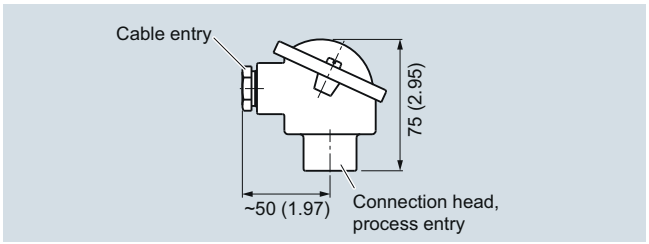
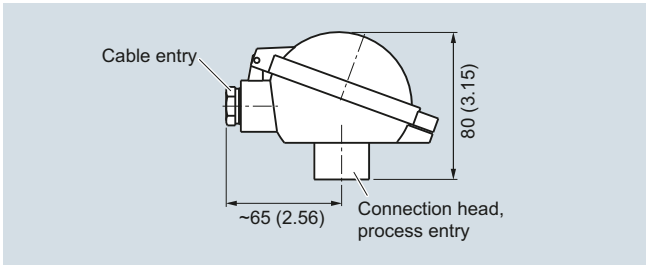
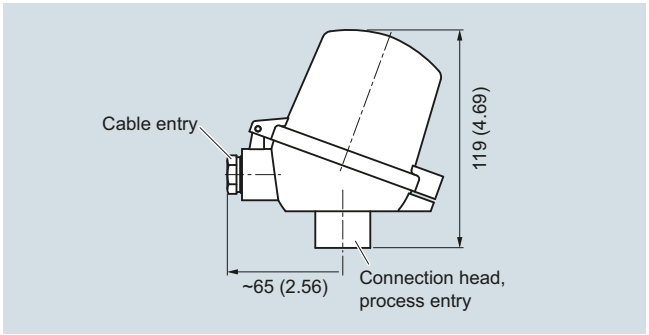
Type 3F, tubular quick with flange and extension



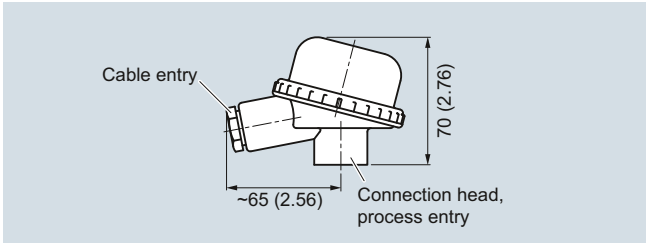
Connection head, aluminum, Type BA0, dimensions in mm (inch)



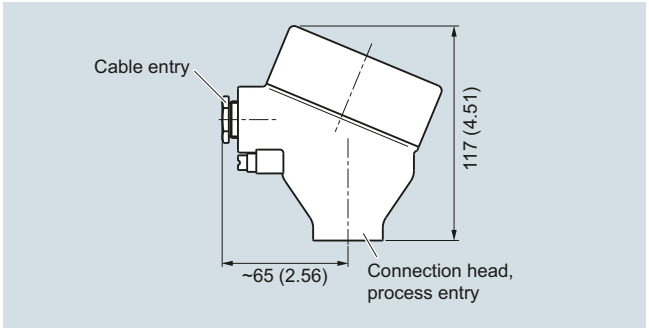
Connection head, aluminum, Type BB0, dimensions in mm (inch)



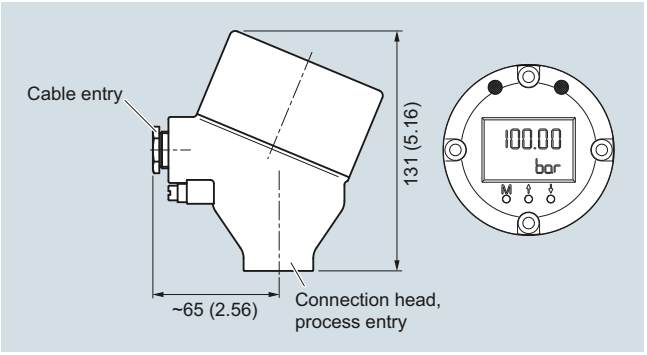
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

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Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500	**7MC751-**	
Tubular thermowell, minimal to medium stress, thermowell as per DIN 43722, Type 3F, with flange, with extension	-	-
Head		
Aluminum head, BA0, flange cover, Standard		**A**
Aluminum head, BB0, low hinged cover, screw connection		**B**
Aluminum head, BC0, high hinged cover, screw connection		**C**
Aluminum head, AG0, screw cover, suitable for Ex d		**G**
Aluminum head, AH0, screw cover, suitable for Ex d, display		**H**
Plastic head, BM0, screw cover		**M**
Plastic head, BP0high hinged cover, screw connection		**P**
Stainless steel head, AU0, screw cover, Ex d		**U**
Stainless steel head, screw cover, Ex d, display		**V**
Sensor		
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88		
Pt100, basis, -50 ... +400 °C (-58 ... +752 °F)		**A**
Pt100, vibration.resistant, -50 ... +400 °C (-58 ... +752 °F)		**B**
Pt100, expanded range, -196 ... +600 °C (-321 ... +1112 °F)		**C**
Thermocouple Type J, only class 2, -40 ... +750 °C (-40 ... +1 382 °F)		**J**
Thermocouple Type K, -40 .. . +1 000 °C (-40 ... +1 832 °F)		**K**
Thermocouple Type N, -40 ... +1 000 °C (-40 ... 1 832 °F)		**N**
Sensor number/Accuracy		
Single, basic accuracy (Class 2/Class B)		**1**
Single, increased accuracy (Class 1/Class A)		**2**
Single, highest accuracy (Class AA)		**3**
Double, basic accuracy (Class 2/Class B)		**5**
Double, increased accuracy (Class 1/Class A)		**6**
Double, highest accuracy (Class AA)		**7**

Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y44**
Extension length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y45**

Selection and Ordering data	Order code
Options	
Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA, Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
Non sparking "n"	**E04**
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate for hydrostatic pressure test	**C31**
EN10204-3.1 Inspection certificate for helium leak test	**C32**
EN10204-3.1 Inspection certificate for surface tear test	**C33**
EN10204-3.1 Inspection certificate: visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Harting plug Han 7 D (Non Ex, without mating connector)	**G13**
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	**G20**
with outer earth screw for heads AG0, AH0, AU0 and AV0	**A02**
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	**A03**

You find ordering examples on page 2/109!

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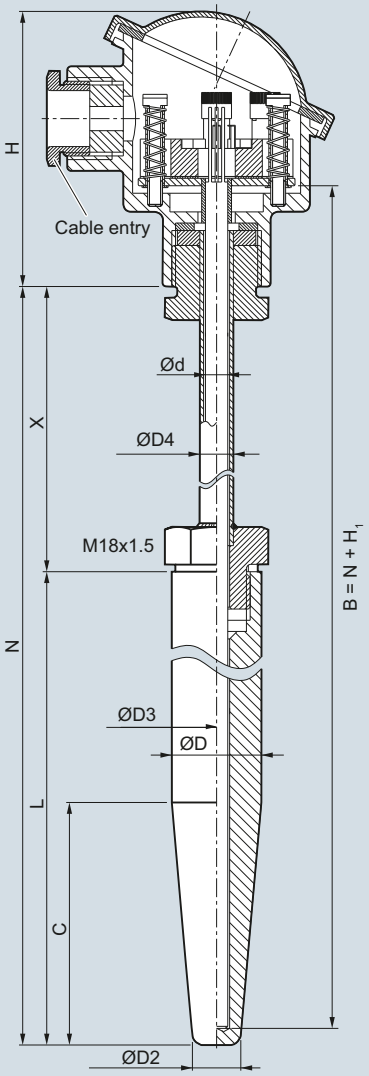
Type 4+4F barstock thermowell, with extension

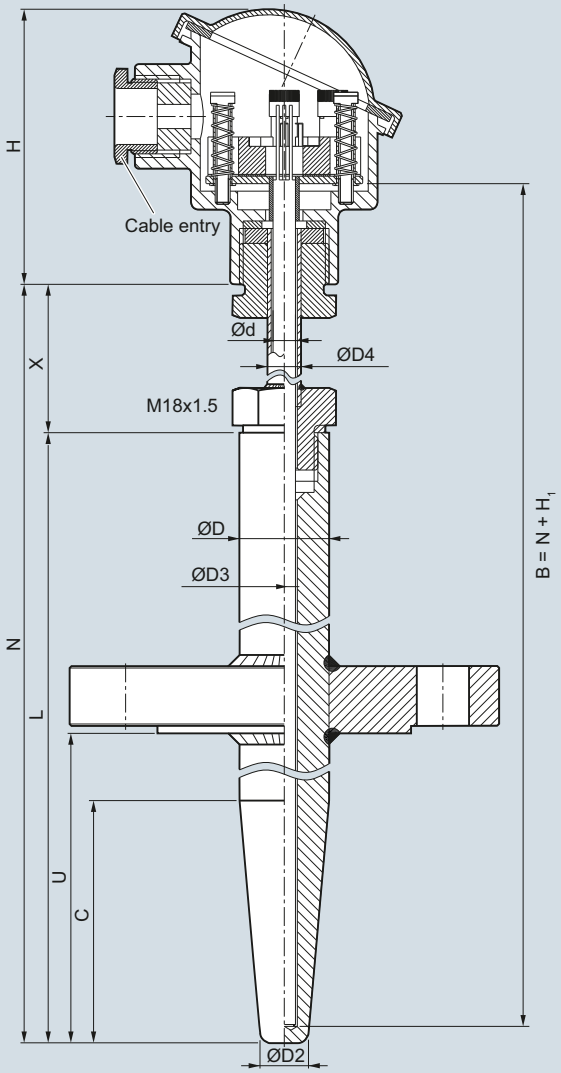
Dimensional drawings

SITRANS TS500, temperature sensors for vessels and pipelines, barstock version for minimal to minimum to medium stress, thermowell as per DIN 43722.



B	Measuring insert length
C	Cone length = U_{min}
Ød	Measuring insert outer diameter (6 (0.24))
ØD	Process connection outer diameter
ØD2	Tip outer diameter
ØD3	Thermowell internal diameter
ØD4	Extension outer diameter
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
L	Length of thermowell
N	Nominal length
X	Extension length

Thermowell type 4, for welding in, with extension, dimensions in mm (inch)



B	Measuring insert length
C	Cone length = U_{min}
Ød	Measuring insert outer diameter (6 (0.24))
ØD	Process connection outer diameter
ØD2	Tip outer diameter
ØD3	Thermowell internal diameter
ØD4	Extension outer diameter
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
L	Length of thermowell
N	Nominal length
U	Insertion length (Standard: U = L - 70 (2.76))
X	Extension length

Thermowell type 4F, with flange, with extension, dimensions in mm (inch)

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Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500 ↗	**7MC752-**	
Barstock thermowell for medium to highest stress, thermowell as per DIN 43722, Type 4, for welding in, Type 4F with flange, with extension	-	-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Material, in contact with media		
316Ti (1.4571)	1	
316L (1.4404 or 1.4435)	2	
1.7335 heat resistant, only for versions without flange	3	
1.5415 heat resistant, only for versions without flange	4	
Process connection		
Without (for welding in)	0 N	
Flange DN25 PN40 B1	2 A	
Flange 1"RF150	2 E	
Flange 1"RF300	2 F	
Flange 1.5"RF150	2 G	
Flange 1.5"RF300	2 H	
Thermowell form		
For flanged types only: specify with Y44 in plain text if insertion length "U" deviates from standard (U=L-70 mm (2.76 inch)). (Min: U = C; Max; U= L-50 mm (1.97 inch)) Specify with Y46 in plain text if protective tube length "L" deviates from standard		
Type 4/4F, L=140 (5.51 inch), C= 65 (3.74 inch), Ød=24 (0.95 inch), Ød=6 (0.24 inch)	A 0 0	
Type 4/4F, L=200 (7.87 inch), C= 65 (3.74 inch), Ød=24 (0.95 inch), Ød=6 (0.24 inch)	B 0 0	
Type 4/4F, L=200 (7.87 inch), C= 125 (4.92 inch), Ød=24 (0.95 inch), Ød=6 (0.24 inch)	D 0 0	
Type 4/4F, L=260 (10.24 inch), C= 125 (4.92 inch), Ød=24 (0.95 inch), Ød=6 (0.24 inch)	E 0 0	
Extension X		
as per DIN 43772 (X=149 mm (5.87 inch))		1
Extension X, customer-specific enter customer specific length with Y45, see page 2/157 Order Codes		
55 ...150 mm (2.17 ... 5.91 inch) Initial: 150 mm (5.91 inch)		9 N 1 D
151 ... 300 mm (5.95 ... 11.81 inch) Initial: 300 mm (11.81 inch)		9 N 2 D
301 ... 450 mm (11.85 ... 17.72 inch) Initial: 450 mm (17.72 inch)		9 N 3 D
451 ... 600 mm (17.86 ... 23.62 inch) Initial: 600 mm (23.62 inch)		9 N 4 D
601 ... 750 mm (23.66 ... 29.53 inch) Initial: 750 mm (29.53 inch)		9 N 5 D
751 ... 900 mm (29.57 ... 45.43 inch) Initial: 900 mm (45.43 inch)		9 N 6 D
901 ... 1 050 mm (45.47 ... 41.34 inch) Initial: 1 050 mm (41.34 inch)		9 N 7 D

Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500	**7MC752-**	
Barstock thermowell for medium to highest stress, thermowell as per DIN 43722, Type 4, for welding in, Type 4F with flange, with extension	-	-
Head		
Aluminum head, BA0, flange cover, Standard		A
Aluminum head, BB0, low hinged cover, screw connection		B
Aluminum head, BC0, high hinged cover, screw connection		C
Aluminum head, AG0, screw cover, suitable for Ex d		G
Aluminum head, AH0, screw cover, suitable for Ex d, display		H
Plastic head, BM0, screw cover		M
Plastic head, BP0high hinged cover, screw connection		P
Stainless steel head, AU0, screw cover, Ex d		U
Stainless steel head, AV0, screw cover, Ex d, display		V
Sensor		
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88		
Pt100, basis, -50 ... +400 °C (-58 ... +752)		A
Pt100, vibration resistant, -50 ... +400 °C (-58 ... +752)		B
Pt100, expanded range, -196 ... 600 °C (-321 ... +1 112)		C
Thermocouple Type K, -40 ... +1 000 °C (-40 ... +1 832)		K
Thermocouple Type J, only class 2, -40 ... +750 °C (-40 ... +1 382)		J
Thermocouple Type N, -40 ... +1 000 °C (-40 ... +1 832)		N
Sensor number/Accuracy		
Single, basic accuracy (Class 2/Class B)		1
Single, increased accuracy (Class 1/Class A)		2
Single, highest accuracy (Class AA)		3
Double, basic accuracy (Class 2/Class B)		5
Double, increased accuracy (Class 1/Class A)		6
Double, highest accuracy (Class AA)		7

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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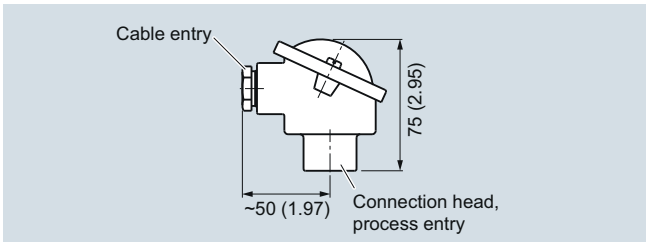
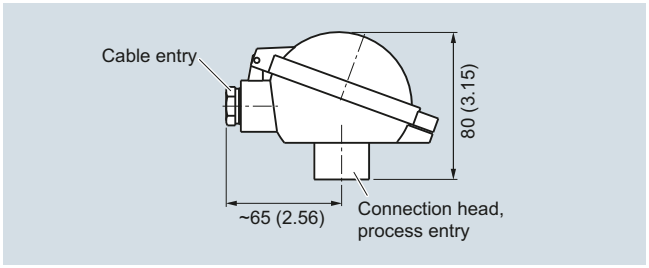
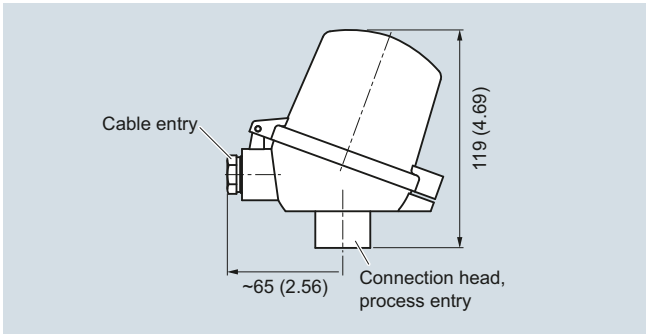
Type 4+4F barstock thermowell, with extension



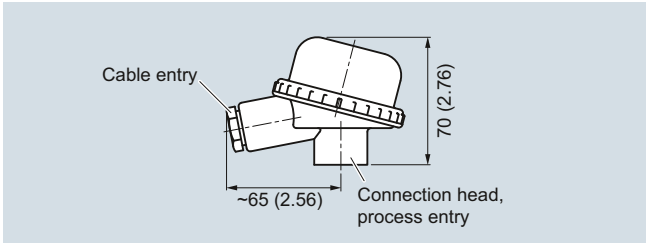
Connection head, aluminum, Type BA0, dimensions in mm (inch)



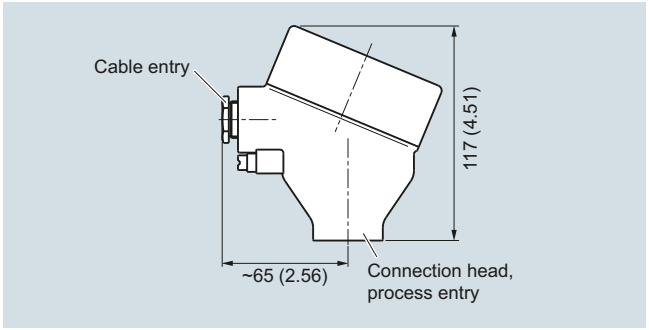
Connection head, aluminum, Type BB0, dimensions in mm (inch)



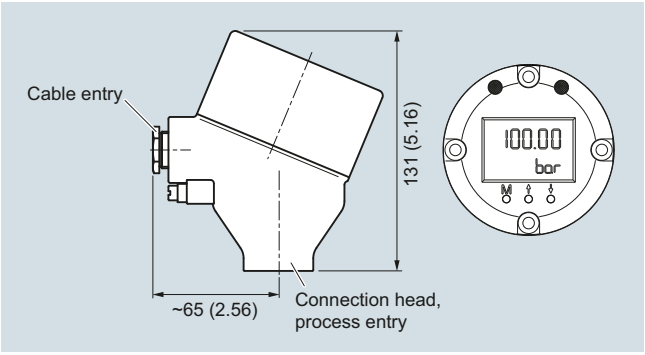
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

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Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Insertion length customer-specific	**Y44**
Select range, enter desired length in plain text Insertion length U deviating from standard; (Min: U = C; Max; U= L-50 mm (1.97 inch)), no entry = standard length (U=L-70 mm (2.76 inch))	
Extension length customer-specific	**Y45**
Select range, enter desired length in plain text (No entry = standard length)	
Options	
Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter	
Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA, Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
Non sparking "n"	**E04**
Certificates and approvals	
EN10204-3.1 Inspection certificate for materials coming into contact with media	**C12**
EN10204-3.1 Inspection certificate for hydrostatic pressure test	**C31**
EN10204-3.1 Inspection certificate for helium leak test	**C32**
EN10204-3.1 Inspection certificate for surface tear test	**C33**
EN10204-3.1 Inspection certificate: visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
NACE Standard MR-01-75 compliance	**C50**
ISO 9001 grease-free (cleaned for e.g. oxygen applications)	**C51**

Selection and Ordering data	Order code
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Harting plug Han 7 D (Non Ex, without mating connector)	**G13**
Connection head with ½ NPT thread without cable gland, for AU0 and AH0 only IP66	**G20**
with outer earth screw for heads AG0, AH0, AU0 and AV0	**A02**
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	**A03**

You find ordering examples on page 2/109!

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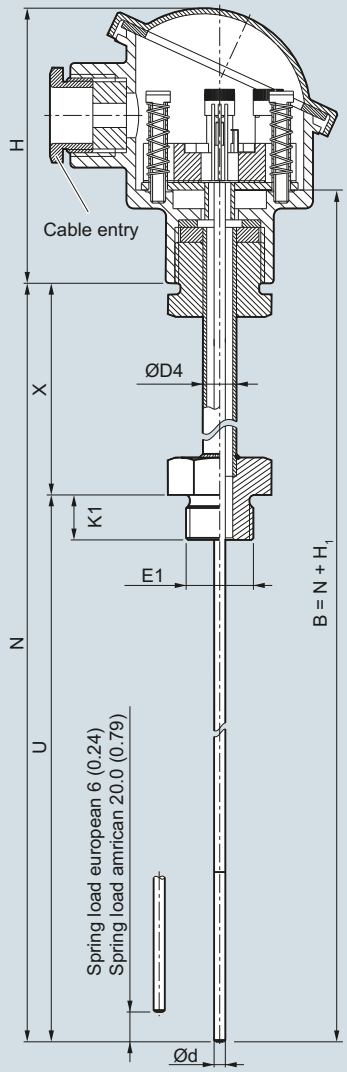
2

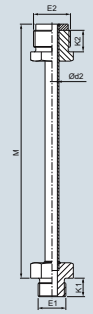
Dimensional drawings



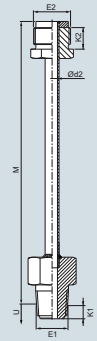
B	Measuring insert length
Ød	Measuring insert outer diameter
ØD4	Extension outer diameter
E1	Process connection, thread size
H	Head height
H_1	Type Axx = 41 (1.61) Type Bxx = 26 (1.02)
K1	Screw depth
N	Nominal length
U	Insertion length
X	Extension length

Recommended rebound = inside length of the protective tube + 3 (0.12)

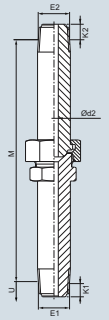
SITRANS TS500, temperature sensors for vessels and pipings, temperature sensors for installation in existing thermowells, suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001 with extension European or American types, dimensions in mm (inch)



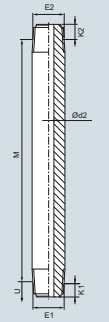
Neck tube (1, 2, 3), ajustable, european, cylindrical, dimensions in mm (inch)



Neck tube NPT (1, 2, 3), ajustable, european, conical, dimensions in mm (inch)



Neck tube NUN, ajustable, conical, european (5), american (8), dimensions in mm (inch)



Neck tube, nipple, non ajustable, conical, european (4), american (6), dimensions in mm (inch)

[1] Numerics 1 ... 8: s. Selection and Ordering data option extension page 2/159

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Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500 ↗	**7MC7500-**	
Temperature sensors for installation in existing thermowells, suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001 with extension European or American types		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Model		
existing thermowells	**1**	
Thread type		
G½" (½"BSPF) (not for American type)	**C**	
NPT½"	**J**	
M14x1.5 (not for American type)	**T**	
M18x1.5 (not for American type)	**U**	
Insertion ength U free length, standard lengths		
110 mm (4.33 inch)	**B 1**	
140 mm (5.51 inch)	**B 2**	
200 mm (7.87 inch)	**C 1**	
260 mm (10.24 inch)	**C 2**	
410 mm (16.14 inch)	**E 1**	
Insertion U free length, customer-specific		
enter customer specific length with Y44, see page 2/161 Order Codes		
10 ... 100 mm (0.39 ... 3.94 inch) Initial: 100 mm (3.94 inch)	**A 0**	
101 ... 200 mm (3.98 ... 7.87 inch) Initial: 200 mm (7.87 inch)	**B 0**	
201 ... 300 mm (7.91 ... 11.81 inch) Initial: 300 mm (11.81 inch)	**C 0**	
301 ... 400 mm (11.85 ... 15.75 inch) Initial: 400 mm (15.75 inch)	**D 0**	
401 ... 500 mm (15.79 ... 19.68 inch) Initial: 500 mm (19.68 inch)	**E 0**	
501 ... 600 mm (19.72 ... 23.62 inch) Initial: 600 mm (23.62 inch)	**F 0**	
601 ... 800 mm (23.66 ... 31.50 inch) Initial: 800 mm (31.50 inch)	**G 0**	
801 ... 1 000 mm (31.54 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	**H 0**	
1 001 ... 1 250 mm (39.41 ... 49.21 inch) Initial: 1 250 mm (49.21 inch)	**J 0**	
1 251 ... 1 500 mm (49.25... 59.05 inch) Initial: 1 500 mm (59.05 inch)	**K 0**	
Measurement tip diameter		
6 mm (0.24 inch)	**6**	
8 mm (0.31 inch) (with sleeve)	**8**	
10 mm (0.39 inch) (with sleeve)	**0**	

Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500	**7MC7500-**	
Temperature sensors for installation in existing thermowells, suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001 with extension European or American types		
Extension X		
European type: X=65 (M=80 mm) (3.15 inch) adjustable	**1**	
European type: X=139 mm (5.47 inch) (M=155 mm (6.10 inch)) adjustable (DIN standard length for L=110)	**2**	
European type: X=149 mm (5.87 inch) (M=165 mm (6.50 inch)) adjustable	**3**	
European type:NIP, =150 mm (5.91 inch) not adjustable (NPT½")	**4**	
European type: X=150 mm (5.91 inch) NUN adjustable (NPT½")	**5**	
American type: X=74 mm (2.91 inch) integrated sensor spring, NIP, not adjustable (NPT½")	**6**	
American type: X=150 mm (5.91 inch) integrated sensor spring NUN adjustable (NPT½")	**8**	
Extension X, customer-specific		
enter customer specific length with Y45, see page 2/161 Order Codes		
55 ...150 mm (2.17 ... 5.91 inch) Standard: 150 mm (5.91 inch)	**9**	**N 1**
151 ... 300 mm (5.95 ... 11.81 inch) Standard: 300 mm (11.81 inch)	**9**	**N 2**
301 ... 450 mm (11.85 ... 17.72 inch) Standard: 450 mm (17.72 inch)	**9**	**N 3**
Model		
European type (M24 adjustable)		**D**

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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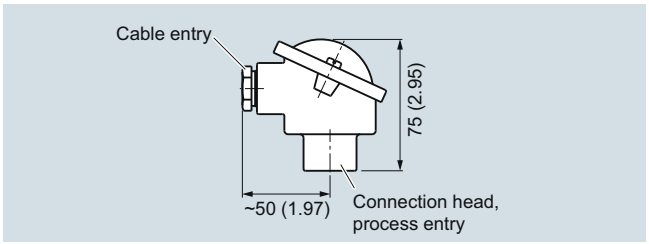
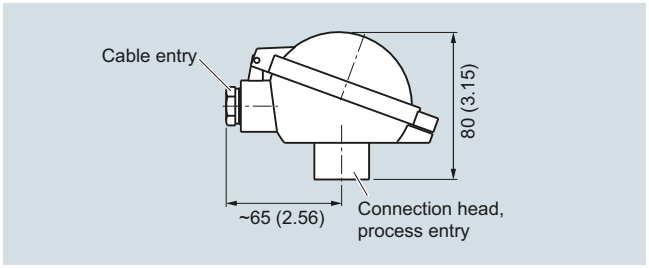
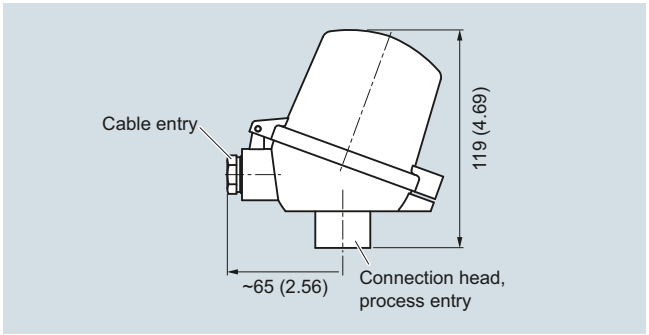
For the installation of existing protective tubes



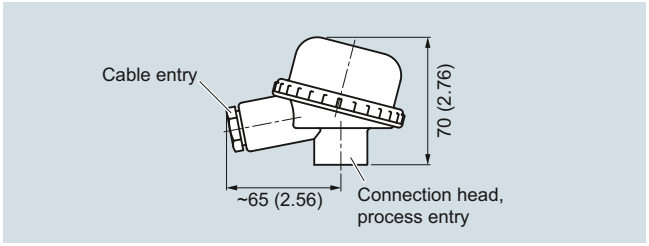
Connection head, aluminum, Type BA0, dimensions in mm (inch)



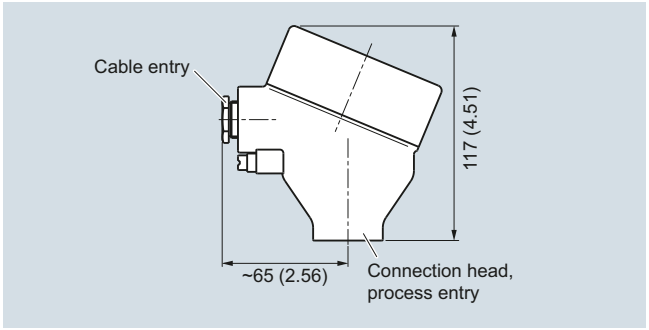
Connection head, aluminum, Type BB0, dimensions in mm (inch)



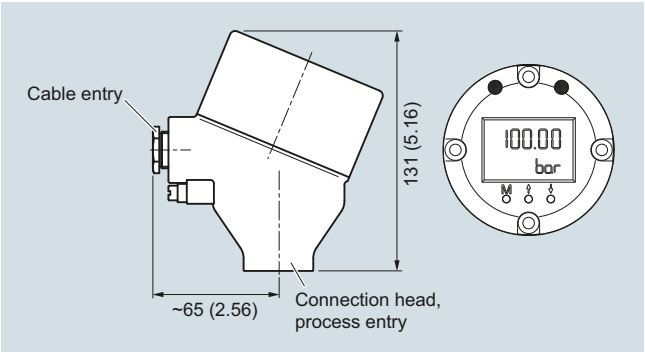
Connection head, aluminum, Type BC0, plastic, type BP0, dimensions in mm (inch)



Connection head, plastic, Type BM0, dimensions in mm (inch)



Connection head, aluminum, Type AG0, stainless steel, Type AU0, dimensions in mm (inch)



Connection head with 4-20 mA display, aluminum, Type AH0, stainless steel, Type AV0, dimensions in mm (inch)

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Selection and Ordering data	Article No.	Ord. Code
SITRANS TS500 **Temperature sensors for installation in existing thermowells, suitable for thermowells as per DIN 43772 as well as ASME B40.9-2001 with extension European or American types**	**7MC7500-**	-
Head		
Aluminum head, BA0, flange cover, Standard		**A**
Aluminum head, BB0, low hinged cover, screw connection		**B**
Aluminum head, BC0, high hinged cover, screw connection		**C**
Aluminum head, AG0, screw cover, suitable for Ex d		**G**
Aluminum head, AH0, screw cover, suitable for Ex d, display		**H**
Plastic head, BM0, screw cover		**M**
Plastic head, BP0high hinged cover, screw connection		**P**
Stainless steel head, AU0, screw cover, Ex d		**U**
Stainless steel head, AV0, screw cover, Ex d, display		**V**
Sensor		
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88		
Pt100, Basis, -50 ... +400 °C (-58 ... +752 °F)		**A**
Pt100, vibration resistant, -50 ... +400 °C (-58 ... +752 °F)		**B**
Pt100, expanded range, -196 ... +600 °C (-321 ... +1112 °F)		**C**
Thermocouple Type J, only class 2, -40 ... +750 °C (-40 ... +1 382 °F)		**J**
Thermocouple Type K, -40 .. . +1 000 °C (-40 ... +1 832 °F)		**K**
Thermocouple Type N, -40 ... +1 000 °C (-40 ... +1 832 °F)		**N**
Sensor number/Accuracy		
Single, basic accuracy (Class 2/Class B)		**1**
Single, increased accuracy (Class 1/Class A)		**2**
Single, highest accuracy (Class AA)		**3**
Double, basic accuracy (Class 2/Class B)		**5**
Double, increased accuracy (Class 1/Class A)		**6**
Double, highest accuracy (Class AA)		**7**

Selection and Ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order Code.	
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y44**
Extension length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y45**

Selection and Ordering data	Order code
Options Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i (ATEX), 4 ... 20 mA, Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
Non sparking "n"	**E04**
Certificates and approvals	
EN10204-3.1 Factory certificate: visual, measurement and functional inspection	**C34**
EN 10204-2.1: Declaration of compliance with the order	**C35**
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**
Further options	
Connection form, flying leads (for the direct transmitter assembly, delivery without screws and springs)	**G01**
M12 plug (in combination with 1x Pt100 and/or transmitter, Non-Ex)	**G12**
Harting plug Han 7 D (Non Ex, without mating connector)	**G13**
Connection head with ½" NPT thread without cable gland, for AU0 and AH0 only IP66	**G20**
with outer earth screw for heads AG0, AH0, AU0 and AV0	**A02**
with inner earth screw for heads BC0, AG0, AH0, AU0 and AV0	**A03**

You find ordering examples on page 2/109!

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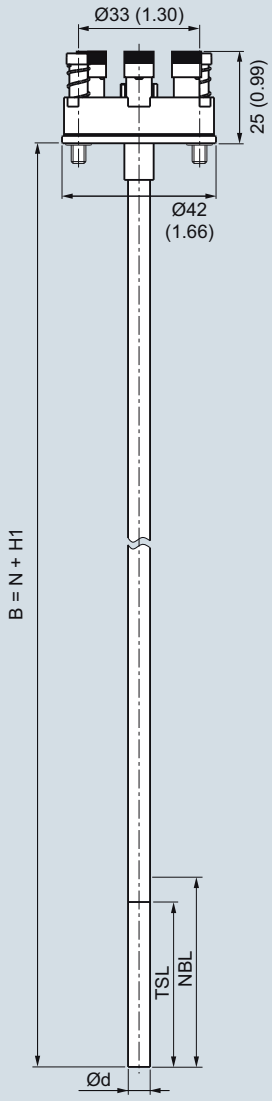
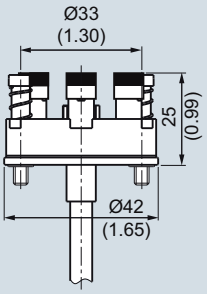
2

Dimensional drawings

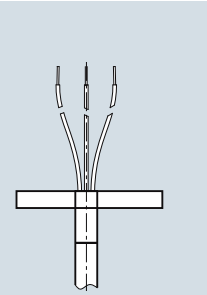


B	Measuring insert length
Ød	Measuring insert outer diameter
N	Nominal length
NBL	Non-bending length
TSL	Temperature-sensitive length

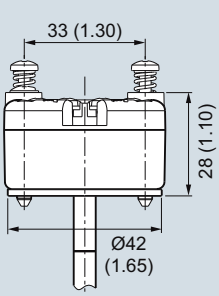
SITRANS TSinsert measuring inserts for temperature sensors, replaceable, mineral-insulated design
European type (DIN ceramic base), spring load approx. 8 mm (0.31 inch)
Cold End types: see drawings on right side, dimensions in mm (inch)



Cold End type, ceramic base, dimensions in mm (inch)



Cold End type, free wire ends, dimensions in mm (inch)



Cold End type, built-on transmitter, dimensions in mm (inch)

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Selection and Ordering data	Article No.
SITRANS TSinsert for temperature sensors, replaceable, mineral-insulated design, European or American type	**7MC701** ■ - ■■■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Measurement tip diameter	
6 mm (0.24 inch)	**6**
8 mm (0.31 inch) (with sleeve)	**8**
10 mm (0.39 inch) (with sleeve)	**0**
Type	
European type - DIN ceramic base	**1**
European type - DIN flying leads, absolutely necessary with built-on transmitter	**2**
American type - ANSI (nipple spring)	**5**
Sensor	
Please note: The accuracy class range can be lower than the measuring range. For more information, see page 2/88	
Pt100, basis, -50 ... +400 °C (-58 ... +752 °F)	**A**
Pt100, vibration-resistant, -50 ... +400 °C (-58 ... +752 °F)	**B**
Pt100, expanded range, -196 ... +600 °C (-321 ... +1112 °F)	**C**
Thermocouple Type J, -40 ... +750 °C (-40 ... 1 382 °F)	**J**
Thermocouple Type K, -40 .. . +1 000 °C (-40 ... +1 832 °F)	**K**
Thermocouple Type N, -40 ... 1+ 000 °C (-40 ... +1 832 °F)	**N**
Sensor number/Accuracy	
Single, basic accuracy (Class 2/Class B)	**A**
Single, increased accuracy (Class 1/Class A)	**B**
Single, highest accuracy (Class AA)	**C**
Double, basic accuracy (Class 2/Class B)	**D**
Double, increased accuracy (Class 1/Class A)	**E**
Double, highest accuracy (Class AA)	**F**
Measuring insert length B, standard	
145 mm (6.89 inch)	**1 3**
205 mm (8.07 inch)	**1 7**
275 mm (10.83 inch)	**2 1**
315 mm (12.40 inch)	**2 3**
345 mm (13.58 inch)	**2 4**
375 mm (14.76 inch)	**2 5**
405 mm (15.94 inch)	**2 7**
435 mm (17.13 inch)	**2 0**
555 mm (21.85 inch)	**3 5**
585 mm (23.03 inch)	**3 6**

Selection and Ordering data	Article No.
SITRANS TSinsert for temperature sensors, replaceable, mineral-insulated design, European or American type	**7MC701** ■ - ■■■■■■
Measuring insert length B, customer-specific	
specify length with Y44, s. page 2/165	
50 ... 100 mm (1.97 ... 3.94 inch) Initial: 100 mm (3.94 inch)	**1 1**
101 ... 150 mm (3.98 ... 5.91 inch) Initial: 145 mm (5.71 inch)	**1 3**
151 … 200 mm (5.95 ... 7.87 inch) Initial: 200 mm (7.87 inch)	**1 5**
201 … 250 mm (7.91 ... 9.84 inch) Initial: 205 mm (8.07 inch)	**1 7**
251 … 300 mm (9.88 ... 11.81 inch) Initial: 275 mm (10.83 inch)	**2 1**
301 … 350 mm (11.85 ... 13.78 inch) Initial: 315 mm (12.40 inch)	**2 3**
351 … 400 mm (13.82 ... 15.75 inch) Initial: 375 mm (14.76 inch)	**2 5**
401 … 450 mm (15.79 ... 17.72 inch) Initial: 405 mm (15.94 inch)	**2 7**
451 … 500 mm (17.76 ... 19.68 inch) Initial: 500 mm (19.68 inch)	**3 1**
501 … 550 mm (19.72 ... 21.65 inch) Initial: 525 mm (20.67 inch)	**3 3**
551 … 600 mm (21.69 ... 23.92 inch) Initial: 555 mm (21.85 inch)	**3 5**
601 … 700 mm (23.66 ... 27.56 inch) Initial: 655 mm (25.79 inch)	**3 7**
701 … 800 mm (27.60 ... 31.50 inch) Initial: 735 mm (28.94 inch)	**4 1**
801 … 900 mm (31.54 ... 35.43 inch) Initial: 825 mm (32.48 inch)	**4 3**
901 … 1 000 mm (35.47 ... 39.37 inch) Initial: 950 mm (37.40 inch)	**4 5**
1 001 … 1 500 mm (39.41 ... 59.05 inch) Initial: 1 250 mm (49.21 inch)	**4 7**

Additional configurations on page after next page!

You find ordering examples on page 2/109!

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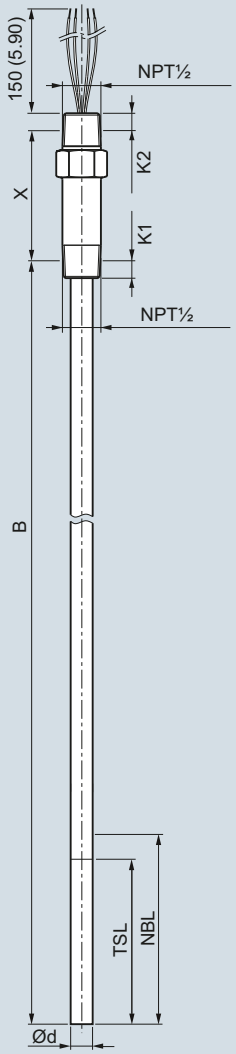

B	Measuring insert length
Ød	Measuring insert outer diameter
K1	Screw depth
K2	Screw depth
N	Nominal length
NBL	Non-bending length
TSL	Temperature-sensitive length
X	Extension length

SITRANS TSinsert, measuring inserts for temperature sensors, replaceable, mineral-insulated design
American type, spring load approx. 21 mm (0.83 inch)

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Selection and Ordering data	Order code
Further designs	
Add "**-Z**" to Article No. and specify Order Code.	
Measeuring insert length B Select range, enter desired length in plain text (No entry = standard length)	**Y44**
Options Add "**-Z**" to Article No. and add options, separate extensions with "+".	
Built-in head transmitter Measuring range to be set must be specified with plain text data "Y01".	
SITRANS TH100, 4 ... 20 mA, Pt100	**T10**
SITRANS TH100 Ex i (ATEX), 4 ... 20 mA, Pt100	**T11**
SITRANS TH200, 4 ... 20 mA, Universal	**T20**
SITRANS TH200 Ex i(ATEX), 4 ... 20 mA, Universal	**T21**
SITRANS TH300, HART, Universal	**T30**
SITRANS TH300 Ex i (ATEX), HART, Universal	**T31**
SITRANS TH400 PA, Universal	**T40**
SITRANS TH400 PA Ex i, Universal	**T41**
SITRANS TH400 FF, Universal	**T45**
SITRANS TH400 FF Ex i, Universal	**T46**
Explosion protection	
Intrinsic safety "ia", "ic" (please select Ex i version of the optional transmitter)	**E01**
Flameproof enclosure "d"; dust protection through housing "t" only with connection heads code AG0, AH0, AU0, AV0, without cable gland (please select non-Ex version of the optional transmitter)	**E03**
for SITRANS TS500 with protection type Ex n	**E04**
Designation, calibration	
Stainless steel TAG plate , enter lettering in plain text	**Y15**
Plant calibration per 1 point, enter temperature in plain text	**Y33**
Transmitter options	
Transmitter, enter complete setting in plain text (Y01:+/-NNNN ... +/-NNNN C,F)	**Y01**
Enter measuring point (max. 8 characters) in plain text	**Y17**
Transmitter, enter measuring point description (max. 16 characters) in plain text	**Y23**
Transmitter, enter measuring point text (max. 32 characters) in plain text	**Y24**
Transmitter, enter bus address in plain text	**Y25**
Transmitter, fail-safe value 3.6 mA (instead of 22.8 mA)	**U36**
Transmitter with a SIL 2 conformity	**C20**
Transmitter with a SIL 2/3 conformity	**C23**
Transmitter test protocol (5 points)	**C11**

You find ordering examples on page 2/109!

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Temperature transmitters for mounting in the connection head

Overview

The following temperature transmitters are available for mounting in the connection head:

SITRANS TH100

Programmable two-wire temperature transmitter (4 to 20 mA), without electrical isolation, only for Pt100 resistance thermometers.

SITRANS TH200

Programmable two-wire temperature transmitter (4 to 20 mA), electrical isolation for resistance thermometers and thermocouple elements.

SITRANS TH300

Two-wire temperature transmitter with HART communication (4 to 20 mA), electrical isolation for resistance thermometers and thermocouple elements.

SITRANS TH400

Temperature transmitter with PROFIBUS PA or FOUNDATION Fieldbus connection, electrical isolation for resistance thermometers and thermocouple elements.

Note:

- SITRANS TH100/TH200/TH300/TH400 can be fitted instead of the terminal block or in the high hinged cover. Additional fitting only possible in high hinged cover.
- If using intrinsically-safe temperature sensors any installed temperature transmitters must also be intrinsically-safe.

Selection and Ordering Data

Detailed information on the transmitters can be found for the respective products under "Transmitters for temperature“.

Transmitter to be fitted	Order code
To order the sensor with a built-in temperature transmitter, add "**-Z**" to the Article No. of the sensor, and supplement by the following Order code:	
SITRANS TH100, only for Pt100	
• Without Ex	**T10**
• EEx ia IIC and EEx n for zone 2	**T11**
• FM	**T13**
SITRANS TH200	
• Without Ex	**T20**
• EEx ia IIC and EEx n for zone 2	**T21**
• FM (IS, I, NI)	**T23**
SITRANS TH300	
• Without Ex	**T30**
• EEx ia IIC und EEx n for zone 2	**T31**
• FM (IS, I, NI)	**T33**
SITRANS TH400 PA	
• Without Ex	**T40**
• EEx ia	**T41**
SITRANS TH400 FF	
• Without Ex	**T45**
• EEx ia	**T46**
• Customer-specific setting of the built-in transmitter (specify settings in plain text)	**Y11**

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Questionnaire for temperature sensors (resistance thermometers and thermocouples)

General information

Customer: .....

Address: .....

Contact partner: .....

Purchasing dept.: ..... Tel.: .....

Sales dept.: ..... Tel.: .....

Process dept.: ..... Tel.: .....

Inquiry: .....

Quotation: .....

Place and date: .....

Operating conditions

1. Application: .....
   (e.g. exhaust gas measurement)
2. Location: .....
   (e.g. pipe bend, tank)
3. Mounting position: .....
   (e.g. vertical, 45° against flow)
4. Temperature (measuring point): .....
   Operating temperature: .....
   Temperature range: .....
5. Medium: .....
6. Pressure: .....
   Nominal pressure: .....
   Operating pressure: .....
7. Flow: .....
8. Vibrations: .....
9. Miscellaneous: .....
   (e.g. vessel or pipe materials, PTFE lining)

Ambient conditions

(e.g. seawater atmosphere, chemical plant)

Definition: .....

.....

.....

Special information

1. Mounting of temperature transmitter in connection head:
   .....
   .....
2. Packaging regulations: .....
   .....
   .....

Miscellaneous

Please additionally provide the following: rough sketch, installation diagram, section of drawing, photo

Sensor design

1. Measuring element .....
   (type and standard) (e.g. Pt100 or TC type K)

1.1. Tolerance: .....

1.2. Design: .....
   (e.g. Pt100 or 2, 3 or 4-wire system)

1.3. Degree of protection/type of protection: .....

2. Protective fitting: .....

2.1. Protective tube: .....
   (dimensions/material)

2.2. Mounting: .....
   (dimensions/material)

2.3. Neck tube: .....
   (dimensions/material)

2.4. Mounting length/nominal length: .....

3. Material certificates: .....

4. Connection: .....

4.1. Connection head/box: .....

4.2. Cable: .....
   (dimensions/insulation/standard)

4.3. Other: .....
   .....

5. Tests: .....
   .....

6. Accessories: .....
   .....

7. Supplementary requirements: .....
   .....

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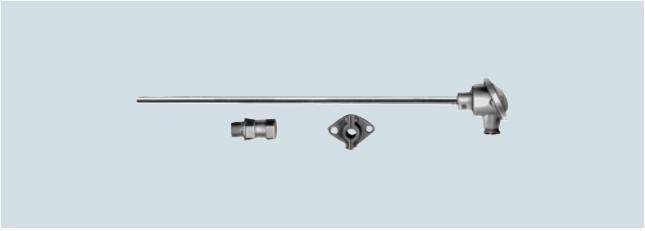
Flue gas resistance thermometers with connection head

Overview



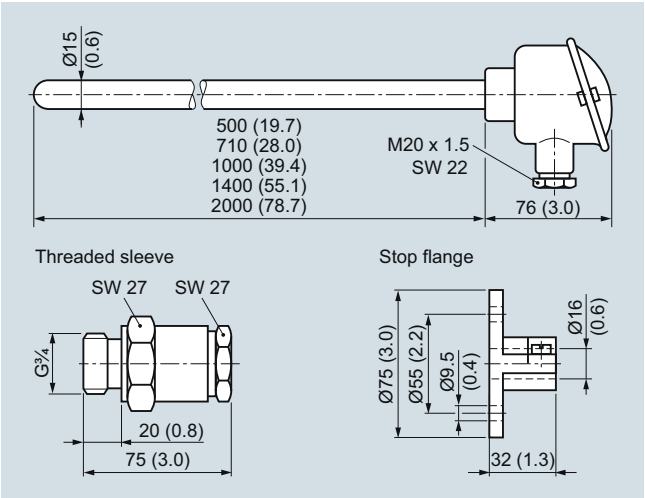
The flue gas resistance thermometer with connection head is suitable for the temperature range from -50 to +600 °C (-58 to +1112 °F) and can also be supplied with a built-in temperature transmitter.

Please order mounting flange or threaded sleeve separately.

Technical specifications

Design	According to DIN 43764: Thermometer without mount
Protective tube	
• Form	1, DIN 43772; cylindrical, 15 mm diameter (0.59 inch), wall thickness 3 mm (0.12 inch), seamless
• Material	St 35.8, mat. No. 1.0305, enamelled
• Loading capacity	1 bar (14.5 psi) above atmospheric, to DIN 43772
Measuring insert	Replaceable, with measuring insert tube (8 mm diameter (0.31 inch)) made of stainless steel; terminal block with clamping springs

Dimensional drawings



Flue gas resistance thermometer with connection head, dimensions in mm (inches)

Selection and Ordering data

	Article No.
Flue gas resistance thermometer Measuring resistor (winding) embedded in ceramic 1 Pt100 measuring resistor, three-wire circuit	
Mounting length/ mm (inch): / Weight/ kg (lb):	
• 500 (19.7) / 0.9 (1.98)	↗ **7MC1000 - 1BA2** ■
• 710 (28.0) / 1.1 (2.43)	↗ **7MC1000 - 2BA2** ■
• 1000 (39.4) / 1.5 (3.31)	↗ **7MC1000 - 3BA2** ■
• 1400 (55.1) / 1.9 (4.19)	↗ **7MC1000 - 4BA2** ■
• 2000 (78.7) / 2.7 (5.95)	↗ **7MC1000 - 5BA2** ■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Connection head, form B, made of cast light alloy, with 1 cable inlet and	
• Screw cover	**1**
• Standard hinged cover	**4**
• High hinged cover	**6**
Further designs Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	Order code
Special version, specify in plain text	**Y98**
Process number for special version	**Y99**
TAG plate made of stainless steel specify TAG No. in plain text	**Y15**
Calibration carried out at one point, specify desired temperature in plain text (order equivalent number of times for several calibration points). If optional head transmitters are integrated, please note that all calibration points are located in the set measuring range. If the points are located outside the standard measuring range, a Y11 addition is always required.	**Y33**
Accessories	Article No.
Mounting flange Adjustable, to DIN 43734; Material: GTW 35, mat. No. 0.8035, for protective tube diameter 15 mm (0.59 inch), 0.3 kg (0.66 lb)	**7MC2998 - 5CA**
Gas-tight threaded sleeve Material: 9 SMnPb 28 Material No. 1.0718, for protective tube diameter 15 mm (0.59 inch), 0.4 kg (0.88 lb)	
• G¾ internal thread with gasket	**7MC2998 - 5DA**
• G½ internal thread with gasket	**7MC2998 - 5DC**

To order a temperature transmitter installed in the connection head and transmitters for SIL applications, see "Temperature transmitters for mounting in the connection head" (page 2/166).

Individual parts: Measuring inserts, see "Accessories".on page 2/170

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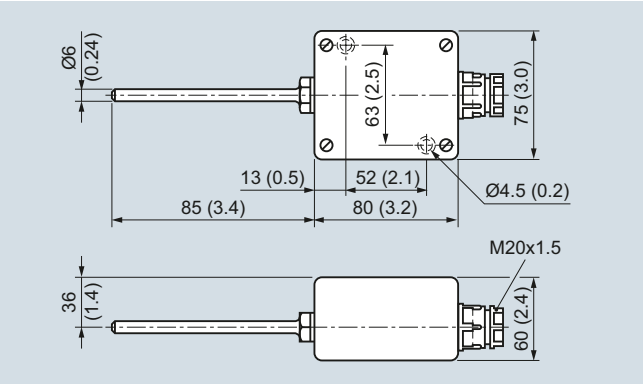
Overview

The resistance thermometer for damp rooms is suitable for a temperature range from -30 to +60 °C (-22 to +140 °F).

Technical specifications

Protective tube	Made of stainless steel
Connection head	Made of cast light alloy, with cable bushing; made of plastic on request
Measuring insert	1 or 2 Pt measuring resistors to DIN EN 60751, connection in three-wire or two-wire system, class B
Degree of protection	IP65 acc. to DIN EN 60529

Dimensional drawings



Resistance thermometer for damp rooms, dimensions in mm (inches)

Selection and Ordering data

	Article No.
Resistance thermometer for damp rooms stainless steel protective tube	
• with one Pt100 measuring resistor 0.1 kg (0.22 kg)	► **7MC1027-1AA**
• with two Pt100 measuring resistors 0.1 kg (0.22 kg)	**7MC1027-1AB**
Further designs Please add "-**Z**" to Article No. and specify Order code(s) and plain text.	Order code
Special version, specify in plain text	**Y98**
Process number for special version	**Y99**
TAG plate made of stainless steel specify TAG No. in plain text	**Y15**
Calibration carried out at one point, specify desired temperature in plain text (order equivalent number of times for several calibration points). If optional head transmitters are integrated, please note that all calibration points are located in the set measuring range. If the points are located outside the standard measuring range, a Y11 addition is always required.	**Y33**

► Available ex stock

To order a temperature transmitter installed in the connection head and transmitters for SIL applications, see "Temperature transmitters for mounting in the connection head" (page 2/166).

Note:

Additional fitting of head mounted transmitter of SITRANS TH series is possible.

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Welding-type protective tube

Welding-type protective tube for high-pressure resistance thermometers to DIN 43 767, without neck tube, without connection head

- Tapered shank with cylindrical welding stubs
- For measuring insert tube with 6 mm (0.24 inch)
- OD female thread M18 x 1.5 (including steel screw plug)

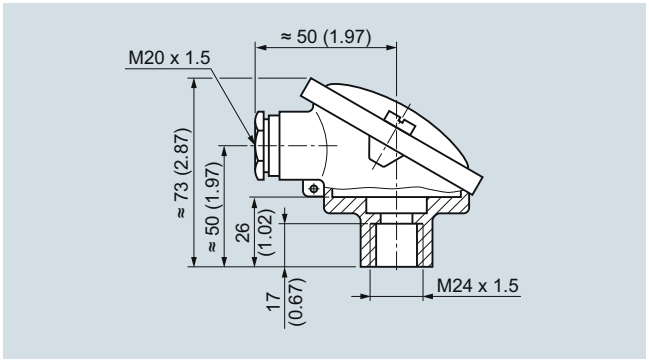
Neck tube

Neck tube for high-pressure screw-in resistance thermometer

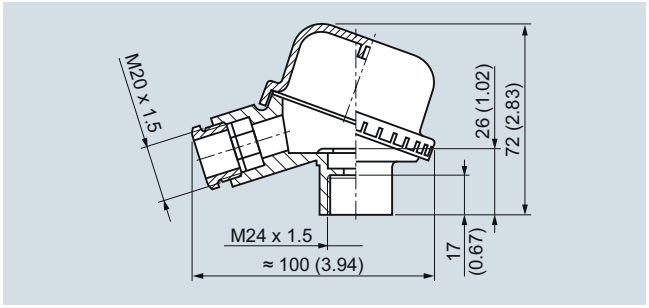
- Made of stainless steel, mat. No. 1.4571
- With threads at both ends
- For measuring insert tube with 6 mm (0.24 inch) OD

Dimensional drawings

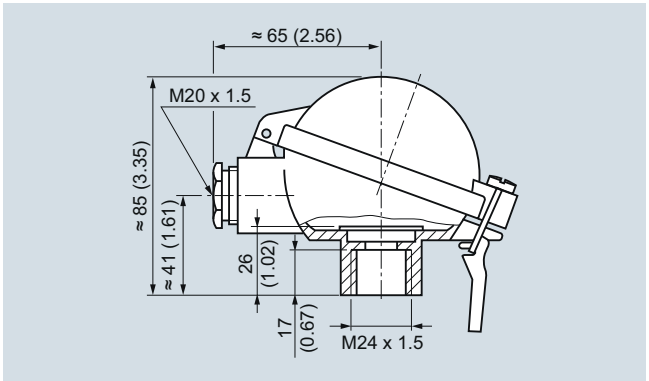
Connection heads for low and high-pressure resistance thermometers, flue gas and flange-type resistance thermometers



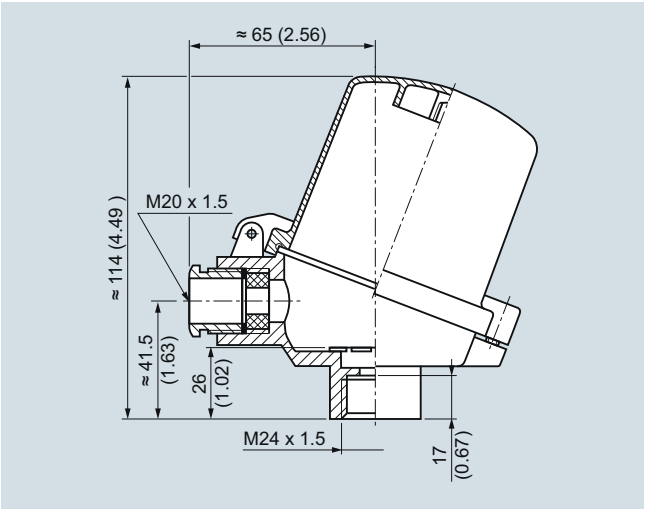
Connection head, form B, degree of protection IP54, made of cast light alloy, with screw cover, dimensions in mm (inches)



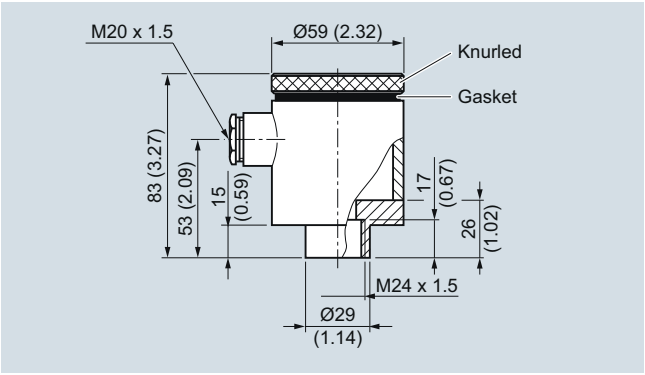
Connection head, form B, degree of protection IP54, made of plastic, with screw cover, dimensions in mm (inches)



Connection head, form B, degree of protection IP65, made of cast light alloy, with standard hinged cover, dimensions in mm (inches)



Connection head, form B, degree of protection IP65, made of cast light alloy, with high hinged cover, dimensions in mm (inches)



Connection head, form B-VA, degree of protection IP65, made of stainless steel, with screw cover, dimensions in mm (inches)

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Selection and Ordering data

Article No.

Welding protective tube for high-pressure resistance thermometers according to DIN 43767, without neck tube, without connection head

tapered shank with cylindrical welding stub, for measuring insert tube with 6 mm (0.24 inch) OD; female thread M18 x 1.5 (including steel screw plug)

Up to 540 °C (1004 °F)
Protective tube to DIN 43772, form 4 made of 13 CrMo 44, mat. No. 1.7335

Cone length C mm (inch)	Protective tube length L mm (inch)	Weight mm (inch)	
• 65 (2.56)	140 (5.51)	0.3 (0.66)	**7MC1905-1GA**
• 65 (2.56)	200 (7.87)	0.5 (1.1)	**7MC1905-2GA**
• 125 (4.92)	200 (7.87)	0.5 (1.1)	**7MC1905-3GA**
• 125 (4.92)	260 (10.24)	0.6 (1.32)	**7MC1905-4GA**

Up to 550 °C (1022 °F)
Protective tube to DIN 43772, form 4 made of 6 CrNiMoTi 17122, mat. No. 1.4571

Cone length C mm (inch)	Protective tube length L mm (inch)	Weight kg (lb)	
• 65 (2.56)	140 (5.51)	0.3 (0.66)	**7MC1905-1DA**
• 65 (2.56)	200 (7.87)	0.5 (1.1)	**7MC1905-2DA**
• 125 (4.92)	200 (7.87)	0.5 (1.1)	**7MC1905-3DA**
• 125 (4.92)	260 (10.24)	0.6 (1.32)	**7MC1905-4DA**

Selection and Ordering data

Article No.

Neck tube for high-pressure screw-in resistance thermometer

made of stainless steel, mat. No. 1.4571, with thread at both ends, for measuring insert tube with 6 mm (0.24 inch) OD

Neck tube length mm (inch)	Total length of the resistance thermometer, without connection head mm (inch)	Protective tube length mm (inch)	Weight kg (lb)	
• 135 (5.31)	395 (15.55)	260 (10.24)	0.14 (0.31)	**7MC1906-1AA**
• 165 (6.50)	305/365 (12.01/14.37)	140/200 (5.51/7.87)	0.15 (0.33)	**7MC1906-2AA**
• 195 (7.68)	395 (15.55)	200 (7.87)	0.18 (0.40)	**7MC1906-3AA**
• 225 (8.86)	365 (14.37)	140 (5.51)	0.20 (0.44)	**7MC1906-4AA**
• 255 (10.04)	395 (15.55)	140 (5.51)	0.22 (0.49)	**7MC1906-5AA**

Selection and Ordering data

Article No.

Connection heads for low-pressure, high-pressure, flue gas and flange-type resistance thermometers

Connection head, form B, degree of protection IP54

Made of cast light alloy, with screw cover and with 1 cable bushing, weight: 0.14 kg (0.31 lb) — **7MC1907-1BA**

Made of plastic, with screw cover and with 1 cable bushing, weight: 0.08 kg (0.18 lb) — **7MC1907-1BK**

Connection head, form B, degree of protection IP65

Weight: 0.3 kg (0.66 lb)

Made of cast light alloy, with standard hinged cover and with 1 cable bushing — **7MC1907-1BF**

Made of cast light alloy, with high hinged cover and with 1 cable bushing — **7MC1907-1BL**

Connection head, form B-VA, degree of protection IP65

Made of stainless steel, with screw cover and with 1 cable bushing, weight: 0.65 kg (1.43 lb) — **7MC1907-1BV**

Accessories

for connection head, form B, degree of protection IP65

Quick-release clamp (degree of protection of connection head reduced to IP54) Weight: 0.02 kg (0.04 lb) — **7MC1907-1BS**

Connection heads with a drilled hole of 15.5 mm diameter (0.61 inch) instead of the female thread M24 x 1.5 on request.

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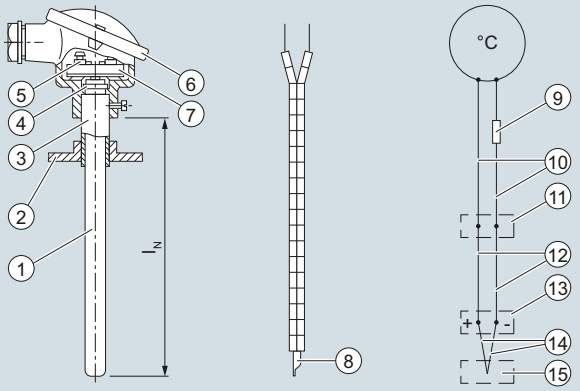
Technical description

Design

A thermocouple comprises

- The thermocouple element (sensor) and
- The mounting and connection parts required in each case.

The thermocouple element is formed by two conductors of dissimilar metals or metal alloys which are soldered or welded together at one end, the measuring junction:



Cross section of thermocouple | Thermocouple element with insulating beads | Connection diagram

l_N Nominal length

1. Ceramic protective tube
2. Locating flange
3. Support tube
4. Retaining ring
5. Terminal
6. Connection head
7. Terminal block
8. Temperature sensor
9. Balancing resistor
10. Lead
11. Cold junction
12. Extension lead
13. Connection point
14. Thermocouple element with positive and negative legs
15. Measuring junction

Thermocouple element

Function

Measuring principle of the thermocouple element

If the measuring junction is exposed to a temperature different from that at the free ends of the thermocouple, a voltage (the thermoelectric voltage, Seebeck effect) is produced at these free ends. The magnitude of the thermoelectric voltage depends on the difference in temperature between the measuring junction and the free ends, and on the combination of materials in the thermocouple. Since a thermocouple always measures a temperature difference, the free ends of the thermocouple must be connected to a reference junction (cold junction) and held constant at a known temperature.

Calibration data for thermoelectric voltages and permissible deviations

The calibration data and the permissible deviations for commonly used thermocouples are defined isee Technical Data, Table "Calibration data for thermoelectric voltages and error limits").

The thermocouples Cu-CuNi and Fe-CuNi to DIN 43710 are used for replacement purposes. Thermocouples of class 2 are supplied as standard. For more accurate measurements, thermocouples are available with half the DIN tolerance or with a test certificate. The tolerances only apply to the condition upon delivery.

During operation at high temperatures, the tolerances of the thermocouples may change due to absorption of foreign matter, oxidation or evaporation of alloy components.

Mode of operation

The thermocouples are extended from the connection point to a point whose temperature is as constant as possible (the cold junction) by means of extension leads.

The extension leads have the same color code as the associated thermocouple elements; the positive pole is marked in red. Correct polarity must be ensured since otherwise large errors will occur. Up to 200 °C, the same calibration data and tolerances apply to the extension leads as to the corresponding thermo-couples.

The influence of temperature changes at the cold junction can be balanced by means of a compensating circuit, e.g. a compensating box. The reference temperature is 0 (32 °F) or 20 °C (68 °F).

It is also possible to keep the cold junctions at a constant temperature of 50, 60 or 70 °C (122, 140 or 158 °F) using a thermostat (for several measuring junctions).

The connections from the cold junction to the measuring or process instrument are made using copper leads. With energy-consuming instruments such as indicators or multipoint recorders, the complete measuring circuit (thermocouple, extension lead and copper lead) must be balanced in the operating condition using a resistor. SITRANS T transmitters and process recorders for connection to thermocouple elements have a built-in compensating circuit for balancing the effect of the ambient temperature on the cold junction. Lead balancing is not necessary in this case because of the high input impedance.

Protection fitting/protective tubes

The thermocouple can be protected against mechanical stress and chemical attack by a ceramic or metal protective tube which may be mounted using flanges, screwed glands or by welding into the pipeline or tank. The thermocouple element terminates in the connection head.

Installation examples with specification of the recommended thermocouples and protective tube materials are listed on pages "Technical Data"and "Installation Examples".

Owing to the different operating conditions, no guarantee can be given for protective fittings. The manufacturer is responsible for damages and measuring errors caused by wrong installation in compliance with the General Terms of Delivery if the instruments have been installed by the manufacturer and if the specifications for the operating conditions furnished by the customer were correct and sufficiently detailed.

Thermocouple elements are very compatible since it is almost always possible to adapt them in shape and size to the particular problem. The temperature-responsive part is almost point-shaped. Thermocouple elements are therefore particularly suitable for measuring rapidly changing temperatures.

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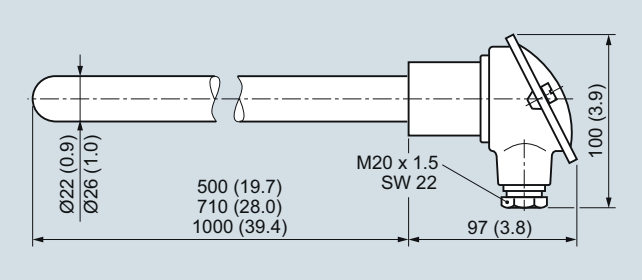
Overview

The straight thermocouple together with a metal protective tube is suitable for temperatures from 0 to 1250 °C (32 to 2282 °F) and can be supplied with a built-in temperature transmitter.

Technical specifications

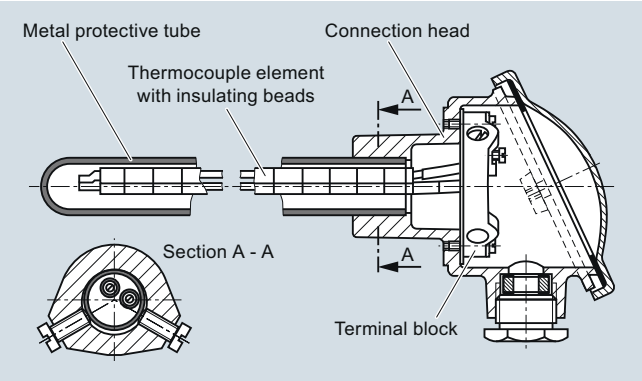
Thermocouples	Ni Cr/Ni type K
• Number	1 or 2
• Leg diameter	2 ... 3 mm (0.08 ... 0.12 inch)
• Insulation of legs	Insulating beads
Protective tube	Metal
Connection head	Form A, DIN 43729; made of cast light alloy, with one cable bushing

Dimensional drawings



Straight thermocouple, dimensions in mm (inches)

Design



Straight thermocouple with base-metal element Ni Cr/Ni with metal protective tube

Selection and Ordering data

	Article No.
Straight thermocouple with Ni Cr/Ni thermocouple (type K) with metallic protective tube ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7MC2000 - ■■■ 0 ■**
Nominal length Enter customer specific length with Y44, see Order Codes below	
300 ... 500 mm (11.81 ... 19.68 inch) Initial: 500 mm (19.68 inch)	**1**
501 ... 710 mm (19.72 ... 27.95 inch) Initial: 710 mm (27.95 inch)	**2**
711 ... 1000 mm (27.11 ... 39.37 inch) Initial: 1 000 mm (39.37 inch)	**3**
1 001 ... 1 400 mm (39.41 ... 55.12 inch) Initial: 1 400 mm (55.12 inch)	**4**
1 401 ... 2 000 mm (55.16 ... 78.74 inch) Initial: 2 000 mm (78.74 inch)	**5**
Protective tube	
to 1 000 °C (1 832 °F); X 10 CrAl 24, material No. 1.4762 Ø 22 mm x 2 mm (0.87 inch x 0.079 inch) Leg diameter 2 mm (0.08 inch)	**D**
to 1 100 °C; (2 012 °F) X 18 CrN28, material No. 1.4749 Ø 26 x 4 mm (1.02 x 0.16 inch) Leg diameter 3 mm (0.12 inch)	**E**
to 1 200 °C; (2 192 °F) X 15 CrNi Si 24 19, material No. 1.4841 Ø 22 x 2 mm (0.87 x 0.079 inch) Leg diameter 2 mm (0.08 inch)	**F**
to 1 250 °C; (2 282 °F) CrAl 205 (Kantal AF), material No. 1.4767 Ø 22 x 2 mm (0.87 x 0.079 inch) Leg diameter 3 mm (0.12 inch)	**H**
Number of thermocouples	
1 thermocouple	**C**
2 thermocouples	**D**
Connection head, form A,	
made of cast light alloy, with 1 cable inlet and - screw cover	**1**
- high hinged cover	**6**

Selection and Ordering data

	Order code
Straight thermocouple with Ni Cr/Ni thermocouple (type K) for temperatures to 1250 °C (2282 °F); with metallic protective tube	
Further designs Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Special version, specify in plain text	**Y98**
Process number for special version	**Y99**
TAG plate made of stainless steel specify TAG No. in plain text	**Y15**
Calibration carried out at one point, specify desired temperature in plain text (order equivalent number of times for several calibration points).	**Y33**
Insertion length customer-specific Select range, enter desired length in plain text (No entry = standard length)	**Y44**

To order a temperature transmitter installed in the connection head, see "Temperature transmitters for installation in the connection head" (page 2/166).

Installation of a transmitter is only possible here in the versions with a high hinged cover (7MC2000-....6).

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Straight thermocouples Individual parts and accessories

Selection and Ordering data		Article No.
Metallic protective tubes for straight thermocouple elements according to DIN 43733		
X 10 CrAl 24, material No. 1.4762		
∅ 22 mm x 2 mm (∅ 0.87 inch x 0.08 inch), 0.55 ... 1.10 kg (1.21 ... 2.42 lb), dished		
Nominal length in mm (inch):	Protective tube length in mm (inch):	
• 500 (19.7)	520 (20.5)	**7MC2900-1DA**
• 710 (28.0)	730 (28.7)	**7MC2900-2DA**
• 1000 (39.4)	1020 (40.2)	**7MC2900-3DA**
X 10 CrAl 24, material No. 1.4749		
∅ 26 mm x 4 mm (∅ 1.02 inch x 0.16 inch), 1.25 ... 2.20 kg (2.76 ... 4.85 lb), dished		
Nominal length in mm (inch):	Protective tube length in mm (inch):	
• 500 (19.7)	520 (20.5)	**7MC2900-1EC**
• 710 (28.0)	730 (28.7)	**7MC2900-2EC**
• 1000 (39.4)	1020 (40.2)	**7MC2900-3EC**
X 15 CrNiSi 25 20, material No. 1.4841		
∅ 22 mm x 2 mm (∅ 0.87 inch x 0.08 inch), 1.05 kg (2.31 lb), dished		
Nominal length in mm (inch):	Protective tube length in mm (inch):	
• 1000 (39.4)	1020 (40.2)	**7MC2900-3FA**
CrAl 205 (Megapyr), material No. 1.4767		
∅ 22 mm x 2 mm (∅ 0.87 inch x 0.05 inch), 0.55 ... 1.10 kg (1.21 ... 2.42 lb)		
Nominal length in mm (inch):	Protective tube length in mm (inch):	
• 500 (19.7)	520 (20.5)	**7MC2900-1HA**
• 710 (28.0)	730 (28.7)	**7MC2900-2HA**
• 1000 (39.4)	1020 (40.2)	**7MC2900-3HA**

Selection and Ordering data		Article No.
Thermocouples elements for straight thermocouple according to DIN 43733		
Base-metal thermocouple with insulating beads		
Wire diameter 3 mm (0.12 inch) Ni Cr/Ni, to 1000 °C (maximal 1300 °C), (to 1832 °F (max. 2372 °F)) 0.55 ... 2.10 kg (1.21 ... 4.63 lb)		
Nominal length *L1* in mm (inch):	Thermocouple length *L2* in mm (inch):	
• 500 (19.7)	540 (21.3)	**7MC2903-1CA**
• 710 (28.0)	750 (29.5)	**7MC2903-2CA**
• 1000 (39.4)	1040 (40.9)	**7MC2903-3CA**

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Connection heads

Connection head, form A (without terminal block and terminals) for protective tube diameter (bore = protective tube diameter +0.5 mm (0.02 inch))

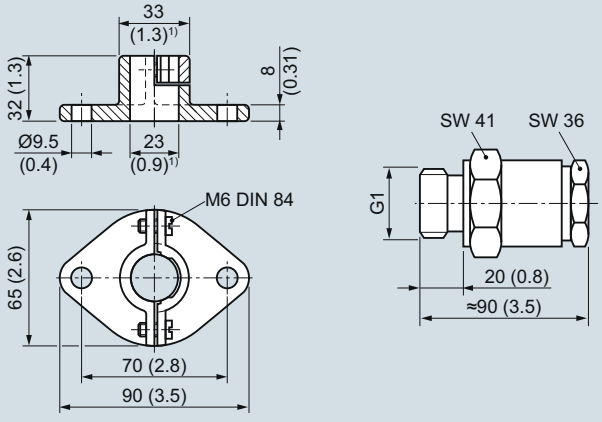
Selection and Ordering data	Article No.
Connection head, form A, (without terminal block and terminals) 1 Cable inlet, degree of protection IP53, 0.35 kg (0.77 lb)	
Cast light alloy fastener, unscrewable for protective tube diameter in mm (inch) (bore = protective tube diam. +0.5 mm) (0.02 inch):	
• 22 (0.87)	**7MC2905-1AA**
• 26 (1.02)	**7MC2905-1BA**
Cast light alloy high hinged cover for protective tube diameter in mm (inch) (bore = protective tube diam. +0.5 mm) (0.02 inch):	
• 22 (0.87)	**7MC2905-4AA**
• 26 (1.02)	**7MC2905-4BA**

Mounting accessories for connection heads

- Terminal block
- Terminal
- Set of gaskets
- Set of washers
- Mounting flange
- Threaded sleeve

Selection and Ordering data	Article No.
Mounting accessories	
Terminal block without terminals for base-metal thermocouples; 0.06 kg (0.13 lb)	**7MC2998-1AA**
Terminal for base-metal thermocouples; 0.01 kg (0.02 lb)	**7MC2998-1BA**
Set of gaskets (100 off) for the connection head cover; 0.01 kg (0.02 lb)	**7MC2998-1CA**
Set of washers (100 off) for the terminal block; 0.01 kg (0.02 lb)	**7MC2998-1CB**
Mounting flange, adjustable; made of GTW	
• for protective tube outer diameters 22 mm (0.87 inch); 0.35 kg (0.77 lb)	**7MC2998-2CB**
• for protective tube outer diameters 26 mm (1.02 inch); 0.32 kg (0.71 lb)	**7MC2998-2CC**
Threaded sleeve Gas-tight up to 1 bar (14.5 psi), adjustable, materiall No. 1.0718, with gasket; 0.40 kg (0.88 lb)	
• for protective tube outer diameters 22 mm (0.87 inch), **G1**	**7MC2998-2DB**
• for protective tube outer diameters 26 mm (1.02 inch), **G1**	**7MC2998-2DC**

Dimensional drawings



1) For protective tube diameter 22 mm (0.9 inch)

Mounting flange to DIN 43734 (left) and threaded sleeve (right) for installing straight thermocouples, dimensions in mm (inches)

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Notes

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You can download all instructions, catalogs and certificates for SITRANS F free of charge at the following Internet address:
www.siemens.com/sitransf

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Overview

	Application	Description	Catalog page	Software for parameterization
SITRANS F M electromagnetic flowmeters - Pulsed DC magnetic flowmeter				
	Designed in robust IP67 polyamide enclosures for compact or remote mounting. 19", back of panel and front of panel enclosure program.	**Transmitter MAG 5000/6000** • Superior signal resolution for optimum turn down ratio • Comprehensively self-diagnostic, for error indication and logging • Multi-lingual display and keypad interface • Custody transfer approval: PTB K7.2, OIML R 117, OIML R 49 and MI-001	3/33	SIMATIC PDM
	Designed in robust die-cast aluminum enclosure for demanding applications and where explosion proof protection is necessary.	**Transmitter MAG 6000 I/6000 I Ex** • Remote and compact mounting with all sensors • Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet • Ex Approval: ATEX, IECEx, FM, UL, CSA • Multi-lingual display and touchpad keypad • Comprehensively self-diagnostic	3/45	SIMATIC PDM
	Designed for the general industry environment The obstructionless performance of this sensor is unaffected by the suspended solids, viscosity and temperature challenges.	**Flow sensor MAG 1100** • Metering tube DN 2 ... DN 100 (1/12“ ... 4“) flangeless design. • Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet • Corrosion-resistant AISI 316 stainless steel housing. • Highly resistant liner (ceramic or PFA) and electrodes fitting most extreme process media. • Temperature rating up to 200 °C (390 °F) • Ex Approval: ATEX, FM	3/50	
	Specially designed for the food & beverage and pharmaceutical industry 	**Flow sensor MAG 1100 F** • AISI 316 stainless steel enclosure • Hygienic seal, 3A and EHEDG • Easy to clean • Supplied with connections according to your specification • Ex Approval: ATEX, FM	3/58	
	The MAG 3100 series with its flexibility in the choice of liner, electrode and flange material allows the measurement of even the most extreme process media.	**Flow sensor MAG 3100** • For a wide range of pipe dimensions: DN 15 ... DN 2000 (½” ... 78”) • Wide range of liner and electrode materials • High-temperature version for application with temperatures up to 180 °C (355 °F) • High-pressure solutions • Custody transfer approval: PTB, OIML R 117	3/69	

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	Application	Description	Catalog page	Software for parameterization
	Designed for all water and waste water applications in water plants and industrial applications	**Flow sensor MAG 5100 W** • Metering tube DN 15 ... DN 1200 (DN 2000) (½"¨ ... 48" (78")) • Hard Rubber or EPDM lining • Integral grounding electrodes as standard • Increased low flow accuracy for water leak detection • Drinking water approvals and custody transfer approvals , OIML R 49, MI-001 and PTB K7.2	3/92	
SITRANS F M electromagnetic flowmeters - High-power AC magnetic flowmeter				
	Designed for heavy-duty applications like pulp & paper stock over 3 %; heavy mining slurries and mining slurries with magnetic particles	**Transmitter TRANSMAG 2** • Magnetic flowmeter with a very strong pulsed AC magnetic field • PROFIBUS PA or HART communication • Comprehensive self-test function • Ex approval: ATEX, IECEx, FM, UL, CSA	3/104	SIMATIC PDM
	Designed for heavy-duty applications-like pulp & paper stock over 3 %; heavy mining slurries and mining slurries with magnetic particles	**Flow sensor 911/E** • Metering tube: DN 15 ... DN 1000 (½" ... 40") • Metering tube liner: Hard Rubber, Linatex, Soft rubber, PTFE and Novolak • Integral smartPLUG for storing of calibration values • Multi-lingual display and touchpad keypad • Only remote version	3/104	
SITRANS F M electromagnetic flowmeters - Battery-operated magnetic water meter				
	Battery-operated electromagnetic water meter for water applications within abstraction, distribution network, revenue metering and irrigation	**Water meter MAG 8000** • Battery- and/or mains power operated water meter • Metering tube DN 25 ... DN 1200 (1" ... 48") • Remote and compact installation IP68/ NEMA 6P enclosure • Custody transfer approval: PTB K7.2, OIML R 49 and MI-001 • Drinking water approvals • Communication modules: GSM/GPRS, Modbus, Encoder	3/114	SIMATIC PDM and Flow Tool

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	Application	Description	Catalog page	Software for parameterization
SITRANS F C mass flowmeters				
	Designed for a variety of liquid and gas applications Measurement of mass flow, density, temperature and fraction	**Flowmeters FC430 (Dual tube design)** • DN 15, DN 25, DN 50 and DN 80 • Flow from 0.2 ... 181 000 kg/h (400 000 lb/h) - water • Pipe material: AISI 316L • Accuracy, typically: Flow: ≤ 0.1 %, Density: ≤ 0.005 g/cm³ • Liquid temp./pressure: -50 ... +200 °C (-58 ... + 392 °F)/up to 100 bar (1450 psi) • Approvals: ATEX, IECEx, FM CSA, NEPSI, OIML R 117, SIL 2/3, EHEDG, 3A	3/149	
	Designed for a variety of liquid and gas applications Measurement of mass flow, density, temperature Modbus RS 485 RTU communication for direct integration into skids, OEM and pre-assembled plant packages	**Flowmeters FC410 (Dual tube design)** • DN 15, DN 25, DN 50 and DN 80 • Flow from 0.2 ... 181 000 kg/h (0.4 ... 400 000 lb/h) • Pipe material: AISI 316L or Hastelloy C22 • Accuracy, typically: Flow: ± 0.1 %, Density: ± 0.005 g/cm³ • Liquid temperature/pressure: -50 ... +200 °C (-58 ... +392 °F)/up to 160 bar (2321 psi) • Approvals: ATEX, IECEx, FM CSA, NEPSI, OIML R 117, EHEDG, 3A	3/156	
	Designed for accurate mass flow measurement of gases in high pressure applications	**Flow sensor FCS200** • DN 10, DN 15, DN 25 • Flow from 0 ... 30 000 kg/h • Pipe material: Hastelloy C22 • Accuracy: ± 0.5 % of rate • Process temperature: -40 ... +125 °C (-40 ... 257 °F) • Pressure: Up to 350 bar • Ex approvals: ATEX, IECEx, FM • Custody transfer approval: PTB - OIML R 139	3/203	
	Designed for a variety of liquid and gas applications	**Flow sensors MASS 2100 (Single tube design) and FC300** • DI 1.5, DI 3, DI 6, DI 15, DI 25, DI 40 and DN 4 • Flow from 0.1 ... 52 000 kg/h (114 640 lb/h) • Pipe material: Stainless steel AISI 316L/ 1.4435; Hastelloy C22/2.4602 • Accuracy, typically: - Flow: ≤ 0.1 % of flow rate - Density: ≤ 0.0005 g/cm³ • Liquid temp./pressure: -50 ... +180°C (-58 ... +356 °F) / Up to 410 bar (5946 psi) • Approved according to ATEX, UL	3/208, 3/212	

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	Application	Description	Catalog page	Software for parameterization
	Measurement of liquids. Measurement of mass flow, density and temperature.	**Flow sensor MC2 Standard (Dual tube design)** • DN 100 and DN 150 • Flow from 0 ... 510 000 kg/h (112 400 lb/h) • Tube material: AISI 316Ti/1.4571 and Hastelloy C4/2.4610 • Accuracy: ≤ 0.15 % of rate • Density: ≤ 0.001 g/cm^3 • Liquid temp.: -50 ... +180 °C (-58 ... +356 °F) • Pressure: < 100 bar (1450 psi) • Approvals: ATEX EEx em [ib] IIC T2 ... T6	3/228	
	Measurement of liquids and gases Multiparameter transmitter for remote or compact mounting measuring mass flow, density, temperature and fraction e.g. °Brix and °Plato	**Transmitters MASS 6000 (IP67, 19", Ex d)** • Superior signal resolution for optimum-turn down ratio • Comprehensively self-diagnostic, for error indication and logging • Adaptive batch function • Multi-lingual display and keypad interface • Approvals: ATEX [EEx ia] IIC T6 • Ex Approval: ATEX, IECEx,C-UL • Communication modules: HART, Modbus, PROFIBUS, FOUNDATION Fieldbus, DeviceNet	3/180, 3/194	SIMATIC PDM
	Measurement of liquids and gases Multiparameter transmitter for remote or compact mounting measuring mass flow, density, temperature and fraction e.g. °Brix and °Plato	**Transmitters SIFLOW FC070 Standard and Ex CT** • Digital signal processing measuring 30 times a second. • 3 current, 2 freq. and 2 relay outputs • Adaptive batch function • SENSORPROM memory unit making it easy to start up the flowmeter. • Direct integration into SIMATIC S7 and SIMATIC PCS7 • Automation systems • Ex approval: Ex Approval: ATEX, IECEx, FM • Custody transfer approval: PTB - OIML R 139	3/199	SIMATIC PDM SIMATIC STEP 7 SIMATIC PCS 7
SITRANS F US ultrasonic inline flowmeters				
	SITRANS FUS060 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the F US inline industry series up to DN 4000	**SITRANS FUS060 transmitter** • Die cast aluminum enclosure • EEx approved according to ATEX • HART communication + 1 analog output, 1 digital output for frequency or pulse and 1 relay output for alarms and flow direction • PROFIBUS PA communication with 1 digital output for frequency or pulse • Multi-functional output for process control • Easy menu based local operation with two-line display	3/244	SIMATIC PDM
	SITRANS FUS080 is a time-based transmitter designed for ultrasonic flowmetering in pipes for the SONOKIT, FUS380 and FUE380 series up to DN 1200	**SITRANS FUS080 transmitter** • Battery or mains-powered • Easy one-button operation • Bidirectional measuring • IrDA optical eye communication • Robust poyamide enclosure	3/251	SIMATIC PDM

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	Application	Description	Catalog page	Software for parameterization
	The main application for SONO 3300 ultrasonic flowmeters is to measure the volume flow of: • Water and treated waste water • Oil and liquefied gases • Hot water/cooling systems	**SONO 3300/FUS060** • ATEX-approved • DN 50 … DN 300 (2" … 12") steel pipes • PN 10 ... PN 40 or class 150 ... class 300 pressure rates • Flow 0.3 … 3200 m^3/h (1.3 ... 14 089 GPM) • No pressure drop • FUS060 transmitter for separate mounting • Signal cables from sensor to transducer are highly protected from aggressive environment by stainless steel pipes	3/258	SIMATIC PDM
	The main application for SONO 3100 ultrasonic flowmeters is to measure the volume flow of: • Water and treated waste water • Oil and liquefied gases • Liquid cryogenic application • District heating systems	**SONO 3100/FUS060** • DN 100 ... DN 600 (4" ... 24") • Pipe in carbon steel • Transducers can be replaced under pressure • FUS060 transmitter for separate mounting • ATEX-approved • Measure of all liquids less than 350 Cst, conductive or non-conductive • No pressure drop • 1-path; 4-path on request • Special material on request	3/264	SIMATIC PDM
	Installation of one, two or four transducer sets in existing concrete or steel pipes. Typically installed in pipes with large diameters or in hot/cold water applications	**SONOKIT** • FUS060 or FUS080 transmitter for separate mounting • DN 100 ... DN 4000 (4" ... 160") • Control and display unit • Temperature of medium: -20 ... +200 °C (-4 ... +395 °F) • Installation on empty pipes or pipes under pressure (hot-tap installation) • Standard 1-path or 2-path (4-path on request)	3/273	SIMATIC PDM
	Battery or mains-powered ultrasonic flowmeter for use within water-based district heating, cooling systems and utility. The FUS380 can also be used for water irrigation systems. SITRANS FUS380/FUE380 are designed to work with the SITRANS FUE950 energy calculator.	**FUS380/FUE380** • *FUS380/FUE380:* DN 50 ... DN 1200 (2" ... 48") • *FUE380:* Approved for custody transfer according to EN 1434 Class 2, OIML R 75, MID and MI004 • *FUS380/FUE380:* Red brass or painted carbon steel flanges and metering tube. AISI transducers • Water temperatures 2 … 200 °C (35.6 ... 392 °F) • Battery or mains-powered	3/284, 3/289	SIMATIC PDM
	Universal thermal energy calculator for district heating and cooling applications.	**SITRANS FUE950** • Battery or mains-powered • 24 periods memory • 2 ports for plug-in modules as data output, extra input, M-Bus, RS 232/RS 485, current output • Complete set with temperature sensors and pockets • MID heating approval, PTB K7.2 cooling approval, MI004 type approval	3/300	

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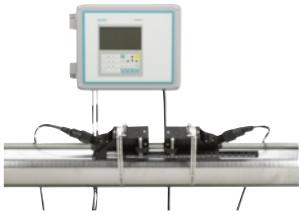
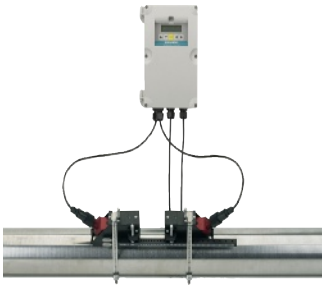
	Application	Description	Catalog page	Software for parameterization
SITRANS F US ultrasonic clamp-on flowmeters				
	The thickness gauge can be used in any field application where there is a need for flow measurement. Including but not limited to: • Water and waste water • Energy measurement • Oil and gas industries	**Thickness gauge** The hand-held micro-processor controlled gauge is designed to measure the thickness of various metallic or non-metallic pipes. • Materials include steel, aluminum, titanium, plastics and ceramics • Measurements shown in millimeter or inches • Simple-to-read 4-digit LCD display • Weights 150 g (5.3 oz) • Battery operation for 250 h	3/327	
	Dedicated flowmeters are suitable for a wide variety of liquid applications, including those in the: • Water Industry • Wastewater Industry • HVAC Industry • Power Industry • Processing Industry	**SITRANS FUS1010 General purpose** • Suitable for virtually any liquid, even those with high aeration or suspended solids • Full range of safety approvals, I/O's and enclosure types available • Has wide applicability but not the special functions found in FUH1010, FUG1010 and FUE1010 meters • Hazardous area approvals: FM, CSA, ATEX	3/328	
	Dedicated flowmeter is a basic option for many clean liquid applications in the: • Water Industry • Wastewater Industry • HVAC & Power Industries • Processing Industry	**SITRANS FST020 Basic** • Has FUS1010 system function but without the same I/O capability or safety approval ratings • This basic meter is intended for single liquid applications that do not require these features • Not available with hazardous area approvals • Unclassified, ordinary locatons approvals: UL, C-UL, CE and C-TICK	3/338	
	Portable flowmeters are suitable for a wide variety of liquid applications, including those in the: • Water Industry • Wastewater Industry • HVAC Industry • Power Industry • Processing Industry	**SITRANS FUP1010 Portable** • Basic function portable meter • Has all the capabilities of the FUS1010 meter but in a battery-powered, portable configuration • Ideal for high-accuracy flow survey applications • Not available with hazardous area approvals • Unclassified, ordinary location approvals: UL, C-UL, CE	3/342	
	The SITRANS FUP1010 check meter measures practically all conductive or non-conductive clean or moderately aerated liquids or liquids with suspended solids. This basic feature enables the perfomance check and verification of existing meters used in various water and wastewater applications such as: • Water Industry - Raw water - Potable water - Chemicals • Wastewater industry - Raw sewage - Effluent - Sludges - Mixed liquor - Chemicals	**SITRANS FUP1010 Portable Check metering kit** • Pipe sizes 25.4 mm ... 9.14 m (1“ ... 360“) • Current, voltage, frequency and RS 232 outputs • Optional current, voltage and temperature inputs • Zeromatic Path automatically sets zero • Bi-directional flow operation • 1 MByte data logger with both site and data logger storage	3/348	

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	Application	Description	Catalog page	Software for parameterization
	Portable and dedicated energy meters are ideal for thermal energy/ power applications: • Chilled & hot water submetering • Condenser water, potable water • Glycol and brine solution • Thermal storage	**SITRANS FUE1010 Energy** • Accurate absolute and differential temperature measurement with two matched 1000 Ω RTD elements installed on supply and return side of the heating or cooling system • Efficiency calculation (kW/ton, EER or COP) available in systems with optional analog input • Dedicated available with hazardous area approvals: FM, CSA • Portable available with unclassified/ ordinary locations approval: UL, C-UL, FM	3/350	
	The SITRANS FUE1010 check metering kit is a highly accurate clamp-on non-intrusive ultrasonic flow display computer for revenue grade thermal energy sub-metering and energy efficiency distribution monitoring, with a real-time coefficient of performance (COP) for HVAC systems. This kit is ideal for applications which include: • Chilled water sub-metering • Condenser water • Potable water • Ammonia and glycol • River and lake water • Lake source cooling	**SITRANS FUE1010 HVAC Check metering kit** • Pipe sizes 25.4 mm ... 9.14 m (1“ ... 360“) • Built-in energy/BTU mode • 4-wire 1000 Ω platinum RTDs for supply and return temperature measurements are precision matched to within 0.01 °C (0.02 °F) • Chiller efficiency analysis: accepts an independent analog input representing kW usage for calculation of the following functions which can be selected for data logging or output purposes: - Cooling load (kW/ton) - Coefficient of performance (COP) - Energy efficiency ratio (EER) • Current, voltage, frequency and RS 232 outputs • 1 MByte data logger with both site and data logger storage	3/358	
	Dedicated hydrocarbon flowmeters are ideal for crude oil, refined petroleum or liquefied gas. There are three application areas: • Viscosity compensated volumetric flowmeters • Standard volume (Net) mass flowmeters • Interface detectors/density meters	**SITRANS FUH1010 Oil** • Volumetric flowmeters output viscosity compensated gross volume to external RTU's or flow computers • Mass flowmeters output standard volume (net) mass flow, API, liquid identification, density, interface & pig detection • Interface Detectors are used for liquid identification and API density output, but do not output flow • Hazardous area approvals: FM, CSA, ATEX	3/360	
	Dedicated gas flowmeters are ideal for most natural and process gas industry applications, including: • Checkmetering • Allocation • Flow survey verification • Lost and unaccounted for (LAUF) gas analysis • Production	**SITRANS FUG1010 Gas** • Suitable for most gases (natural gas, oxygen, nitrogen, carbon monoxide, etc.) with typical minimum operating pressure of 10 bar g (145 psi g). • Standard volume or mass flow output for fixed gas compositions • Analog input for pressure and temperature compensation • Hazardous area approvals: FM, CSA, ATEX	3/367	

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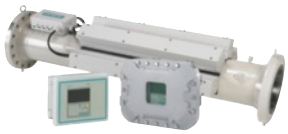
	Application	Description	Catalog page	Software for parameterization
	The clamp-on SITRANS FUG1010 Gas Check Metering Kit is an all-inclusive solution developed especially for verifying the accuracy and performance of any brand or type of flowmeter. The kit is ideal for applications that include: • Check metering • Allocation • Flow survey verification • Lost and unaccounted for (LAUF) gas analysis • Production • Storage	**FUG1010 Check Metering Kit** • Pipe sizes 50 ... 1200 mm (2 ... 48") up to 15.7 mm (0.62") pipe wall thickness • Analog inputs for pressure and temperature • Internal AGA-8 table for fixed gas composition is available for standard volume computation • Upward compatibility and compliance with AGA-10 speed of sound measurement practice • Bi-directional flow operation	3/374	
	Ideal for applications within the liquid and gas hydrocarbon industry capable of providing custody transfer accuracy. Both versions are offered in pipe sizes ranging from 4“ ... 24“ (DN 100 ... DN 600) with flange ratings of ANSI Class 150/300/600 for liquid and 300/600 for gas.	**SITRANS FUT1010 Basic** • WideBeam technology allows for precision flow measurement by reducing the meter's sensitivity to changes in the medium's physical properties • TransLoc permanent mounting system ensures sealing and virtually no maintenance • High viscosity range (up to 2800 Cst) • Completely cavity free design which eliminates any signal degrading build-up or ports to clog • Large bi-directional flow range • Modbus RTU RS 232/485 output available. • Dynamic Reynolds number compensation	3/375	
SITRANS F X Vortex Flowmeter				
	Measurement of steam, gases and liquids in: • Chemical • HVAC/Power plants • Oil & Gas • Food & Beverage • Pharma	**SITRANS FX300** • Flange DN 15 … DN 300 (½" … 12") Sandwich DN 15 … DN 100 (½" … 4") • 2-wire device 4 ... 20 mA, with integrated temperature and pressure sensors for compensation • HART communication • Medium temp.: -40 ... +240 °C (-40 ... +464 °F) • Medium pressure: up to 100 bar (1450 psi) • Hazardous area approvals: FM, CSA, ATEX • Compact or remote mounted transmitter	3/393	

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	Application	Description	Catalog page	Software for parameterization
SITRANS F VA variable area meters				
	Measurement of flow of liquids and gases, also highly suitable for corrosive media, high temperatures and high pressures.	**SITRANS FVA250** • All-metal variable area meter with various float materials • Connections: DN 15 ... DN 100 (½" ... 4") • Temperature of medium: -20 °C ... +300 °C (-4 ... +572 °F) • Optionally available with analog output or contacts	3/411	
SITRANS F O delta p - primary differential pressure devices				
	Measurement of flow with orifice plates and metering pipes for mounting between flanges, e.g. together with SITRANS P transmitters, DS III HART, DS III PROFIBUS PA and DS III FOUNDATION Fieldbus series.	• Nominal diameters DN 10 ... DN 1000 (0.4" ... 40") • Temperature of medium: -200 ... +500 °C (-328 ... +932 °F) for vapors, gases and liquids. SITRANS P transmitters • DS III HART series • DS III PROFIBUS PA series • DS III FOUNDATION Fieldbus series	3/420	
SITRANS F R liquid meters				
	Rotary-piston meters Industrial design for measurement of flowing liquids	• DN 15 ... DN 80 (½" ... 3") for industrial requirements • With the required registers and quantity-preset registers • Temperature of medium: -30 ... +300 °C (-22 ... +572 °F)	3/446	
	Automatic batchmeter Any quantity of liquid can be preselected and filled automatically.	• DN 25 ... DN 50 (1" ... 2") • Temperature of medium: -30 ... +300 °C (-22 ... +572 °F)	3/446	

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Overview

Criteria for selection of flowmeter

Each method for measuring flow has specific properties, and each flow measuring point is characterized by specific requirements. The table shown below compares the properties of the various measuring instruments and thus provides assistance in selection of the optimum device.

This section of the field device catalog includes the following instruments for measuring flow:

- Electromagnetic
- Coriolis mass flow
- Ultrasonic
- Vortex volumetric- and mass flow
- Variable area meter
- Orifice plate
- Rotary-piston meters and drum meters

Measuring principle		**Electro-magnetic**	**Coriolis**	**Ultrasonic (inline)**	**Ultrasonic (clamp-on)**	**Vortex**	**Variable area meter**	**Orifice plate**	**Rotary-piston meter**
Medium		Liquid (conductive)	Liquid or gas	Liquid	Liquid or gas	Steam/vapor, gases, liquid	Liquid or gas	Liquid, vapor, gas	Liquid
Nominal diameter		DN 2 … 2000 (0.08" … 78")	1.5…150 mm (0.06" … 6")	DN 50…4000 (2" … 160") optional down to DN 15 (½")	6.4 mm ... 9.14 m (0.25"...360")	DN 15 … 300 (½" … 12")	DN 10 … 100 (0.4" … 4") G½" … G3"	DN 10…1000 (0.4" … 40")	DN 15 … 80 (½" … 3")
Temperature range	°C (°F)	-40 … +200 (-40 … +392)	-50 … +180 (-58 … +356)	-200 ... +250 (-328 ... +482)	-40 ... +120 (-40 ... +248)	-40 ... +240 (-40 ... +464)	-20 … +300 (-4 … +572)	-200 … +500 (-328 … +932)	-30 … +300 (-22 … +572)
Max. pressure	bar (psi)	160 (2 320), optional higher	Up to 410 (Up to 5 950)	40 (580) optionally 160 (2 320)	Unlimited	100 (1 450)	100 (1 450)	315 (4 569)	63 (914)
Accuracy	%	± 0.2 or ± 0.4	± 0.1 or ± 0.15	± 0.5 … ± 2	0.5 ... 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s)	± 0.75 … ± 1	± 1.6 ... ± 2.0	± 0.5 … ± 2	± 0.2 … ± 0.5
Repeatability	%	0.1/0.2	0.05	0.25	0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s)	0.1	0.5	0.5	0.005
Dynamic response range		1:100	1:100	1:100	1:100	1:25	1:10	1:6	1:10
Start-of-scale value	m/s (ft/s)	0 (0)	0 (0)	0 (0)	0 (0)	0.4 (1.31) 2.0 (6.56)	0.2 (0.66)	Re > 500	0.3 (0.98)
Full-scale value					± 36/120			Re < 10^8	
• For liquids	m/s (ft/s)	0.25 … 10 (0.825 … 32.8)	10 (32.8)	10 (32.8)	± 12/40	10 (32.8)	3.5 (11.4)	3 (9.8)	3 (9.8)
• For steam/vapor, gases	m/s (ft/s)		Approx. 300 (1000)		± 12/40	80 (262.5)	60 (197)	50/25 (164/82)	
Measured values									
• Volume flow		•	•	•	•	•	•	•	•
• Sound velocity				•	•				
• Sound amplitude				•	•				
• Density			•		•				
• Mass flow			•	•	•	•			
• Bidirectional measurement		•	•	•	•			•	
Use									
• For custody transfer		•	•	•	•				•
• As batching system		•	•		•				•
• In viscosity range	mPa·s (cp)	0.1 … 100 000 (0.1 … 100 000)	0 ... 100 000 (0 ... 100 000)	0 ... 350 (0 ... 350)	0.5 ... 2800 (0.5 ... 2800)	0 … 10 (0 … 10)	0.5 … 100 (0.5 … 100)	0 … 10 (0 … 10)	0.3 … 350 000 (0.3 … 350 000)
Power supply		Mains or battery	Mains	Mains or battery	90... 240 V AC, 50...60 Hz, 15 VA or 9 ... 36 V DC, 10 W	2-wire	non	2-wire	non

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Communication solutions

Communication solutions

Transmitter	HART	PROFIBUS PA	PROFIBUS DP	FOUNDATION Fieldbus H1	DeviceNet	Modbus RTU	GSM/GPRS
SITRANS F M MAG 5000	• 1) 2) 4)						
SITRANS F M MAG 6000	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 5) 10)	
SITRANS F M MAG 5000/6000 CT[8)]							
SITRANS F M MAG 6000 I	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 5) 10)	
SITRANS F M MAG 6000 I Ex	• 1) 2) 4) 5)	• 1) 5) 6) 7)					
SITRANS F M TRANSMAG 2	• 1) 4)	• 1) 6)					
SITRANS F M MAG 8000						• 1) 3) 10) 11) 12)	• 14)
SITRANS F C FCT030	• 1) 2) 4) 8)						
SITRANS F C MASS 6000	• 1) 2) 4) 5)	• 1) 5) 6) 7)	• 1) 5) 6) 7)	• 2) 4) 5)	• 5)	• 1) 10)	
SITRANS F C MASS 6000 Ex d	• 1) 2) 4) 5)	• 1) 5) 6) 7)		• 2) 4) 5)	• 5)		
SIFLOW FC070			• 13)			• 1) 10) 11)	
SITRANS FUS060	• 1)	• 1) 6)					
SITRANS FUS1010[9)]						• 9) 10) 11)	
SITRANS FX300	• 1)						
SITRANS P DS III Differential pressure and flow	• 1) 2)	• 1) 2) 7)		• 2)			

1) Supports SIMATIC PDM
2) Supports AMS
3) Supports Siemens Flow Tool
4) Supports HH275/375
5) Pluggable add-on modules
6) Profile 2
7) Profile 3
8) CT versions are not approved with communication modules.
9) All wall mount models
10) RS 485
11) RS 232
12) IrDA (Infrared)
13) Connected to ET200M PROFIBUS interface
14) Only with 7ME6810

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Overview

SITRANS F M electromagnetic flowmeters are designed for measuring the flow of electrically conductive mediums.

The full SITRANS F M program consists of three different types of flowmeters making Siemens unique in that it covers all possible applications where electromagnetic flowmeters are a suitable match:

Modular pulsed DC flowmeters cover all ordinary applications within all industries. The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task and application.

SITRANS F M products

Battery-operated water meters (fully electronic) are the perfect match for drinking water applications like network distribution, revenue metering and irrigation where mains power is not available. In addition, it complies with the MID (EU) and OIML R 49 water meter standards and has the MCERTS certificate.

SITRANS F M MAG 8000

High-powered flowmeters are used for difficult applications where other flowmeters cannot stand up to the task. This flowmeter can handle liquids and heavy slurries in industries such as mining, cement and pulp and paper.

SITRANS F M 911/TRANSMAG 2

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System information SITRANS F M Electromagnetic flowmeters

Benefits

Greater flexibility

- Wide product program
- Compact or remote installation using the same transmitter and sensor
- USM II communication platform for easy integration with all systems

Easier commissioning of MAG 5000, 6000, 6000 I

All SITRANS F M pulsed DC electromagnetic flowmeters feature a unique SENSORPROM memory unit which stores sensor calibration data and transmitter settings for the lifetime of the product.

At commissioning the flowmeter commences measurement without any initial programming.

The factory settings matching the sensor size are stored in the SENSORPROM unit. Also customer specified settings are downloaded to the unit. Should the transmitter be replaced, the new transmitter will upload all previous settings and resume measurement without any need for reprogramming.

Further, the „fingerprint“ used in connection with the SITRANS F M Verificator is stored during the initial sensor calibration.

Easier service

Transmitter replacement requires no programming. SENSORPROM automatically updates all settings after initialization.

Room for growth

USM II the Universal Signal Module with "plug & play" simplicity, makes it easy to access and integrate the flow measurement with almost any system and bus-protocol and it ensures the flowmeter will be easy to upgrade to future communication/bus platforms.

Application

Electromagnetic flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries.

A prerequisite is that the medium must have a minimum conductivity. The temperature, pressure, density and viscosity have no influence on the result.

The main applications of the electromagnetic flowmeters can be found in the following sectors:

- Water and waste water
- Chemical industries
- Pharmaceutical industries
- Food and beverage industry
- Mining, aggregates and cements industries
- Pulp and paper industry
- Steel industry
- Power; utility and chilled water industry

The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

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Please see product selector on the Internet, because some constrains might be related to some of the features:
www.pia-selector.automation.siemens.com

	MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W		911/E	MAG 8000/ MAG 8000 CT	MAG 8000 Irrigation
	7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880
Industry											
Water / waste water	XX			XX		X	XXX	XXX	X	XXX[1]	XXX[1]
Chemical	XXX	XXX	XX	XXX	XXX	XXX	X	X		X	
Pharmaceutical	XX	XX	XXX	XX	XX	XX	X	X		X	
Food and beverage	XX		XXX	X	X	X	X	X		X	
Mining, aggregates and cement	XX			XXX			X	X	XXX	X	
HPI	XX	X		XX	X	XX	X	X		X	
Other	XX	XX	XX	XX	XX	XX	XX	XX	XXX	X	
Design											
Compact	●		●	●	●	●	●	●		●	●
Remote	●	●	●	●	●	●	●	●	●	●	●
Constant field (DC)	●	●	●	●	●	●	●	●		●	●
Alternating field (AC)									●		
Battery-operated constant field (DC)										●	●
Size											
DN 2 (1/12")	●										
DN 3 (1/8")	●										
DN 6 (1/4")	●										
DN 10 (3/8")	●		●								
DN 15 (½")	●	●	●	●	●	●	●		●		
DN 25 (1")	●	●	●	●	●	●	●	●	●	●	
DN 32 (1¼")			●								
DN 40 (1½")	●	●	●	●	●	●	●	●	●	●	
DN 50 (2")	●	●	●	●	●	●	●	●	●	●	●
DN 65 (2½")	●	●	●	●	●	●	●	●	●	●	●
DN 80 (3")	●	●	●	●	●	●	●	●	●	●	●
DN 100 (4")	●	●	●	●	●	●	●	●	●	●	●
DN 125 (5")				●	●	●	●	●	●	●	●
DN 150 (6")				●	●	●	●	●	●	●	●
DN 200 (8")				●	●	●	●	●	●	●	●
DN 250 (10")				●	●	●	●	●	●	●	●
DN 300 (12")				●	●	●	●	●	●	●	●
DN 400 (16")				●			●	●	●	●	●
DN 450 (18")				●			●	●	●	●	●
DN 500 (20")				●			●	●	●	●	●
DN 600 (24")				●			●	●	●	●	●
DN 700 (28")				●			●	●	●	●	
DN 750 (30")				●			●	●	●	●	
DN 800 (32")				●			●	●	●	●	
DN 900 (36")				●			●	●	●	●	
DN 1000 (40")				●			●	●	●	●	
DN 1050 (42")				●			●	●		●	
DN 1100 (44")				●			●	●		●	
DN 1200 (48")				●			●	●		●	
DN 1400 (54")				●				●			
DN 1500 (60")				●				●			
DN 1600 (66")				●				●			
DN 1800 (72")				●				●			
DN 2000 (78")				●				●			

● = available, **X** = can be used, **XX** = often used, **XXX** = most often used

[1] Not suitable for wastewater applications

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System information SITRANS F M Electromagnetic flowmeters

Please see product selector on the Internet, because some constrains might be related to some of the features:
www.pia-selector.automation.siemens.com

	MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W		911/E	MAG 8000/ MAG 8000 CT	MAG 8000 Irrigation
	7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880
Process connection											
Wafer design	●	●									
Sanitary process connections			●								
Flanges				●	●	●	●	●	●	●	●[3]
Flange norms											
EN 1092-1				●	●	●	●	●	●	●	●[3]
ANSI B 16.5 class 150				●	●	●	●	●	●	●	●[3]
ANSI B 16.5 class 300				●	●				●		
ASME B 16.47 class 150				●							
AWWA class D				●			●	●	●	●	
AS 2129				●	●						●[3]
AS 4087, PN 16				●	●		●	●		●	
AS 4087, PN 21				●	●						
AS 4087, PN 35				●	●						
JIS 10K				●				●	●		
JIS 20K				●							
Pressure rating[1]											
PN 6				●				●			
PN 10				●	●	●	●	●	●	●	
PN 16	●		●	●	●	●	●	●	●	●	
PN 25				●	●				●		
PN 40	●	●	●	●	●	●	●	●	●	●	
PN 63				●							
PN 100				●							
Accuracy											
0.2 %	●	●	●	●	●	●	●	●		●	
0.4 %	●	●	●	●	●	●	●	●		●	
0.5 %									●		
0.8 %											●
Repeatability[5]											
0.1 %	●	●	●	●	●	●	●	●		●	●
0.2 %									●		
Grounding electrodes, incl.[2]				●		●[4]	●	●	(●)	●	
Grounding rings premounted from factory											●

● = available
[1] Pressure may be limited by the liner material chosen
[2] Not for PTFE liner.
[3] Drilled pattern flange max. 7 bar (107 psi).
[4] Optional on PFA
[5] Of actual flow for v ≥ 0.5 m/s (1.5 ft/s) and conductivity > 10 µS/cm

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Please see product selector on the Internet, because some constrains might be related to some of the features:
www.pia-selector.automation.siemens.com

	MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W		911/E	MAG 8000/ MAG 8000 CT	MAG 8000 Irrigation
	7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880
Materials/temperature:											
Liner material/max. temperatures											
NBR Hard Rubber: 70 °C (158 °F)							●				
EPDM: 70 °C (158 °F)				●			●			●	
Soft rubber: 70 °C (158 °F)				●					●		
PTFE: 100 °C (212 °F)				●							
PTFE: 130 °C (266 °F)					●	●			●		
PTFE: 180 °C (356 °F)					●				(●)[1]		
Ebonite Hard Rubber: 95 °C (203 °F)				●				●[3]	●		●[3]
Linatex: 70 °C (158 °F)				●					●		
Ceramic: 150 °C (302 °F)	●		●								
Ceramic: 200 °C (392 °F)		●[2]									
PFA: 100 °C (212 °F)				●							
PFA: 150 °C (302 °F)	●		●		●	●					
Novolak: 130 °C (266 °F)									●		
Electrodes											
Stainless steel				●	●				●		●
Hastelloy C	●		●	●	●	●	●	●	●	●	
Platinum	●	●	●	●	●				●		
Titanium				●	●				●		
Tantalum				●	●				●		
Flange/housing material											
Carbon steel				●	●	●	●	●	●	●	●
Stainless steel / carbon steel				●	●				●		
Polished stainless steel	●	●	●	●	●						
Approvals											
Custody transfer											
Cold water - MI-001 (EU)							●			●	
Cold water approval - OIML R 49/OIML R 49 MAA										●[4]	
Cold water pattern approval - OIML R 49 (Denmark)							●[4]				
Cold water pattern approval PTB (Germany)	●[4]		●[4]	●[4]							
Hot water pattern approval - PTB (Germany)	●[4]		●[4]	●[4]							
Other media than water pattern approval - OIML R 117 (Denmark)	●[4]		●[4]	●[4]							
NMI 10											●
Chilled water pattern approval PTB K 7.2							●[4]			●[4]	
OE12/C 040 (Austria) Chilled water pattern approval							●				

● = available
[1] 150 °C (302 °F)
[2] Ex sensor: 180 °C (356 °F)
[3] 70 °C (158 °F)
[4] For verification submit Product Variation Request

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System information SITRANS F M Electromagnetic flowmeters

Please see product selector on the Internet, because some constrains might be related to some of the features:
www.pia-selector.automation.siemens.com

	MAG 1100	MAG 1100 HT	MAG 1100 F	MAG 3100	MAG 3100 HT	MAG 3100 P	MAG 5100 W		911/E	MAG 8000/ MAG 8000 CT	MAG 8000 Irrigation
	7ME6110	7ME6120	7ME6140	7ME6310	7ME6320	7ME6340	7ME6520	7ME6580	7ME5610	7ME6810 7ME6820	7ME6880
Approvals (continued)											
Hazardous areas											
ATEX - 2 GD (Zone 1/21)	●	●	●	●	●	●					
IECEx Gb Zone 1/21				●	●	●					
FM Class I/II/III, Div 1				●[9]	●[9]	●[9]					
FM Class I, Zone 1/21				●	●	●					
FM Class I, Div 2	●	●	●	●	●	●	●	●			
CSA Class I, Zone 1/21				●	●	●					
CSA Class I, Div 2				●	●	●	●	●			
Hygienic											
EHEDG			●								
3A			●								
EC 1925:2003 European food contact material			●								
Drinking water											
WRAS (WRc) - (UK)				●			●[4]	●		●	●
ANSI/NSF 61 (US)[8]				●[5]			●	●		●	●
ACS (FR) EPDM liner				●			●			●	
Belgaqua (B) EPDM liner				●			●			●	
DVGW-W270 (D) EPDM liner				●			●			●	
MCERTS (UK environmental)				●[6]			●[4]			●	
Other											
FM Fire Service (class number 1044)							●[7]			●[7]	
GOSS/GOST (Russia)	●	●	●	●	●	●	●			●	
CRN (Canada)	●[1]		●[1]	●	●		●				
PED 97/23 EC	●	●	●	●	●	●	●	●	●	●	
VdS							●[3]				
Other national approvals, see internet	●[8]	●[8]	●[8]	●[8]	●[8]	●[8]	●[8]	●[8]	●[8]	●[8]	
Verificator compatible	●[2]	●[2]	●[2]	●[2]	●[2]	●[2]	●[2]	●[2]			

● = available
[1] Only PFA liner.
[2] Only in combination with MAG 5000 and MAG 6000 transmitters.
[3] Only valid for DN 50 to DN 300 (2" to 12")
[4] EPDM liner
[5] Only EPDM with Hastelloy electrodes
[6] EPDM or PTFE liner with AISI 316 or Hastelloy electrodes.
[7] Sizes: DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges
[8] Including Annex G
[9] Only DN 15 to DN 300 (½" to 12") with MAG 6000 I Ex, compact mounted

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Please see Product selector on the Internet, because some constrains might be related to some of the features:
www.pia-selector.automation.siemens.com

	MAG 5000	MAG 6000	MAG 6000 I	MAG 6000 I Ex	MAG 6000 + Ex Safety barrier	TRANSMAG 2	MAG 8000/ MAG 8000 CT	MAG8000 Irrigation
	7ME6910	7ME6920	7ME6930	7ME6930	7ME6920	7ME5034	7ME6810 7ME6820	7ME6880
Industry								
Water / waste water	XXX	XXX	XX	X		X	XXX	XXX
Chemical	X	XX	XX	XXX	X		X	
Pharmaceutical	X	XXX	XX	XXX	X		X	
Food and beverage	XX	XXX	XX				X	
Mining, aggregates and cement	XX	X	XX	X		XXX	X	
HPI	X	X	X	XX			X	
Other	XX	XX	XX	XX		XX	X	
Design								
Compact	●	●	●	●			●	●
Remote	●	●	●	●	●	●	●	●
Constant field (DC)	●	●	●	●	●		●	●
Alternating field (AC)						●		
Battery-operated constant field (DC)							●	●
Enclosure transmitter								
Polyamide, IP67	●	●						
Die-cast aluminum			●	●		●		
Stainless steel		●					●[1]	●[1]
19“ rack	●	●			●			
Back of panel	●	●			●			
Panel mounting	●	●			●			
IP67 wall mounting	●	●	●	●	●			
Accuracy								
0.2 %		●	●	●	●		●	
0.4 %	●						●	
0.5 %						●		
0.8 %								●
Repeatability[3]								
0.1 %	●	●	●	●	●		●	●
0.2 %						●		
Communication								
HART	●	●	●	●	●	●		
PROFIBUS PA		●	●	●	●	●		
PROFIBUS DP		●	●		●			
FOUNDATION Fieldbus H1		●	●	●	●			
DeviceNet		●	●		●			
Modbus RTU/RS 485		●	●		●		●[2]	●[2]
Encoder interface module (Sensus protocol) for Itron 200WP radio							●	●
GSM/GPRS module							●	
Batching		●	●	●	●			

● = available, **X** = can be used, **XX** = often used, **XXX** = most often used
[1] IP68 enclosure
[2] Modbus RTU also as serial RS 232
[3] Of actual flow for v ≥ 0.5 m/s (1.5 ft/s) and conductivity > 10 µS/cm

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System information SITRANS F M Electromagnetic flowmeters

Please see Product selector on the Internet, because some constrains might be related to some of the features:
www.pia-selector.automation.siemens.com

	MAG 5000	MAG 6000	MAG 6000 I	MAG 6000 I Ex	MAG 6000 + Ex Safety barrier	TRANSMAG 2	MAG 8000/ MAG 8000 CT	MAG8000 Irrigation
	7ME6910	7ME6920	7ME6930	7ME6930	7ME6920	7ME5034	7ME6810 7ME6820	7ME6880
Power supply								
24 V	●[1]	●[1]	●	●			●[1) 2)]	●[1) 2)]
115 V - 230 V	●	●	●	●	●	●	●[2)]	●[2)]
Battery							●	
Approvals								
Custody transfer								
Cold water - MI-001 (EU)	●	●					●	
Cold water pattern approval - OIML R 49 (Denmark)	●	●					●	
Cold water approval - OIML R 49/OIML R 49 MAA							●	
Cold water pattern approval PTB (Germany)	●	●						
Chilled water pattern approval PTB K 7.2	●	●					●	
Hot water pattern approval PTB (Germany)		●						
Other media than water pattern approval - OIML R 117 Denmark		●						
OE12/C 040 (Austria) Chilled water pattern approval	●	●						
Hazardous areas								
ATEX - 2 GD (Zone 1/21)				●	(●)[3]			
IECEx Gb Zone 1/21				●				
FM Class I/II/III, Div 1				●[4]				
FM Class I, Zone 1/21				●				
FM Class I, Div 2/Zone 2	●	●	●					
CSA Class I, Zone 1/21				●				
CSA Class I, Div 2	●	●	●					
UL / C-UL- general safety	●	●			●			
Other								
FM Fire Service (1044)	●	●					●	
C - tick (Australia)	●	●	●	●	●			
GOSS / GOST (Russia)	●						●	
VdS	●	●						
Other national approvals, see internet	●	●	●	●	●	●	●	●
Verificator compatible	●	●						

● = available
[1] 12/24 V AC/DC
[2] Main power with battery backup
[3] Only sensor in hazardous area
[4] Only with sensors sizes DN 15 to DN 300 (½" to 12") compact

For more national approvals please check our internet page
http://support.automation.siemens.com/WW/view/en/10806954/134200

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Practical examples of ordering

SITRANS F M compact installation

MAG 6000 transmitter + MAG 3100 sensor = MAG 6000 compact mounted on a MAG 3100 sensor

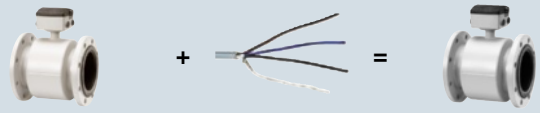
Example

Sensor	**7ME6310-3TC11-1JA1**
Pipe size	DN 100
Liner	Soft rubber
Electrodes	SS 316
Flanges	EN 1092-1, PN 16
Transmitter	**MAG 6000, Polyamide, 115 ... 230 V AC**
Accuracy	± 0.2 % ± 1 mm/s
Supply	230 V AC

Note:
MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place.

SITRANS F M remote installation

Wall bracket + MAG 6000 =



MAG 3100 + 2 x cable = MAG 3100 remote installation

Example

Sensor	**7ME6310-3TC11-1AA1**
Pipe size	DN 100
Liner	Soft rubber
Electrodes	SS 316
Flanges	EN 1092-1, PN 16
Transmitter	**7ME6920-1AA10-0AA0**
Accuracy	± 0.2 % ± 1 mm/s
Supply	230 V AC
Wall mounting kit	**FDK:085U1018**
Cable kit with sensor cabel and electrode cable	**A5E01181647**

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3

Technical specifications

Flowmeter Calibration and traceability

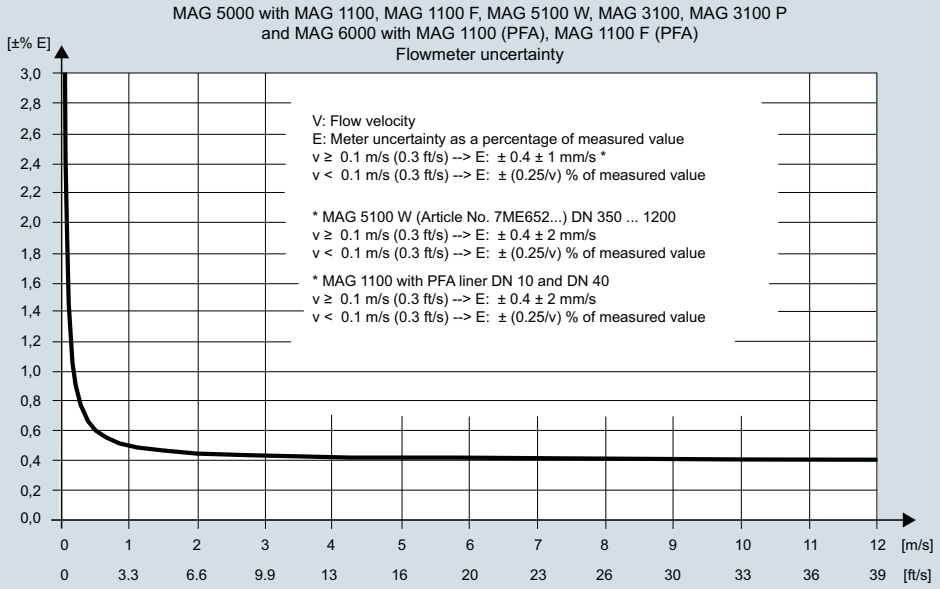
To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

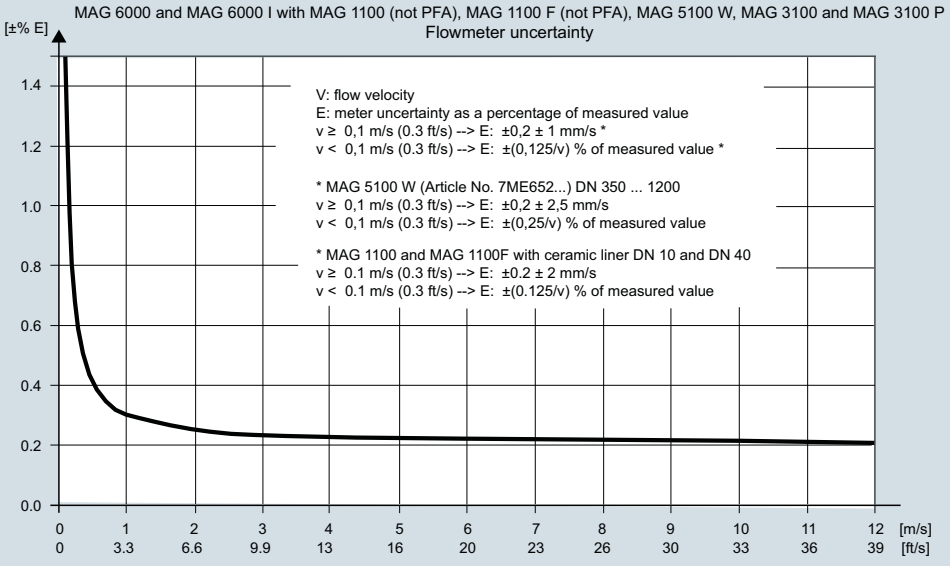
Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m^3/h to 10 000 m^3/h.
Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit.

Flowmeter uncertainty





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Calibration reference conditions

Reference conditions (ISO 9104 and DIN EN 29104)	
Temperature medium	20 °C ± 10 K (68 °F ± 18 °F)
Temperature ambient	25 °C ± 10 K (77 °F ± 18 °F)
Supply voltage	U_n ± 1 %
Warming-up time	30 minutes
Incorporation in conductive pipe section	
• Inlet section	10 x DN (DN ≤ 1200/48") 5 x DN (DN > 1200/48")
• Outlet section	5 x DN (DN ≤ 1200/48") 3 x DN (DN > 1200/48")
Flow conditions	Developed flow profile
Additions in the event of deviations from reference conditions	
Current output	As pulse output (± 0.1 % of actual flow + 0.05 % FSO)
Effect of ambient temperature	
• Display / frequency / pulse output	< ± 0.003 %/K act.
• Current output	< ± 0.005 %/K act.
Effect of supply voltage	< 0.005 % of measuring value on 1% change
Repeatability	± 0.1 % of actual flow for v ≥ 0.5 m/s (1.5 ft/s) and conductivity > 10 µS/cm
Certificates	
• EN 10204-2.1	Certificate of conformity, stating that the delivered parts are made of the material quality that was ordered. Available as Z option C15.
• EN 10204-2.2	Test report certificate, a non batch specific material analysis of the ordered material. Available as Z option C14.
• EN 10204-3.1	Material analysis certificate, a batch specific analysis of the material issued by an independent inspector. Certification covers all pressure containing and wetted parts. Available as Z option C12.

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3

Technical specifications

General specifications	
PROFIBUS device profile	3.00 Class B
Certified	No
MS0 connections	1
MS1 connections	1
MS2 connections	2

Electrical specification DP

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	RS 485
Transmission speed	≤ 1.5 Mbits/s
Number of stations	Up to 32 per line segment, (maximum total of 126)
Cable specification (Type A)	
Cable design	Two-wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 Ω at frequencies from 3 ... 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0.34 mm², corresponds to AWG 22
Resistance	< 110 Ω per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	200 m at 1500 kbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

Electrical specification PA

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC-61158-2
Transmission speed	31.25 Kbits/second
Number of stations	Up to 32 per line segment, (maximum total of 126)
Max. basic current [I_B]	14 mA
Fault current [I_{FDE}]	0 mA
Bus voltage	9 ... 32 V (non Ex)
Preferred cable specification (Type A)	
Cable design	Two-wire twisted pair
Conductor area (nominal)	0.8 mm² (AWG 18)
Loop resistance	44 Ω/km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km
Bus termination	Passive line termination at both
Max. bus length	Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data	
Required sensor electronics	Compact or remote mounted SITRANS F M MAG 6000 I Ex
FISCO	Yes
Max. U_I	17.5 V
Max. I_I	380 mA
Max. P_I	5.32 V
Max. L_I	0 µH
Max. C_I	0 nF
FISCO cable requirements	
Loop resistance R_C	15 ... 150 Ω/km
Loop inductance L_C	0.4 ... 1 mH/km
Capacitance C_C	80 ... 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

PROFIBUS parameter support

The following parameters are accessible using a MS0 relationship from a Class 1 Master.
MS0 specifies cyclic Data Exchange between a Master and a Slave.

Cyclic services		
Input (Master view)	**Parameter**	**MAG 6000/MAG 6000 I**
	Mass flow	
	Volume flow	✓
	Temperature	
	Density	
	Fraction A[1)]	
	Fraction B[1)]	
	Pct Fraction A[1)]	
	Totalizer 1	✓
	Totalizer 2[2)]	✓
	Batch progress[2)]	✓
	Batch setpoint	✓
	Batch compensation	✓
	Batch status (running ...)	✓
Output (Master view)	Set Totalizer 1+2	✓
	Set Mode Totalizer 1+2	✓
	Batch control (start, stop ...)	✓
	Batch setpoint	✓
	Batch compensation	✓

1) Requires a SENSORPROM containing valid fraction data.
2) Value returned is dependent on the BATCH function.
When ON, Batch progress is returned.
When OFF, TOTALIZER 2 is returned.

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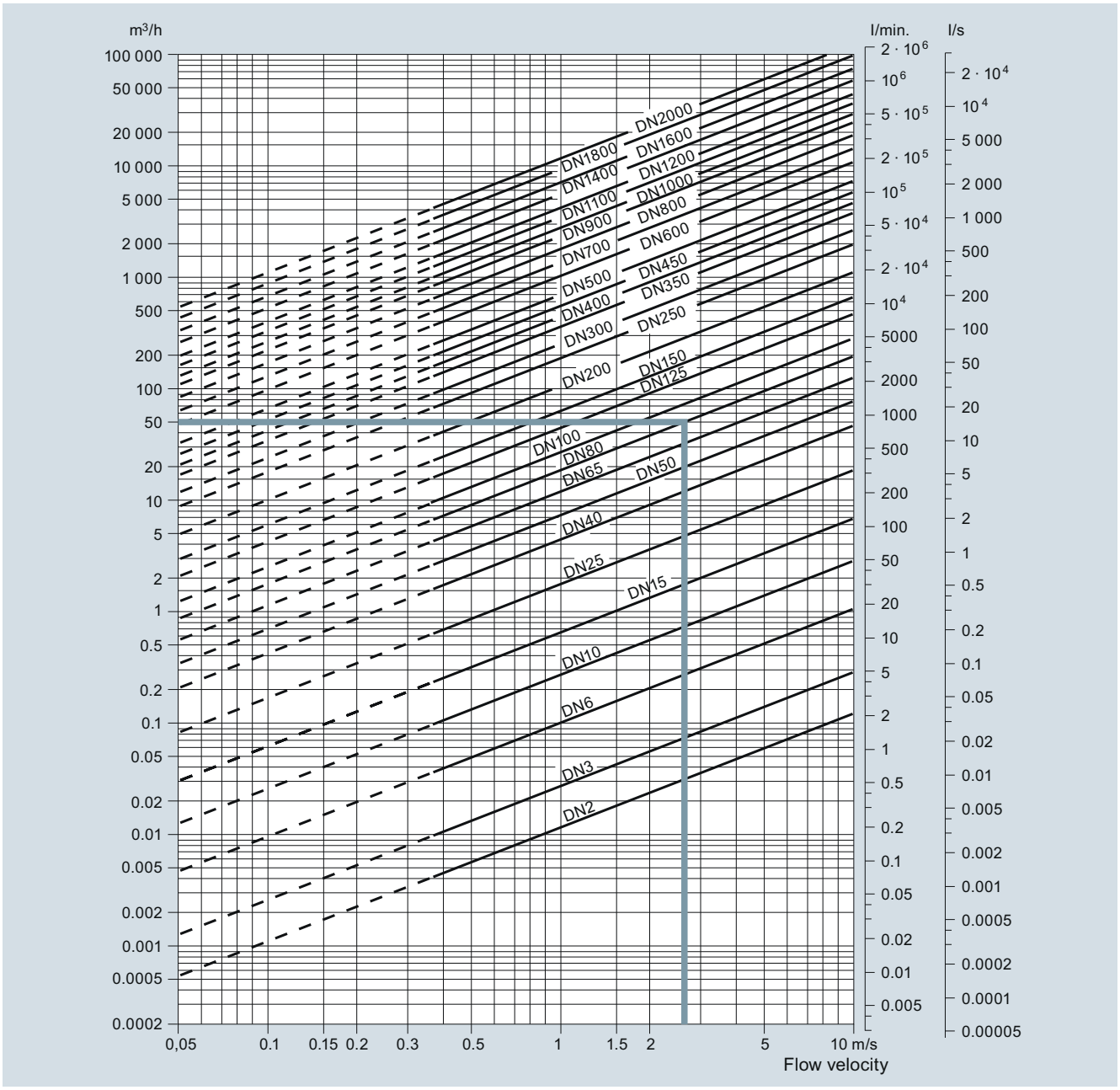
Flow and speed chart

Metric



Sizing table (DN 2 … DN 2000)

The table shows the relationship between flow velocity v, flow quantity Q and sensor dimension DN.

Guidelines for selection of sensor

Min. measuring range: 0 to 0.25 m/s

Max. measuring range: 0 to 10 m/s

Normally the sensor size is selected so that the nominal flow velocity v lies within the measuring range 1 to 3 m/s.

Example:

Flow quantity of 50 m^3/h and a sensor dimension of DN 80 gives a flow velocity of 2.7 m/s, which is within the recommended measuring range of 1 to 3 m/s.

Flow velocity calculation formula	Units
$v = 1273.24 \cdot Q / DN^2$ or	v : [m/s], Q : [l/s], DN : [mm]
$v = 353.68 \cdot Q / DN^2$	v : [m/s], Q : [m^3/h], DN : [mm]

Link to "Sizing program":
https://pia.khe.siemens.com/index.aspx?nr=11501

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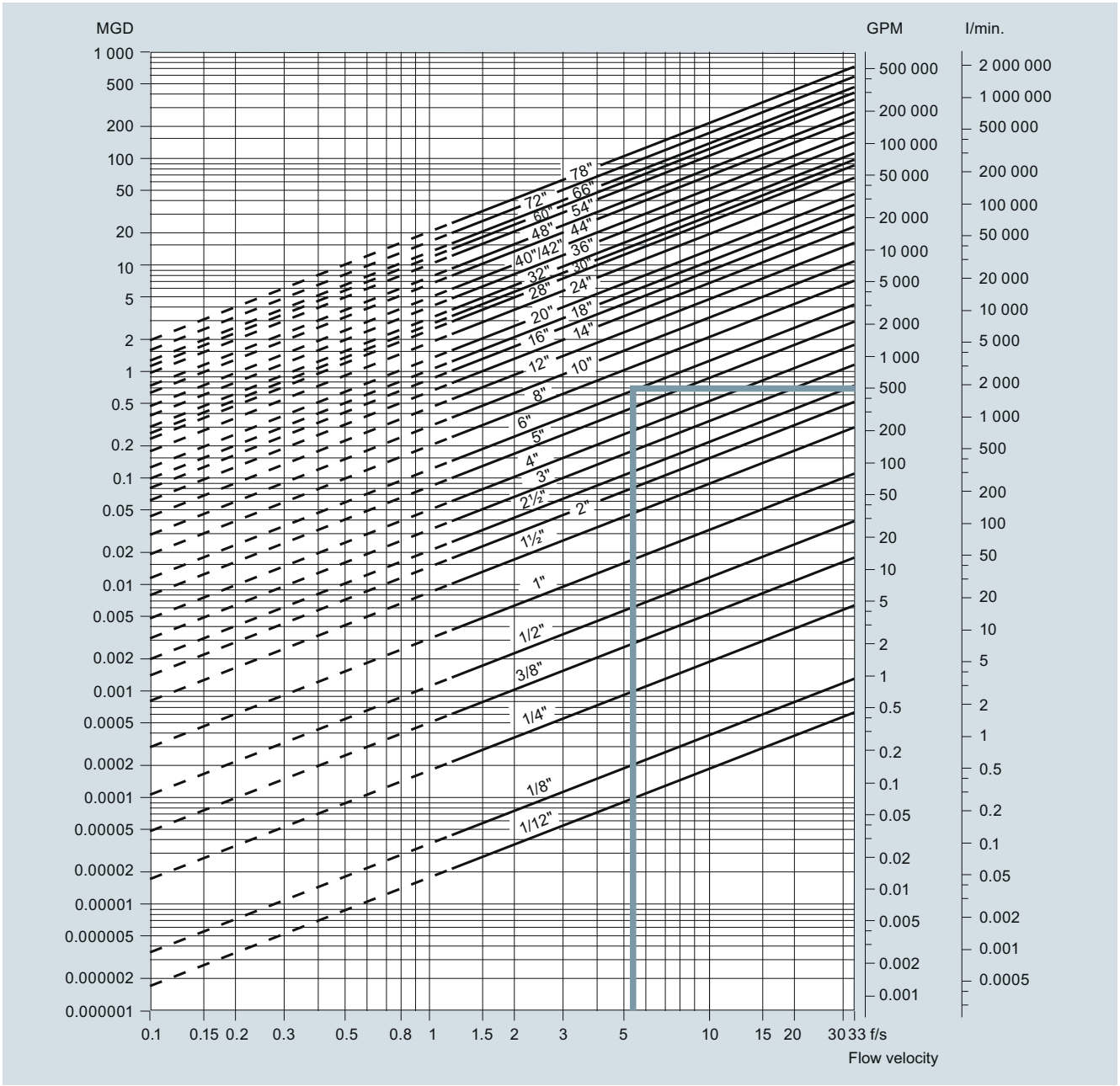
Imperial



Sizing table ($^1/_{12}$" … 78")

The table shows the relationship between flow velocity v, flow quantity Q and sensor dimension size.

Guidelines for selection of sensor

Min. measuring range: 0 to 0.8 ft/s

Max. measuring range: 0 to 33 ft/s

Normally the sensor size is selected so that the nominal flow velocity v lies within the measuring range 3 to 10 ft/s.

Example:

Flow quantity of 500 GPM and a sensor dimension of 6" gives a flow velocity of 5.6 ft/s, which is within the recommended measuring range of 3 to 10 ft/s.

Flow velocity calculation formula	Units
$v = 0.408 \cdot Q / (\text{Pipe I.D.})^2$ or	v : [ft/s], Q : [GPM], Pipe I.D. : [inch]
$v = 283.67 \cdot Q / (\text{Pipe I.D.})^2$	v : [ft/s], Q : [MGD], Pipe I.D. : [inch]

Link to "Sizing program":
https://pia.khe.siemens.com/index.aspx?nr=11501

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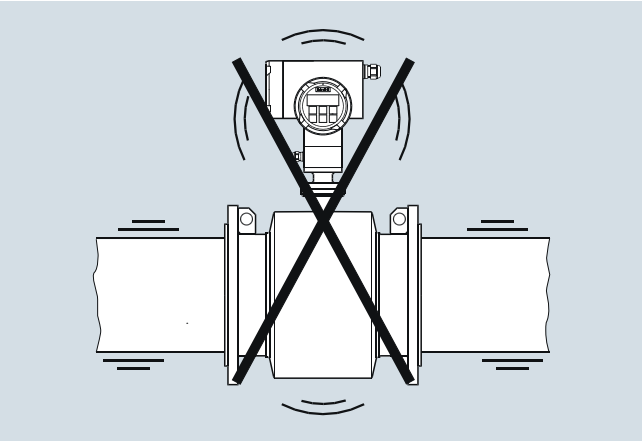
Installation conditions

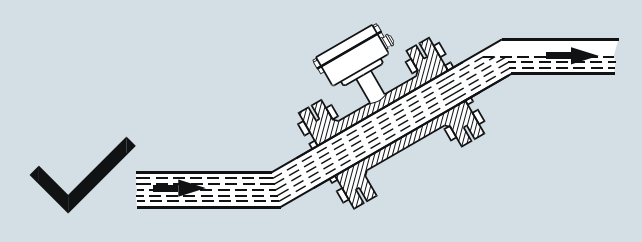
Vibrations

Strong vibrations should be avoided.

In applications with strong vibrations, remote mounting of the transmitter is recommended.



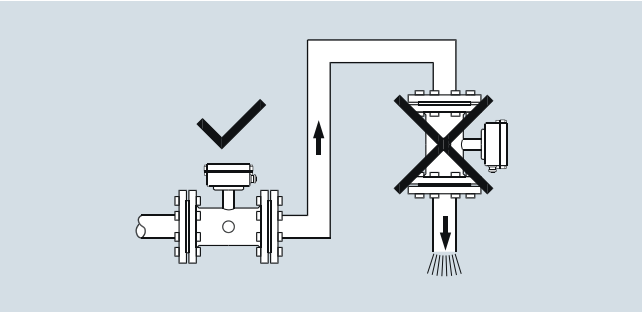
The sensor must always be completely filled with liquid.

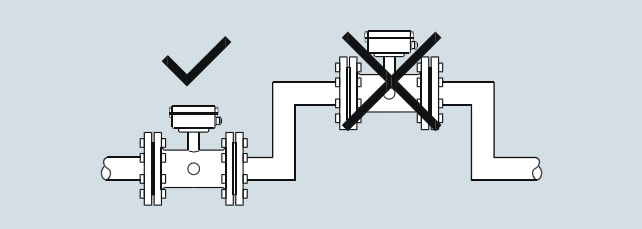


Install in pipelines which are always full

The sensor must always be completely filled with liquid. Therefore avoid:

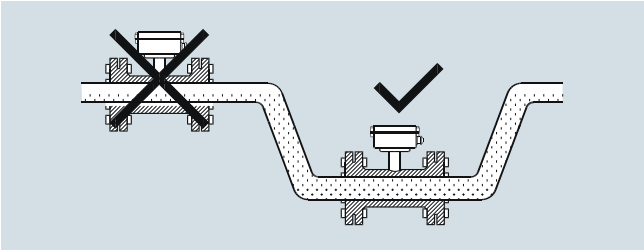
- Installation at the highest point in the pipe system
- Installation in vertical pipes with free outlet





Do not install in pipelines which can run empty

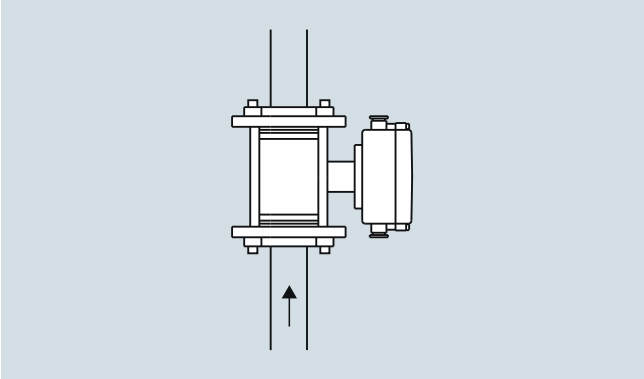
For partially filled pipes or pipes with downward flow and free outlet the flowmeter should be located in a U-Tube.



Install in U-tubes when pipe is partially filled

Installation in vertical pipes

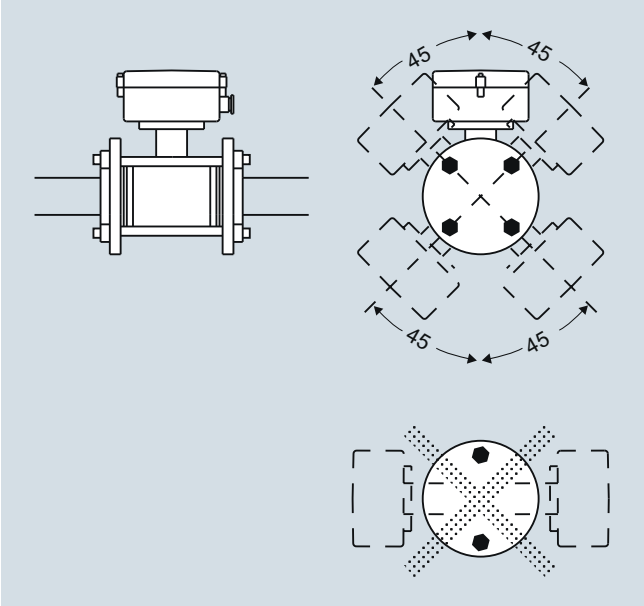
Recommended flow direction: upwards. This minimizes the effect on the measurement of any gas/air bubbles in the liquid.



Install in vertical pipes with upward flow direction

Installation in horizontal pipes

The sensor must be mounted as shown in the below figure. Do not mount the sensor as shown in the lower figure. This will position the electrodes at the top where there is possibility for air bubbles and at the bottom where there is possibility for mud, sludge, sand etc.



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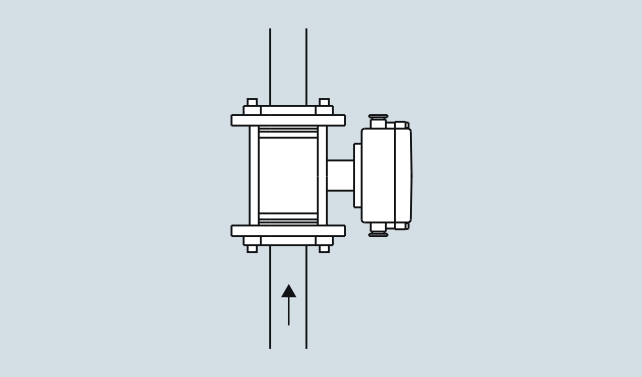
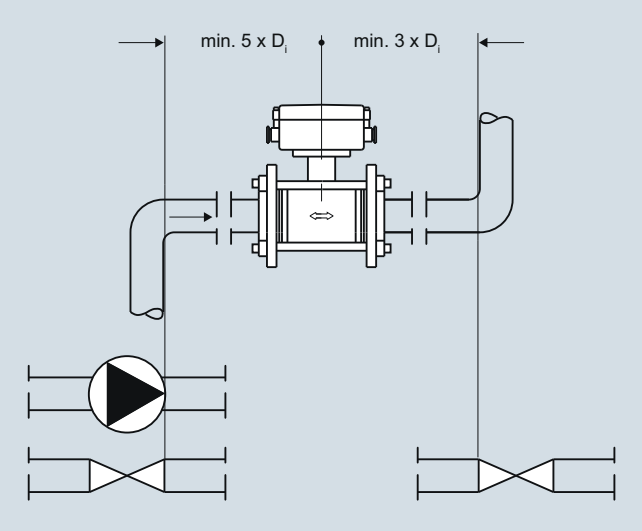
Measuring abrasive liquids and liquids containing particles

Recommended installation is in a vertical/inclined pipe to minimize the wear and deposits in the sensor.



Install in vertical pipelines with upward flow direction if measuring abrasive liquids

Inlet and outlet conditions



Installation between elbows, pumps and valves: standard inlet and outlet pipe sections

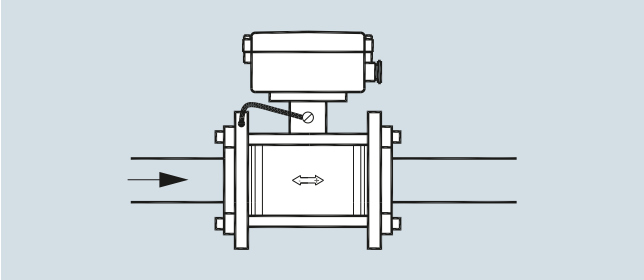
To achieve maximum accurate flow measurement it is essential to have straight length of inlet and outlet pipes and a certain distance between the flowmeter and pumps or valves.

It is also important to center the flowmeter in relation to pipe flange and gaskets.

Ambient temperature-Installation

Temperature changes can cause expansion or contraction in the pipe system. To avoid damage on the sensor use of proper gasket and torque should be ensured. For more information see sensor instruction.

Potential equalization

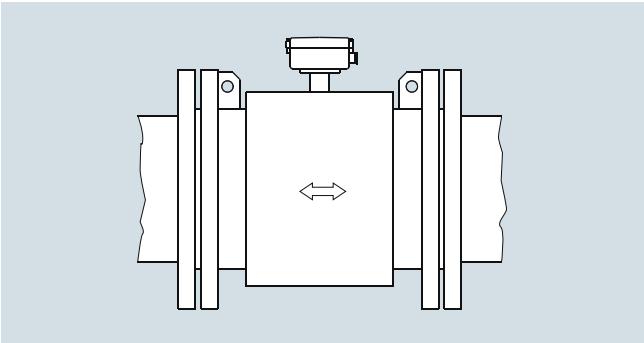


Potential equalization

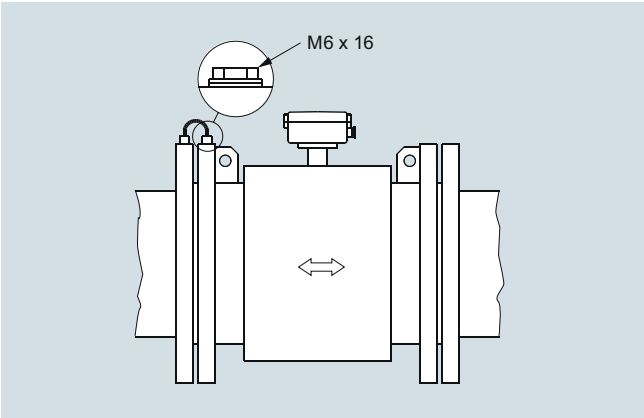
The electrical potential of the liquid must always be equal to the electrical potential of the sensor. This can be achieved in different ways depending on the application:

- Wire jumper between sensor and adjacent flange (MAG 1100, MAG 3100)
- Direct metallic contact between sensor and fittings (MAG 1100 F)
- Build-in grounding electrodes (MAG 3100, MAG 5100 W)
- Optional grounding/protection flanges/rings (MAG 1100, MAG 3100, MAG 8000)
- Optional graphite gaskets on MAG 1100 (standard for MAG 1100 High Temperature)
- MAG 8000 installed in plastic or coated pipes: two grounding rings to be used.

Grounding



MAG 3100 (not PTFE), MAG 5100 W: with earthing electrodes in conductive and non-conductive pipes (no further action necessary)



MAG 1100, MAG 3100 (PTFE): without earthing electrodes in conductive pipes (MAG 1100 use graphite gasket)

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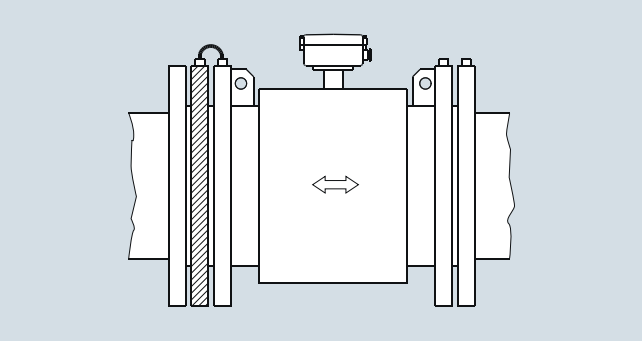
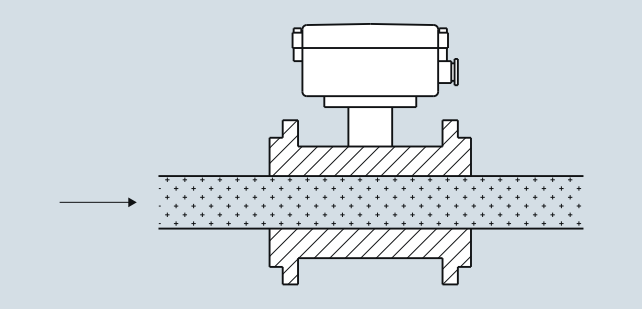


Without earthing electrodes in non-conductive pipes use grounding ring (MAG 1100 use graphite gasket)

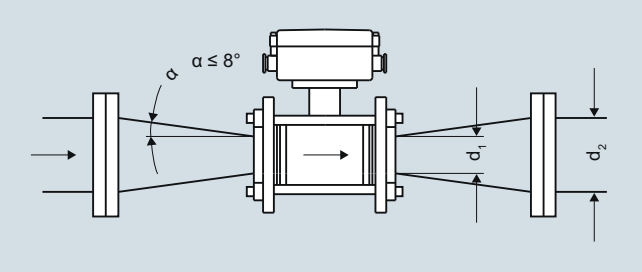
MAG 1100 F grounding via process connections. MAG 8000 grounding see MAG 8000 pages.

Vacuum



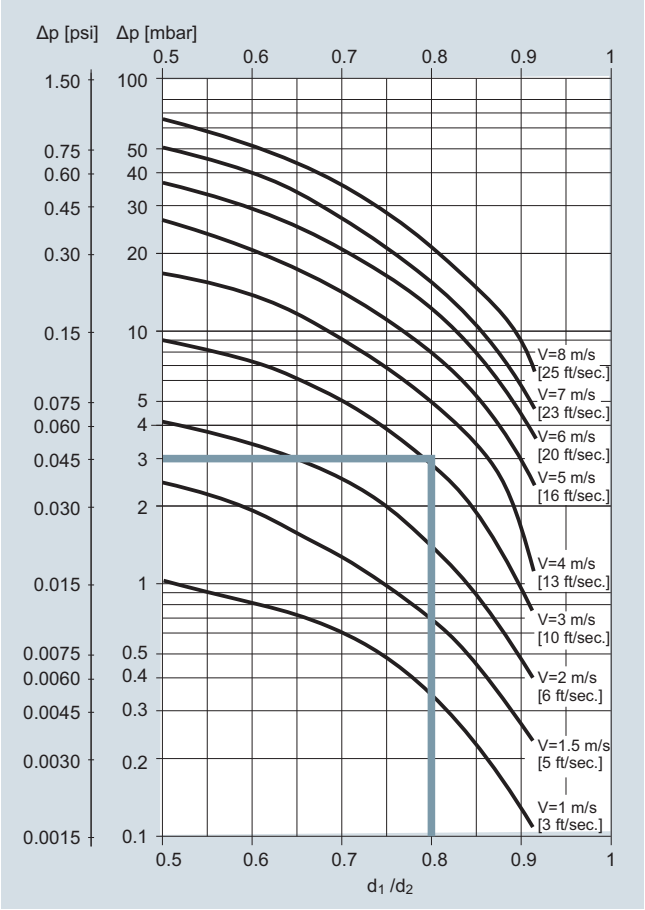
Avoid a vaccum in the measuring pipe, because this can damage certain liners.

Installation in large pipes



Reduction in nominal pipe diameter

The flowmeter can be installed between two reducers (e.g. DIN 28545). Assuming that at 8° the following pressure drop curve applies. The curves are applicable to water.

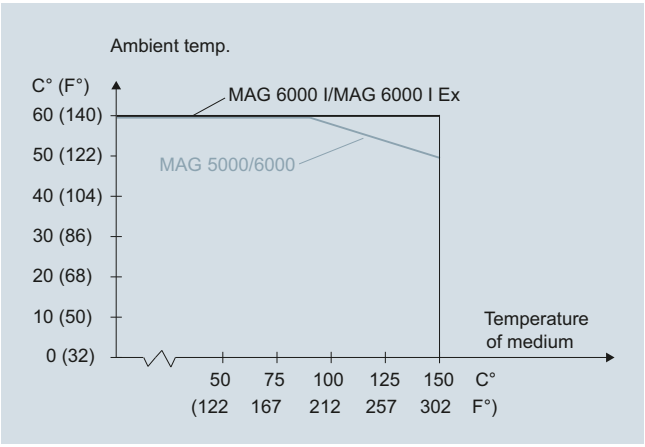


Pressure drop as function of diameter reduction between reducers

Example:

Flow velocity (v) of 3 m/s (10 ft/s) in a sensor with a diameter reduction DN 100 (4") to DN 80 (3") (d_1/d_2 = 0.8) gives a pressure drop of 2.9 mbar (0.04 psi).

Ambient temperature



Max. ambient temperature as a function of temperature of medium

The transmitter can be installed either compact or remote.

With compact installation the temperature of medium must be according to the graph.

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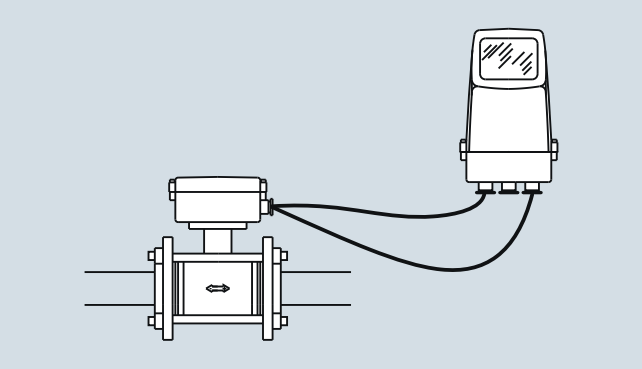
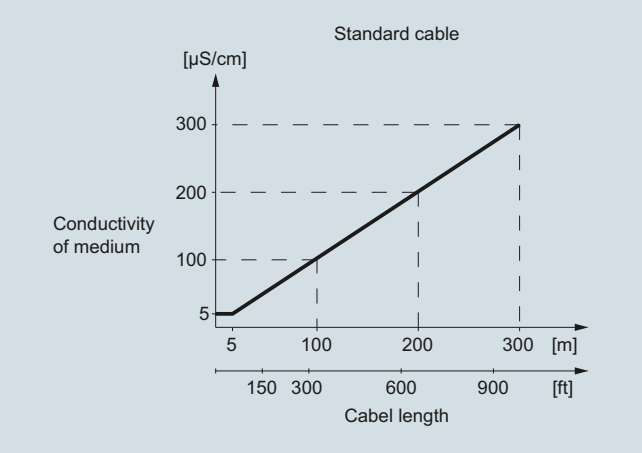
Sensor cables and conductivity of medium

Compact installation:

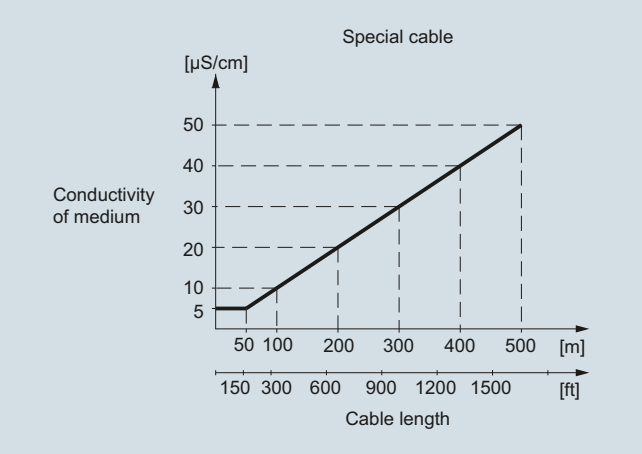
Liquids with an electrical conductivity ≥ 5 µS/cm.



Remote installation



Minimum conductivity of medium (using standard electrode cable)



Minimum conductivity of medium (using special electrode cable)

Empty pipe detection

The installation has to fulfill the following limitations for usage of the empty pipe detection function:

- media conductivity ≥ 20 µS/cm
- length of cable at remote installation ≤ 50 m (150 ft)
- special shield cable must be used

Note for MAG 1100 sizes DN 2 and DN 3:

- empty pipe detection is not available
- the media conductivity must be ≥ 30 µS/cm

Note for MAG 5000/6000 CT (FW 3.03):

- empty pipe detection is not available

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Function

All electromagnetic flowmeters are based on Faraday's law of induction:

$U_M = B \cdot v \cdot d \cdot k$

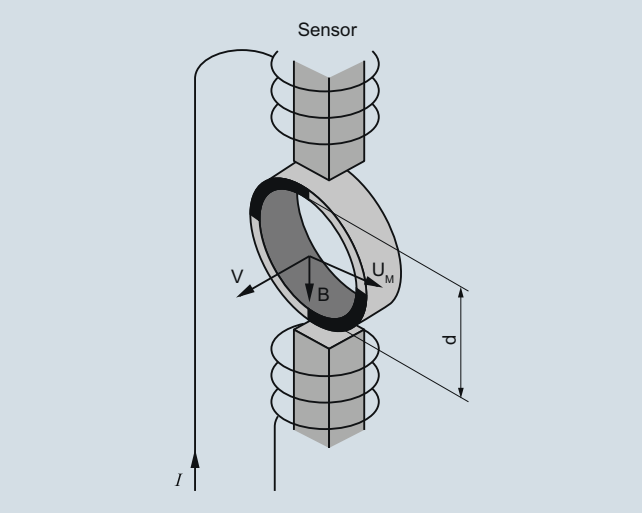
U_M = Measured voltage induced in the medium perpendicular to the magnetic field and the flow direction. The voltage is tapped at two point electrodes.

B = Magnetic flux density which permeates the flowing medium perpendicular to the flow direction.

v = flow velocity of medium

d = internal diameter of metering tube

k = proportionality factor or sensor constant



Function and measuring principle of electromagnetic measurement

An electromagnetic flowmeter generally consists of a magnetically non-conducting metering tube with an internal electrically non-conducting surface, magnet coils connected in series and mounted diametrically on the tube, and at least two electrodes which are inserted through the pipe wall and are in contact with the measured medium. The magnet field coils through which the current passes generate a pulsed electromagnetic field with the magnetic flux density B perpendicular to the pipe axis.

This magnetic field penetrates the magnetically non-conducting metering tube and the medium flowing through it, which must have a minimum electrical conductivity.

According to Faraday's law of induction, a voltage U_M is generated in an electrically conducting medium, and is proportional to the flow velocity v of the medium, the magnetic flux density B, and the distance between the electrodes d (internal diameter of pipe).

The signal voltage U_M is tapped by the electrodes which are in contact with the medium, and passed through the insulating pipe wall. The signal voltage U_M which is proportional to the flow velocity is converted by an associated transmitter into appropriate standard signals such as 4 to 20 mA.

SITRANS F M diagnostics

The diagnostic functions are all internal tools in the meter:

- Identification in clear text and error log
- Error categories: function; warning; permanent and fatal errors
- Transmitter self-check including all outputs and the accuracy
- Sensor check: coil and electrode circuit test
- Overflow
- Empty pipe: partial filling; low conductivity; electrode fouling

SITRANS F M Verificator (MAG 5000 and 6000)

The SITRANS F M Verificator is an external tool designed for MAG 5000 and MAG 6000 with MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P or MAG 5100 W sensors to verify the entire product, the installation and the application.

The goal is to improve operation, reduce downtime and maintain measurement accuracy as long as possible.

The SITRANS F M Verificator is highly advanced and carries out the complex verification and performance check of the entire flowmeter system, according to unique Siemens patented principles. The whole verification test is automated and easy to operate so there is no opportunity for human error or influence. The system is traceable to international standards and tested by WRc (Water Research Council).

SITRANS F M Verificator

- Stand alone Verificator to measure a number of selected parameters in the flow sensor and a transmitter which affects the integrity of the flow measurement
- Up to 20 measurements can be stored in the Verificator
- The Verificator can be connected via a serial cable to a PC enabling download of the data. A Windows program enables printing and management of verificator reports.

Verification - Steps

Verification of a SITRANS F M flowmeter consists of the following test routines:

1. Transmitter test
2. Flowmeter and cable insulation test
3. Sensor magnetism test

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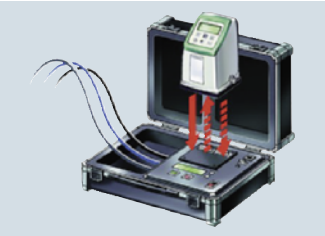
SITRANS F M Verificator

1. Transmitter test

The transmitter test is the traditional way of on-site testing on the market and checks the complete electronic system from signal input to output.

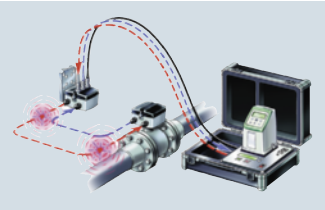


Transmitter test

Using the excitation power output, which is generated to drive the magnetic field of the sensor, the verificator simulates flow signal to the transmitter input. By measuring the transmitter outputs the verificator calculates its accuracy against defined values. Test includes:

- Excitation power to drive the magnetic field
- Signal function from signal input to output
- Signal processing – gain, offset and linearity
- Test of analogue and frequency output

2. Insulation test



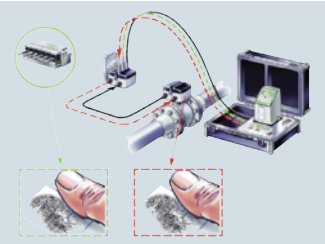
Flowmeter insulation test

The verification test of the flowmeter insulation is a „cross talk“ test of the entire flowmeter which ensures that the flow signal generated in the sensor is not affected by any external influences.

In the "cross-talk" test the verificator generates a high voltage disturbance within the coil circuit and then looks for any "cross-talk" induced in the flow signal circuit. By generating dynamic disturbances close-coupled to the flow signal, the flowmeter is tested for noise immunity to a maximum level:

- EMC influence on the flow signal
- Moisture in sensor, connection and terminal box
- Non-conductive deposit coating the electrodes within the sensor
- Missing or poor grounding, shielding and cable connection.

3. Sensor magnetism test



Sensor magnetism test

The verification of the sensor magnetism is a "boost" test of the magnetic field coil. The test ensures that the magnetism behaviour is like the first time, by comparing the current sensor magnetism with the "fingerprint" which was determined during initial calibration and stored in the SENSORPROM memory unit.
In the "boost" test the verificator changes the magnetic field in certain pattern and with high voltage to get quick stable magnetic condition. This unique test is fulfilled without any interference or compensation of surrounding temperature or interconnecting cabling.

- Changes in dynamic magnetic behaviour
- Magnetic influence inside and outside the sensor
- Missing or poor coil wire and cable connection

Certificate

The test certificate generated by a PC contains:

- Test result with passed or failed
- Installation specification
- Flowmeter specification and configuration
- Verificator specification with date of calibration ensuring traceability to international standards.

MAGFLO® Verification Certificate

Customer:
Name
Address
Phone
Email

MAGFLO® Identification:

TAG No./Name	0
Sensor Code No.	7ME634
Sensor Serial No.	057701H142
Transmitter Code No.	7ME692
Transmitter Serial No.	109418N080
Location	

Results:

Verification file name or No.		FT-103FT2801
Transmitter		Passed
Sensor	Insulation	Passed
	Magnetic Circuit	Passed

Velocity	Current Output			Frequency Output		
Theoretical	Theoretical	Actual	Deviation	Theoretical	Actual	Deviation
0.5m/s	4.800mA	4.802mA	0.25%	0.500kHz	0.501kHz	0.11%
1.0m/s	5.600mA	5.601mA	0.08%	1.000kHz	1.001kHz	0.07%
3.0m/s	8.800mA	8.804mA	0.08%	3.000kHz	3.004kHz	0.14%
	Current Output 4-20mA			Frequency Output 0-10kHz		

Transmitter Settings:

Basic	Qmax.	2.00000 m³ /h
	Flow Direction	Positive
	Low flow Cut-off	1.50%
	Empty Pipe	ON
Output	Current Output	ON (4-20mA)
	Time Constant	5.0 Sec.
	Relay Output	Error Level
	Digital Output	Pulse
	Frequency Range	N/A
	Time Constant	N/A
	Volume/pulse	1.0 l/p
	Pulse width	0.51999998 sec.
	Pulse polarity	Positiv
Totalizer 1 value before test		819442.93213 l
Totalizer 1 value after test		819458.92334 l
Totalizer 2 value before test		693.87579 l
Totalizer 2 value after test		693.88145 l
Operating time in days		1068

Sensor Details:

Size	DN 15 1/2 IN
Cal. Factor	0.16531426
Correction Factor	1.0
Excitation Freq.	12.5Hz

Verificator Details (083F5060)

Serial No.	107920N490
Device No.	94683
Software Version	1.40
PC-Software Version	5.01
Cal. date	2012.10.26
ReCal. date	2013.10.26

Comments

These tests verify that the flowmeter is functioning within 2% deviation of the original test parameters.
Verification is traceable to National and International Standards.

Date and signature
2013.04.17

Description	Article No.
SITRANS F M Verificator	
• 11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 50 Hz	**FDK:083F5060**
• 11 ... 30 V DC, 11 ... 24 V AC, 115 ... 230 V, 60 Hz	**FDK:083F5061**

Note:
It is mandatory to have the Verificator returned to the factory once a year for check and re-verification.

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Overview

Transmitter MAG 5000/6000 compact version (left) and 19“ insert version (right)

The MAG 5000 and 6000 are transmitters engineered for high performance, easy installation, commissioning and maintenance. The transmitters evaluate the signals from the SITRANS F M sensors type MAG 1100, MAG 1100 F, MAG 3100, MAG 3100 P and MAG 5100 W.

Transmitter types:

- MAG 5000: Max. measuring error ± 0.4 % ± 1 mm/s (incl. sensor)
- MAG 6000: Max. measuring error ± 0.2 % ± 1 mm/s (incl. sensor, see also sensor specifications) and with additional features such as: "plug & play" add-on bus modules; integrated batch functions.

Benefits

- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection.
- 3 lines, 20 characters display in 11 languages.
- Flow rate in various units
- Totalizer for forward, reverse and net flow as well as additional information available
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging (see under SITRANS F M diagnostics)
- Batch control (MAG 6000 only)
- Custody transfer approval: PTB, OIML R 117, OIML R 49, MI-001, PTB K 7.2 and OE12/C 040 for chilled water
- MAG 6000 with add-on bus modules for HART, FOUNDATION Fieldbus H1, DeviceNet, Modbus RTU/RS 485, PROFIBUS PA and DP

Application

The SITRANS F M flowmeters are suitable for measuring the flow of almost all electrically conductive liquids, pastes and slurries. The main applications can be found in:

- Water and waste water
- Chemical and pharmaceutical industries
- Food and beverage industries
- Power generation and utility

Design

The transmitter is designed as either IP67 NEMA 4X/6 enclosure for compact or wall mounting or 19" version as a 19” insert as a base to be used in:

- 19" rack systems
- Panel mounting IP20/NEMA 1 (prepared for IP65/NEMA 2 display side)
- Back of panel mounting IP20/NEMA 1
- Wall mounting IP66/NEMA 4X

Several options on 19” versions are available such as:

- Transmitters mounted in safe area for Ex ATEX approved flow sensors (incl. barriers)
- Transmitters with electrode cleaning unit on request

Function

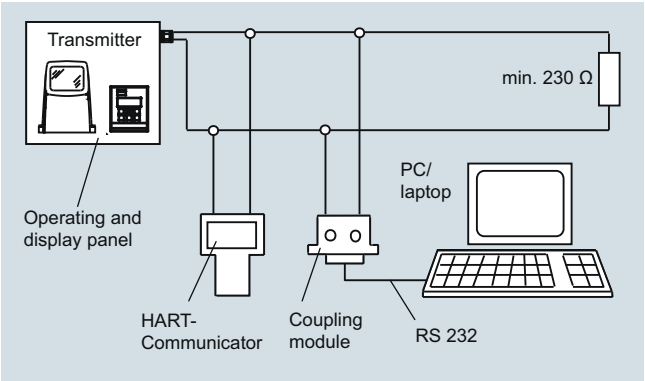
The MAG 5000/6000 are transmitters with a build-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

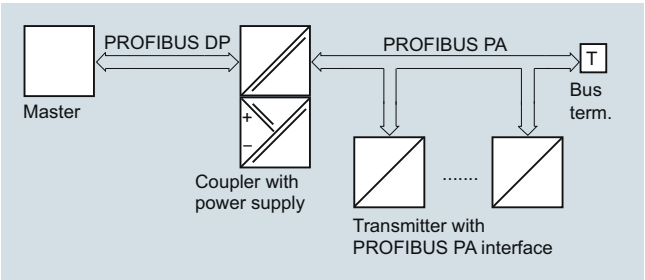
Displays and controls

Operation of the transmitter can be carried out using:

- Control and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication



HART communication



PROFIBUS PA communication

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Technical specifications

Mode of operation and design	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	> 1 x 10^{14} Ω
Input	
Digital input	11 ... 30 V DC, R_i = 4.4 KΩ
• Activation time	50 ms
• Current	$I_{11\ V\ DC}$ = 2.5 mA, $I_{30\ V\ DC}$ = 7 mA
Output	
Current output	
• Signal range	0 ... 20 mA or 4 ... 20 mA
• Load	< 800 Ω
• Time constant	0.1 … 30 s, adjustable
Digital output	
• Frequency	0 ... 10 kHz, 50 % duty cycle (uni/bidirectional)
• Pulse (active)	24 V DC, 30 mA, 1 KΩ ≤ R_i ≤ 10 KΩ, short-circuit-protected (power supplied from flowmeter)
• Pulse (passive)	3 … 30 V DC, max. 110 mA, 200 Ω ≤ R_i ≤ 10 KΩ (powered from connected equipment)
• Time constant	0.1 … 30 s, adjustable
Relay output	
• Time constant	Changeover relay, same as current output
• Load	42 V AC/2 A, 24 V DC/1 A
Low flow cut off	0 ... 9.9 % of maximum flow
Galvanic isolation	All inputs and outputs are galvanically isolated.
Max. measuring error (incl. sensor and zero point)	
• MAG 5000	0.4 % ±1 mm/s
• MAG 6000	0.2 % ±1 mm/s
Rated operation conditions	
Ambient temperature	
• Operation	• Display version: -20 ... +60 °C (-4 ... +140 °F) • Blind version: -20 ... +60 °C (-4 ... +140 °F) • MI-001 version -25 ... +55 °C (-13 ... +131 °F) • Custody Transfer (CT) version -20 ... +50 °C (-4 ... +122 °F)
• Storage	-40 ... +70 °C (-40 ... +158 °F)
Mechanical load (vibration)	
Compact version	18 ... 1000 Hz, 3.17 g RMS, sinusoidal in all directions to IEC 68-2-36
19“ insert	1 ... 800 Hz, 1 g, sinusoidal in all directions to IEC 68-2-36
Degree of protection	
Compact version	IP67/NEMA 4X/6 to IEC 529 and DIN 40050 (1 mH_2O 30 min.)
19“ insert	IP20/NEMA 1 to IEC 529 and DIN 40050
EMC performance	IEC/EN 61326-1 (all environments) IEC/EN 61326-2-5

Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign
Time constant	Time constant as current output time constant
Design	
Enclosure material	
• Compact version	Fiber glass reinforced polyamide; stainless steel AISI 316/1.4436 (IP65)
• 19" insert	Standard 19“ insert of aluminum/steel (DIN 41494), width: 21 TE, height: 3 HE
• Back of panel	IP20/NEMA 1; Aluminum
• Panel mounting	IP20/NEMA 1 (prepared for IP65/NEMA 2 display side); ABS plastic
• Wall mounting	IP66/NEMA 4X; ABS plastic
Dimensions	
Compact version	See dimensional drawings
19“ insert	See dimensional drawings
Weight	
Compact version	0.75 kg (2 lb)
19“ insert	See dimensional drawings
Power supply	• 115 ... 230 V AC +10 % -15 %, 50 ... 60 Hz • 11 ... 30 V DC or 11 ... 24 V AC
Power consumption	• 230 V AC: 17 VA • 24 V AC: 9 VA, I_N = 380 mA, I_{ST} = 8 A (30 ms) • 12 V DC: 11 W, I_N = 920 mA, I_{ST} = 4 A (250 ms) • 24 V DC: 8.4 VA, I_N = 350 mA, I_{ST} = 4 A (10 ms) I_{ST}= 4 A (250 ms): For solar panel please secure stable current supply
Certificates and approvals	CE, C-UL general purpose, C-tick; FM Class I, Div 2, CSA Class I, Div 2
Custody transfer approval (MAG 5000/6000 CT)	• Cold water: MI-001, PTB/OIML R 49 (pattern approval DE/DK) • Hot water: PTB and DANAK (MAG 6000 CT) • Chilled water: PTB K 7.2; OE12/C 040 • Other media than water (milk, beer etc.): PTB and DANAK OIML R 117 (pattern approval DE/DK) (MAG 6000 CT)
Communication	
Standard	
• MAG 5000	Without serial communication or HART as option
• MAG 6000	Prepared for client-mounted add-on modules
Optional (MAG 6000 only)	HART, Modbus RTU/RS 485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP as add-on modules
• MAG 5000/6000 CT	No communication moduls approved

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Safety barrier (e/ia)

Application	**For use with MAG 5000/6000 19" and MAG 1100 Ex ATEX/MAG 3100 Ex ATEX**		
Ex approval	MAG 1100 Ex [EEx e ia] IIB ATEX		
	MAG 3100 Ex [EEx e ia] IIC ATEX		
Cable parameter	Group	Capacity in µF	Inductance in mH
Electrode	IIC	≤ 4.1	≤ 80
	IIB	≤ 45	≤ 87
	IIA	≤ 45	≤ 87
Ambient temperature			
• During operation	-20 ... +50 °C (-4 ... +122 °F)		
• During storage	-20 ... +70 °C (-4 ... +158 °F)		
Enclosure			
• Material	Standard 19" insert in aluminum/steel (DIN 41494)		
• Width	21 TE (4.75")		
• Height	3 HE (5.25")		
• Rating	IP20 / NEMA 1 to EN 60529		
• Mechanical load	1 g, 1 … 800 Hz sinusoidal in all directions to EN 60068-2-36		

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Selection and Ordering data

Transmitter MAG 5000

Description	Article No.	
Transmitter MAG 5000 Blind for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6910-1AA30-0AA0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6910-1AA10-0AA0**	
Transmitter MAG 5000 Display for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6910-1AA30-1AA0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6910-1AA10-1AA0**	
• 115 ... 230 V AC, 50/60 Hz, with HART	**7ME6910-1AA10-1BA0**	
Transmitter MAG 5000 CT for compact and wall mounting, approved for custody transfer (only with approval marks, no verification – only a complete flowmeter can be verified, i.e. sensor together with the transmitter); IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6910-1AA30-1AB0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6910-1AA10-1AB0**	
Transmitter MAG 5000 for 19" rack and wall mounting		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6910-2CA30-1AA0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6910-2CA10-1AA0**	

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

Transmitter MAG 6000

Description	Article No.	
Transmitter MAG 6000 Blind for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6920-1AA30-0AA0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6920-1AA10-0AA0**	
Transmitter MAG 6000 for compact and wall mounting; IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6920-1AA30-1AA0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6920-1AA10-1AA0**	
Transmitter MAG 6000 for compact and wall mounting; IP65/NEMA 4, stainless steel AISI 316/1.4436 (only for sensor with SS terminal box) (for remote installation order SS terminal box separately)		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6920-1QA30-1AA0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6920-1QA10-1AA0**	
Transmitter MAG 6000 CT for compact and wall mounting, approved for custody transfer (no communication modules possible; only with approval marks, no verification – only a complete flowmeter can be verified, i.e. sensor together with the transmitter); IP67/NEMA 4X/6, fibre glass reinforced polyamide		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6920-1AA30-1AB0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6920-1AA10-1AB0**	
Transmitter MAG 6000 SV for compact and wall mounting; special excitation 44 Hz settings for Batch application DN ≤ 25/1" IP67/NEMA 4X/6, fibre glass reinforced polyamide		
11 ... 30 V DC/ 11 ... 24 V AC	**7ME6920-1AB30-1AA0**	
115 ... 230 V AC, 50/60 Hz	**7ME6920-1AB10-1AA0**	
Transmitter MAG 6000 for 19" rack and wall mounting		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6920-2CA30-1AA0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6920-2CA10-1AA0**	

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Description	Article No.	
Transmitter MAG 6000 SV for 19“ rack and wall mounting; special excitation 44 Hz settings for Batch application DN ≤ 25/1“		
• 11 ... 30 V DC/ 11 ... 24 V AC	**7ME6920-2CB30-1AA0**	
• 115 ... 230 V AC, 50/60 Hz	**7ME6920-2CB10-1AA0**	
MAG 6000 with IP66/NEMA 4X enclosure; 115 ... 230 V AC, 50/60 Hz; cable gland PG13.5	**7ME6920-2EA10-1AA0**	
MAG 6000 with safety barrier for Ex-approved sensors, complete mounted with IP66/NEMA 4X wall mounting enclosure, ATEX, 115 ... 230 V AC, 50/60 Hz; cable gland PG13.5		
• For ATEX 2G D sensors	**7ME6920-2MA11-1AA0**	
MAG 6000 SV, 19” insert, in IP66/NEMA 4X , ABS plastic enclosure, excitation frequency 44 Hz for Batch application DN ≤ 25/1“; cable gland PG13.5		
• 11 … 30 V DC, 11 … 24 V AC, 50/60 Hz	**7ME6920-2EB30-1AA0**	
• 115 … 230 V AC, 50/60 Hz	**7ME6920-2EB10-1AA0**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Operating instructions for SITRANS F M MAG 5000/6000

Description	Article No.
For SITRANS F M MAG 5000/6000 IP67	
• English	**A5E02338368**
• German	**A5E02944982**
• Spanish	**A5E02944995**
• French	**A5E02944990**
For SITRANS F M MAG 5000/6000 19"	
• English	**A5E02082880**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Communication modules for MAG 6000

Description		Article No.	
HART (not for MAG 6000 I)	⬟	**FDK:085U0226**	
Modbus RTU/RS 485	⬟	**FDK:085U0234**	
PROFIBUS PA Profile 3	⬟	**FDK:085U0236**	
PROFIBUS DP Profile 3	⬟	**FDK:085U0237**	
DeviceNet	⬟	**FDK:085U0229**	
FOUNDATION Fieldbus H1		**A5E02054250**	

Operating instructions for SITRANS F add-on modules

Description	Article No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
Modbus	
• English	**A5E00753974**
• German	**A5E03089262**
• Spanish	**A5E03089278**
• French	**A5E03089265**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
• Spanish	**A5E02512177**
• French	**A5E02512169**
DeviceNet	
• English	**A5E03089720**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

Accessories for MAG 5000 and MAG 6000

Description		Article No.	
Wall mounting unit for IP67/ NEMA 4X/6 version, wall bracket, terminal box in polyamide[1)]			
• 4 x M20 cable glands	⬟	**FDK:085U1018**	
• 4 x ½“ NPT cable glands	⬟	**FDK:085U1053**	
Sun lid for MAG 5000/6000 transmitter (Frame and lid)		**A5E02328485**	
Cable for standard electrode or coil, 3 x 1.5 mm² / 18 gage with shield PVC; Temperature range: -30 ... +70 °C (-22 ... +158 °F)			
• 10 m (33 ft)	⬟	**FDK:083F0121**	
• 20 m (65 ft)	⬟	**FDK:083F0210**	
• 40 m (130 ft)	⬟	**FDK:083F0211**	
• 60 m (200 ft)	⬟	**FDK:083F0212**	
• 100 m (330 ft)		**FDK:083F0213**	
• 150 m (500 ft)		**FDK:083F3052**	
• 200 m (650 ft)		**FDK:083F3053**	
• 500 m (1650 ft)		**FDK:083F3054**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) For stainless steel wall mounting kit, order:
- M20: FDK:085U1018 and A5E00836867
- ½ NPT: FDK:085U1053 and A5E00836868

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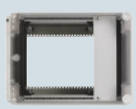
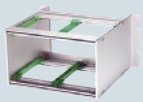
Transmitter MAG 5000/6000

Description	Article No.	
Electrode cable for empty pipe or low conductivity[1], double shielded, 3 x 0.25 mm². Temperature range : -30 ... +70 °C (-22 ... +158 °F)		
• 10 m (33 ft)	**FDK:083F3020**	
• 20 m (65 ft)	**FDK:083F3095**	
• 40 m (130 ft)	**FDK:083F3094**	
• 60 m (200 ft)	**FDK:083F3093**	
• 100 m (330 ft)	**FDK:083F3092**	
• 150 m (500 ft)	**FDK:083F3056**	
• 200 m (650 ft)	**FDK:083F3057**	
• 500 m (1650 ft)	**FDK:083F3058**	
Low-noise electrode coax cable for low conductivity and high vibration levels of cables, 3 x 0.13 mm²		
• 2 m (6.6 ft)	**A5E02272692**	
• 5 m (16.5 ft)	**A5E02272723**	
• 10 m (33 ft)	**A5E02272730**	
Cable kit with standard coil cable[1], 3 x 1.5 mm²/18 gage with shield PVC and electrode cable double shielded, 3 x 0.25 mm² Temperature range: -30 ... +70 °C (-22 ... +158 °F)		
• 5 m (16.5 ft)	**A5E02296329**	
• 10 m (33 ft)	**A5E01181647**	
• 15 m (49 ft)	**A5E02296464**	
• 20 m (65 ft)	**A5E01181656**	
• 25 m (82 ft)	**A5E02296490**	
• 30 m (98 ft)	**A5E02296494**	
• 40 m (130 ft)	**A5E01181686**	
• 50 m (164 ft)	**A5E02296498**	
• 60 m (200 ft)	**A5E01181689**	
• 100 m (330 ft)	**A5E01181691**	
• 150 m (500 ft)	**A5E01181699**	
• 200 m (650 ft)	**A5E01181703**	
• 500 m (1650 ft)	**A5E01181705**	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	**FDK:085U0220**	
19" safety barrier (21 TE)[1] [EEx e ia] IIC for MAG 1100 Ex sensors and MAG 3100 Ex sensors 12 ... 24 V, 115 ... 230 V, incl. back plate (A5E02559810)	**FDK:083F5034**	
Panel mounting enclosure for 19" insert (21 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	**FDK:083F5030**	
Panel mounting enclosure for 19" insert (42 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	**FDK:083F5031**	

Description	Article No.	
Back of panel mounting enclosure for 19" insert (21 TE); IP20/NEMA 1 enclosure in aluminum	**FDK:083F5032**	
Back of panel mounting enclosure for 19" insert (42 TE); IP20/NEMA 1 enclosure in aluminum	**FDK:083F5033**	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates). Use with PCB A5E02559813 or A5E02559814. Cable glands (FDK:083G0288) not included		
• 21 TE	**FDK:083F5037**	
• 42 TE	**FDK:083F5038**	
Front cover (7TE) for panel mounting enclosure	**FDK:083F4525**	
Sun shield for remote MAG 5000/6000 transmitters	**A5E01209496**	
Sun Shield for compact MAG 5000/6000 transmitters on MAG 3100 (DN 15 ... 2000 (½" ... 78") or MAG 5100 W (DN 150 ... 1200 (6" ... 48")	**A5E01209500**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

[1] Special cables cannot be used with 19" safety barrier

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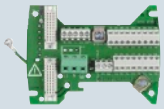
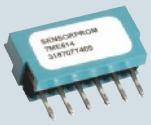
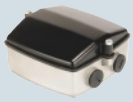
Spare parts

Description	Article No.	
Connection board (for polyamide terminalbox)		
• 12 ... 24 V	**A5E02559817**	
• 115 ... 230 V	**A5E02559816**	
Connection board (for stainless steel terminal-box)		
• 12 ... 24 V	**A5E02604280**	
• 115 ... 230 V	**A5E02604272**	
19" enclosure, 12 ... 24 V, 115 ... 230 V		
• Connection board for standard 19" transmitter	**A5E02559809**	
• Connection board for transmitter ia and safety barrier	**A5E02559810**	
• Connection board for transmitter ia/ib and safety barrier (only for sensors produced before October 2007)	**A5E02559811**	
• Connection board for transmitter and cleaning unit	**FDK:083F4123**	
SENSORPROM memory unit (Sensor code and serial numbers must be specified on order)		
• 2 kB (for MAG 5000/6000/ MAG 6000 I)		
- 1 pc.	**FDK:085U1005**	
- 10 pcs.	**FDK:083F5052**	
• 250 B (for MAG 2500/3000)	**FDK:085U1008**	
Display unit for MAG 5000/6000		
• Black neutral front	**FDK:085U1038**	
• Siemens front	**FDK:085U1039**	
HW key	**On request**	

Description	Article No.	
Cable glands, for above cable, 4 pcs.		½" NPT M20
• M20 ⬟	**A5E00822490**	
• ½" NPT ⬟	**A5E00822501**	
• PG 13.5, 2 pcs.	**FDK:083G0228**	
Sealing screws for sensor/ transmitter, 2 pcs	**FDK:085U0221**	
Terminal box, in polyamide, inclusive lid, terminal blocks, gasket and screws		
• M20	**FDK:085U1050**	
• ½" NPT	**FDK:085U1052**	
Terminal box lid, in polyamide	**FDK:085U1003**	
Terminal box, in stainless steel, inclusive lid, terminal blocks, gasket and screws, for MAG 6000 in stainless steel and for all Ex sensors,		
• M20	**A5E00836867**	
• ½" NPT	**A5E00836868**	
Terminal box (3A) for MAG 1100 F in polyamide, inclusive lid, terminal blocks, gasket and screws		
• M20	**A5E00822478**	
• ½" NPT	**A5E00822479**	
Wall unit enclosure IP66, 12 ... 24 V, 115 ... 230 V		
• PCB for standard transmitter	**A5E02559813**	
• PCB for transmitter ia/e and safety barrier	**A5E02559814**	
• PCB for transmitter ia/ib and safety barrier (7ME6130, 7ME6150 and 7ME6330)	**A5E02559812**	
• PCB for transmitter and cleaning unit	**A5E02559815**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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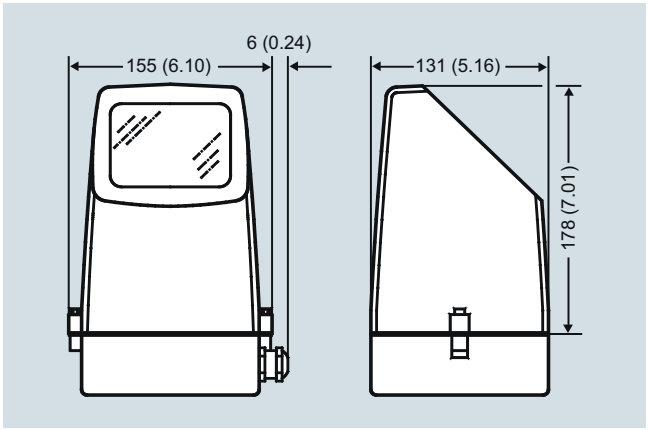
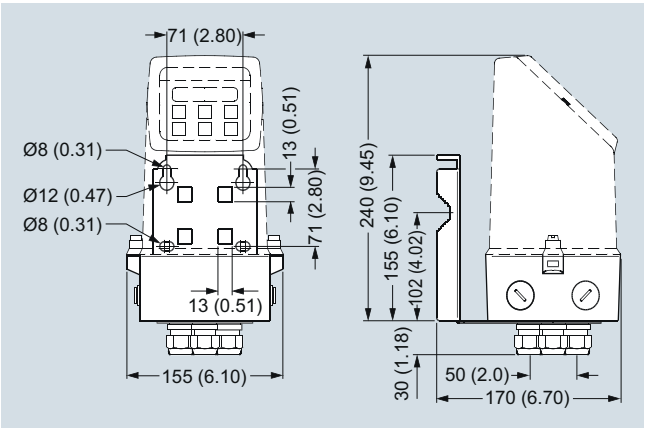
Dimensional drawings

Transmitter IP67/NEMA 4X/6 compact polyamide

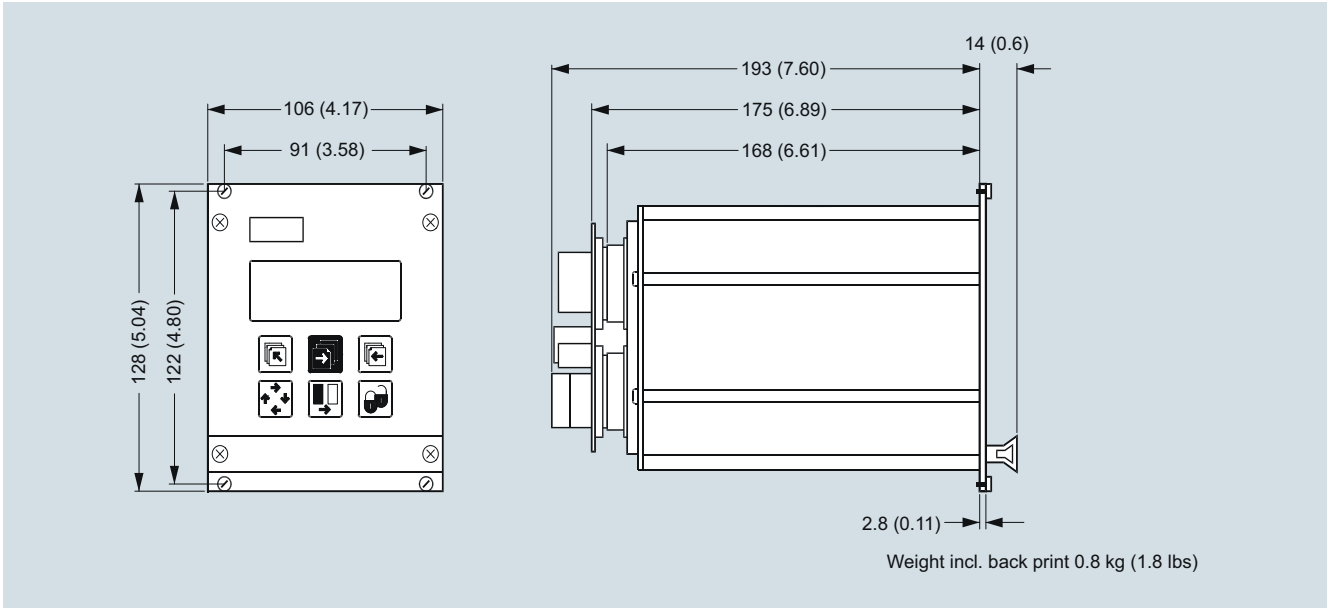


Transmitter compact mounted, dimensions in mm (inch)



Transmitter wall mounted, dimensions in mm (inch)

Transmitter, 19" IP20/NEMA 1 standard unit



Dimensions in mm (inch)

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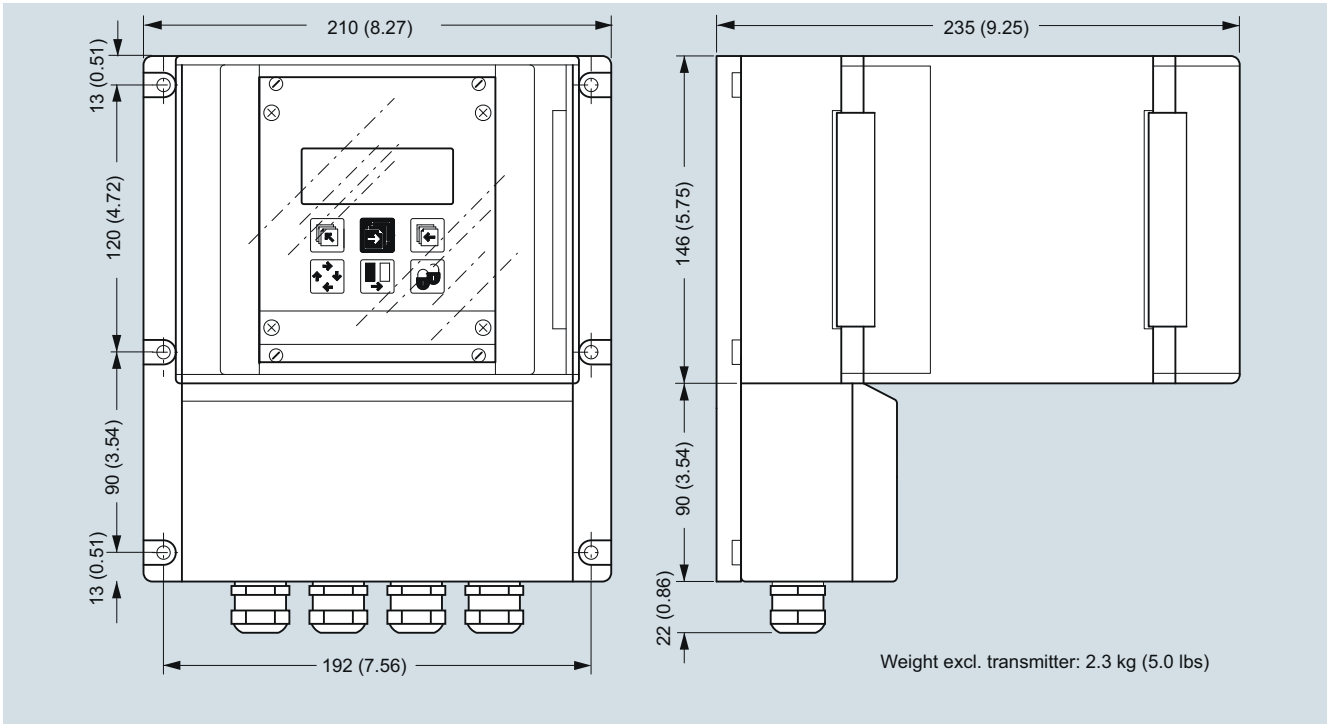
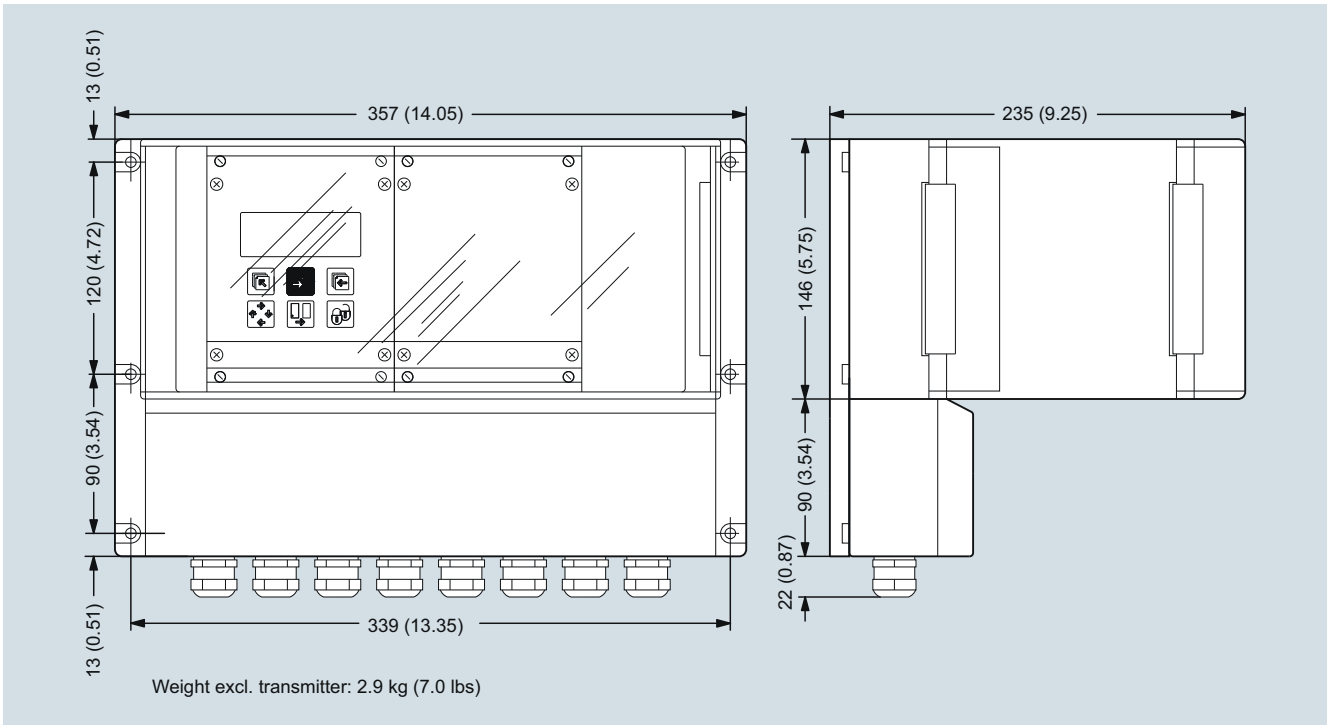
Transmitter, wall mounting IP66/NEMA 4X, 21 TE



Dimensions in mm (inch)

Transmitter, wall mounting IP66/NEMA 4X, 42 TE



Dimensions in mm (inch)

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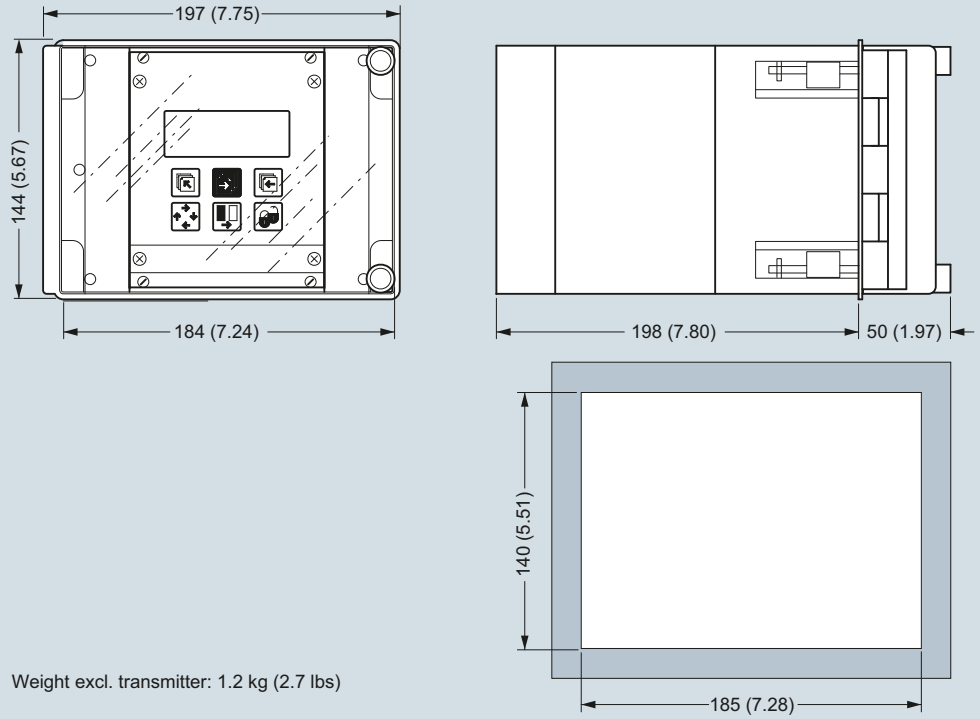
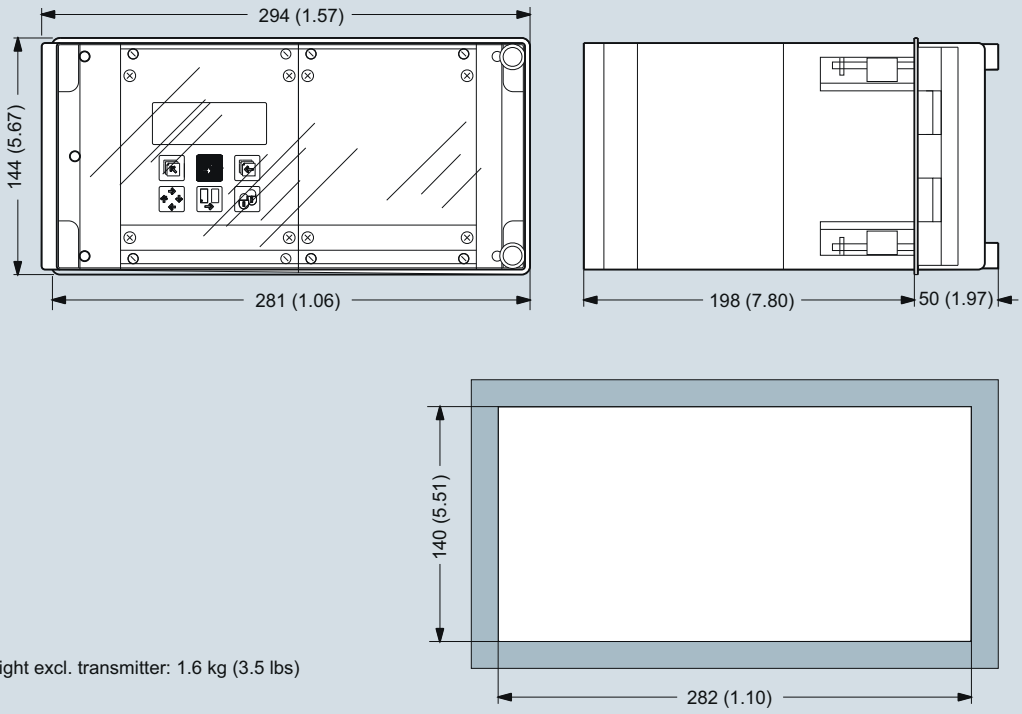
Transmitter, panel front IP20/NEMA 1, 21 TE



Weight excl. transmitter: 1.2 kg (2.7 lbs)

Dimensions in mm (inch)

Transmitter, panel front IP20/NEMA 1, 42 TE



Weight excl. transmitter: 1.6 kg (3.5 lbs)

Dimensions in mm (inch)

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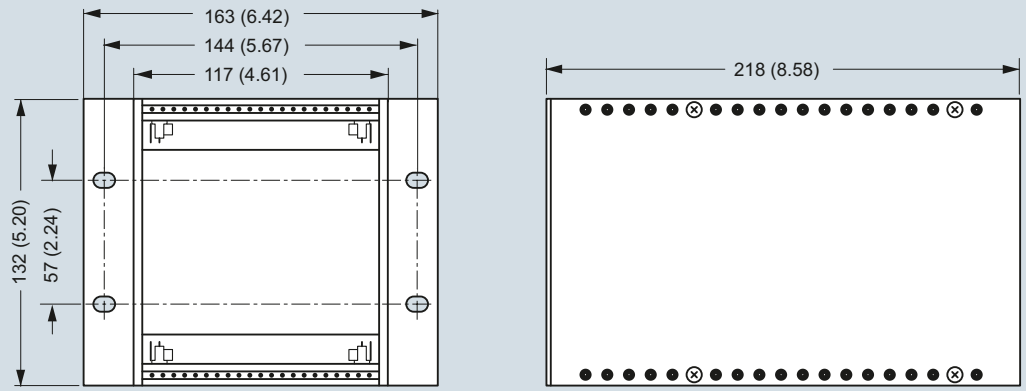
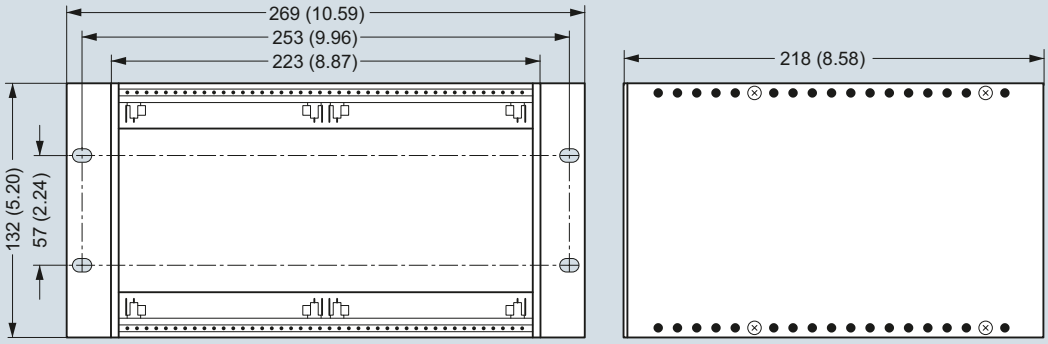
Transmitter, back of panel IP20/NEMA 1, 21 TE



Weight: 0.7 kg (1.6 lbs)

Dimensions in mm (inch)

Transmitter, back of panel IP20/NEMA 1, 42 TE



Weight: 0.9 kg (2.0 lbs)

Dimensions in mm (inch)

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3

Schematics

Electrical connection

Grounding

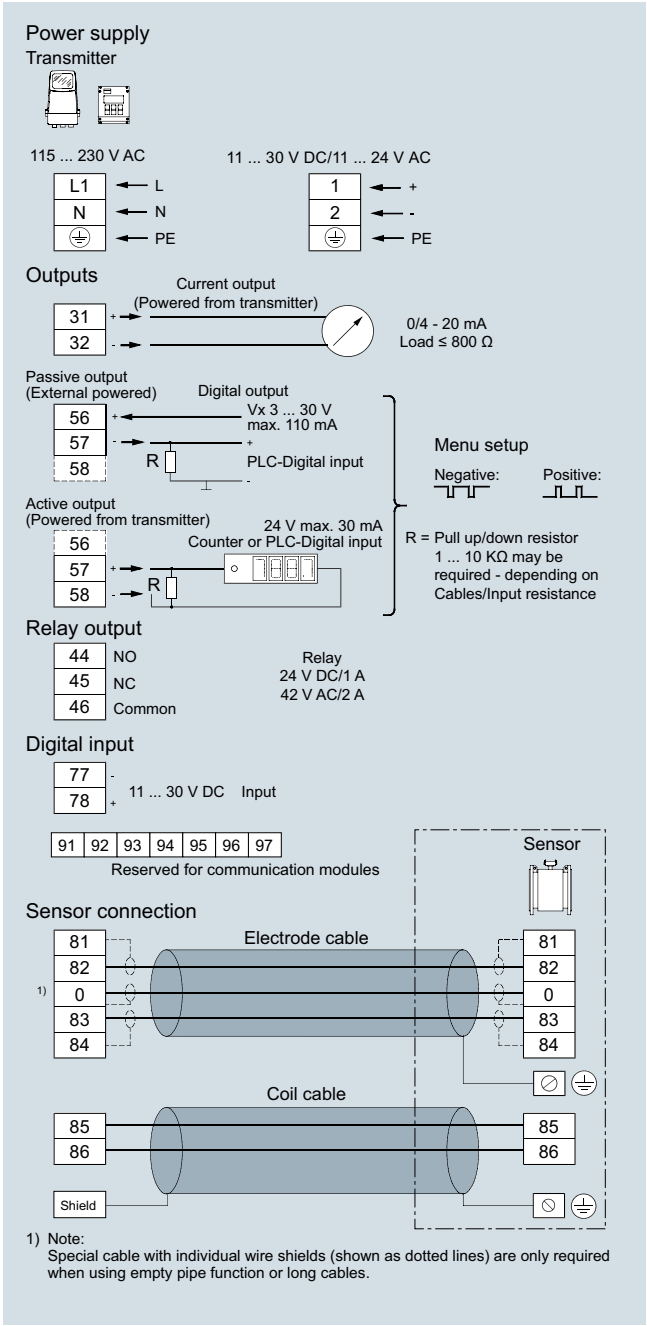
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If the output cable length is long in noisy environment, we recommend to use shielded cable.



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Overview

The SITRANS F M MAG 6000 I/MAG 6000 I Ex transmitter is designed for the demands in the process industry. The robust die cast aluminum housing provides superb protection, even in the most harsh industrial environments. Full input and output functionality is given even in the Ex version.

Benefits

- Full range of Ex-rated flowmeters with intrinsically safe rated input and outputs
- For compact or remote installation
- HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA and DP, Modbus RTU/RS 485 add-on communication modules available
- Superior signal resolution for optimum turn down ratio
- Digital signal processing with many possibilities
- Automatic reading of SENSORPROM data for easy commissioning
- User configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Flow rate in various units
  - Totalizer for forward, reverse and net flow as well as much more information available.
- Multiple functional outputs for process control, minimum configuration with analogue, pulse/frequency and relay output (status, flow direction, limits)
- Comprehensive self-diagnostic for error indication and error logging
- Batch control
- MAG 6000 I NAMUR: compliant with NAMUR NE 21, NE 32, NE 43, NE 53 and NE 70

Design

The transmitter is designed for either compact or remote installation in non-hazardous or hazardous areas (compact mounted transmitter to be ordered together with the sensors).

Function

The following functions are available:

- Flow rate
- 2 measuring ranges
- 2 totalizers
- Low flow cut-off
- Flow direction
- Error system
- Operating time
- Uni-/bidirectional flow
- Limit switches and pulse output
- Batch control

The MAG 6000 I/6000 I Ex is a microprocessor-based transmitter with a build-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

Displays and keypads

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS or Modbus communication

Technical specifications

Mode of operation and design	
Measuring principle	Electromagnetic with pulsed constant field
Empty pipe	Detection of empty pipe (special cable required in remote mounted installation)
Excitation frequency	Depend on sensor size
Electrode input impedance	> 1 x 10^{14} Ω
Input	
Digital input	11 ... 30 V DC, Ri = 4.4 kΩ
• Activation time	50 ms
• Current	$I_{11\ V\ DC}$ = 2.5 mA, $I_{30\ V\ DC}$ = 7 mA
Output	
Current output	
• Signal range	4 ... 20 mA (active/ passive)
• Load	< 560 Ω
• Time constant	0.1 … 30 s, adjustable
Digital output	
• Frequency	0 … 10 kHz, 50 % duty cycle (uni-/bidirectional)
• Time constant	0.1 … 30 s, adjustable
• Pulse (passive)	3 … 30 V DC, max 110 mA (30 mA Ex version), 200 Ω ≤ Ri ≤ 10 kΩ (powered from connected equipment)
• Time constant	0.1 … 30 s, adjustable
Relay output	
• Time constant	Changeover relay, same as current output
• Load	42 V AC/2 A, 24 V DC/1 A
Low flow cut off	0 … 9.9 % of maximum flow
Galvanic isolation	All inputs and outputs are galvanic isolated
Max. measuring error	
MAG 6000 I/MAG 6000 I Ex (incl. sensor)	± 0.2 % ± 1 mm/s

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Transmitter MAG 6000 I/6000 I Ex

Rated operation conditions	
Ambient temperature	
• Operation	
- MAG 6000 I	-20 … +60 °C (-4 … +140 °F)
- MAG 6000 I Ex	-20 … +60 °C (14 … 140 °F)
• Storage	-40 … +70 °C (-40 … +158 °F)
Mechanical load	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Transmitter: 1.14 g RMS
Degree of protection	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH_2O 30 min.)
EMC performance	IEC/EN 61326-1 (all environments) IEC/EN 61326-2-5 NAMUR NE 21
Display and keypad	
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	Background illumination with alphanumeric text, 3 x 20 characters to indicate flow rate, totalized values, settings and faults; Reverse flow indicated by negative sign
Keypad	Capacitive touch keypad with LED light for feedback indication
Time constant	Time constant as current output time constant
Design	
Enclosure material	Die cast aluminum, with corrosion resistant Basic Polyester powder coating (min. 60 µm)
• Wall mounting	Wall mounting bracket enclosed for remote version
Dimensions	See dimensional drawings
Weight	See dimensional drawings
Power supply	• Standard transmitter: 18 ... 90 V DC; 115 ... 230 V AC +10 %/-15 %; 50 ... 60 Hz • Ex transmitter: 18 ... 30 V DC • Ex transmitter: 115 ... 230 V AC; 50 ... 60 Hz • Ex transmitter NAMUR: 18 ... 30 V DC; 115 ... 230 V AC; 50 ... 60 Hz
Power consumption	• 230 V AC: 20 VA • 24 V DC: 9.6 W, I_N = 0.4 A, I_{ST} = 1 A (3 ms)
Certificates and approvals	
MAG 6000 I	• CE • C-tick • FM Class I, Div 2 • FM Class I, Zone 2 • CSA Class I, Div 2
MAG 6000 I Ex	• IEC Ex de [ia] [ib] ia IIC T6 Gb Ex tDa 21 IP67 • ATEX II 2(1)(2) GD EEx de [ia] ia [ib] IIC T6 • FM Class I, Div 1[1)] • FM Class I, Zone 1 • CSA Class I, Zone 1/21

Cable entries	Remote installation
MAG 6000 I	2 x M25 (for supply/output) and 2 x M16 (for sensor connection) or 2 x ½" NPT (for supply/output) and 2 x M16 (for sensor connection)
MAG 6000 I Ex ATEX 2G D	2 x M20 (for supply/output) and 2 x M16 (for sensor connection)
Communication	
Standard versions	HART, Modbus RTU/RS 485, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS PA, PROFIBUS DP add-on modules
Ex versions	HART, PROFIBUS PA,

[1)] Applicable for: Compact mounted MAG 6000 I Ex on MAG 3100 (sizes DN 15 ... DN 300 (½" ... 12"))

Selection and Ordering data — Article No.

SITRANS F M Transmitter MAG 6000 I/Ex ↗ **7ME6930-**

Remote with standard wall mounting bracket, local display, die cast aluminum **2BA□□-1□A□**

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Supply voltage		
Standard transmitter: 18 ... 90 V DC; 115 ... 230 V AC, 50 ... 60 Hz	⬟	**2**
Standard transmitter (NAMUR): 18 ... 30 V DC; 115 ... 230 V AC, 50 ... 60 Hz		**3**
Ex transmitter: 18 ... 30 V DC	⬟	**4**
Ex transmitter: 115 ... 230 V AC, 50 ... 60 Hz	⬟	**5**
Ex transmitter (NAMUR): 18 ... 30 V DC; 115 ... 230 V AC, 50 ... 60 Hz		**6**
Ex approval		
Standard sensor: FM Class I, Div 2, CSA Class I, Div 2	⬟	**0**
Ex sensor: Hazardous area (ATEX 2 GD; FM Class I, Zone 1; CSA Class I, Zone 1)	⬟	**2**
Communication		
None	⬟	**A**
HART	⬟	**B**
PROFIBUS PA Profile 3	⬟	**F**
PROFIBUS DP Profile 3 (not for Ex version)	⬟	**G**
Modbus RTU/RS 485 (not for Ex version)	⬟	**E**
FOUNDATION Fieldbus H1		**J**
Cable gland entries		
Metric	⬟	**0**
½" NPT	⬟	**2**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data — Order code

Further design	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Tag name plate, stainless steel fixed with SS wire (add plain text)	**Y17**
Tag name plate, plastic (self adhesive)	**Y18**
Other, post-production requirements (add plain text)	**Y99**

Operating instructions for SITRANS F M MAG 6000 I

Description	Article No.
• English	**A5E02083319**
• German	**A5E02210835**
• French	**A5E02342413**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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Communication modules for MAG 6000 I (All standard outputs can still be used)

Description		Article No.	
HART (only for MAG 6000 I/Ex)	⬟	**FDK:085U0321**	
Modbus RTU/RS 485[1)]	⬟	**FDK:085U0234**	
PROFIBUS PA Profile 3	⬟	**FDK:085U0236**	
PROFIBUS DP Profile 3[1)]	⬟	**FDK:085U0237**	
DeviceNet[1)]	⬟	**FDK:085U0229**	
FOUNDATION Fieldbus H1[1)]		**A5E02054250**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

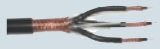
[1)] Not for Ex versions

Operating instructions for SITRANS F add-on modules

Description	Article No.
HART, English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
Modbus	
• English	**A5E00753974**
• German	**A5E03089262**
• Spanish	**A5E03089278**
• French	**A5E03089265**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
• Spanish	**A5E02512177**
• French	**A5E02512169**
DeviceNet, English	**A5E03089720**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

Accessories MAG 6000 I/MAG 6000 I Ex

Description		Article No.	
Cable for standard electrode or coil, 3 x 1.5 mm²/ 18 gage with shield PVC. Temperature range: -30 ... +70 °C (-22 ... +158 °F)			
• 10 m (33 ft)	⬟	**FDK:083F0121**	
• 20 m (65 ft)	⬟	**FDK:083F0210**	
• 40 m (130 ft)	⬟	**FDK:083F0211**	
• 60 m (200 ft)	⬟	**FDK:083F0212**	
• 100 m (330 ft)		**FDK:083F0213**	
• 150 m (500 ft)		**FDK:083F3052**	
• 200 m (650 ft)		**FDK:083F3053**	
• 500 m (1650 ft)		**FDK:083F3054**	
Electrode cable for empty pipe or low conductivity, double shielded, 3 x 0.25 mm² Temperature range: -30 ... +70 °C (-22 ... +158 °F)			
• 10 m (33 ft)	⬟	**FDK:083F3020**	
• 20 m (65 ft)	⬟	**FDK:083F3095**	
• 40 m (130 ft)		**FDK:083F3094**	
• 60 m (200 ft)		**FDK:083F3093**	
• 100 m (330 ft)		**FDK:083F3092**	
• 150 m (500 ft)		**FDK:083F3056**	
• 200 m (650 ft)		**FDK:083F3057**	
• 500 m (1650 ft)		**FDK:083F3058**	
Cable kit with standard coil cable, 3 x 1.5 mm²/18 gage with shield PVC and electrode cable double shielded, 3 x 0.25 mm²			
• 5 m (16.5 ft)	⬟	**A5E02296329**	
• 10 m (33 ft)	⬟	**A5E01181647**	
• 15 m (49 ft)	⬟	**A5E02296464**	
• 20 m (65 ft)	⬟	**A5E01181656**	
• 25 m (82 ft)	⬟	**A5E02296490**	
• 30 m (98 ft)	⬟	**A5E02296494**	
• 40 m (130 ft)	⬟	**A5E01181686**	
• 50 m (164 ft)	⬟	**A5E02296498**	
• 60 m (200 ft)		**A5E01181689**	
• 100 m (330 ft)		**A5E01181691**	
• 150 m (500 ft)		**A5E01181699**	
• 200 m (650 ft)		**A5E01181703**	
• 500 m (1650 ft)		**A5E01181705**	
Low noise electrode coax cable for low conductivity and high vibration levels of cables, 3 x 0.13 mm²			
• 2 m (6.6 ft)		**A5E02272692**	
• 5 m (16.5 ft)		**A5E02272723**	
• 10 m (33 ft)		**A5E02272730**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Spare parts

Description	Article No.	
MAG 6000 I Display	**FDK:085U3122**	
Accessory bag including cable gland inserts coil and electrode connectors	**FDK:085U3144**	
Electronics cover with Ex glass plate. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm).	**7ME5933-0AC01**	
Cover for connection board incl. gasket (for remote version). Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm).	**7ME5933-0AC02**	
Cover for mains supply/communication. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm).	**7ME5933-0AC03**	

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Description	Article No.	
Safety clamp	**7ME5933-0AC06**	
Standard wall mounting bracket. Steel AISI 316L/EN10088-2-1.4404	**7ME5933-0AC04**	
Wall-/pipe mounting bracket kit, BI 2.5 DIN59382 X6Cr17	**7ME5933-0AC05**	

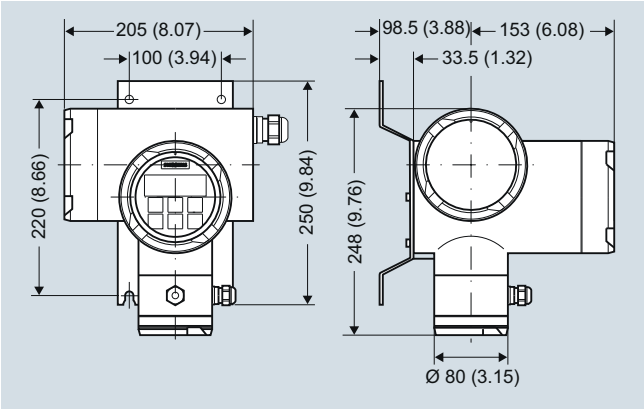
Complete spare part PCB unit

Description	Article No.	
MAG 6000 I PCBA (not for Ex)	**FDK:085U3123**	
MAG 6000 I std. (NAMUR), 18 ... 30 V DC; 115 ... 230 V AC Spare PCBA unit	**A5E31426892**	
MAG 6000 I Ex (NAMUR), 18 ... 30 V DC; 115 ... 230 V AC Spare PCBA unit for use with Ex sensors with increased safety e (For Ex sensors: 7ME6110, 7ME6120, 7ME6140, 7ME6310, 7ME6320, 7ME6340) (For 7ME6330 > DN300)	**A5E31426877**[1)]	

[1)] Ex spare parts may only be exchanged by "Siemens Ex Authorized personnel".

Please use online Product selector to get latest updates.
Product selector link:
www.pia-selector.automation.siemens.com

Dimensional drawings



Dimensions in mm (inch), weight: 6 kg (13.5 lb)

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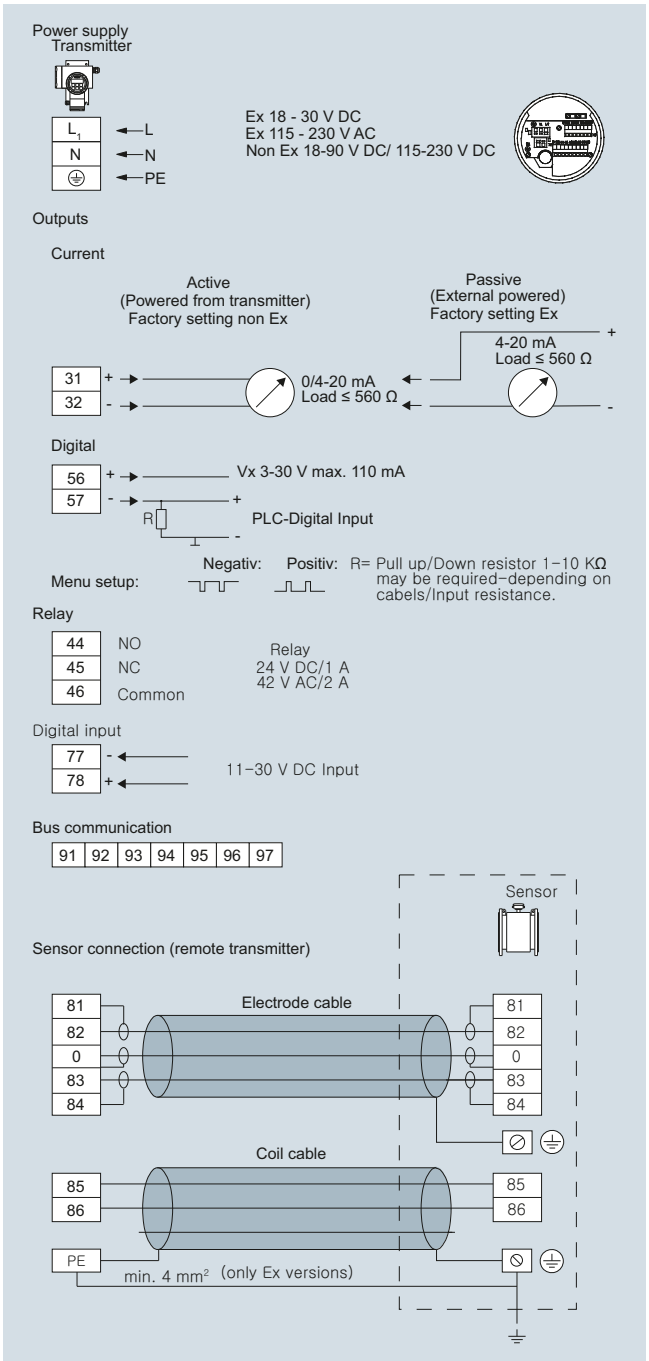
Schematics



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Flow sensor MAG 1100 and MAG 1100 HT

Overview

The SITRANS F M MAG 1100 is an electromagnetic flow sensor in a compact wafer design designed for flow applications in the process industry.

Benefits

- Sensor sizes: DN 2 to 100 (1/12” to 4”)
- Compact wafer design meets EN 1092, DIN and ANSI flange standards
- Corrosion resistant AISI 316 stainless steel sensor housing
- Highly resistant liner and electrodes fitting most extreme process media
- Temperature rating up to 200 °C (392 °F)
- Hose proof IP67/NEMA 4X enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints.

Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- Pharmaceutical industry
- Water treatment like e.g. chemical dosing

Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- Simple on site upgrade to IP68/NEMA 6P terminal box
- Ex ATEX 2G D version
- FM Class I, Div 2

Mode of operation

The flow measuring principle is based on Faraday’s law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS F M MAG 5000, 6000 or 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

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Technical specifications

Version	MAG 1100	MAG 1100 HT (High temperature)
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	DN 2 ... 65 (1/12“ … 2½”): 12.5 Hz/15 Hz DN 80, 100 (3”, 4”): 6.25 Hz/7.5 Hz	DN 15 ... 50 (½“ … 2”): 12.5 Hz/15 Hz DN 80, 100 (3”, 4”): 6.25 Hz/7.5 Hz
Process connection		
Nominal size		
• MAG 1100 (Ceramic)	DN 2 … DN 100 (1/12" … 4")	DN 15 … DN 100 (½” … 4")
• MAG 1100 (PFA)	DN 10 … DN 100 (3/8" … 4")	
Mating flanges	EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent Option: DN 2 ... 10 (1/12” ... 3/8”): G½” / NPT ½” pipe connection adapters	EN 1092-1 (DIN 2501), ANSI B 16.5 class 150 and 300 or equivalent
Rated operating conditions		
Ambient conditions		
Ambient temperature[1]		
• Standard sensor	-40 … +100 °C (-40 … +212 °F)	-40 … +100 °C (-40 … +212 °F)
• Ex sensor	-20 … +60 °C (-4 … +140 °F)	-20 … +60 °C (-4 … +140 °F)
• Compact transmitter MAG 5000/6000[2]	-20 … +60 °C (-4 … +140 °F)	
• Compact transmitter MAG 6000 I	-20 … +60 °C (-4 … +140 °F)	
• Compact transmitter MAG 6000 I Ex	-20 … +60 °C (-4 … 140 °F)	
Temperature of medium		
• MAG 1100 (Ceramic)	-20 … +150 °C (-4 … +302 °F)	-20 … +200 °C (-4 … +392 °F)
• MAG 1100 Ex (Ceramic)	-20 … +150 °C (-4 … +302 °F)	-20 … +180 °C (-4 … +356 °F)
• MAG 1100 (PFA)	-30 … +130 °C (-22 … +266 °F) Suitable for steam sterilization at 150 °C (302 °F)	
Temperature shock		
• MAG 1100 (Ceramic)		
- Duration ≤ 1 min, followed by 10 min rest	• DN 2, 3 (1/12”, 1/8”) No limitations • DN 6, 10, 15, 25: Max. ΔT ≤ 80 °C/min (¼”, 3/8”, ½”, 1”: Max. ΔT ≤ 144 °F/min) • DN 40, 50, 65: Max. ΔT ≤ 70 °C/min (1½”, 2”, 2½”: Max. ΔT ≤ 126 °F/min) • DN 80, 100: Max. ΔT ≤ 60 °C/min (3”, 4”: Max. ΔT ≤ 108 °F/min)	• DN 15, 25: Max. ΔT ≤ 80 °C/min (½”, 1”: Max. ΔT ≤ 144 °F/min) • DN 40, 50: Max. ΔT ≤ 70 °C/min (1½”, 2”: Max. ΔT ≤ 126 °F/min) • DN 80, 100: Max. ΔT ≤ 60 °C/min (3”, 4”: Max. ΔT ≤ 108 °F/min)
• MAG 1100 (PFA)	Max. ± 100 °C (212 °F) momentarily	
Operating pressure		
• MAG 1100 (Ceramic)	• DN 2 ... 65: 40 bar (1/12” … 2½”: 580 psi) • DN 80: 37.5 bar (3”: 540 psi) • DN 100: 30 bar (4”: 435 psi) Vacuum: 1 x 10^{-6} bar_{abs} (1.5 x 10^{-5} psi_{abs})	• DN 15 ... 50: 40 bar (½” … 2”: 580 psi) • DN 80: 37.5 bar (3”: 540 psi) • DN 100: 30 bar (4”: 435 psi) Vacuum: 1 x 10^{-6} bar_{abs} (1.5 x 10^{-5} psi_{abs})
• MAG 1100 (PFA)	20 bar (290 psi) Vacuum: 0.02 bar_{abs} (0.3 psi_{abs}) DN 80 ... DN 100: CO_2 pressure max. 7 bar (101.5 psi)	
Mechanical load (vibration)	• 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS • Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 g RMS • Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 g RMS • For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.	• 18 ... 1000 Hz random in x, y z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS
Enclosure rating (standard)	IP67 to EN 60529 (NEMA 4X), 1 mH_2O for 30 min	IP67 to EN 60529 (NEMA 4X), 1 mH_2O for 30 min
EMC	2004/108/EC	2004/108/EC

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Flow sensor MAG 1100 and MAG 1100 HT

Version	MAG 1100	MAG 1100 HT (High temperature)
Design		
Weight	See Dimensional drawings	See Dimensional drawings
Material		
• Enclosure		
- MAG 1100	Stainless steel AISI 316L/1.4404	Stainless steel AISI 316L/1.4404
• Terminal box		
- Standard	Fibre glass reinforced polyamide (not for Ex)	Stainless steel AISI 316/1.4436
- Option	Stainless steel AISI 316/1.4436	
• Fixing studs	Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001	Stainless steel AISI 304/1.4301, Number and size to EN 1092-1:2001
• Gaskets		
- Standard	EPDM (max. 150 °C, PN 40 (max. 302 °F, 600 psi))	Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi))
- Option	• Graphite (max. 200 °C, PN 40 (max. 392 °F, 600 psi)) • PTFE (max. 130 °C, PN 25 (max. 266 °F, 300 psi))	
• Pipe connection adapters: DN 2, 3, 6 and 10 (1/12“, 1/8“, ¼” and 3/8”)	• Stainless steel, AISI 316/1.4436 • Hastelloy C22/2.4602 • PVDF	
Liner		
• MAG 1100 (Ceramic)	• DN 2, 3 (1/12“, 1/8“): Zirconium oxide (ZrO_2) (ceramic) • DN 6 ... 100 (¼“ ... 4“): Aluminum oxide Al_2O_3	DN 15 ... 100 (½“ ... 4“): Aluminum oxide Al_2O_3
• MAG 1100 (PFA)	Reinforced PFA (not for Ex)	
Electrodes		
• MAG 1100 (Ceramic)	• DN10 ... 100 (3/8" ... 4") : Platinum with gold / Titanium brazing alloy • DN 2 ... 6 (1/12“ ... ¼”): Platinium	Platinum with gold / Titanium brazing alloy
• MAG 1100 (PFA)	• DN 10 ... 15 (3/8" ... ½"): Hastelloy C276/2.4819 • DN 25 ... 100 (1" ... 4"): Hastelloy C22/2.4602	
Cable entries	• Remote installation 2 x M20 or 2 x ½" NPT • Compact installation - MAG 5000/MAG 6000: 4 x M20 or 4 x ½” NPT - MAG 6000 I: 2 x M25 (for supply/output) - MAG 6000 I Ex: 2 x M25 (for supply/output)	Remote installation 2 x M20 or 2 x ½“ NPT
Certificates and approvals		
Calibration		
• Standard production calibration (default), calibration report shipped with sensor	Zero-point, 2 x 25 %, 2 x 90 %	Zero-point, 2 x 25 %, 2 x 90 %
• Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max} Matched-pair calibration: default, 5-point or 10-point	
Conforms to	• PED – 97/23/EC[3] (Fluid group: Liquid of fluid group 1) • CRN (PFA)	• PED – 97/23/EC[3] • CRN (PFA)
Material certificate EN 10204-3.1	Available when ordering together with meter[4]	Available when ordering together with meter[4]
Ex approvals		
• MAG 1100 (Ceramic)		
- Ex sensor or Compact with MAG 6000 I Ex	ATEX 2G D sensor Ex de ia IIB T3 - T6	ATEX 2G D sensor Ex de ia IIB T3 - T6
- Sensor with/without MAG 5000/6000 /6000 I	FM Class I, Div 2	FM Class I, Div 2
• MAG 1100 (PFA)		
- Sensor with/without MAG 5000/6000/6000 I	FM Class I, Div 2	
• Custody transfer approval (MAG 5000/6000 CT)[2]	• Cold water pattern approval PTB (Germany) • Hot water pattern approval PTB (Germany) • Other media than water pattern approval- OIML R 117 (Ceramic liner) (Denmark)	• Hot water pattern approval PTB (Germany)

[1] Conditions are also dependent on liner characteristics

[2] With compact transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... +122 °F)

[3] For further information on the PED standard and requirements, see page 9/6.

[4] Has to be ordered with the meter. It is not possible to order the certificate afterwards.

For technical specification for transmitter - see transmitter pages.

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Selection and Ordering data		Article No.
Sensor SITRANS F M MAG 1100 EPDM gaskets included	↗	7ME6110-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		■■A■0-■■■■
Diameter		
DN 2 (1/12“)	⬟ 1)	1D
DN 3 (1/8“)	⬟ 1)	1H
DN 6 (¼“)	⬟ 1)	1M
DN 10 (3/8“)	⬟	1R
DN 15 (½“)	⬟	1V
DN 25 (1“)	⬟	2D
DN 40 (1½“)	⬟	2R
DN 50 (2“)	⬟	2Y
DN 65 (2½“)	⬟	3F
DN 80 (3“)	⬟	3M
DN 100 (4“)	⬟	3T
Liner material		
PFA - DN 10 ... 100 (3/8“ ... 4“) (not for Ex)	⬟	1
Ceramic	⬟	2
Electrode material		
Hastelloy C (only with PFA liner)	⬟	1
Platinum (only with ceramic liner)	⬟	2
Transmitter		
Standard sensor for remote transmitter (order transmitter separately)	⬟	A
Ex sensor for remote transmitter (order transmitter separately)		B
MAG 6000 I, Aluminum 18 ... 90 V DC, 115 ... 230 V AC		C
MAG 6000 I, Aluminum 18 ... 30 V DC, Ex		D
MAG 6000 I, Aluminum 115 ... 230 V AC, Ex		E
MAG 6000 Polyamide, 11 ... 30 V DC/ 11 … 24 V AC	⬟	H
MAG 6000, Polyamide, 115 ... 230 V AC	⬟	J
MAG 5000, Polyamide, 11 ... 30 V DC/ 11 ... 24 V AC	⬟	K
MAG 5000, Polyamide, 115 ... 230 V AC	⬟	L
Communication		
No communication, add-on possible	⬟	A
HART	⬟	B
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	⬟	F
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	⬟	G
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)	⬟	E
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)		J
Cable glands/terminal box		
Metric: Polyamide terminal box or 6000 I compact	⬟	1
½" NPT: Polyamide terminal box or 6000 I compact	⬟	2
Metric: SS terminal box (mandatory for stainless steel MAG 6000 transmitter)		3
½" NPT: SS terminal box (mandatory for stainless steel MAG 6000 transmitter)		4

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) Quick ship only in combination with Ceramic liner

Selection and Ordering data	Order code
Additional information	
Please add **“-Z“** to Article No. and specify Order code(s) and plain text.	
Special calibration	
• 5-point calibration[1]	**D01**
• 10-point calibration[2]	**D06**
• Default (2 x 25 % and 2 x 90 %) matched-pair calibration	**D11**
• 5-point, matched-pair calibration[1]	**D15**
• 10-point, matched-pair calibration[2]	**D18**
Customer-specific converter setup	**Y20**
Tag name plate, stainless steel fixed with SS wire (add plain text)	**Y17**
Tag name plate, plastic (self adhesive)	**Y18**
Material certificate according to EN 10204-3.1	**C12**
Factory certificate according to EN 10204-2.2	**C14**
Factory certificate according to EN 10204-2.1	**C15**
Sensor cables wired (specify cable Article No.)	**Y40**
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.) (not for Ex sensors)	**Y41**
Other postproduction requirements (add desired text)	**Y99**
Additional calibrations	
• Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	**On request**[3]
• Customer-specified calibration up to 10 points	**On request**[3]
• Customer-witnessed calibration Any of above calibration	**On request**[3]

1) 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

3) Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://www.automation.siemens.com/mcms/automation/en/sensor-systems/process-instrumentation/Pages/Default.aspx and send together with the order. (Size dependent restriction on maximum flow rates may apply

Operating instructions for SITRANS F M MAG 1100

Description	Article No.
Handbook	
• English	**A5E02435647**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	⬟ **FDK:085U0220**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Flow sensor MAG 1100 and MAG 1100 HT

Selection and Ordering data	Article No.
Sensor SITRANS F M	
MAG 1100 HT High Temperature ↗	**7ME6120-**
Ceramic liner, Platinum electrode, Graphite gaskets included	**■■A20-2■A■**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 15 (½")	**1V**
DN 25 (1")	**2D**
DN 40 (1½")	**2R**
DN 50 (2")	**2Y**
DN 80 (3")	**3M**
DN 100 (4")	**3T**
Transmitter	
Standard sensor for remote transmitter (order transmitter separately)	**A**
Ex sensor for remote transmitter (order transmitter separately)	**B**
Cable glands/terminal box	
Metric: SS terminal box	**3**
½" NPT: SS terminal box	**4**

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Special calibration	
• 5-point calibration[1]	**D01**
• 10-point calibration[2]	**D06**
• Default (2 x 25 % and 2 x 90 %) matched-pair calibration	**D11**
• 5-point, matched-pair calibration[1]	**D15**
• 10-point, matched-pair calibration[2]	**D18**
Customer-specific converter setup	**Y20**
Tag name plate, stainless steel fixed with SS wire (add plain text)	**Y17**
Tag name plate, plastic (self adhesive)	**Y18**
Material certificate according to EN 10204-3.1	**C12**
Factory certificate according to EN 10204-2.2	**C14**
Factory certificate according to EN 10204-2.1	**C15**
Sensor cables wired (specify cable Article No.)	**Y40**
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.) (not for Ex sensors)	**Y41**
Other postproduction requirements (add desired text)	**Y99**
Additional calibrations	
• Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	**On request[3]**
• Customer-specified calibration up to 10 points	**On request[3]**
• Customer-witnessed calibration Any of above calibration	**On request[3]**

1) 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

3) Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply

Operating instructions for SITRANS F M MAG 1100

Description	Article No.
Handbook	
• English	**A5E02435647**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I/MAG 6000 I Ex ATEX 2G D transmitters and sensors are delivered compact mounted from factory. Communication module will be premounted in the transmitter.

Please use online Product selector to get latest updates.

Product selector link:
www.pia-selector.automation.siemens.com

Accessories

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/ NEMA 6P	⬟ **FDK:085U0220**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Accessories for MAG 1100 sensor		Article No.
Pipe connection ½" external thread		
For DN 2 ... 10 (1/12" ... 3/8") sensor, material: SS 316 2 pipe connections, 2 EPDM gaskets, 12 pcs M4 x 12 screws		
• ½" G, ISO 7-1 tappered thread, SS 316	⬟	**FDK:083G0080**
• ½" NPT thread, SS 316	⬟	**FDK:083G4330**
For DN 2 ... 10 (1/12" ... 3/8") sensor, material: Hastelloy C 2 pipe connections, 2 PTFE gaskets, 12 pcs M4 x 14 screws		
• ½" G, ISO 7-1 tappered thread	⬟	**FDK:083G4332**
• ½" NPT thread	⬟	**FDK:083G4331**
For DN 2…10 (1/12"…3/8") sensor 2 PVDF pipe connections (Max. 70 °C, PN 8 bar/max 158 °F, 116 PSI), 1 grounding ring[1], 1 earthing wire, 3 PTFE gaskets, 2 space rings, 6 pcs. M4 x 12 and 6 pcs. M4 x 20 screws		
• ½"G, ISO 7-1 tapered thread PVDF incl. grounding ring Hastelloy C22/2.4602		**A5E01018395**
• ½" NPT thread PVDF incl. grounding ring Hastelloy C22/2.4602		**A5E01018400**
EPDM gaskets		
Material: EPDM; each set includes: 2 EPDM gaskets, 1 earthing wire, 1 M6 screw, 1 nut, 1 washer, 1 bolt earthing plate		
• DN 2 ... 10 (1/12" ... 3/8")	⬟	**FDK:083G3116**
• DN 15 (½")	⬟	**FDK:083G3117**
• DN 25 (1")	⬟	**FDK:083G3119**
• DN 40 (1½")	⬟	**FDK:083G3121**
• DN 50 (2")	⬟	**FDK:083G3122**
• DN 65 (2½")	⬟	**FDK:083G3123**
• DN 80 (3")	⬟	**FDK:083G3124**
• DN 100 (4")	⬟	**FDK:083G3125**
PTFE gaskets		
Material: PTFE; each set includes: 2 gaskets, 2 earthing wires, 3 M6 screws (DN 2 ... DN 10: 12 pcs M4 x 14)		
• DN 2 ... 10 (1/12" ... 3/8")	⬟	**FDK:083G0156**
• DN 15 (½")	⬟	**FDK:083G0157**
• DN 25 (1")	⬟	**FDK:083G0159**
• DN 40 (1½")	⬟	**FDK:083G0161**
• DN 50 (2")	⬟	**FDK:083G0162**
• DN 65 (2½")	⬟	**FDK:083G0163**
• DN 80 (3")	⬟	**FDK:083G0164**
• DN 100 (4")	⬟	**FDK:083G0165**
Graphite gaskets		
Material: Graphite; conductive, each set includes: 2 gaskets (conductive (can also be used as grounding ring))		
• DN 2 ... 10 (1/12" ... 3/8")	⬟	**FDK:083G0116**
• DN 15 (½")	⬟	**FDK:083G0117**
• DN 25 (1")	⬟	**FDK:083G0119**
• DN 40 (1½")	⬟	**FDK:083G0121**
• DN 50 (2")	⬟	**FDK:083G0122**
• DN 65 (2½")	⬟	**FDK:083G0123**
• DN 80 (3")	⬟	**FDK:083G0124**
• DN 100 (4")	⬟	**FDK:083G0125**

Accessories for MAG 1100 sensor		Article No.
Grounding ring SS		
Material: AISI 316/1.4436; each set includes: 1 grounding ring[1], 3 PTFE gaskets, 1 earth wire, 1 M6 screw		
• DN 2 ... 10 (1/12" ... 3/8")	⬟	**FDK:083G0686**
• DN 15 (½")	⬟	**FDK:083G0687**
• DN 25 (1")	⬟	**FDK:083G0689**
• DN 40 (1½")		**FDK:083G0691**
• DN 50 (2")		**FDK:083G0692**
• DN 65 (2½")		**FDK:083G0693**
• DN 80 (3")		**FDK:083G0694**
• DN 100 (4")		**FDK:083G0695**
Grounding ring (Hastelloy C)		
Material: Hastelloy C22/2.4602; each set includes: 1 grounding ring[1], 3 PTFE gaskets, 1 earth wire, 1 M6 screw		
• DN 2 ... 10 (1/12" ... 3/8")	⬟	**FDK:083G3256**
• DN 15 (½")	⬟	**FDK:083G3257**
• DN 25 (1")	⬟	**FDK:083G3259**
• DN 40 (1½")	⬟	**FDK:083G3261**
• DN 50 (2")	⬟	**FDK:083G3262**
• DN 65 (2½")		**FDK:083G3263**
• DN 80 (3")		**FDK:083G3264**
• DN 100 (4")		**FDK:083G3265**
Grounding ring (Tantalum)		
Material: Tantalum; each set includes: 1 grounding ring[1], 3 PTFE gaskets, 1 earth wire, 1 M6 screw		
• DN 2 ... 10 (1/12" ... 3/8")		**A5E01181599**
• DN 15 (½")		**A5E01181606**
• DN 25 (1")		**A5E01181610**
• DN 40 (1½")		**A5E01181613**
• DN 50 (2")		**A5E01181615**
• DN 65 (2½")		**A5E01181616**
• DN 80 (3")		**A5E01181619**
• DN 100 (4")		**A5E01181622**
Studs and nuts		
for DN 100 PN 25/40, 8 M20 studs, 16 M20 nuts		
Material: AISI 304/1.4305		
• DN 100 (4")	⬟	**FDK:083G0226**

[1] Thickness of grounding ring is 2 mm (0.08 inch)

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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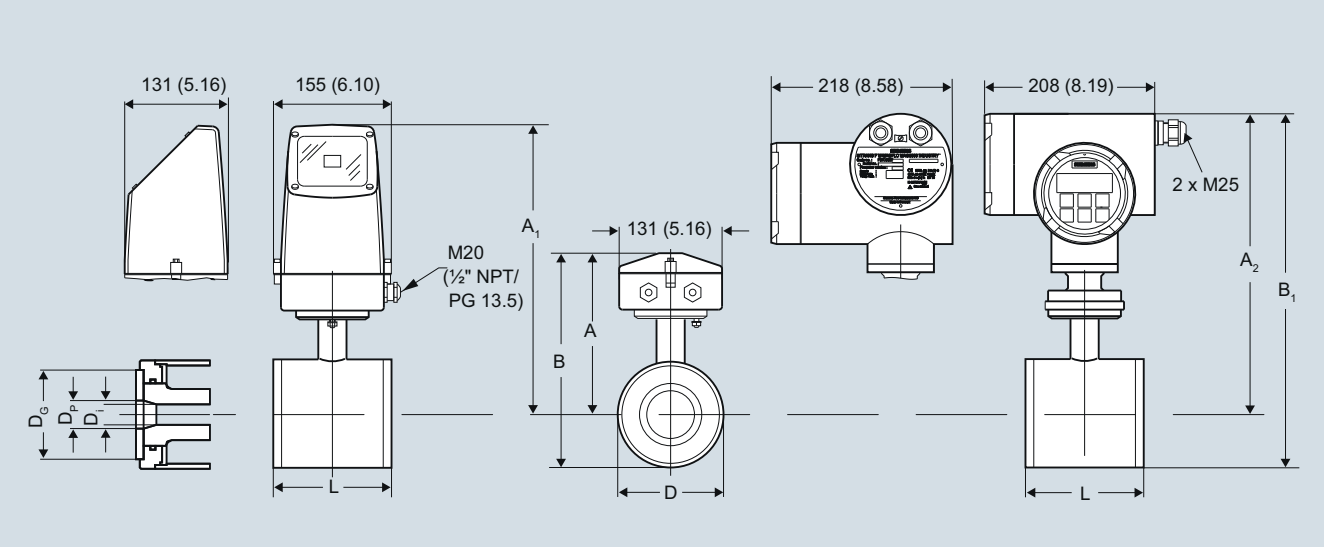
3

Dimensional drawings

Sensor MAG 1100, compact/remote



Dimensions in mm (inch)

Important note: For compact installation with MAG 6000 I/Ex - transmitter to be supported to avoid tension on the sensor part

Size DN	A[1] [mm]	B[1] [mm]	A_1/A_2[3] [mm]	B_1 [mm]	D [mm]	D_i [mm]	D_i (PFA) [mm]	D_P [mm]	D_G [mm]	Weight[2] [kg]
2	161	186	315	340	48.7	2		17.3	34	2.2
3	161	186	315	340	48.7	3		17.3	34	2.2
6	161	186	315	340	48.7	6		17.3	34	2.2
10	161	186	315	340	48.7	10	10	13.6	34	2.2
15	161	186	315	340	48.7	15	16	17.3	40	2.2
25	169	201	323	354	63.5	25	26	28.5	56	2.7
40	179	221	333	375	84.0	40	38	43.4	75	3.4
50	188	239	342	393	101.6	50	50	54.5	90	4.2
65	198	258	351	412	120.9	65	66	68.0	112	5.5
80	204	270	357	424	133.0	80	81	82.5	124	7.0
100	217	296	370	450	159.0	100	100	107.1	150	10.0

Size [inch]	A[1] [inch]	B[1] [inch]	A_1/A_2[3] [inch]	B_1 [inch]	D [inch]	D_i [inch]	D_i (PFA) [inch]	D_P [inch]	D_G [inch]	Weight[2] [lb]
1/12	6.34	7.33	12.40	13.39	1.92	0.08		0.68	1.34	4.8
1/8	6.34	7.33	12.40	13.39	1.92	0.12		0.68	1.34	4.8
¼	6.34	7.33	12.40	13.39	1.92	0.24		0.68	1.34	4.8
3/8	6.34	7.33	12.40	13.39	1.92	0.39	0.39	0.53	1.34	4.8
½	6.34	7.33	12.40	13.39	1.92	0.59	0.63	0.68	1.57	4.8
1	6.66	7.92	12.72	13.94	2.50	0.98	1.02	1.12	2.20	4.9
1½	7.05	8.70	13.11	14.76	3.31	1.57	1.50	1.71	2.95	7.5
2	7.40	9.41	13.47	15.47	4.00	1.97	1.97	2.15	3.54	9.2
2½	7.80	10.16	13.82	16.22	4.76	2.56	2.60	2.68	4.41	12
3	8.03	10.63	14.06	16.70	5.24	3.15	3.19	3.25	4.88	15
4	8.54	11.65	14.57	17.72	6.26	3.94	3.94	4.22	5.91	22

1) 14.5 mm/0.571" shorter when the AISI terminal box is used (Ex or high temperature 200 °C (392 °F) version)
2) With transmitter MAG 5000 or MAG 6000 installed, weight is increased by approximately 0.8 kg (1.8 lb).
With MAG 6000 I weight is increased with 5.5 kg (12.1 lb).
3) A_2 is 3 mm (0.12") shorter than A_1

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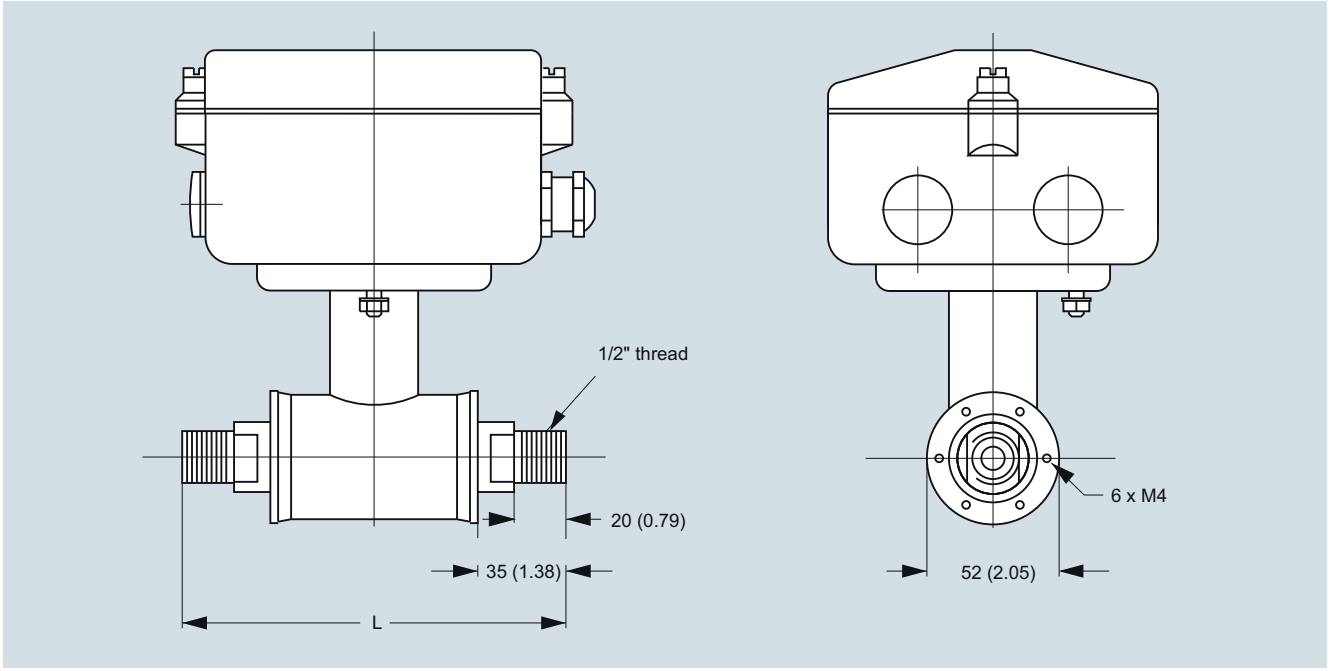
The total build-in length “L” [mm]/[inch] before assembling depends on the gasket selected

Size		EPDM		Graphite		PTFE (Teflon)		Without gasket		Earthing ring	
DN	inch	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
2 ... 10[1)]	1/12 ... 3/8	64	2.52	66	2.60	70	2.75	64	2.52	77	3.03
15	½	65	2.56	66	2.60	70	2.75	64	2.52	77	3.03
25	1	80	3.15	81	3.19	85	3.35	79	3.10	92	3.62
40	1½	95	3.74	96	3.78	100	3.94	94	3.70	107	4.21
50	2	105	4.13	106	4.17	110	4.33	104	4.05	117	4.61
65	2½	130	5.12	131	5.15	135	5.31	129	5.05	142	5.60
80	3	155	6.10	156	6.14	160	6.30	154	6.00	167	6.57
100	4	185	7.28	186	7.31	190	7.48	184	7.20	197	7.76

1) Mounting between two flanges

Sensor MAG 1100 DN 2 ... 10 (1/12“ ... 3/8“) with adapters



The MAG 1100 DN 2, 3, 6 and 10 (1/12“, 1/8“, ¼” and 3/8”) are prepared for assembly with the ½” pipe connections. Dimensions in mm (inch)

The length “L“ varies dependent on the gasket choice.

Stainless steel and Hastelloy pipe connections								PVDF pipe connections	
Without gasket		EPDM		Graphite		PTFE		PTFE	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
150	5.9	150	5.9	152	6.0	156	6.1	133	5.2

Important note:
For compact installation with the MAG 6000 I, transmitter to be supported to avoid tension on sensor part.

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3

Overview

The electromagnetic sensor SITRANS F M MAG 1100 F is designed to meet applications in the food and beverage industry.

Benefits

- Sensor sizes: DN 10 to DN 100 (3/8" to 4")
- AISI 316 stainless steel enclosure
- Sensor: Hygienic connection, 3A approval and EHEDG certified
- Sanitary design for CIP / SIP cleaning
- Conforms to FDA
- Easy commissioning, the SENSORPROM unit automatically updates settings
- Hose proof IP67/NEMA 4X enclosure rating
- Designed that patented in-situ verification can be conducted. Using SENSORPROM fingerprints

Application

The main applications of the SITRANS F M electromagnetic sensors can be found in the following fields:

- Food industry
- Beverage industry
- Pharmaceutical industry

Design

- Unique mechanical design with a wide range of customer specified sanitary connection
- Compact or remote mounting possible easy "plug & play" field changeable
- Simple on site upgrade to IP68/NEMA 6P terminal box
- Ex ATEX 2G D version for hazardous areas (ceramic liner)

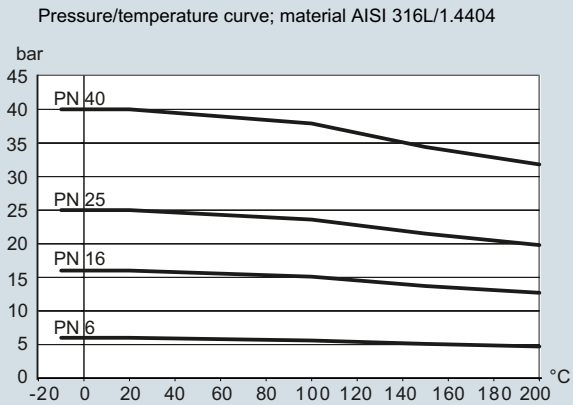
Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

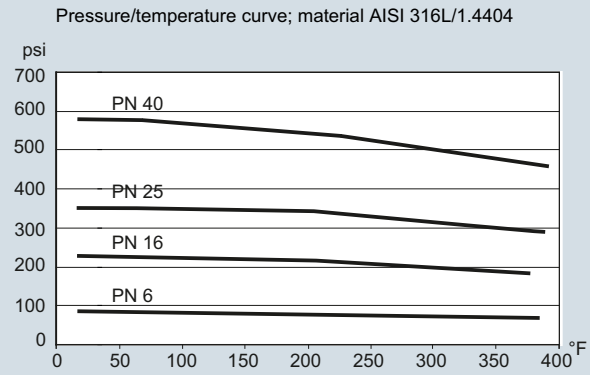
Integration

The complete flowmeter consists of a sensor and an associated transmitter SITRANS F M MAG 5000, 6000 and 6000 I. The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as PROFIBUS DP and PA, Modbus RTU/RS 485, HART, FOUNDATION Fieldbus H1, DeviceNet.

Pressure/temperature curve; material AISI 316L/1.4404



Pressure/temperature curve; material AISI 316L/1.4404



For further information on the PED standard and requirements, see page 9/6.

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Technical specifications

Measuring principle	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	DN 10 ... 65 (¼“ … 2½”): 12.5 Hz/15 Hz DN 80 ... 100 (3”, 4”): 6.25 Hz/7.5 Hz
Process connection	
Nominal size	DN 10 … DN 100 (3/8" … 4")
Process connection	Hygienic adapters available for: • Direct welding onto pipe • Clamp fitting • Threaded fitting
Rated operating conditions	
Ambient conditions	
Ambient temperature[1]	
• Sensor	-40 … +100 °C (-40 … +212 °F)
• Ex sensor	-20 … +60 °C (-4 … +140 °F)
• Compact transmitter MAG 5000/6000[2]	-20 … +60 °C (-4 … +140 °F)
• Transmitter MAG 6000 I	-20 … +60 °C (-4 … +140 °F)
• Compact transmitter MAG 6000 I Ex	-20 … +60 °C (-4 … +140 °F)
Temperature of medium	
MAG 1100 F (Ceramic)	-20 … +150 °C (-4 … +302 °F) Suitable for steam sterilization
MAG 1100 F (PFA)	-30 … +130 °C (-22 … +266 °F) Suitable for steam steralization at 150 °C (302 °F)
Temperature shock	
MAG 1100 F	
• Duration ≤ 1 min, followed by 10 min rest	• DN 10, 15, 25: Max. ΔT ≤ 80 °C/min (3/8”, ½”, 1”: Max. ΔT ≤ 144 °F/min) • DN 40, 50, 65: Max. ΔT ≤ 70 °C/min (1½”, 2”, 2½”: Max. ΔT ≤ 126 °F/min) • DN 80, 100: Max. ΔT ≤ 60 °C/min (3”, 4”: Max. ΔT ≤ 108 °F/min)
MAG 1100 F (PFA)	Max. ± 100 °C (212 °F) momentarily
Operating pressure	
MAG 1100 F (Ceramic)	DN 10 ... 65: 40 bar (3/8” … 2½”: 580 psi) DN 80: 25 bar (3”: 363 psi) DN 100: 25 bar (4”: 363 psi) Vacuum: 1 x 10^{-6} bar_{abs} (1.5 x 10^{-5} psi_{abs})
MAG 1100 F (PFA)	20 bar (290 psi) Vacuum: 0.02 bar_{abs} (0.3 psi_{abs}) DN 80 ... DN 100: CO_2 pressure max. 7 bar (101.5 psi)
Mechanical load (vibration)	18 ... 1000 Hz random in x, y z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 g RMS. Sensor with compact MAG 6000 I/MAG 6000 I Ex mounted transmitter: 1.14 g RMS For compact installation with the MAG 6000 I/MAG 6000 I Ex, transmitter to be supported to avoid tension on sensor part.
Enclosure rating	IP67 to EN 60529 (NEMA 4X), 1 mH_2O for 30 min
EMC	2004/108/EC

Design	
Weight	See Dimensional drawings
Material	
Enclosure	
• MAG 1100 F	Stainless steel AISI 316L/1.4404
Terminal box (remote version only)	
• Standard	Fibre glass reinforced polyamide
• Option	Stainless steel AISI 316/1.4436
• Ex ATEX (remote version only)	Stainless steel AISI 316/1.4436
Liner	
MAG 1100 F (Ceramic)	Aluminum oxide Al_2O_3 (ceramics)
MAG 1100 F (PFA)	Reinforced PFA (teflon) (not for Ex)
Electrodes	
MAG 1100 F (Ceramic)	Platinum with gold /Titanium brazing alloy
MAG 1100 F (PFA)	• DN 10 ... 15 (3/8" ... ½"): Hastelloy C276/2.4819 • DN 25 ... 100 (1" ... 4"): Hastelloy C22/2.4602
Cable entries	• Remote installation 2 x M20 or 2 x ½" NPT • Compact installation - MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT - MAG 6000 I: 2 x M25 (for supply/output) - MAG 6000 I Ex: 2 x M25 (for supply/output)
Certificates and approvals	
Calibration	
• Standard Production calibration, calibration report shipped with sensor	Zero-point, 2 x 25 %, 2 x 90 %
MAG 1100 F (Ceramic)	3A (sensor with Polyamide terminal box and FKM/FPM or EPDM gaskets), transmitter not part of the approval
• Ex ATEX approvals for sensor or compact with MAG 6000 I Ex	ATEX 2G D sensor EEx d e ia IIB T3 - T6
• Sensor with/without MAG 5000/6000/6000 I	FM Class I, Div 2
MAG 1100 F (PFA)	3A (sensor with Polyamide terminal box with EPDM gasket), transmitter not part of the approval EHEDG certified (use EPDM gasket) (DN 25 ... 100 (1 ... 4”)) FM Class I, Div 2 Hygienic EC 1925:2003 European food contact material
Material certificate EN 10204 3.1	Available when ordering together with meter[3]
Conforms to	• PED – 97/23/EC[4] • CRN (PFA) • FDA
Custody transfer approvals (MAG 5000/6000 CT)	• Cold water pattern approval PTB (Germany) • Hot water pattern approval PTB (Germany) • Other media than water pattern approval- OIML R 117 (Ceramic liner)(Denmark)

1) Conditions are also dependent on liner characteristics.
2) With compact transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... +122 °F)
3) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
4) For further information on the PED standard and requirements, see page 9/6.

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Flow sensor MAG 1100 F

Accessories

Weld-in adapter	
Adapter for welding onto dairy pipe	Tri-Weld, ISO 2037, DIN 11850, SMS 3008, BS 4825-1
• DN 10, 15, 25, 40, 50 and 65 (3/8", ½", 1", 1½", 2"and 2½")	PN 40 (600 psi)
• DN 80 and DN 100 (3" and 4")	PN 25 (350 psi)
Clamp adapter	Tri-Clamp, ISO 2852, DIN 32676, SMS 3016, BS 4825-3
DN 10, 15, 25, 40 and 50 (3/8", ½", 1", 1½", and 2")	PN 16 (200 psi)
DN 65, 80 and 100 (2½", 3" and 4")	PN 10 (150 psi)
Thread adapter	
DIN 11851	
• DN 10, 15, 25, and 40 (3/8", ½", 1", and 1½")	PN 40 (600 psi)
• DN 50, 65, 80 and 100 (2", 2½", 3" and 4")	PN 25 (350 psi)
ISO 2853, BS 4825-4	
• DN 10, 15, 25, 40, 50, 65 and 80 (3/8", ½", 1", 1½", 2", 2½ and 3")	PN 16 (200 psi)
SMS 1145	
• DN 25, 40, 50, 65 and 80 (1", 1½", 2", 2½" and 3")	PN 6 (80 psi)
Design	
Material	
Adapter	Stainless steel AISI 316/1.4436
Gasket	
• MAG 1100 F (Ceramic)	FKM/FPM with stainless steel insert (AISI 304/1.4301) (-20 ... +150 °C (-4 ... +302 °F))
	EPDM (-20 ... +150 °C (-4 ... +302 °F))
• MAG 1100 F (PFA)	EPDM (-20 ... +150 °C (-4 ... +302 °F))
	NBR (-20 ... +100 °C (-4 ... +212 °F))

Note:

When combined sensor and adapter, the operating pressure is the lower rated of the pair.

Selection and Ordering data		Article No.
Sensor SITRANS F M MAG 1100 F	↗	**7ME6140-** ■■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter		
DN 10 (3/8")	⬟	**1R**
DN 15 (½")	⬟	**1V**
DN 25 (1")	⬟	**2D**
DN 40 (1½")	⬟	**2R**
DN 50 (2")	⬟	**2Y**
DN 65 (2½")	⬟	**3F**
DN 80 (3")	⬟	**3M**
DN 100 (4")	⬟	**3T**
Process connections		
No adaptors (specials see accessories)	⬟	**A**
Weld in		
DIN 11850	⬟	**B**
ISO 2037 (SMS 3008)	⬟	**C**
BS 4825-1	⬟	**D**
Tri-Weld	⬟	**E**
Clamp type		
DIN 32676		**G**
ISO 2852 (SMS 3016)		**H**
BS 4825-3		**J**
Tri-Clamp	⬟	**K**
Threaded type		
DIN 11851	⬟	**M**
SMS 1145[1)]	⬟	**N**
Liner material		
PFA (not for Ex)	⬟	**1**
Ceramic	⬟	**2**
Gasket material[1)]		
EPDM flat gasket (FDA, 3A)	⬟	**0**
FPM/FKM (FDA, 3A) (only with ceramic liner)		**2**
EPDM-P gasket (only for PFA) (FDA, EHEDG certified, 3A)		**3**
Electrode material		
Hastelloy C (only with PFA liner)	⬟	**1**
Platinum (only with ceramic liner)	⬟	**2**
Transmitter		
Standard sensor for remote transmitter (order transmitter separately), 3A	⬟	**A**
Ex sensor for remote transmitter (order transmitter separately) 3A	⬟	**B**
MAG 6000 I, Alu.18 ... 90 V DC, 115 ... 230 V AC	⬟	**C**
MAG 6000 I, Aluminum 18 ... 30 V DC, Ex	⬟	**D**
MAG 6000 I, Aluminum 115 ... 230 V AC, Ex	⬟	**E**
MAG 6000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	⬟	**H**
MAG 6000, Polyamide, 115 ... 230 V AC	⬟	**J**
MAG 5000, Polyamide, 11 ... 30 V DC/ 11 ... 24 V AC	⬟	**K**
MAG 5000, Polyamide, 115 ... 230 V AC	⬟	**L**
Communication		
No communication, add-on possible	⬟	**A**
HART	⬟	**B**
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	⬟	**F**
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	⬟	**G**
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)	⬟	**E**
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	⬟	**J**

[1)] SMS 1145 standard is not approved by 3A

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Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 1100 F	**7ME6140 -** ■■■■■ - ■■■■
Cable glands/terminal box	
Metric: Polyamide terminal box or 6000 I compact ⬟	**1**
½" NPT: Polyamide terminal box or 6000 I compact ⬟	**2**
Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)	**3**
½" NPT: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)	**4**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Customer-specific converter setup	**Y20**
Tag name plate, stainless steel fixed with SS wire (add plain text)	**Y17**
Tag name plate, plastic (self adhesive)	**Y18**
Material certificate according to EN 10204-3.1	**C12**
Factory certificate according to EN 10204-2.2	**C14**
Factory certificate according to EN 10204-2.1	**C15**
Sensor cables wired (specify cable Article No.)	**Y40**
Sensor for remote transmitter's junction box potted with wired cable (specify cable Article No.) (not for Ex sensors)	**Y41**
Other postproduction requirements (add desired text)	**Y99**
Additional calibrations	
• Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	**On request**[1)]
• Customer-specified calibration up to 10 points	**On request**[1)]
• Customer-witnessed calibration Any of above calibration	**On request**[1)]

[1)] Ordering "On request" as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://intranet.automation.siemens.com/w1/automation-technology-flow-measurement-18626.htm#content-19336&para1=Flow%20Measurement and send together with the order. (Size dependent restriction on maximum flow rates may apply

Operating instructions for SITRANS F M MAG 1100F

Description	Article No.
Handbook	
• English	**A5E02435647**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I/MAG 6000 I Ex ATEX 2G D transmitters and sensors are delivered compact mounted from factory. Communication module will be pre-mounted in the transmitter.

Please use online Product selector to get latest updates.
Product selector link:
www.pia-selector.automation.siemens.com

Accessories

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	⬟ **FDK:085U0220**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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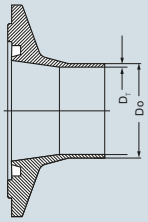
Accessories — Article No.

Weld-in connection fittings for MAG 1100 F with P gaskets for EHEDG

Only for sensors with PFA liner.

2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
P gaskets not included



DIN 11850

Adapter DN (mm)	D_o (mm)	D_T (mm)	Sensor DN (mm)		Article No.
10[2]	13	1.5	10	⬟	**A5E02054630**
15[2]	19	1.5	15[3]	⬟	**A5E02054633**
20	23	1.5	15		**A5E02054634**
25	29	1.5	25[3]	⬟	**A5E02054635**
32	35	1.5	25		**A5E02054637**
40	41	1.5	40	⬟	**A5E02054638**
50	53	1.5	50	⬟	**A5E02054640**
65	70	2.0	65	⬟	**A5E02054643**
80	85	2.0	80	⬟	**A5E02054644**
100	104	2.0	100	⬟	**A5E02054646**

ISO 2037

Adapter DN (mm)	D_o (mm)	D_T (mm)	Sensor DN (mm)		Article No.
12.7	12.7	1.0	10	⬟	**A5E03727946**
17.2	17.2	1.0	15	⬟	**A5E03728098**
25	25	1.6	25[3]	⬟	**A5E02196073**
33	33.7	1.6	25		**A5E02196074**
38	38	1.6	40[3]	⬟	**A5E02196075**
40	40	1.6	40	⬟	**A5E02196076**
51	51	1.6	50	⬟	**A5E02196077**
63.5	63.5	1.6	65	⬟	**A5E02196078**
76.1	76.1	1.6	80	⬟	**A5E02196080**
101.6	101.6	2.0	100		**A5E02196082**

Tri-Weld (BS 4825-1)

Adapter DN (mm)	D_o (mm)	D_T (mm)	Sensor DN (mm)	Article No.
12.7	12.7	1.2	10	**A5E02199113**
19.05	19.05	1.2	15	**A5E02199114**
25.4	25.4	1.6	25	**A5E02199115**
38.1	38.1	1.6	40	**A5E02199116**
50.8	50.8	1.6	50	**A5E02199117**
63.5[1]	63.5	1.6	65	**A5E02199118**
76.2	76.2	1.6	80	**A5E02199119**
101.6[1]	101.6	2.0	100	**A5E02199120**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

D_o: Outer diameter

D_i: Inner diameter

1) For BS 4825-1 see ISO 2037

2) Not EHEDG approved

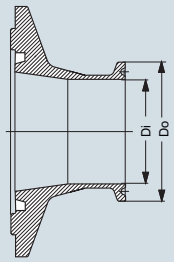
3) Default delivery

Accessories — Article No.

Clamp-type connection fittings for MAG 1100 F with P gaskets for EHEDG

Only for sensors with PFA liner.

2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
P gaskets not included



DIN 32676

Adapter DN (mm)	D_o (mm)	D_i (mm)	Sensor DN (mm)	Article No.
10	34	10	10	**A5E02211143**
15	34	16	15	**A5E02211144**
25	50.5	22.6	25	**A5E02211146**
40	50.5	38	40	**A5E02211147**
50	64	50	50	**A5E02211148**
65	91	66	65	**A5E02211151**
80	106	81	80	**A5E02211152**
100	119	100	100	**A5E02211153**

ISO 2852

Adapter DN (mm)	D_o (mm)	D_i (mm)	Sensor DN (mm)	Article No.
25	50.5	22.6	25[1]	**A5E02213581**
33.7	50.5	31.3	25	**A5E02213582**
38	50.5	35.6	40	**A5E02213583**
51	64	48.6	50	**A5E02213584**
63.5	77.5	60.3	65	**A5E02213585**
76.1	91	72.9	80	**A5E02213586**
101.6	119	97.6	100	**A5E02213587**

Tri-Clamp (BS 4825-3)

Adapter DN (mm)	D_o (mm)	D_i (mm)	Sensor DN (mm)	Article No.
12.7	25.4	9.5	10	**A5E02213596**
19.05	25.4	15.85	15	**A5E02213597**
25.4	50.5	22.2	25	**A5E02213598**
38.1	50.5	34.9	40	**A5E02213599**
50.8	64	47.6	50	**A5E02213600**
63.5	77.5	60.3	65	**A5E02213601**
76.2	91	73	80	**A5E02213602**
101.6	119	97.6	100	**A5E02213603**

D_o: Outer diameter

D_i: Inner diameter

1) Default delivery

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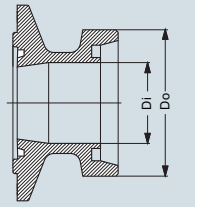
Accessories Article No.

Threaded type connection fittings for MAG 1100 F with P gaskets for EHEDG

Only for sensors with PFA liner.

2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
P gaskets not included

DIN 11851



Adapter DN (mm)	D_o (mm)	D_i (mm)	Sensor DN (mm)		Article No.
10	28	10	10		**A5E02218293**
15	34	16	15[2]		**A5E02218294**
20	44	20	15		**A5E02218295**
25	52	26	25[2]	⬟	**A5E02218296**
32	58	32	25		**A5E02218297**
40	65	38	40	⬟	**A5E02218298**
50	78	50	50	⬟	**A5E02218299**
65	95	66	65		**A5E02218300**
80	110	81	80		**A5E02218301**
100	130	100	100		**A5E02218302**

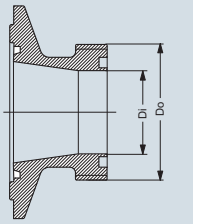
Accessories Article No.

Threaded type connection fittings for MAG 1100 F with P gaskets for EHEDG

Only for sensors with PFA liner.

2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting),
P gaskets not included

SMS 1145[1]



Adapter DN (mm)	D_o (mm)	D_i (mm)	Sensor DN (mm)	Article No.
25	40	22.6	25	**A5E02218310**
38	60	35.6	40	**A5E02218312**
51	70	48.6	50	**A5E02218313**
63.5	85	60.3	65	**A5E02218314**
76	98	72	65[2]	**A5E02218315**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

D_o: Outer diameter

D_i: Inner diameter

[1] SMS 1145 standard is not approved by 3A

[2] Default delivery

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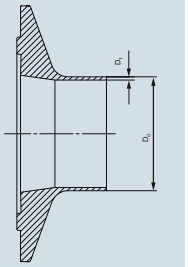
Accessories — Article No.

Weld in connection fittings for MAG 1100 F with flat gaskets for 3A

For sensors with ceramic and PFA liner.

2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting), flat gaskets not included

DIN 11850



Adapter DN (mm)	Adapter D_o (mm)	Adapter D_T (mm)	Sensor DN (mm)		Article No.
10	13	1.5	10	⬟	**FDK:083G2116**
15	19	1.5	15[2]	⬟	**FDK:083G2117**
20	23	1.5	15	⬟	**FDK:083G2118**
25	29	1.5	25[2]	⬟	**FDK:083G2119**
32	35	1.5	25	⬟	**FDK:083G2120**
40	41	1.5	40	⬟	**FDK:083G2121**
50	53	1.5	50	⬟	**FDK:083G2122**
65	70	2.0	65	⬟	**FDK:083G2123**
80	85	2.0	80	⬟	**FDK:083G2124**
100	104	2.0	100	⬟	**FDK:083G2125**

ISO 2037

Adapter DN (mm)	Adapter D_o (mm)	Adapter D_T (mm)	Sensor DN (mm)	Article No.
12.7	12.7	1.0	10	**A5E03720273**
17.2	17.2	1.0	15	**FDK:083G2107**
25	25.6	1.6	25[2]	**FDK:083G2109**
33.7	33.7	1.6	25	**FDK:083G2100**
38	38	1.6	40[2]	**FDK:083G2111**
40	40	1.6	40	**FDK:083G2101**
51	51	1.6	50	**FDK:083G2112**
63.5	63.5	1.6	65	**FDK:083G2113**
76.1	71.1	1.6	80	**FDK:083G2114**
101.6	101.6	2.0	100	**FDK:083G2115**
114.3	118.3	2.0	100	**FDK:083G2105**

Tri-Weld (BS 4825-1)

Adapter DN (mm)	Adapter D_o (mm)	Adapter D_T (mm)	Sensor DN (mm)	Article No.
12.7	12.7	1.2	10	**FDK:083G2276**
19.05	19.05	1.2	15	**FDK:083G2277**
25.4	25.4	1.6	25	**FDK:083G2279**
38	38.1	1.6	40	**FDK:083G2281**
50.8	50.8	1.6	50	**FDK:083G2282**
63.5[1]	63.5	1.6	65	**FDK:083G2283**
76.2	76.2	1.6	80	**FDK:083G2284**
101.6[1]	101.6	2.0	100	**FDK:083G2285**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

D_o: Outer diameter

D_i: Inner diameter

[1] For BS 4825-1 see ISO 2037

[2] Default delivery

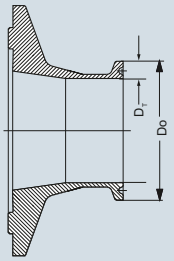
Accessories — Article No.

Clamp-type connection fittings for MAG 1100 F with flat gaskets for 3A

For sensors with ceramic and PFA liner.

2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting), flat gaskets not included

DIN 32676



Adapter DN (mm)	Adapter D_o (mm)	Adapter D_T (mm)	Sensor DN (mm)	Article No.
10	34	10	10	**FDK:083G2186**
15	34	16	15	**FDK:083G2187**
25	50.5	26	25	**FDK:083G2179**
40	50.5	38	40	**FDK:083G2181**
50	64	50	50	**FDK:083G2182**
65	91	66	65	**FDK:083G2183**
80	106	81	80	**FDK:083G2184**
100	119	100	100	**FDK:083G2185**

ISO 2852

Adapter DN (mm)	Adapter D_o (mm)	Adapter D_T (mm)	Sensor DN (mm)	Article No.
25	50.5	22.6	25[1]	**FDK:083G2189**
33.7	50.5	31.3	25	**FDK:083G2190**
38	50.5	35.6	40	**FDK:083G2191**
51	64	48.6	50	**FDK:083G2192**
63.5	77.5	60.3	65	**FDK:083G2193**
76.1	91	72.9	80	**FDK:083G2194**
101.6	119	97.6	100	**FDK:083G2195**

Tri-Clamp (BS 4825-3)

Adapter DN (mm)	Adapter D_o (mm)	Adapter D_T (mm)	Sensor DN (mm)		Article No.
12.7	25.4	9.5	10		**FDK:083G2286**
19.05	25.4	15.85	15		**FDK:083G2287**
25.4	50.5	22.2	25	⬟	**FDK:083G2289**
38.1	50.5	34.9	40		**FDK:083G2291**
50.8	64	47.6	50	⬟	**FDK:083G2292**
63.5	77.5	60.3	65		**FDK:083G2293**
76.2	91	73	80	⬟	**FDK:083G2294**
101.6	119	97.6	100		**FDK:083G2295**

D_o: Outer diameter

D_i: Inner diameter

[1] Default delivery

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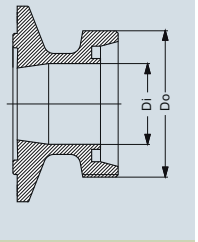
Accessories Article No.

Threaded type connection fittings for MAG 1100 F with flat gaskets for 3A

For sensors with ceramic and PFA liner.

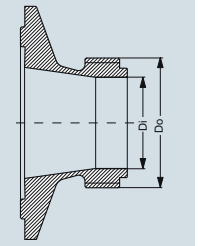
2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting), flat gaskets not included

DIN 11851



Adapter DN (mm)	D_o (mm)	D_i (mm)	Sensor DN (mm)		Article No.
10	28	10	10		**FDK:083G2156**
15	34	16	15[2]		**FDK:083G2157**
20	44	20	15		**FDK:083G2158**
25	52	26	25[2]	⬟	**FDK:083G2159**
32	58	32	25		**FDK:083G2160**
40	65	38	40	⬟	**FDK:083G2161**
50	78	50	50	⬟	**FDK:083G2162**
65	95	66	65		**FDK:083G2163**
80	110	81	80		**FDK:083G2164**
100	130	100	100		**FDK:083G2165**

ISO 2853



Adapter DN (mm)	D_o (mm)	D_i (mm)	Sensor DN (mm)	Article No.
25	37	22.6	25	**FDK:083G2149**
38	51	35.6	40	**FDK:083G2151**
51	64	48.6	50	**FDK:083G2152**
63.5	78	60.3	65	**FDK:083G2153**
76.1	91	72.9	80	**FDK:083G2154**

BS 4825-4

Adapter DN (mm)	D_o (mm)	D_i (mm)	Sensor DN (mm)	Article No.
25.4	37	22.2	25	**A5E03732429**
38.1	51	34.9	40	**A5E03732431**
50.8	64	47.6	50	**A5E03732433**
63.5	78	60.3	65	**A5E03732434**
76.2	91	73	80	**A5E03732435**
101.6	126	97.6	100	**FDK:083G2145**

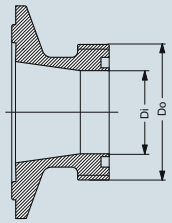
Accessories Article No.

Threaded type connection fittings for MAG 1100 F with flat gaskets for 3A

For sensors with ceramic and PFA liner.

2 pcs. fittings
2 pcs. clamps (to join flow sensor and fitting), flat gaskets not included

SMS 1145[1]



Adapter DN (mm)	D_o (mm)	D_i (mm)	Sensor DN (mm)		Article No.
25	40	22.6	25	⬟	**FDK:083G2139**
38	60	35.6	40		**FDK:083G2141**
51	70	48.6	50	⬟	**FDK:083G2142**
63.5	85	60.3	65		**FDK:083G2143**
76	98	72	65[2]		**FDK:083G2144**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

D_o: Outer diameter

D_i: Inner diameter

[1] SMS 1145 standard is not approved by 3A

[2] Default delivery

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Spare parts for MAG 1100 F	Article No.
Gaskets	
(delivered in pairs, to be placed between flow sensor and adapter)	
MAG 1100 F (PFA) - P gaskets	
Rubber: EPDM (FDA)	
• DN 10	⬟ **A5E02055286**
• DN 15	⬟ **A5E02055287**
• DN 25	⬟ **A5E02055290**
• DN 40	⬟ **A5E02055291**
• DN 50	⬟ **A5E02055292**
• DN 65	⬟ **A5E02055293**
• DN 80	⬟ **A5E02055295**
• DN 100	⬟ **A5E02055297**
MAG 1100 F (ceramic) - flat gaskets	
Rubber: FKM/FPM (FDA)	
• DN 10	⬟ **A5E00915707**
• DN 15	⬟ **A5E00915764**
• DN 25	⬟ **A5E00915771**
• DN 40	⬟ **A5E00915773**
• DN 50	⬟ **A5E00915775**
• DN 65	⬟ **A5E00915780**
• DN 80	⬟ **A5E00915782**
• DN 100	⬟ **A5E00915784**
MAG 1100 F (PFA) - flat gaskets	
Rubber: EPDM (FDA)	
• DN 10	⬟ **FDK:083G2206**
• DN 15	⬟ **FDK:083G2207**
• DN 25	⬟ **FDK:083G2209**
• DN 40	⬟ **FDK:083G2211**
• DN 50	⬟ **FDK:083G2212**
• DN 65	⬟ **FDK:083G2213**
• DN 80	⬟ **FDK:083G2214**
• DN 100	⬟ **FDK:083G2215**
Rubber: NBR	
• DN 10	**FDK:083G2216**
• DN 15	**FDK:083G2217**
• DN 25	**FDK:083G2219**
• DN 40	**FDK:083G2221**
• DN 50	**FDK:083G2222**
• DN 65	**FDK:083G2223**
• DN 80	**FDK:083G2224**
• DN 100	**FDK:083G2225**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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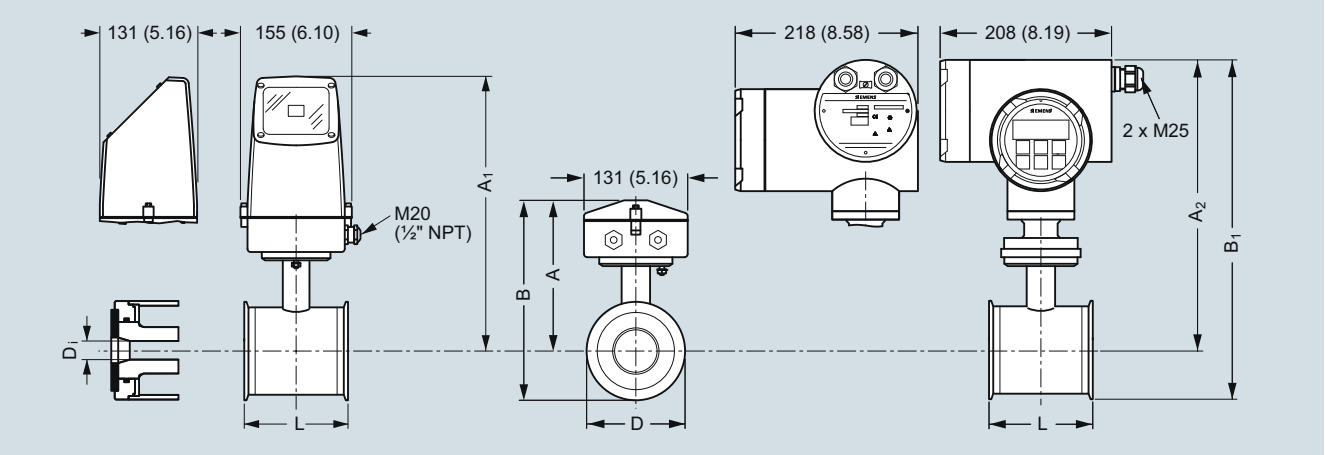
Dimensional drawings

Sensor MAG 1100 F compact/remote



Dimensions in mm (inch)

Important note:
For compact installation with MAG 6000 I/Ex - Supports the transmitter to avoid tension on the sensor part.

Size	L	A	A_1 [3]	B [2]	B_1	D	D_i (Al_2O_3)	D_i PFA	Weight [1]
DN	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
10	64	161	315	193.7	344.7	64.0	10	10	2.2
15	64	161	315	193.7	344.7	64.0	15	16	2.2
25	79	169	323	207.5	359.0	77.5	25	26	2.7
40	94	179	333	228.0	379.0	91.0	40	38	3.4
50	104	188	342	247.7	398.7	119.0	50	50	4.2
65	131	197.5	351	262.6	413.6	130.0	65	66	5.5
80	156	204	357	281.0	432.0	155.0	80	81	7.0
100	186	217	370	308.0	459.0	183.0	100	100	10.0

Size	L	A	A_1 [3]	B [2]	B_1	D	D_i (Al_2O_3)	D_i PFA	Weight [1]
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
3/8	2.52	6.34	12.40	7.62	13.57	2.52	0.39	0.39	4.8
½	2.52	6.34	12.40	7.62	13.57	2.52	0.59	0.63	4.8
1	3.11	6.66	12.72	8.17	14.13	3.05	0.98	1.02	4.9
1½	3.70	7.05	13.11	8.98	14.92	3.58	1.57	1.50	7.5
2	4.09	7.40	13.47	9.75	15.70	4.68	1.97	1.97	9.2
2½	5.16	7.78	13.82	10.34	16.28	5.12	2.56	2.60	12.0
3	6.14	8.03	14.06	11.06	17.01	6.10	3.15	3.19	15.0
4	7.32	8.54	14.57	12.13	18.07	7.20	3.94	3.94	22.0

1) With transmitter MAG 5000 or MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb)
With MAG 6000 I weight is increased with 5.5 kg (12.1 lb)
2) 14.5 mm (0.571“) shorter when the AISI terminal box is used (always Ex version)
3) A_2 is 3 mm (0.12“) shorter than A_1

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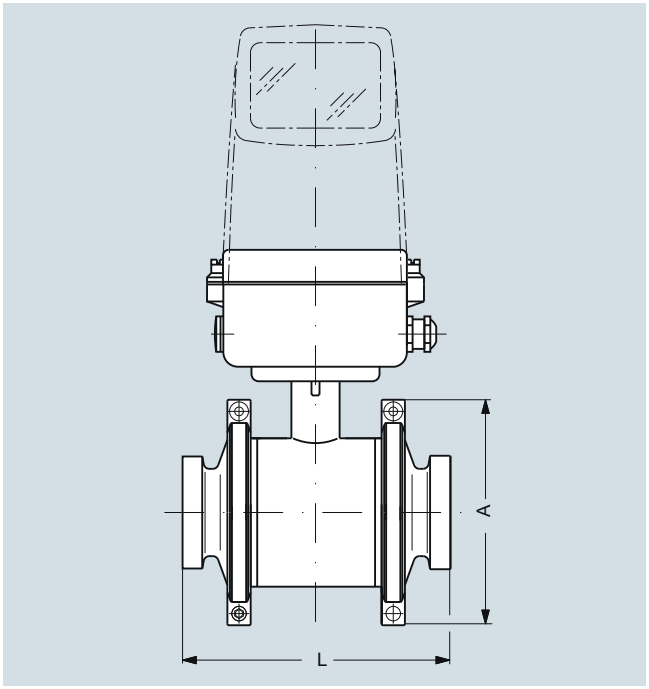
Flow sensor MAG 1100 F

Sensor MAG 1100 F compact/separate – build-in length



Size		A		L[1)]	
DN	inch	[mm]	[inch]	[mm]	[inch]
10	3/8	99	3.90	146	5.75
15	½	99	3.90	146	5.75
25	1	113	4.45	161	6.34
40	1½	126	4.96	176	6.93
50	2	154	6.06	186	7.32
65	2½	165	6.50	223	8.78
80	3	200	7.87	258	10.16
100	4	225	8.86	288	11.34

1) The total build-in length “L” is independent of the adapter type selected.

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Overview

The SITRANS F M MAG 3100 is an electromagnetic flow sensor in a large variety that meets the demands of almost every flow application.

Benefits

- Wide range of sizes: DN 15 to DN 2000 (½" to 78")
- The flexible design is for all applications not covered by the standard industry-specific sensors: MAG 1100, MAG 1100 F, MAG 3100 P and MAG 5100 W
- Wide pressure range: PN 6 to PN 100
  ANSI Class 150/300, AS 2129, AS 4087, JIS K10 and K20. On request up to 690 bar (10 000 psi)
- Wide range of electrode and liner material to fit even the most extreme process media
- Fully welded construction provides a ruggedness that suits the toughest applications and environments
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- Designed to allow patented SITRANS F M in-situ verification using the SENSORPROM fingerprints.

Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Process industry
- Chemical industry
- Steel industry
- Mining
- Utility
- Power generation and distribution
- Oil and gas / HPI
- Water and waste water

Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- Ex ATEX and FM/CSA versions
- High temperature sensor for applications with temperatures up to 180 °C (356 °F)
- Approvals for PTB and OIML R 117
- Meets EEC directives: PED, 97/23/EC pressure directive for EN1092-1 flanges
- Build-in length according to ISO 13359, the standard includes sizes up to DN 400
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

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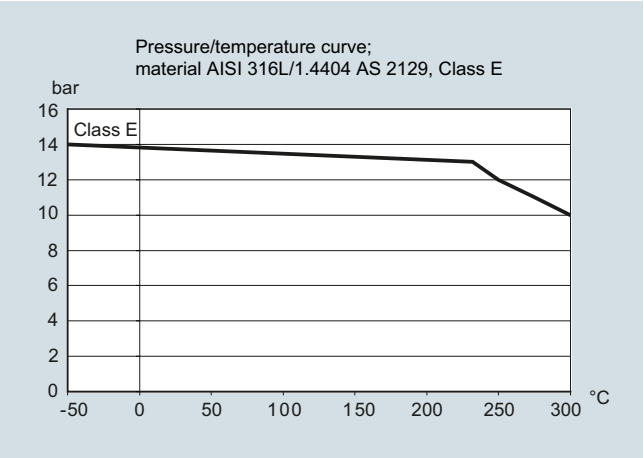
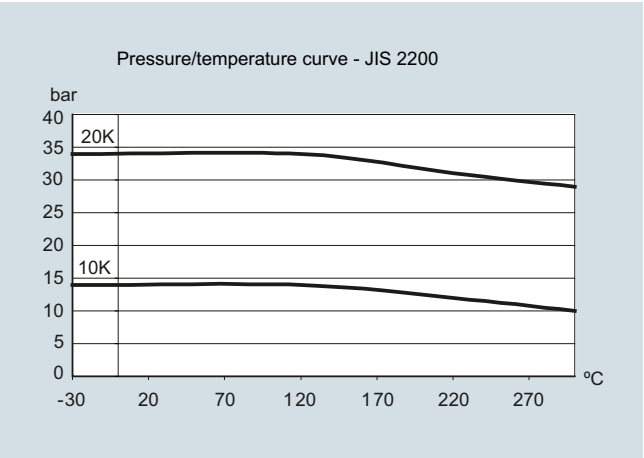
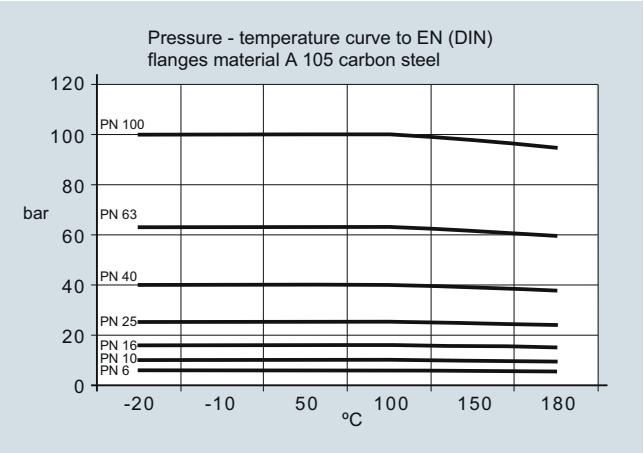
Pressure/temperature curve; material AISI 316L/1.4404 AS 2129, Class E



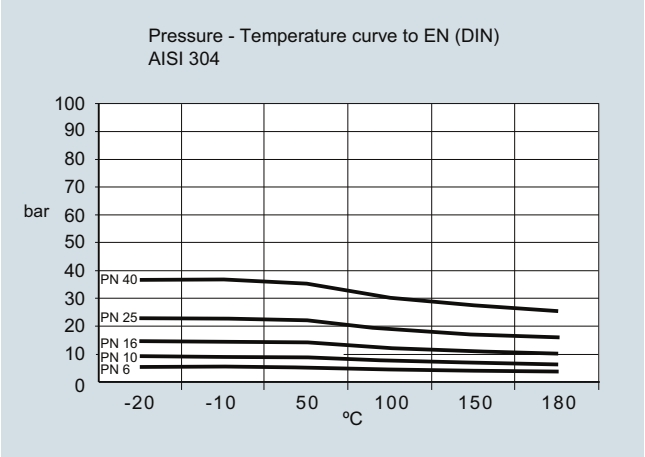
Pressure/temperature curve - JIS 2200



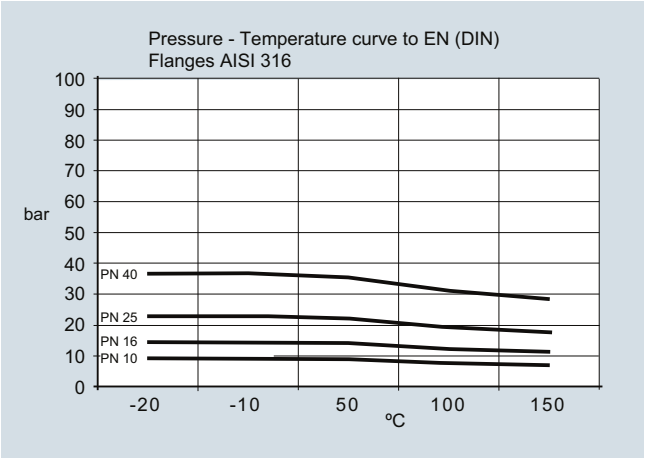
Pressure/temperature curve to EN (DIN) flanges, material A 105 carbon steel



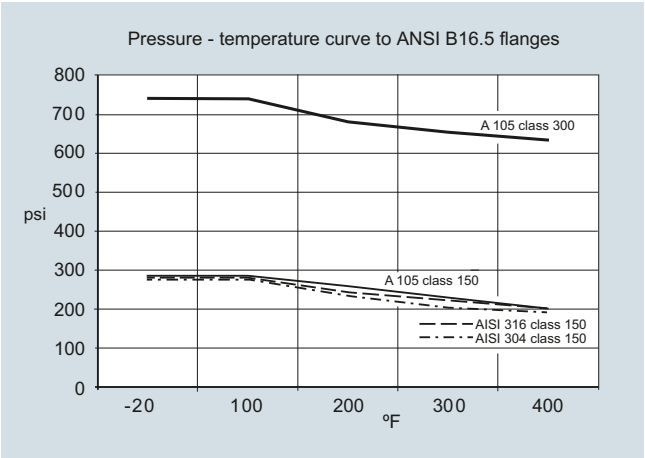
Pressure/temperature curve to EN (DIN) flanges AISI 304



Pressure/temperature curve to EN (DIN) flanges AISI 316



Pressure/temperature curve to ANSI B16.5 flanges



Note: The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For further information on the PED standard and requirements, see page 9/6.

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Technical specifications

Version	MAG 3100	MAG 3100 HT (High Temperature)
Product characteristic	Flexible product program	Flexible product program
Nominal size	DN 15 ... DN 2000 (½" ... 78")	DN 15 … DN 300 (½" ... 12")
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	• DN 15 ... 65 (½" … 2½"): 12.5 Hz/15 Hz • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz • DN 200 ... 1200 (8" ... 48"): 3.125 Hz/3.75 Hz • DN 1400 ... 2000 (54" ... 78"): 1.5625 Hz/1.875 Hz	• DN 15 ... 65 (½" … 2½"): 12.5 Hz/15 Hz • DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz • DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz
Process connection		
Flanges	EN 1092-1, raised face[1)] (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) • DN 65 ... 2000 (2½" … 78"): PN 6 (87 psi) • DN 200 ... 2000 (8" … 78"): PN 10 (145 psi) • DN 65 ... 2000 (2½" … 78"): PN 16 (232 psi) • DN 200 ... 600 (8" … 24"): PN 25 (362 psi) • DN 15 ... 600 (½" … 24"): PN 40 (580 psi) • DN 50 ... 300 (2" … 12"): PN 63 (913 psi) • DN 25 ... 300 (1" … 12"): PN 100 (1450 psi) ANSI B16.5 (~BS 1560), raised face • ½" ... 24": Class 150 (20 bar (290 psi)) • ½" ... 24": Class 300 (50 bar (725 psi)) AWWA C-207, flat face 28" ... 78": Class D (10 bar) AS 2129, raised face ½" ... 48": Table E AS 4087, raised face: • PN 16 (DN 50 ... 1200, 16 bar (232 psi)) • PN 21 (DN 50 ... 600, 21 bar (304 psi)) • PN 35 (DN 50 ... 600, 35 bar (508 psi)) JIS B 2220:2004 • K10 (1" ... 24") • K20 (1" ... 24") Other flanges and pressure ratings on request	EN 1092-1, raised face (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) • DN 15 ... 300 (½" … 12"): PN 40 (580 psi) • DN 65 ... 300 (2½" … 12"): PN 16 (232 psi) • DN 200 ... 300 (8" … 12"): PN 10 (145 psi) • DN 200 ... 300 (8" … 12"): PN 25 (362 psi) ANSI B16.5 (~BS 1560), raised face: • ½" ... 12": Class 150 (20 bar (290 psi)) • ½" ... 12": Class 300 (50 bar (725 psi)) AS 2129, raised face ½" ... 12": Table E Other flanges and pressure ratings on request
Rated operation conditions		
Ambient temperature (conditions also dependent on liner characteristiques)		
• Standard sensor	-40 … +100 °C (-40 … +212 °F)	-40 … +100 °C (-40 … +212 °F)
• Ex sensor	-20 … +60 °C (-4 … +140 °F)	For medium temperature up to 150 °C (302 °F): -20 … +60 °C (-4 … +140 °F) For medium temperature 150 ... 180 °C (302 ... 356 °F): -20 … +50 °C (-4 … +122 °F)
• With compact transmitter		
- MAG 5000/6000[2)]	-20 … +60 °C (-4 … +140 °F)	-20 … +60 °C (-4 … +140 °F)
- MAG 6000 I	-20 … +60 °C (-4 … +140 °F)	-20 … +60 °C (-4 … +140 °F)
- MAG 6000 I Ex	-20 … +60 °C (-4 … +140 °F)	-20 … +60 °C (-4 … +140 °F)

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Flow sensor MAG 3100 and MAG 3100 HT

Version	MAG 3100	MAG 3100 HT (High Temperature)
Operating pressure [abs. bar] (maximum operating pressure decreases with increasing operating temperature and with stainless steel flanges)	• Soft rubber 0.01 ... 100 bar (0.15 ... 1450 psi) • EPDM 0.01 ... 40 bar (0.15 ... 580 psi) • Linatex 0.01 ... 40 bar (0.15 ... 580 psi) • Ebonite 0.01 ... 100 bar (0.15 ... 1450 psi) • PTFE - DN ≤ 300 (≤ 12“): 0.3 ... 50 bar (4 ... 725 psi) - 350 ≤ DN ≤ 600 (14“ ≤ DN ≤ 24“): 0.3 ... 40 bar (4 ... 580 psi) • PFA - DN 15 ... 150 (½“ … 6”): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi)	• PTFE Teflon - DN 15 ... 300 (½“ … 12”) (130/180 °C (266 °F/356°F)): 0.3/0.6 ... 50 bar (4/8 ... 725 psi) (180 °C (356 °F) PTFE has factory mounted grounding SS rings type E and SS terminal box) • PFA - DN 15 ... 150 (½“ … 6”): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi)
Enclosure rating	IP67 to EN 60529/NEMA 4X/6, 1 mH_2O for 30 min Option: IP68 to EN 60529/NEMA 6P, 10 mH_2O cont.	IP67 to EN 60529/NEMA 4X/6, 1 mH_2O for 30 min Option: IP68 to EN 60529/NEMA 6P, 10 mH_2O cont.
Pressure drop at 3 m/s	As straigth pipe	
Test pressure	1.5 x PN (where applicable)	
Mechanical load (vibration)	• 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS • Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 g RMS • Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 g RMS	• 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS • Sensor with compact MAG 5000/ 6000 mounted transmitter: 3.17 g RMS • Sensor with compact MAG 6000 I/ 6000 I Ex mounted transmitter: 1.14 g RMS
Temperature of medium	• Soft rubber 0 … +70 °C (32 … 158 °F) • EPDM -10 … +70 °C (14 … 158 °F) • Linatex (rubber) -40 … +70 °C (-40 … +158 °F) (for temperatures below -20 °C (-4 °F) AISI 304 or 316 flanges must be used) • Ebonite 0 … 95 °C (32 … 203 °F) • PTFE -20 … +100 °C (-4 … +212 °F) • PFA -20 … +100 °C (-4 … +212°F)	• PTFE -20 … +130 °C (-4 … +266 °F) • PTFE -20 … +180 °C (-4 ... +356 °F) Factory mounted grounding rings type E in SS and SS terminal box. Can only be used with remote transmitter. • PFA -20 … +150 °C (-4 … +300 °F)
EMC	2004/108/EC	2004/108/EC
Design		
Weight	See dimensional drawings	
Flange and housing material	Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (150 µm/300 µm) or Stainless steel AISI 304/1.4301 flanges and carbon steel housing, with corrosion resistant two component epoxy coating (150 µm/300 µm) or Stainless steel AISI 316L/1.4404 flanges and housing, polished	Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (150 µm/) or AISI 304/1.4301 flanges and carbon steel housing, with corrosion resistant two component epoxy coating (min. 150 µm) or AISI 316L/1.4404 flanges and housing, polished
Measuring pipe material	Stainless steel AISI 304/1.4301	AISI 304/1.4301
Electrode material	• Stainless steel AISI 316Ti/1.4571 • Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602) • Platinum/Iridium • Titanium • Tantalum	• AISI 316Ti/1.4571 • Hastelloy C276/2.4819 (PFA: Hastelloy C22/2.4602) • Platinum/Iridium • Titanium • Tantalum
Grounding electrode material	• Soft rubber, EPDM, Linatex, Ebonite: available with measuring electrodes in stainless steel AISI 316Ti/1.4571 or Hastelloy • PTFE: none • PFA: optional in Hastelloy, Tantalum or Platinium	• PTFE: none • PFA: optional in Hastelloy, Tantalum or Platinium

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Version	MAG 3100	MAG 3100 HT (High Temperature)
Design (continued)		
Terminal box (remote version only)	• Standard fibre glass reinforced polyamide • Option Stainless steel AISI 316/1.4436 • Ex Stainless steel AISI 316/1.4436	• Standard fibre glass reinforced polyamide (max. 150 °C (302 °F)) • Stainless steel AISI 316/1.4436 • Ex Stainless steel AISI 316/1.4436
Cable entries	• Remote installation 2 x M20 or 2 x ½" NPT • Compact installation - MAG 5000/MAG 6000: 4 x M20 or 4 x ½" NPT - MAG 6000 I: 2 x M25 or 2 x ½" NPT (for supply/output) - MAG 6000 I Ex: 2 x M25 or 2 x ½" NPT (for supply/output)	• Remote installation 2 x M20 or 2 x ½" NPT
Certificates and approvals		
Calibration		
• Standard production calibration (default), calibration report shipped with sensor	Zero-point, 2 x 25 % and 2 x 90 % (default)	Zero-point, 2 x 25 % and 2 x 90 % (default)
• Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max} Matched-pair calibration: default, 5-point or 10-point	
Conforms to	PED (All EN1092-1 flanges conforms to PED) – 97/23/EC[3] CRN	PED (All EN1092-1 flanges conforms to PED) – 97/23/EC[3] CRN
Material certificate EN 10204-3.1	Available when ordering together with meter[4]	Available when ordering together with meter[4]
Ex approvals[5]	Ex sensors • ATEX 2 GD DN 15 ... 300: EEx d e ia IIC T4 - T6 • DN 350 ... 2000: EEx e ia IIC T4 - T6 • IEC Ex de ia IIC T3-T6 • FM Class I/II/III, Div 1[6] • FM Class I, Zone 1/21 • CSA Class I, Zone 1 Standard sensors • FM Class I, Div 2/Zone 2 • CSA Class I, Div 2/Zone 2	Ex sensors • ATEX 2 GD DN 15 ... 300: EEx d e ia IIC T3 - T6 • IEC Ex de ia IIC T3-T6 • FM Class I/II/III, Div 1[6] • FM Class I, Zone 1/21 • CSA Class I, Zone 1 Standard sensors • FM Class I, Div 2/Zone 2 • CSA Class I, Div 2/Zone 2
Drinking water approvals	EPDM lining: • WRAS (WRc, BS690 cold water, GB) • NSF/ANSI Standard 61[7] (Cold water, US) • ACS listed (F) • DVGW W270 (D) • Belgaqua (B) • MCERTS (GB) (EPDM or PTFE lining with AISI 316 or Hastelloy electrodes)	
Custody transfer (CT) (≤ DN2000) (only together with MAG 5000/6000 CT), order as special	Cold water pattern approval - DANAK TS 22.36.001, PTB (Denmark and Germany) Hot water pattern approval - PTB (Germany) Other media than water - OIML R 117 (Denmark)	Hot water pattern approval - PTB (Germany)

Technical specification for transmitter - see transmitter pages.

1) PN 6-40: DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF); PN 63-100: type 11 (WNRF)

2) With compact transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... +122 °F).

3) For sizes larger than 600 mm (24") in PN 16 PED conformity is available as a cost-added option. The basic unit will carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the Pressure Equipment directive, also products sold into certain market sectors are excluded. These include:
a) Meters used in networks for the supply, distribution and discharge of water.
b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore.
c) Meters used in the extraction of petroleum or gas, including christmas tree and manifold equipment.
d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see page 9/6.

4) Has to be ordered with the meter. It is not possible to order the certificate afterwards.

5) Not for sensors with 300 µm coating.

6) Only with sensors sizes DN 15 ... 300 (½" ... 12") compact.

7) Including Annex G

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Flow sensor MAG 3100 and MAG 3100 HT

3

Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 3100 ↗	**7ME6310-** ■■■■■-■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 15 (½“) (PTFE and PFA liner)	1V
DN 25 (1“)	2D
DN 40 (1½“)	2R
DN 50 (2“)	2Y
DN 65 (2½“)	3F
DN 80 (3“)	3M
DN 100 (4“)	3T
DN 125 (5“)	4B
DN 150 (6“)	4H
DN 200 (8“)	4P
DN 250 (10“)	4V
DN 300 (12“)	5D
DN 350 (14“)	5K
DN 400 (16“)	5R
DN 450 (18“)	5Y
DN 500 (20“)	6F
DN 600 (24“)	6P
DN 700 (28“)	6Y
DN 750 (30“) (AWWA and AS 2129 only)	7D
DN 800 (32“)	7H
DN 900 (36“)	7M
DN 1000 (40“)	7R
DN 1050 (42“) (AWWA only)	7U
DN 1100 (44“) (AWWA only)	7V
DN 1200 (48“)	8B
DN 1400 (54“)	8F
DN 1500 (60“)	8K
DN 1600 (66“)	8P
DN 1800 (72“)	8T
DN 2000 (78“)	8Y
Flange norm and pressure rating	
EN 1092-1	
PN 6 (DN 65 ... 2000 (2½“ ... 78“))	A
PN 10 (DN 200 ... 2000 (8“ ... 78“))	B
PN 16 (DN 65 ... 1200 (2½“ ... 48“))	C
PN 16, non-PED (DN 700 ... 2000 (28“ ... 78“))	D
PN 25 (DN 200 ... 600 (8“ ... 24“))[1]	E
PN 40 (DN 15 ... 600 (½“ ... 24“))	F
PN 63 (DN 50 ... 300 (2“ ... 12“))	G
PN 100 (DN 25 ... 300 (1“ ... 12“))	H
ANSI B16.5	
Class 150 (½“ ... 24“)	J
Class 300 (½“ ... 24“)	K
AWWA C-207	
Class D (28“ ... 78“)	L
AS	
2129, table E	M
4087, PN 16 (DN 50 ... 1200 (2“ ... 48“)) (Not PTFE and PFA)	N
4087, PN 21 (DN 50 ... 600 (2“ ... 24“)) (Not PTFE and PFA)	P
4087, PN 35 (DN 50 ... 600 (2“ ... 24“)) (Not PTFE and PFA)	Q
JIS B 2220:2004	
K10 (1" ... 24")	R
K20 (1" ... 24")	S

Selection and Ordering data	Article No.
Sensor SITRANS F M MAG 3100	**7ME6310-** ■■■■■-■■■■
Flange material and coating	
Carbon steel flanges ASTM A 105, 150 µm coating	1
Stainless steel flanges, AISI 304/1.4301, 150 µm coating	2
Stainless steel flanges and sensor body, AISI 316L/1.4404, polished	3
Carbon steel flanges ASTM A 105, 300 µm coating	4
Stainless steel flanges, AISI 304/1.4301, 300 µm coating	5
Liner material	
Soft rubber	1
EPDM	2
PTFE (DN ≤ 300, PN ≤ 50 bar / ≤ 12“, PN ≤ 725 psi), PTFE (350 ≤ DN ≤ 600, PN ≤ 40 bar / 14“ ≤ DN ≤ 24“, PN ≤ 580 psi)	3
Ebonite	4
Linatex (PN ≤ 40 bar (580 psi) DN ≤ 600 (24“))	5
PFA (DN 15 ... 150 (½" ... 6")) (PN ≤ 40 bar (580 psi))	7
Electrode material (Grounding electrodes not for PTFE liner or Pressure PN 100)	
AISI 316Ti/1.4571 (not for PFA)	1
Hastelloy C276/2.4819 (PFA liner: Hastelloy C22/2.4602)	2
Platinum (DN ≤ 300 (12")) (not ebonite liner)	3
Titanium (not PFA liner) (DN ≤ 600 (24"))	4
Tantalum (DN ≤ 600 (24")) (not ebonite liner)	5
Hastelloy C22/2.4602 incl. grounding electrodes (only PFA)	6
Platinium incl. grounding electrodes (only PFA)	7
Tantalum incl. grounding electrodes (only PFA)	8
Transmitter with display	
Standard sensor for remote transmitter (Order transmitter separately)	A
Ex sensor for remote transmitter (Order transmitter separately)	B
MAG 6000 I, Alu.18 ... 90 V DC, 115 ... 230 V AC	C
MAG 6000 I Alu. 18 ... 30 V DC, Ex	D
MAG 6000 I Alu. 115 ... 230 V, Ex	E
MAG 6000 Polyamide, 11… 30 V DC / 11…24 V AC	H
MAG 6000, Polyamide, 115 ... 230 V AC	J
MAG 5000, Polyamide, 11… 30 V DC / 11…24 V AC	K
MAG 5000, Polyamide, 115 ... 230 V AC	L
Communication	
No communication, add-on possible	A
HART	B
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	F
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	G
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)	E
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	J
Cable glands/terminal box	
Metric: Polyamide terminal box or 6000 I compact	1
½" NPT: Polyamide terminal box or 6000 I compact	2
Metric: SS terminal box (mandatory for stainless steel MAG 6000 Transmitter)	3
½" NPT: SS terminal box (mandatory for stainless steel MAG 6000 Transmitter)	4

[1] Under preparation

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	**C12**
Factory certificate according to EN 10204-2.2	**C14**
Factory certificate according to EN 10204-2.1	**C15**
Special calibration	
• 5-point calibration for DN 15 ... DN 200[1)]	**D01**
• 5-point calibration for DN 250 ... DN 600[1)]	**D02**
• 5-point calibration for DN 700 ... DN 1200[1)]	**D03**
• 10-point calibration for DN 15 ... DN 200[2)]	**D06**
• 10-point calibration for DN 250 ... DN 600[2)]	**D07**
• 10-point calibration for DN 700 ... DN 1200[2)]	**D08**
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 ... DN 200	**D11**
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 ... DN 600	**D12**
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 ... DN 1200	**D13**
• 5-point, matched-pair calibration for DN 15 ... DN 200[1)]	**D15**
• 5-point, matched-pair calibration for DN 250 ... DN 600[1)]	**D16**
• 5-point, matched-pair calibration for DN 700 ... DN 1200[1)]	**D17**
• 10-point, matched-pair calibration for DN 15 ... DN 200[2)]	**D18**
• 10-point, matched-pair calibration for DN 250 ... DN 600[2)]	**D19**
• 10-point, matched-pair calibration for DN 700 ... DN 1200[2)]	**D20**
Tag name plate, stainless steel fixed with SS wire (add plain text)	**Y17**
Tag name plate, plastic (self adhesive)	**Y18**
Customer-specific converter setup	**Y20**
Sensor cables wired (specify cable Article No.)	**Y40**
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.) (not for Ex)	**Y41**
Other postproduction requirements (add desired text)	**Y99**
Additional calibrations	
• Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005	**On request[3)]**
• CT verification and authority seal according to: Cold water pattern approval - DANAK TS 22.36.001, PTB (Denmark and Germany)	**On request[3)]**
• Customer-witnessed calibration Any of above calibration	**On request[3)]**

1) 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

3) Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)

Operating instructions for SITRANS F M MAG 3100

Description	Article No.
• English	**A5E03005599**
• German	**A5E03086288**
• Spanish	**A5E03086291**
• French	**A5E03086290**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P ⬟	**FDK:085U0220**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Please use online Product selector to get latest updates.

Product selector link:
www.pia-selector.automation.siemens.com

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I/MAG 6000 I ATEX 2G D transmitters and sensors are delivered compact mounted from factory.
Communication module will be pre-mounted in the transmitter.

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Flow sensor MAG 3100 and MAG 3100 HT

Selection and Ordering data	Article No.
Sensor SITRANS F M **MAG 3100 HT (High Temperature)**	**7ME6320 -** ■■■■■ - ■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 15 (½“)	1V
DN 25 (1“)	2D
DN 40 (1½“)	2R
DN 50 (2“)	2Y
DN 65 (2½“)	3F
DN 80 (3“)	3M
DN 100 (4“)	3T
DN 125 (5“)	4B
DN 150 (6“)	4H
DN 200 (8“)	4P
DN 250 (10“)	4V
DN 300 (12“)	5D
Flange norm and pressure rating	
EN 1092-1	
PN 10 (DN 200 ... 300 (8“ ... 12“))	B
PN 16 (DN 65 ... 300 (2½“ ... 12“))	C
PN 25 (DN 200 ... 300 (8“ ... 12“))	E
PN 40 (DN 15 ... 300 (½“ ... 12“))	F
ANSI B16.5	
Class 150 (½“ ... 12“)	J
Class 300 (½“ ... 12“)	K
AS	
2129, table E	M
Flange material	
Carbon steel flanges ASTM A 105	1
Stainless steel flanges, AISI 304/1.4301	2
Stainless steel flanges and sensor body, AISI 316L/1.4404, polished	3
Liner material	
PTFE (130 °C (266 °F))	2
PTFE including type E protection rings AISI 316/1.4436 (180 °C (356 °F))	3
PFA (150 °C (302 °F)) (DN 15 ... 150 (½" ... 6"))	7
Electrode material	
AISI 316Ti/1.4571 (not for PFA)	1
Hastelloy C276/2.4819 (PFA liner: Hastelloy C22/2.4602)	2
Platinum	3
Titanium (not for PFA)	4
Tantalum	5
Hastelloy C22/2.4602 incl. grounding electrodes (only PFA)	6
Platinium incl. grounding electrodes (only PFA)	7
Tantalum incl grounding electrodes (only PFA)	8
Transmitter with display	
Standard sensor for remote transmitter (Order transmitter separately)	A
Ex sensor for remote transmitter (Order transmitter separately)	B
MAG 6000 I, Alu.18 ... 90 V DC, 115 ... 230 V AC	C
MAG 6000 I, Alu. 18 ... 30 V DC, Ex	D
MAG 6000 I, Alu. 115 ... 230 V AC, Ex	E
MAG 6000, Polyamide, 11 ... 30 V DC/ 11 ... 24 V AC	H
MAG 6000, Polyamide, 115 ... 230 V AC	J
MAG 5000, Polyamide, 11 ... 30 V DC/ 11 ... 24 V AC	K
MAG 5000, Polyamide, 115 ... 230 V AC	L

Selection and Ordering data	Article No.
Sensor SITRANS F M **MAG 3100 HT (High Temperature)**	**7ME6320 -** ■■■■■ - ■■■■
Communication	
No communication, add-on possible	A
HART	B
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	F
PROFIBUS DP Profile 3 (only MAG 6000/MAG 6000 I)	G
Modbus RTU/RS 485 (only MAG 6000/MAG 6000 I)	E
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	J
Cable glands/terminal box	
Metric: Polyamide terminal box (PTFE 130 °C (266 °F)) or 6000 I compact	1
½" NPT: Polyamide terminal box (PTFE 130 °C (266 °F)) or 6000 I compact	2
Metric: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)	3
½" NPT: SS terminal box (mandatory for Stainless steel MAG 6000 Transmitter)	4

Selection and Ordering data	Order code
Additional information	
Please add **“-Z“** to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	**C12**
Factory certificate according to EN 10204-2.2	**C14**
Factory certificate according to EN 10204-2.1	**C15**
Customer-specific converter setup	**Y20**
Tag name made, stainless steel fixed with SS wire (add plain text)	**Y17**
Tag name plate, plastic (self adhesive)	**Y18**
Sensor cables wired (specify cable Article No.)	**Y40**
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.) (not for Ex)	**Y41**
Other postproduction requirements (add desired text)	**Y99**
Additional calibrations	
• Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	**On request**[1)]
• Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005	**On request**[1)]
• Customer-specified calibration up to 10 points	**On request**[1)]
• CT verification and authority seal according to: Cold water pattern approval - DANAK TS 22.36.001, PTB (Denmark and Germany)	**On request**[1)]
• Customer-witnessed calibration Any of above calibration	**On request**[1)]

[1)] Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)

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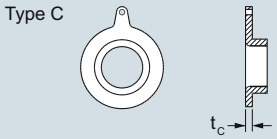
Selection and Ordering data

MAG 3100 and MAG 3100 HT[1] Type C Grounding and protection rings

1 pc. AISI 304 grounding and protection ring **type C** for all liners except PTFE and PFA



DN	PN 6 Article No.	PN 10 Article No.	PN 16 Article No.	PN 25 Article No.	PN 40 Article No.	AS 2129 Table E Article No.
DN 25					FDK:083N8361	FDK:083N8361
DN 40					FDK:083N8362	FDK:083N8362
DN 50					FDK:083N8344	FDK:083N8344
DN 65	FDK:083N8345		FDK:083N8345		FDK:083N8345	FDK:083N8346
DN 80	FDK:083N8347		FDK:083N8347		FDK:083N8347	FDK:083N8347
DN 100	FDK:083N8070		FDK:083N8025		FDK:083N8025	FDK:083N8025
DN 125	FDK:083N8071		FDK:083N8071		FDK:083N8071	FDK:083N8071
DN 150	FDK:083N8072		FDK:083N8008		FDK:083N8008	FDK:083N8008
DN 200	FDK:083N8074	FDK:083N8011	FDK:083N8011	FDK:083N8011	FDK:083N8075	FDK:083N8011
DN 250	FDK:083N8078	FDK:083N8013	FDK:083N8013	FDK:083N8013	FDK:083N8079	FDK:083N8013
DN 300	FDK:083N8080	FDK:083N8012	FDK:083N8012	FDK:083N8081	FDK:083N8082	FDK:083N8012
DN 350	FDK:083N8083	FDK:083N8039	FDK:083N8039	FDK:083N8084	FDK:083N8085	FDK:083N8039
DN 400	FDK:083N8099	FDK:083N8100	FDK:083N8100	FDK:083N8101	FDK:083N8102	FDK:083N8100
DN 450	FDK:083N8103	FDK:083N8103	FDK:083N8104	FDK:083N8104	FDK:083N8105	FDK:083N8104
DN 500	FDK:083N8107	FDK:083N8107	FDK:083N8108	FDK:083N8108	FDK:083N8109	FDK:083N8108
DN 600	FDK:083N8111	FDK:083N8111	FDK:083N8112	FDK:083N8112		FDK:083N8113
DN 700	FDK:083N8300	FDK:083N8294	FDK:083N8294			FDK:083N8372
DN 750						
DN 800	FDK:083N8303	FDK:083N8304	FDK:083N8304			FDK:083N8373
DN 900	FDK:083N8306	FDK:083N8307	FDK:083N8307			FDK:083N8396
DN 1000	FDK:083N8309	FDK:083N8310	FDK:083N8310			FDK:083N8397
DN 1100		FDK:083N8367	FDK:083N8367			FDK:083N8367
DN 1200	FDK:083N8312	FDK:083N8313	FDK:083N8313			FDK:083N8398
DN 1400	FDK:083N8467	FDK:083N8468	FDK:083N8469			
DN 1500	FDK:083N8471	FDK:083N8472	FDK:083N8473			
DN 1600	FDK:083N8475	FDK:083N8476	FDK:083N8477			
DN 1800	FDK:083N8479	FDK:083N8480	FDK:083N8481			
DN 2000	FDK:083N8483	FDK:083N8484	FDK:083N8485			

[1] Also for MAG 5100 W (7ME6520 > DN 300; and 7ME6580).

Size	ANSI Class 150 Article No.	Class 300 Article No.	JIS K10 Article No.	JIS K20 Article No.
1“	FDK:083N8361	FDK:083N8361	FDK:083N8361	FDK:083N8361
1½“	FDK:083N8362	FDK:083N8362	FDK:083N8362	FDK:083N8362
2“	FDK:083N8344	FDK:083N8344	FDK:083N8344	FDK:083N8344
2½“	FDK:083N8345	FDK:083N8345	FDK:083N8345	FDK:083N8345
3“	FDK:083N8347	FDK:083N8347	FDK:083N8347	FDK:083N8347
4“	FDK:083N8025	FDK:083N8025	FDK:083N8070	FDK:083N8025
5“	FDK:083N8071	FDK:083N8071	FDK:083N8071	FDK:083N8071
6“	FDK:083N8008	FDK:083N8073	FDK:083N8008	FDK:083N8008
8“	FDK:083N8011	FDK:083N8076	FDK:083N8011	FDK:083N8011
10“	FDK:083N8013	FDK:083N8079	FDK:083N8013	FDK:083N8079
12“	FDK:083N8012	FDK:083N8082	FDK:083N8012	FDK:083N8081
14“	FDK:083N8039	FDK:083N8085	FDK:083N8083	FDK:083N8039
16“	FDK:083N8100	FDK:083N8102	FDK:083N8100	FDK:083N8101
18“	FDK:083N8104	FDK:083N8106	FDK:083N8103	FDK:083N8104
20“	FDK:083N8107	FDK:083N8110	FDK:083N8107	FDK:083N8108
24“	FDK:083N8113	FDK:083N8114	FDK:083N8111	FDK:083N8112

Size	AWWA C-207 Article No.
28“	FDK:083N8302
30“	FDK:083N8366
32“	FDK:083N8305
36“	FDK:083N8308
40“	FDK:083N8311
42“	FDK:083N8394
44“	FDK:083N8395
48“	FDK:083N8314
54“	FDK:083N8470
60“	FDK:083N8474
66“	FDK:083N8478
72“	FDK:083N8482
78“	FDK:083N8486

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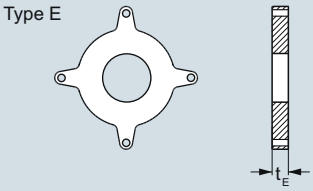
Selection and Ordering data

MAG 3100 and 3100 HT Type E grounding and protection ring

1 pc. AISI 316 grounding and protection ring **type E** for PTFE liners incl. straps and screws

Note:
For MAG 3100 HT High temperature version 7ME6320... for PTFE 180 °C (356 °C) versions - grounding ring type E is included and factory mounted.



DN	PN 6 Article No.	PN 10 Article No.	PN 16 Article No.	PN 25 Article No.	PN 40 Article No.
DN 15					**FDK:083N8365**
DN 25					**FDK:083N8271**
DN 40					**FDK:083N8278**
DN 50					**FDK:083N8282**
DN 65	**FDK:083N8284**		**FDK:083N8285**		**FDK:083N8286**
DN 80	**FDK:083N8288**		**FDK:083N8289**		**FDK:083N8290**
DN 100	**FDK:083N8116**		**FDK:083N8117**		**FDK:083N8118**
DN 125	**FDK:083N8120**		**FDK:083N8121**		**FDK:083N8122**
DN 150	**FDK:083N8124**		**FDK:083N8125**		**FDK:083N8126**
DN 200	**FDK:083N8129**	**FDK:083N8130**	**FDK:083N8130**	**FDK:083N8131**	**FDK:083N8132**
DN 250	**FDK:083N8135**	**FDK:083N8136**	**FDK:083N8137**	**FDK:083N8138**	**FDK:083N8139**
DN 300	**FDK:083N8144**	**FDK:083N8144**	**FDK:083N8145**	**FDK:083N8146**	**FDK:083N8147**
DN 350	**FDK:083N8152**	**FDK:083N8153**	**FDK:083N8154**	**FDK:083N8155**	**FDK:083N8156**
DN 400	**FDK:083N8160**	**FDK:083N8161**	**FDK:083N8162**	**FDK:083N8163**	**FDK:083N8164**
DN 450	**FDK:083N8168**	**FDK:083N8169**	**FDK:083N8170**	**FDK:083N8171**	**FDK:083N8172**
DN 500	**FDK:083N8177**	**FDK:083N8178**	**FDK:083N8179**	**FDK:083N8180**	**FDK:083N8181**
DN 600	**FDK:083N8186**	**FDK:083N8187**	**FDK:083N8188**	**FDK:083N8189**	

Protection of PTFE liner use 2 pcs.
Earthing of PTFE lined flowmeter use 1 pc.

Size	ANSI			
	Class 150 Article No.	**Class 300** Article No.	**JIS K10** Article No.	**JIS K20** Article No.
½"	**FDK:083N8365**	**FDK:083N8365**		
1"	**FDK:083N8272**	**FDK:083N8272**	**FDK:083N8271**	**FDK:083N8271**
1½"	**FDK:083N8279**	**FDK:083N8279**	**FDK:083N8278**	**FDK:083N8278**
2"	**FDK:083N8283**	**FDK:083N8283**	**FDK:083N8282**	**FDK:083N8282**
2½"	**FDK:083N8287**	**FDK:083N8287**	**FDK:083N8285**	**FDK:083N8285**
3"	**FDK:083N8291**	**FDK:083N8292**	**FDK:083N8288**	**FDK:083N8289**
4"	**FDK:083N8118**	**FDK:083N8119**	**FDK:083N8116**	**FDK:083N8117**
5"	**FDK:083N8122**	**FDK:083N8123**	**FDK:083N8121**	**FDK:083N8122**
6"	**FDK:083N8126**	**FDK:083N8127**	**FDK:083N8125**	**FDK:083N8126**
8"	**FDK:083N8370**	**FDK:083N8133**	**FDK:083N8130**	**FDK:083N8370**
10"	**FDK:083N8140**	**FDK:083N8141**	**FDK:083N8137**	**FDK:083N8139**
12"	**FDK:083N8148**	**FDK:083N8149**	**FDK:083N8144**	**FDK:083N8146**
14"	**FDK:083N8157**	**FDK:083N8158**	**FDK:083N8152**	**FDK:083N8154**
16"	**FDK:083N8165**	**FDK:083N8166**	**FDK:083N8160**	**FDK:083N8165**
18"	**FDK:083N8173**	**FDK:083N8174**	**FDK:083N8169**	**FDK:083N8171**
20"	**FDK:083N8182**	**FDK:083N8183**	**FDK:083N8178**	**FDK:083N8180**
24"	**FDK:083N8190**	**FDK:083N8191**	**A5E32709738**	**A5E32710253**

Protection of PTFE liner use 2 pcs.
Grounding of PTFE lined flowmeter use 1 pc.

AS2129, Table E DN	Article No.
DN 15	**FDK:083N8365**
DN 25	**FDK:083N8272**
DN 40	**FDK:083N8280**
DN 50	**FDK:083N8281**
DN 65	**FDK:083N8284**
DN 80	**FDK:083N8293**
DN 100	**FDK:083N8117**
DN 125	**FDK:083N8121**
DN 150	**FDK:083N8128**
DN 200	**FDK:083N8134**
DN 250	**FDK:083N8143**
DN 300	**FDK:083N8151**
DN 350	**FDK:083N8153**
DN 400	**FDK:083N8161**
DN 450	**FDK:083N8176**
DN 500	**FDK:083N8185**
DN 600	**A5E32710253**

Protection of PTFE liner use 2 pcs.
Grounding of PTFE lined flowmeter use 1 pcs.

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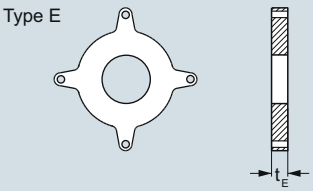
Selection and Ordering data

MAG 3100 and MAG 3100 HT type E grounding and protecting ring

1 pc. Hastelloy C276 grounding and protection ring **type E** for PTFE liners incl. straps and screws

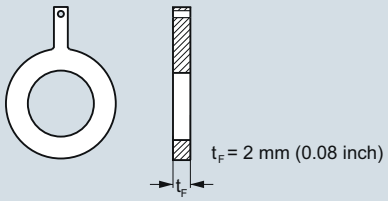


DN	PN 6	PN 16	PN 40	Size	ANSI Class 150	Class 300
	Article No.	Article No.	Article No.		Article No.	Article No.
DN 15			**FDK:083N8487**	½“	**FDK:083N8487**	**FDK:083N8487**
DN 25			**FDK:083N8488**	1“	**FDK:083N8489**	**FDK:083N8489**
DN 40			**FDK:083N8490**	1½“	**FDK:083N8491**	**FDK:083N8491**
DN 50			**FDK:083N8492**	2“	**FDK:083N8493**	**FDK:083N8493**
DN 65	**FDK:083N8494**	**FDK:083N8495**	**FDK:083N8496**	2½“	**FDK:083N8497**	**FDK:083N8497**
DN 80	**FDK:083N8498**	**FDK:083N8499**	**FDK:083N8500**	3“	**FDK:083N8501**	**FDK:083N8502**
DN 100	**FDK:083N8503**	**FDK:083N8504**	**FDK:083N8505**	4“	**FDK:083N8506**	**FDK:083N8507**

Selection and Ordering data

MAG 3100 and MAG 3100 HT[1] Grounding rings: Flat rings

1 pc. **AISI 316** grounding **flat ring** for all liners (PTFE max. 130 °C (266 °F))



DN	PN 10	PN 16	PN 40	Size	ANSI Class 150	Class 300
	Article No.	Article No.	Article No.		Article No.	Article No.
DN 15			**A5E01191969**	½“	**A5E01191968**	
DN 25			**A5E01150880**	1“	**A5E01150022**	**A5E01150378**
DN 40			**A5E01191952**	1½“	**A5E01191961**	
DN 50			**A5E01150918**	2“	**A5E01151121**	**A5E01151194**
DN 65		**A5E01191940**	**A5E01191954**	2½“	**A5E01191962**	
DN 80		**A5E01152876**	**A5E01152876**	3“	**A5E01152910**	**A5E01153422**
DN 100		**A5E01158875**	**A5E01159072**	4“	**A5E01159146**	**A5E01159628**
DN 125		**A5E01191941**	**A5E01191956**	5“	**A5E01191963**	
DN 150		**A5E01191943**	**A5E01191957**	6“	**A5E01191964**	
DN 200	**A5E01191951**	**A5E01191944**	**A5E01191958**	8“	**A5E01191965**	
DN 250	**A5E01191950**	**A5E01191946**	**A5E01191959**	10“	**A5E01191966**	
DN 300	**A5E01191949**	**A5E01191947**	**A5E01191960**	12“	**A5E01191967**	

[1] Also for MAG 5100 W (7ME6520 DN 40 ... 300)

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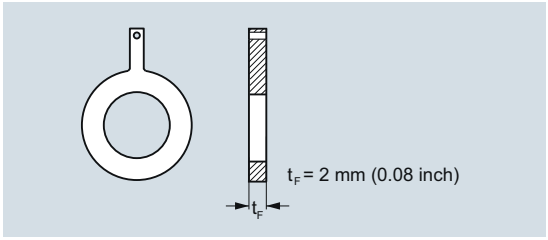
Selection and Ordering data

MAG 3100 and MAG 3100 HT Grounding rings : Flat rings

1 pc. **Hastelloy** C276 grounding **flat ring** for all liners (PTFE max. 130 °C (266 °F))

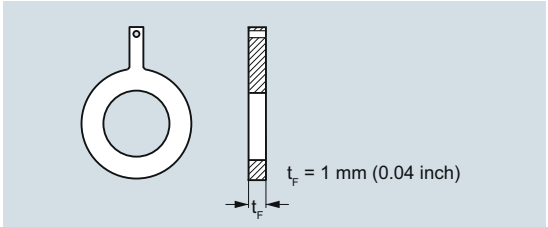


DN	PN 10 Article No.	PN 16 Article No.	PN 40 Article No.	Size	ANSI Class 150 Article No.	Class 300 Article No.
DN 15			**A5E01191981**	½“	**A5E01191989**	
DN 25			**A5E01150882**	1“	**A5E01150028**	**A5E01150379**
DN 40			**A5E01191982**	1½“	**A5E01191990**	
DN 50			**A5E01150922**	2“	**A5E01151124**	**A5E01151197**
DN 65		**A5E01191971**	**A5E01191983**	2½“	**A5E01191991**	
DN 80		**A5E01152889**	**A5E01152889**	3“	**A5E01152913**	**A5E01153424**
DN 100		**A5E01158886**	**A5E01159074**	4“	**A5E01159150**	**A5E01159629**
DN 125		**A5E01191973**	**A5E01191984**	5“	**A5E01191992**	
DN 150		**A5E01191974**	**A5E01191985**	6“	**A5E01191993**	
DN 200	**A5E01191978**	**A5E01191975**	**A5E01191986**	8“	**A5E01191994**	
DN 250	**A5E01191979**	**A5E01191976**	**A5E01191987**	10“	**A5E01191995**	
DN 300	**A5E01191980**	**A5E01191977**	**A5E01191988**	12“	**A5E01191996**	

Selection and Ordering data

MAG 3100 and MAG 3100 HT Grounding rings : Flat rings

1 pc. **Tantalum** grounding **flat ring** for all liners (PTFE max. 130 °C (266 °F))



DN	PN 16 Article No.	PN 40 Article No.	Size	ANSI Class 150 Article No.	Class 300 Article No.
DN 15		**A5E01192007**	½“	**A5E01192010**	
DN 25		**A5E01150883**	1“	**A5E01150030**	**A5E01150381**
DN 40		**A5E01192008**	1½“	**A5E01192011**	
DN 50		**A5E01150926**	2“	**A5E01151129**	**A5E01151199**
DN 65	**A5E01192005**	**A5E01192009**	2½“	**A5E01192012**	
DN 80	**A5E01152890**	**A5E01152890**	3“	**A5E01152916**	**A5E01153427**
DN 100	**A5E01158891**	**A5E01159076**	4“	**A5E01159156**	**A5E01159631**

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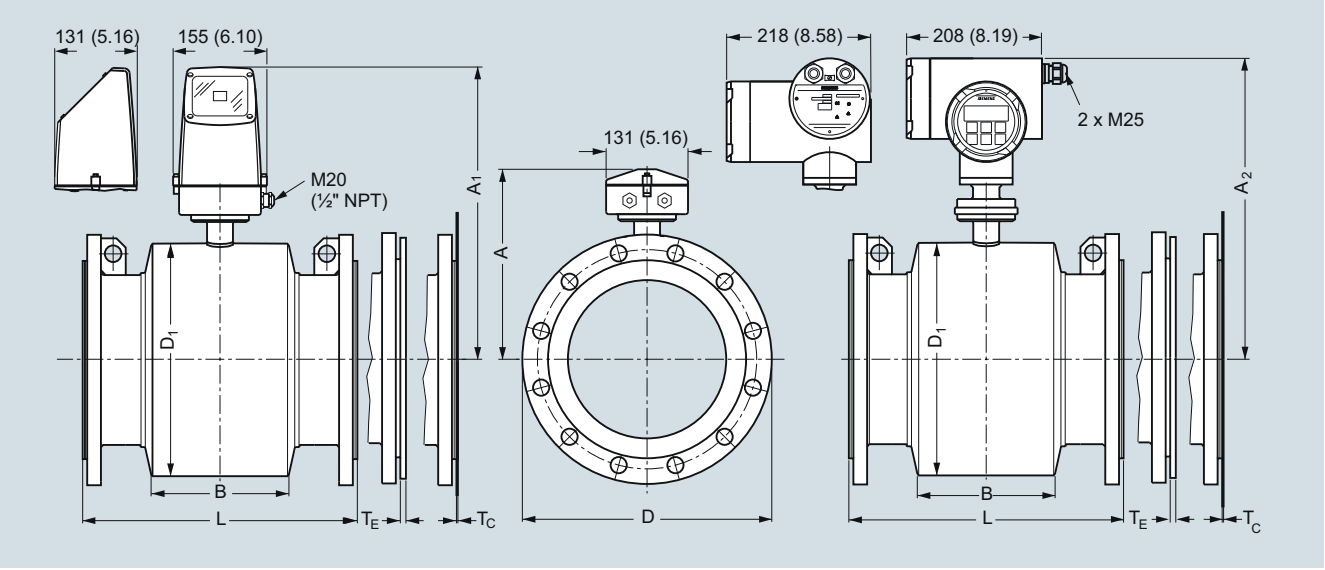
Dimensional drawings

MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter



Dimensions in mm (inch)

Metric

DN	A[1]	A_1	A_2	B	D_1	L[2] EN 1092-1-201						ANSI 16.5	
						PN 6, 10	PN 16/ PN 16 non-PED	PN 25	PN 40	PN 63	PN 100	Class 150	Class 300
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
15	187	341	338	59	104	-	-	-	200	-	-	200	200
25	187	341	338	59	104	-	-	-	200	-	260	200	200
40	197	351	348	82	124	-	-	-	200	-	280	200	200
50	205	359	356	72	139	-	-	-	200	276	300	200	200
65	212	366	363	72	154	200	200/-	-	200	320	350	200	272
80	222	376	373	72	174	200	200/-	-	272[3]	323	340	272[3]	272[3]
100	242	396	393	85	214	250	250/-	-	250	380	400	250	310
125	255	409	406	85	239	250	250/-	-	250	420	450	250	335
150	276	430	427	85	282	300	300/-	-	300	415	450	300	300
200	304	458	455	137	338	350	350/-	350	350	480	530	350	350
250	332	486	483	157	393	450	450/-	450	450	550	620	450	450
300	357	511	508	157	444	500	500/-	500	500	600	680	500	500
350	362	516	513	270	451	550	550/-	550	550	-	-	550	550
400	387	541	538	270	502	600	600/-	600	600	-	-	600	600
450	418	572	569	310	563	600	600/-	600	600	-	-	600	640
500	443	597	594	350	614	600	600/-	625	680	-	-	600	730
600	494	648	645	320	715	600	600/-	750	800	-	-	600	860
700	544	698	695	450	816	700	875/700	800	-	-	-	800	-
750	571	725	722	556	869	-	-/-	-	-	-	-	950	-
800	606	760	757	560	927	800	1000/800	900	-	-	-	900	-
900	653	807	804	630	1032	900	1125/900	1000	-	-	-	1100	-
1000	704	858	855	670	1136	1000	1250/1000	1100	-	-	-	1100	-
1050	704	858	855	670	1136	-	-/-	-	-	-	-	-	-
1100	755	904	901	770	1238	-	-/-	-	-	-	-	-	-
1200	810	964	961	792	1348	1200	1500/1200	1300	-	-	-	1400	-
1400	925	1079	1076	1000	1574	1400	-/1400	-	-	-	-	-	-
1500	972	1126	1123	1020	1672	1500	-/1500	-	-	-	-	-	-
1600	1025	1179	1176	1130	1774	1600	-/1600	-	-	-	-	-	-
1800	1123	1277	1274	1250	1974	1800	-/1800	-	-	-	-	-	-
2000	1223	1377	1374	1375	2174	2000	-/2000	-	-	-	-	-	-

1) 14.5 mm shorter with AISI terminal box (Ex and high temperature version)
2) When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
3) Not according to ISO 13359

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Flow sensor MAG 3100 and MAG 3100 HT

DN	L[1]				T_C[2]	T_E[2]	T_F[2]	T_T[2]	Wgt.[3]
	AS 2129 E AS 4087 PN 16, 21, 35	AWWA C-207 Class D	JIS K10	JIS K20					
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
15	200	-	200	200	-	6	2	1	4
25	200	-	200	200	1.2	6	2	1	5
40	200	-	200	240	1.2	6	2	1	8
50	200	-	200	240	1.2	6	2	1	9
65	200	-	200	272	1.2	6	2	1	11
80	200[4]	-	200[8]	272[8]	1.2	6	2	1	12
100	250	-	250	310	1.2	6	2	1	16
125	250	-	250	335	1.2	6	2	-	19
150	300	-	300	300	1.2	6	2	-	27
200	350	-	350	350	1.2	8	2	-	40
250	450	-	450	450	1.2	8	2	-	60
300	500	-	500	500	1.6	8	2	-	80
350	550	-	550	550	1.6	8	-	-	110
400	600	-	600	600	1.6	10	-	-	125
450	600	-	600	640	1.6	10	-	-	175
500	600[5]	-	600	680	1.6	10	-	-	200
600	600[6]	-	600	800	1.6	10	-	-	287
700	700[7]	700	-	-	2.0	-	-	-	330
750	750[7]	750	-	-	2.0	-	-	-	360
800	800[7]	800	-	-	2.0	-	-	-	450
900	900[7]	900	-	-	2.0	-	-	-	530
1000	1000[7]	1000	-	-	2.0	-	-	-	660
1050	-	1050	-	-	2.0	-	-	-	660
1100	-	1100	-	-	2.0	-	-	-	1140
1200	1200[7]	1200	-	-	2.0	-	-	-	1180
1400	-	1400	-	-	2.0	-	-	-	1600
1500	-	1500	-	-	3.0	-	-	-	2460
1600	-	1600	-	-	3.0	-	-	-	2525
1800	-	1800	-	-	3.0	-	-	-	2930
2000	-	2000	-	-	3.0	-	-	-	3665

1) When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
2) T_C = Type C grounding ring, T_E = Type E grounding ring (Included and factory mounted on high temperature 180 °C PTFE sensor), T_F = Flat type grounding rings
3) Weights are approx. (for PN 16) without transmitter
4) PN 35 DN 80 = 272 mm (not according to ISO 13359)
5) PN 35 DN 500 = 680 mm
6) PN 35 DN 600 = 750 mm
7) Not AS 4087 PN 21 or PN 35
8) Not according to ISO 13359

- not available

D = Outside diameter of flange, see flange tables

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MAG 3100 and MAG 3100 HT sensor with compact or remote transmitter

Imperial

Size	A[1]	A_1	A_2	B	D_1	L[2]								
						EN 1092-1-201						ANSI 16.5/ASME B16.47[3]		
						PN 6, 10	PN 16/ PN 16 non PED	PN 25	PN 40	PN 63	PN 100	Class 150	Class 300	Class 600
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]
½	7.36	13.31	13.25	2.32	4.09	-	-	-	7.87	-	-	7.87	7.87	-
1	7.36	13.31	13.25	2.32	4.09	-	-	-	7.87	-	10.24	7.87	7.87	11.02
1½	7.76	13.70	13.64	3.23	4.88	-	-	-	7.87	-	11.02	7.87	7.87	12.60
2	8.07	14.01	13.95	2.83	5.47	-	-	-	7.87	10.87	11.81	7.87	7.87	12.99
2½	8.35	14.29	14.23	2.83	6.06	7.87	7.87/-	-	7.87	12.60	13.78	7.87	10.71	on request
3	8.74	14.69	14.63	2.83	6.85	7.87	7.87/-	-	10.71[4]	12.72	13.39	10.71[4]	10.71[4]	13.78
4	9.53	15.47	15.41	3.35	8.43	9.84	9.84/-	-	9.84	14.96	-	9.84	12.20	18.11
5	10.04	15.98	15.92	3.35	9.41	9.84	9.84/-	-	9.84	16.54	-	9.84	13.10	18.90
6	10.87	16.81	16.75	5.39	11.10	11.81	11.81/-	-	11.81	16.34	-	11.81	11.81	19.68
8	11.97	17.91	17.85	5.39	13.31	13.78	13.78/-	13.78	13.78	18.90	-	13.78	13.78	23.62
10	13.07	19.02	18.96	6.18	15.47	17.72	17.72/-	17.72	17.72	-	-	17.72	17.72	23.62
12	14.05	20.00	19.94	6.18	17.48	19.69	19.69/-	19.69	19.69	-	-	19.69	19.69	27.56
14	14.25	20.20	20.14	10.63	17.76	21.65	21.65/-	21.65	21.65	-	-	21.65	21.65	-
16	15.24	21.18	21.12	10.63	19.76	23.62	23.62/-	23.62	23.62	-	-	23.62	23.62	-
18	16.45	22.40	22.34	12.20	22.16	23.62	23.62/-	23.62	23.62	-	-	23.62	23.62	-
20	17.44	23.39	23.33	13.78	24.17	23.62	23.62/-	24.61	26.77	-	-	23.62	28.70	-
24	19.45	25.39	25.33	12.59	28.15	23.62	23.62/-	29.53	31.50	-	-	23.62	33.80	-
28	21.42	27.36	27.30	17.72	32.13	27.56	34.45/27.56	31.50	-	-	-	31.50	-	-
30	22.48	28.43	28.37	21.89	34.21	-	-/-	-	-	-	-	37.41	-	-
32	23.86	29.80	29.74	22.05	36.50	31.50	39.37/31.50	35.44	-	-	-	35.44	-	-
36	25.71	31.65	31.59	24.80	40.63	35.43	44.29/35.43	39.38	-	-	-	43.32	-	-
40	27.72	33.85	33.79	26.38	44.72	39.37	49.21/39.37	43.32	-	-	-	43.32	-	-
42	27.72	33.85	33.79	26.38	44.72	-	-/-	-	-	-	-	-	-	-
44	29.72	35.67	35.61	30.31	48.74	-	-/-	-	-	-	-	-	-	-
48	31.89	37.83	37.77	31.18	53.07	47.24	59.06/47.24	51.19	-	-	-	55.12	-	-
54	36.42	42.36	42.30	39.37	61.97	55.12	-/55.12	-	-	-	-	-	-	-
60	38.27	44.21	44.15	40.15	65.83	59.06	59.06/59.06	-	-	-	-	-	-	-
66	40.35	46.30	46.24	44.49	69.84	62.99	-/62.99	-	-	-	-	-	-	-
72	44.21	50.16	50.10	49.21	77.72	70.87	-/70.87	-	-	-	-	-	-	-
78	48.15	54.09	54.03	54.13	85.59	78.74	-/78.74	-	-	-	-	-	-	-

1) 0.571 inch shorter with AISI terminal box (Ex and high temperature version)
2) When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
3) ANSI 16.5 for DN ≤ 24"; ASME B16.47 for DN ≥ 28"
4) Not according to ISO 13359

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Flow sensor MAG 3100 and MAG 3100 HT

Size	L[1]				T_C[2]	T_E[2]	T_F[2]	T_T[2]	Weight[3]
	AS 2129 E AS 4087 PN 16, 21, 35	AWWA C-207 Class D	JIS K10	JIS K20					
[in.]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
½	7.87	-	7.87	7.87	-	0.24	0.08	0.04	9
1	7.87	-	7.87	7.87	0.05	0.24	0.08	0.04	11
1½	7.87	-	7.87	9.44	0.05	0.24	0.08	0.04	17
2	7.87	-	7.87	9.44	0.05	0.24	0.08	0.04	20
2½	7.87	-	7.87	10.70	0.05	0.24	0.08	0.04	24
3	7.87[4]	-	7.87[8]	10.70[8]	0.05	0.24	0.08	0.04	26
4	9.84	-	9.84	12.20	0.05	0.24	0.08	0.04	35
5	9.84	-	9.84	13.18	0.05	0.24	0.08	-	42
6	11.81	-	11.81	11.81	0.05	0.24	0.08	-	60
8	13.78	-	13.77	13.77	0.05	0.31	0.08	-	88
10	17.72	-	17.71	17.71	0.05	0.31	0.08	-	132
12	19.69	-	19.68	19.68	0.06	0.31	0.08	-	176
14	21.65	-	21.65	21.65	0.06	0.31	-	-	242
16	23.62	-	23.62	23.62	0.06	0.39	-	-	275
18	23.62	-	23.62	25.19	0.06	0.39	-	-	385
20	23.62[5]	-	23.62	26.77	0.06	0.39	-	-	440
24	23.62[6]	-	23.62	31.49	0.06	0.39	-	-	633
28	27.56[7]	27.56	-	-	0.08	-	-	-	728
30	29.53[7]	29.52	-	-	0.08	-	-	-	794
32	31.50[7]	31.50	-	-	0.08	-	-	-	992
36	35.43[7]	35.43	-	-	0.08	-	-	-	1168
40	39.37[7]	39.37	-	-	0.08	-	-	-	1455
42	-	39.37	-	-	0.08	-	-	-	1455
44	-	43.31	-	-	0.08	-	-	-	2513
48	47.24[7]	47.24	-	-	0.08	-	-	-	2601
54	-	55.12	-	-	0.12	-	-	-	3528
60	-	59.06	-	-	0.12	-	-	-	5423
66	-	63.00	-	-	0.12	-	-	-	5566
72	-	70.87	-	-	0.12	-	-	-	6460
78	-	78.74	-	-	0.12	-	-	-	8080

1) When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
2) T_C = Type C grounding ring, T_E = Type E grounding ring (Included and factory mounted on high temperature 356 °F PTFE sensor), T_F = Flat type grounding rings
3) Weights are for ANSI 150 without transmitter
4) PN 35 DN 80 = 10.70 inch
5) PN 35 DN 500 = 26.77 inch
6) PN 35 DN 600 = 29.53 inch
7) Not AS 4087 PN 21 or PN 35
8) Not according to ISO 13359

- not available

D = Outside diameter of flange, see flange tables

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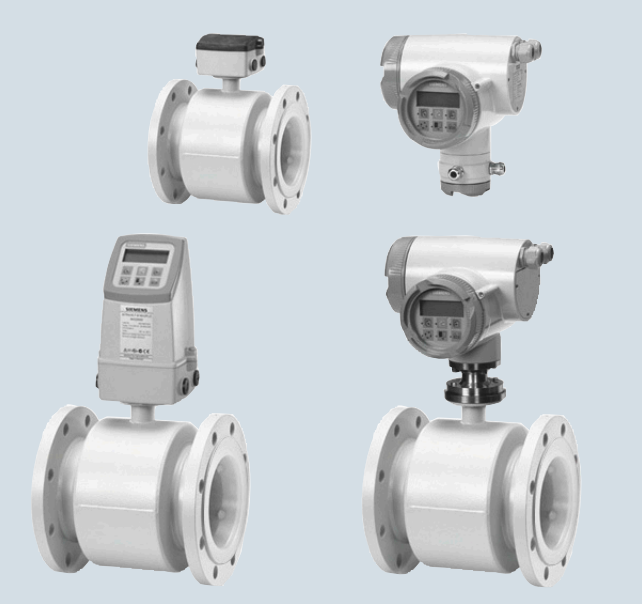
Overview



The SITRANS F M MAG 3100 P is designed to meet the most common specifications within chemical and process industries.

Benefits

- DN 15 to DN 300 (½" to 12")
- Included in Quick Ship Program (delivery time see PIA LCP)
- Most used flowmeter in the chemical and process industries with PTFE/PFA liner and Hastelloy electrodes
- Excellent chemical resistance
- Full scope of global approvals for hazardous areas:
  - ATEX, FM, CSA, IEcEx
  - 24 V and 115/230 V Ex compact and remote
  - intrinsically safe ia analog output
- Comprehensive self-diagnostic for error indication and error logging
- Fully welded construction provides a ruggedness that suits the toughest applications and environments
- Easy commissioning, the SENSORPROM unit automatically updates settings.
- MAG 6000 I full NAMUR compliance
  - compliant with NE 21, NE 32, NE 43, NE 53 and NE 70

Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Chemical industry
- Process industry
- Pulp and paper
- Industrial waste water

Design

- Compact or remote mounting possible
- Easy "plug & play" field changeability of transmitter
- High temperature sensor for applications with temperatures up to 150 °C (302 °F)
- Meets EEC directives: PED, 97/23/EC pressure directive for EN1092-1 flanges, and CRN
- Build-in length according to ISO 13359
- Onsite or factory upgrade to IP68/NEMA 6P of a standard sensor.

Mode of operation

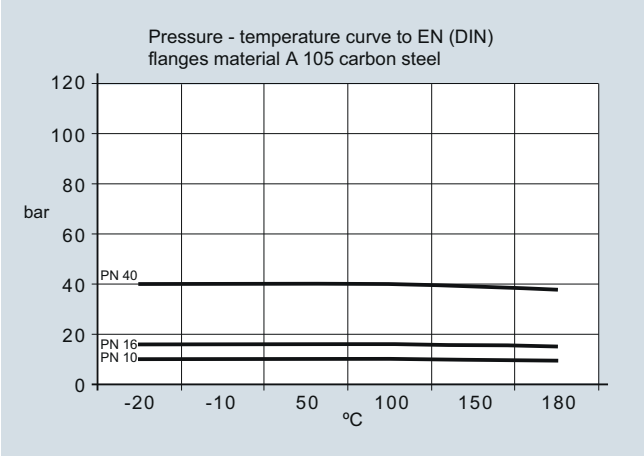
The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

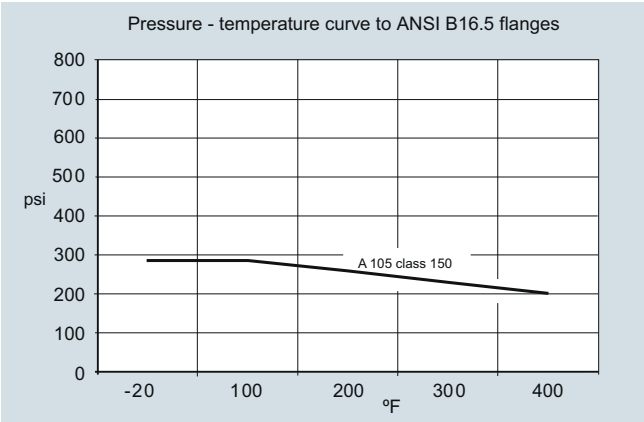
The complete flowmeter consists of a flow sensor and an associated transmitter MAG 5000, 6000 and 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems such as HART, FOUNDATION Fieldbus H1, DeviceNet, PROFIBUS DP and PA, Modbus RTU/RS 485.

Pressure/temperature curve to EN (DIN) flanges, material A 105 carbon steel



Pressure/temperature curve to ANSI B16.5 flanges



Note: The pressure-temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For further information on the PED standard and requirements, see page 9/6.

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Technical specifications

Product characteristic	Chemical and process industry-oriented (Included in Quick Ship Program (delivery time see PIA LCP))
Nominal size	• PTFE: DN 15 ... 300 (½“ … 12”) • PFA: DN 15 ... 150 (½“ … 6”)
Measuring principle	Electromagnetic induction
Excitation frequency (Mains supply: 50 Hz/60 Hz)	• DN 15 ... 65 (½“ … 2½”): 12.5 Hz/15 Hz • DN 80 ... 150 (3” ... 6”): 6.25 Hz/7.5 Hz • DN 200 ... 300 (8” ... 12”): 3.125 Hz/3.75 Hz
Process connection	
Flanges	EN 1092-1, raised face[1)] (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) • DN 15 ... 50 (½“ … 2”): PN 40 (580 psi) • DN 65 ... 300 (2½“ … 12”): PN 16 (232 psi) • DN 200 ... 300 (8“ … 12“): PN 10 (145 psi) ANSI B16.5 (~BS 1560), raised face • ½” ... 12”: Class 150 (20 bar (290 psi))
Rated operation conditions	
Ambient temperature (conditions also dependent on liner characteristiques)	
• Standard sensor	-40 … +100 °C (-40 … +212 °F)
• Ex sensor	-20 … +60 °C (-4 … +140 °F)
• With compact transmitter	
- MAG 5000/6000[2)]	-20 … +60 °C (-4 … +140 °F)
- MAG 6000 I	-20 … +60 °C (-4 … +140 °F)
- MAG 6000 I Ex	-20 … +60 °C (-4 … +140 °F)
Operating pressure [abs. bar] (maximum operating pressure decreases with increasing operating temperature and with stainless steel flanges)	• PTFE Teflon - DN 15 ... 300 (½“ … 12”) : 0.3 ... 40 bar (4 ... 580 psi) • PFA - DN 15 ... 150 (½“ … 6”): Vacuum 0.02 ... 50 bar (0.29 ... 725 psi)
Enclosure rating	IP67 to EN 60529/NEMA 4X/6, 1 mH_2O for 30 min Option: IP68 to EN 60529/NEMA 6P, 10 mH_2O cont. (not for Ex)
Pressure drop at 3 m/s	As straigth pipe
Test pressure	1.5 x PN (where applicable)
Mechanical load (vibration)	• 18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 • Sensor: 3.17 g RMS • Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS • Sensor with compact MAG 6000 I/6000 I Ex mounted transmitter: 1.14 g RMS
Temperature of medium	• PTFE -20 … +130 °C (-4 … +266 °F) • PFA -20 … +150 °C (-4 … +302 °F)
EMC	2004/108/EC

Design	
Weight	See dimensional drawings
Flange and housing material	Carbon steel ASTM A 105, with corrosion resistant two component epoxy coating (min. 150 µm)
Measuring pipe material	AISI 304/1.4301
Electrode material	PTFE: Hastelloy C276/2.4819 PFA: Hastelloy C22/2.4602
Grounding electrode material	PTFE: No grounding electrodes PFA: Hastelloy
Terminal box (remote version only)	• Standard fibre glass reinforced polyamide • Option Stainless steel AISI 316/1.4436 • Ex sensor: Stainless steel AISI 316/1.4436
Cable entries	• Remote installation 2 x M20 or 2 x ½" NPT • Compact installation - MAG 5000/MAG 6000: 4 x M20 or 4 x ½” NPT - MAG 6000 I: 2 x M25 or 2 x ½" NPT (for supply/output) - MAG 6000 I Ex: 2 x M25 or 2 x ½" NPT (for supply/output)
Certificates and approvals	
Calibration	
Standard production calibration, calibration report shipped with sensor	Zero-point, 2 x 25 % and 2 x 90 %
Conforms to	PED (All EN1092-1 flanges conforms to PED) – 97/23/EC[3)] CRN
Material certificate EN 10204 3.1	Available when ordering together with meter[4)]
Ex approvals	Ex sensor • ATEX 2G D: DN 15 ... 300: EEx de ia IIC T3 - T6 • IEC Ex de ia IIC T3-T6 • FM Class I/II/III, Div 1 (compact only) • FM Class I, Zone 1/21 • CSA Class I, Zone 1/21 Standard sensor • FM Class I, Div 2 • CSA Class I, Div 2
Custody transfer (CT) (only together with MAG 5000/6000 CT), order as special	Hot water pattern approval - PTB (Germany) Other media than water - OIML R 117 (Denmark)

1) DN ≤ 600 type 01 (SORF); DN > 600 type 11 (WNRF)
2) With compact transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... +122 °F)
3) For further information on the PED standard and requirements, see page 9/6.
4) Has to be ordered with the meter. It is not possible to order the certificate afterwards.

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Selection and Ordering data		Article No.
Sensor SITRANS F M MAG 3100 P (Short delivery time)	↗	**7ME6340-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		■■■■■-■■■■
Diameter		
DN 15 (½“)	⬟	**1V**
DN 25 (1“)	⬟	**2D**
DN 40 (1½“)	⬟	**2R**
DN 50 (2“)	⬟	**2Y**
DN 65 (2½“)	⬟ 1)	**3F**
DN 80 (3“)	⬟	**3M**
DN 100 (4“)	⬟	**3T**
DN 125 (5“)	⬟	**4B**
DN 150 (6“)	⬟	**4H**
DN 200 (8“)		**4P**
DN 250 (10“)		**4V**
DN 300 (12“)		**5D**
Flange norm and pressure rating		
EN 1092-1		
PN 10 (DN 200 ... 300 (8“ … 12“))		**B**
PN 16 (DN 65 ... 300 (2½“ … 12“))	⬟	**C**
PN 40 (DN 15 ... 50 (½“ … 2“)	⬟	**F**
ANSI B16.5		
Class 150 (½“ ... 12“)	⬟	**J**
Flange material		
Carbon steel flanges ASTM A 105	⬟	**1**
Liner material		
PTFE (130 °C (266 °F))	⬟	**3**
PFA (150 °C (302 °F)) (DN 15 ... 150 (½" ... 6"))	⬟	**7**
Electrode material		
Hastelloy C	⬟	**2**
Hastelloy C incl. grounding electrode, (only PFA)	⬟	**6**
Transmitter		
Standard sensor for remote transmitter (Order transmitter separately)	⬟	**A**
Ex sensor for remote transmitter (Order transmitter separately)	⬟	**B**
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC	⬟	**C**
MAG 6000 I, Aluminum, 18 ... 30 V DC, Ex	⬟	**D**
MAG 6000 I, Aluminum, 115 ... 230 V AC, Ex	⬟	**E**
MAG 6000 I (NAMUR), Aluminum, 18 ... 30 V DC, 115 ... 230 V AC		**F**
MAG 6000 I (NAMUR), Aluminum, 18 ... 30 V DC, 115 ... 230 V AC, Ex		**G**
MAG 6000, Polyamide, 11 … 30 V DC/11 ... 24 V AC	⬟	**H**
MAG 6000, Polyamide, 115 ... 230 V AC	⬟	**J**
MAG 5000, Polyamide, 11 ... 30 V DC/11 ... 24 V AC	⬟	**K**
MAG 5000, Polyamide, 115 ... 230 V AC	⬟	**L**
Communication		
No communication, add-on possible	⬟	**A**
HART	⬟	**B**
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	⬟	**F**
PROFIBUS DP Profile 3 (not for Ex) (only MAG 6000/MAG 6000 I)	⬟	**G**
Modbus RTU/RS 485 (not for Ex) (only MAG 6000/MAG 6000 I)	⬟	**E**
FOUNDATION Fieldbus H1 (only MAG 6000/MAG 6000 I)	⬟	**J**
Cable glands/terminal box		
Metric: Polyamide terminal box or 6000 I compact	⬟	**1**
½" NPT: Polyamide terminal box or 6000 I compact	⬟	**2**
Metric SS terminal box (mandatory for stainless steel MAG 6000 transmitter)		**3**
½" NPT SS terminal box (mandatory for stainless steel MAG 6000 transmitter)		**4**

1) Only for ANSI flanges

Selection and Ordering data	Order code
Additional information	
Please add **“-Z“** to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	**C12**[1)]
Factory certificate according to EN 10204-2.1	**C15**
Factory certificate according to EN 10204-2.2	**C14**
Tag name plate, stainless steel fixed with SS wire (add plain text)	**Y17**
Tag name plate, plastic (self adhesive)	**Y18**
Customer-specific converter setup	**Y20**
Power cable wired (specify cable Article No.)	**Y40**
Sensor for remote transmitter's junction box IP68 with wired cable (specify cable Article No.) (not for ATEX)	**Y41**
Other postproduction requirements (add desired text)	**Y99**
Additional calibrations	
• Matched pair - (Standard production calibration where sensor and transmitter is calibrated together)	**On request**[2)]
• Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025: 2005	**On request**[2)]
• Customer-specified calibration up to 10 points	**On request**[2)]
• CT verification and authority seal according to: PTB (Denmark and Germany)	**On request**[2)]
• Customer-witnessed calibration Any of above calibration	**On request**[2)]

1) Under preparation.

2) Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)

Operating instructions for SITRANS F M MAG 3100 P

Description	Article No.
• English	**A5E03005599**
• German	**A5E03086288**
• Spanish	**A5E03086291**
• French	**A5E03086290**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I/MAG 6000 I ATEX 2G D transmitters and sensors are delivered compact mounted from factory.
Communication module will be pre-mounted in the transmitter.

Accessories

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	⬟ **FDK:085U0220**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Please use online Product selector to get latest updates.

Product selector link:
www.pia-selector.automation.siemens.com

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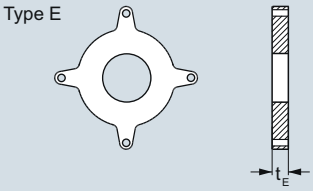
Selection and Ordering data

MAG 3100 P Type E grounding and protection ring

1 pc. **AISI 316** grounding and protection rings **type E** for PTFE liners incl. straps and screws



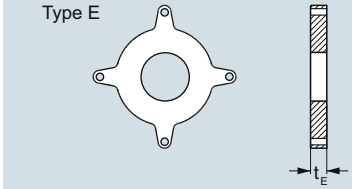
DN	PN 10 Article No.	PN 16 Article No.	PN 40 Article No.	ANSI[1)]	Class 150 Article No.
DN 15			**FDK:083N8365**	½“	**FDK:083N8365**
DN 25			**FDK:083N8271**	1“	**FDK:083N8272**
DN 40			**FDK:083N8278**	1½“	**FDK:083N8279**
DN 50			**FDK:083N8282**	2“	**FDK:083N8283**
DN 65		**FDK:083N8285**		2½“	**FDK:083N8287**
DN 80		**FDK:083N8289**		3“	**FDK:083N8291**
DN 100		**FDK:083N8117**		4“	**FDK:083N8118**
DN 125		**FDK:083N8121**		5“	**FDK:083N8122**
DN 150		**FDK:083N8125**		6“	**FDK:083N8126**
DN 200	**FDK:083N8130**	**FDK:083N8130**		8“	**FDK:083N8370**
DN 250	**FDK:083N8136**	**FDK:083N8137**		10“	**FDK:083N8140**
DN 300	**FDK:083N8144**	**FDK:083N8145**		12“	**FDK:083N8148**

Protection of PTFE liner use 2 pcs.
Earthing of PTFE lined flowmeter use 1 pc.

Selection and Ordering data

MAG 3100 P type E grounding and protecting ring

1 pc. **Hastelloy C276** grounding and protection ring **type E** for PTFE liners incl. straps and screws



DN	PN 16 Article No.	PN 40 Article No.	Size	ANSI[1)] Class 150 Article No.
DN 15		**FDK:083N8487**	½“	**FDK:083N8487**
DN 25		**FDK:083N8488**	1“	**FDK:083N8489**
DN 40		**FDK:083N8490**	1½“	**FDK:083N8491**
DN 50		**FDK:083N8492**	2“	**FDK:083N8493**
DN 65	**FDK:083N8495**		2½“	**FDK:083N8497**
DN 80	**FDK:083N8499**		3“	**FDK:083N8501**
DN 100	**FDK:083N8504**		4“	**FDK:083N8506**

[1)] For dimensions of MAG 3100 P see table on page 3/90

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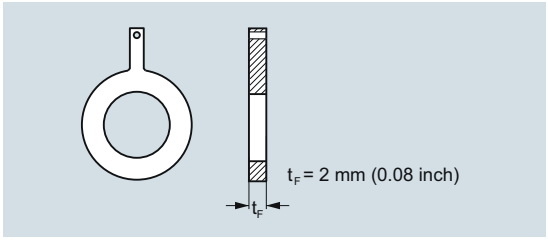
Selection and Ordering data

MAG 3100 P Grounding rings: Flat rings

1 pc. **AISI 316** grounding **flat ring** for all liners

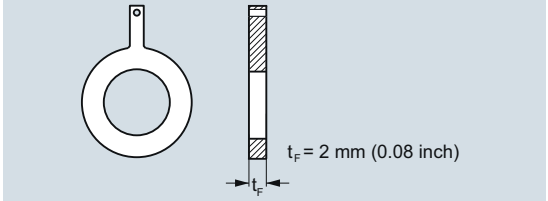


DN	PN 10 Article No.	PN 16 Article No.	PN 40 Article No.	Size	ANSI[1] Class 150 Article No.
DN 15			**A5E01191968**	½“	**A5E01191969**
DN 25			**A5E01150880**	1“	**A5E01150022**
DN 40			**A5E01191952**	1½“	**A5E01191961**
DN 50			**A5E01150918**	2“	**A5E01151121**
DN 65		**A5E01191940**		2½“	**A5E01191962**
DN 80		**A5E01152876**		3“	**A5E01152910**
DN 100		**A5E01158875**		4“	**A5E01159146**
DN 125		**A5E01191941**		5“	**A5E01191963**
DN 150		**A5E01191943**		6“	**A5E01191964**
DN 200	**A5E01191951**	**A5E01191944**		8“	**A5E01191965**
DN 250	**A5E01191950**	**A5E01191946**		10“	**A5E01191966**
DN 300	**A5E01191949**	**A5E01191947**		12“	**A5E01191967**

Selection and Ordering data

MAG 3100 P Grounding rings : Flat rings

1 pc. **Hastelloy** C276 grounding **flat ring**



DN	PN 10 Article No.	PN 16 Article No.	PN 40 Article No.	Size	ANSI[1] Class 150 Article No.
DN 15			**A5E01191981**	½“	**A5E01191989**
DN 25			**A5E01150882**	1“	**A5E01150028**
DN 40			**A5E01191982**	1½“	**A5E01191990**
DN 50			**A5E01150922**	2“	**A5E01151124**
DN 65		**A5E01191971**		2½“	**A5E01191991**
DN 80		**A5E01152889**		3“	**A5E01152913**
DN 100		**A5E01158886**		4“	**A5E01159150**
DN 125		**A5E01191973**		5“	**A5E01191992**
DN 150		**A5E01191974**		6“	**A5E01191993**
DN 200	**A5E01191978**	**A5E01191975**		8“	**A5E01191994**
DN 250	**A5E01191979**	**A5E01191976**		10“	**A5E01191995**
DN 300	**A5E01191980**	**A5E01191977**		12“	**A5E01191996**

[1] For dimensions of MAG 3100 P see table on page 3/90

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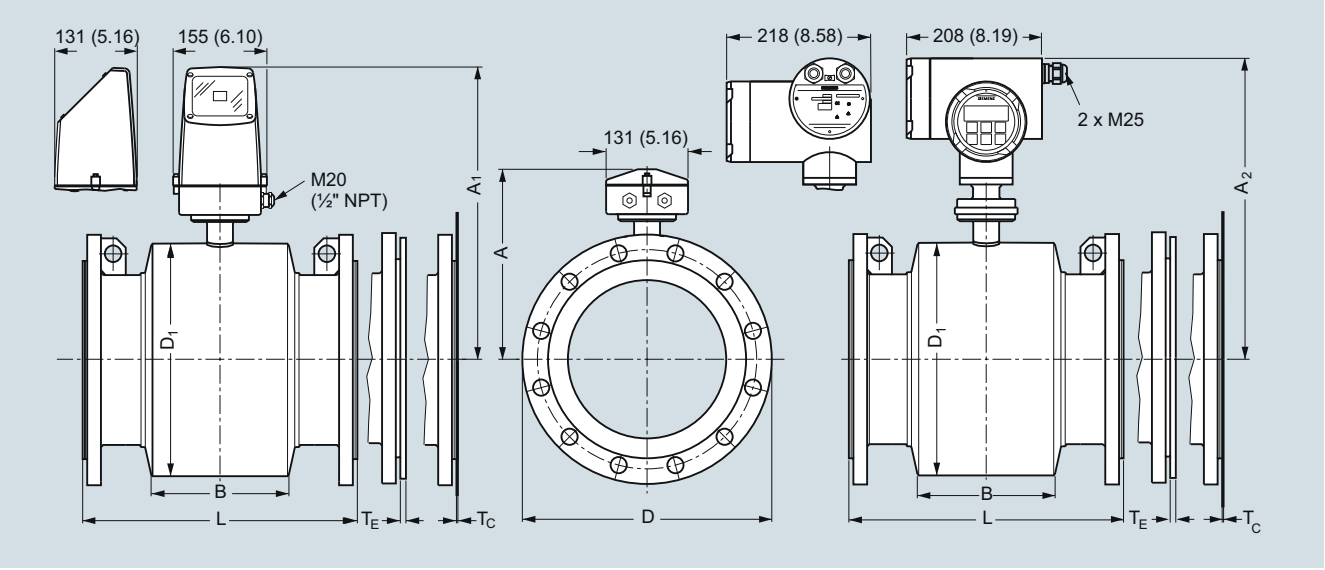
Dimensional drawings

MAG 3100 P sensor with compact or remote transmitter



Dimensions in mm (inch)

Metric

DN	A[1]	A_1	A_2	B	D_1	L[2] EN 1092-1-201 PN 10	L[2] EN 1092-1-201 PN 16	L[2] EN 1092-1-201 PN 40	L[2] ANSI 16.5 Class 150	T_E[3]	T_F[3]	Wgt.[4]
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
15	187	341	338	59	104	-	-	200	200	6	2	4
25	187	341	338	59	104	-	-	200	200	6	2	5
40	197	351	348	82	124	-	-	200	200	6	2	8
50	205	359	356	72	139	-	-	200	200	6	2	9
65	212	369	366	72	154	-	200/-	-	200	6	2	11
80	222	376	373	72	174	-	200/-	-	272[5]	6	2	12
100	242	396	393	85	214	-	250/-	-	250	6	2	16
125	255	409	406	85	239	-	250/-	-	250	6	2	19
150	276	430	427	85	282	-	300/-	-	300	6	2	27
200	304	458	455	137	338	350	350/-	-	350	8	2	40
250	332	486	483	157	393	450	450/-	-	450	8	2	60
300	357	511	508	157	444	500	500/-	-	500	8	2	80

1) 14.5 mm shorter with AISI terminal box (Ex and high temperature version)
2) When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
3) T_E = Type E grounding ring, T_F = Flat type grounding rings
4) Weights are approx. (for PN 16) without transmitter
5) Not according to ISO 13359

- not available

D = Outside diameter of flange, see flange tables

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MAG 3100 P sensor with compact or remote transmitter

Imperial

Size	A[1]	A_1	A_2	B	D_1	L[2]				T_C[3]	T_E[3]	T_F[3]	Wgt.[4]
						EN 1092-1-201			ANSI 16.5				
						PN 10	PN 16	PN 40	Class 150				
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[lb]
½	7.36	13.4	13.34	2.32	4.09	-	-	7.87	7.87	-	0.24	0.08	9
1	7.36	13.4	13.34	2.32	4.09	-	-	7.87	7.87	0.05	0.24	0.08	11
1½	7.76	13.8	13.74	3.23	4.88	-	-	7.87	7.87	0.05	0.24	0.08	17
2	8.07	14.1	14.04	2.83	5.47	-	-	7.87	7.87	0.05	0.24	0.08	20
2½	8.35	14.4	14.34	2.83	6.06	-	7.87/-	-	7.87	0.05	0.24	0.08	24
3	8.74	14.8	14.74	2.83	6.85	-	7.87/-	-	10.71[5]	0.05	0.24	0.08	26
4	9.53	15.6	15.54	3.35	8.43	-	9.84/-	-	9.84	0.05	0.24	0.08	35
5	10.04	16.1	16.04	3.35	9.41	-	9.84/-	-	9.84	0.05	0.24	0.08	42
6	10.87	16.9	16.84	3.35	11.10	-	11.81/-	-	11.81	0.05	0.24	0.08	60
8	11.97	18.0	17.94	5.39	13.31	13.78	13.78/-	-	13.78	0.05	0.31	0.08	88
10	13.07	19.1	19.04	6.18	15.47	17.72	17.72/-	-	17.72	0.05	0.31	0.08	132
12	14.05	20.1	20.04	6.18	17.48	19.69	19.69/-	-	19.69	0.06	0.31	0.08	176

1) 0.571 inch shorter with AISI terminal box (Ex and high temperature version)
2) When earthing flanges are used, the thickness of the earthing flange must be added to the built-in length
3) T_C = Type C grounding ring, T_E = Type E grounding ring, T_F = Flat type grounding rings
4) Weights are for ANSI 150 without transmitter
5) Not according to ISO 13359

- not available

D = Outside diameter of flange, see flange tables

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Flow sensor MAG 5100 W

Overview

The SITRANS F M MAG 5100 W is an electromagnetic flow sensor designed to meet ground water, drinking water, waste water, sewage or sludge applications.

Benefits

- DN 15 to DN 1200 / 2000 (½" to 48"/78")
- Stock program of MAG 5100 W secures short delivery time
- Connection flanges EN 1092-1 (DIN 2501), ANSI, AWWA, AS and JIS.
- NBR Hard Rubber and Ebonite Hard Rubber liner for all water applications
- EPDM liner with drinking water approvals
- Hastelloy integrated grounding and measuring electrodes
- Increased low flow accuracy for water leak detection, due to coned liner design (Article No. 7ME6520, DN 15 to 300 mm (½" to 12")).
- Drinking water approvals
- Suitable for direct burial and constant flooding
- Custody transfer approvals
- Build-in length according to ISO 13359; the standard includes sizes up to DN 400.
- Easy commissioning, SENSORPROM unit automatically uploads calibration values and settings.
- Designed so patented in-situ verification can be conducted. Using SENSORPROM fingerprint.
- Custody Transfer option for water billing, with type approval after OIML R 49 and verified according to MI-001 - 0D inlet/ 0D outlet installation
  - pattern approval OIML R 49 (Denmark, Germany)
  - conforms to ISO 4064 and EN 14154 for mechanical flowmeters
  - PTB K7.2
- FM Fire Service Meter (Class Number 1044) for automatic fire protection systems
- Meets EEC directives: PED, 97/23/EC pressure directive for EN1092-1 flanges
- Simple onsite or factory upgrade to IP68/NEMA 6P of a standard sensor
- MCERTS approval for UK environmental market

Application

The main applications of the SITRANS F M electromagnetic flow sensors can be found in the following fields:

- Water abstraction
- Water treatment
- Water distribution network (leak detection management)
- Custody transfer water meters
- Irrigation
- Waste water treatment
- Filtration plant (e.g. reverse osmosis and ultra filtration)
- Industrial water applications

Mode of operation

The flow measuring principle is based on Faradays law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Integration

The complete flowmeter consists of a flow sensor and an associated transmitter SITRANS F M MAG 5000, MAG 6000 or MAG 6000 I.

The flexible communication concept USM II simplifies integration and update to a variety of fieldbus systems, e.g. HART, DeviceNet, PROFIBUS DP and PA, FOUNDATION Fieldbus H1 or Modbus RTU/RS 485.

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Technical specifications

Product characteristic	MAG 5100 W (7ME6520) Mainly for the European market EPDM or NBR lining	MAG 5100 W (7ME6580) Mainly for the non-European market Ebonite lining
Design and nominal size	Coned sensor (octagon liner): DN 15 ... 40 (½" ... 1½") Coned sensor: DN 50 ... 300 (2" ... 12") Full bore sensor: DN 350 ... 1200 (14" ... 48")	Full bore sensor: DN 25 ... 2000 (1" ... 78")
Measuring principle	Electromagnetic induction	Electromagnetic induction
Excitation frequency (Mains supply: 50/60 Hz)	DN 15 ... 65 (½" ... 2½"): 12.5 Hz/15 Hz DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz DN 200 ... 300 (8" ... 12"): 3.125 Hz/3.75 Hz DN 350 ... 1200 (14" ... 48"): 1.5625 Hz/1.875 Hz	DN 25 ... 65 (1" ... 2½"): 12.5 Hz/15 Hz DN 80 ... 150 (3" ... 6"): 6.25 Hz/7.5 Hz DN 200 ... 1200 (8" ... 48"): 3.125 Hz/3.75 Hz DN 1400 ... 2000 (54" ... 78"): 1.5625 Hz/1.875 Hz
Process connection		
Flanges[1]		
• EN 1092-1	PN 10 (145 psi) : DN 200 ... 300 (8" ... 12") Flat face PN 10 (145 psi): DN 350 ... 1200 (14" ... 48") Raised face[2] PN 16 (232 psi): DN 50 ... 300 (2" ... 12") Flat face[3] PN 16 (232 psi): DN 350 ... 1200 (14" ... 48") Raised face PN 40 (580 psi): DN 15 ... 40 (½" ... 1½") Flat face	Raised face[3] (EN 1092-1, DIN 2501 and BS 4504 have the same mating dimensions) PN 6 (87 psi): DN 1400 ... 2000 (54" ... 78") PN 10 (145 psi): DN 200 ... 2000 (8" ... 78") PN 16 (232 psi): DN 65 ... 600 (2½" ... 24") PN 40 (580 psi): DN 25 ... 50 (1" ... 2")
• ANSI B16.5	Class 150: ½" ... 12" flat face; 14" ... 24" raised face	Class 150: 1" ... 24"; raised face
• AWWA C-207	Class D: 28" ... 48", flat face	Class D: 28" ... 78", flat face
• AS4087	PN 16 (DN 50 ... 1200), (2" ... 48") 16 bar (232 psi)	PN 16 (DN 50 ... 1200), (2" ... 48") 16 bar (232 psi)
• JIS B 2220:2004	-	K10 (1" ... 24")
Rated Operation conditions		
Ambient temperature		
• Sensor	-40 ... +70 °C (-40 ... +158 °F)	-20 ... +70 °C (-4 ... +158 °F)
• With compact transmitter MAG 5000/6000[4]	-20 ... +60 °C (-4 ... +140 °F)	-20 ... +60 °C (-4 ... +140 °F)
Operating pressure (Abs) [abs. bar] (Maximum operating pressure depending on flange standard, decreases with increasing operating temperature)	DN 15 ... 40 (½" ... 1½"): 0.01 ... 40 bar (0.15 ... 580 psi) DN 50 ... 300 (2" ... 12"): 0.03 ... 20 bar (0.44 ... 290 psi) DN 350 ... 1200 (14" ... 48"): 0.01 ... 16 bar (0.15 ... 232 psi)	DN 25 ... 50 (1" ... 2"): 0.01 ... 40 bar (0.15 ... 580 psi) DN 65 ... 1200 (2½" ... 48"): 0.01 ... 16 bar (0.15 ... 232 psi) DN 1400 ... 2000 (54" ... 78"): 0.01 ... 10 bar (0.15 ... 145 psi)
Enclosure rating		
• Standard	IP67 to EN 60529/NEMA 4X/6 (1 mH_2O for 30 min)	IP67 to EN 60529/NEMA 4X/6 (1 mH_2O for 30 min)
• Option	IP68 to EN 60529/NEMA 6P (10 mH_2O continuously)	IP68 to EN 60529/NEMA 6P (10 mH_2O continuously)
Pressure drop	DN 15 and 25 (½" and 1"): Max. 20 mbar (0.29 psi) at 1 m/s (3 ft/s). DN 40 ... 300 (1½" ... 12"): Max 25 mbar (0.36 psi) at 3 m/s (10 ft/s) DN 350 ... 1200 (14" ... 48"): Insignificant	Insignificant
Test pressure	1.5 x PN (where applicable) FM Fire Service: 2 x PN	1.5 x PN (where applicable)
Mechanical load (vibration)	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I mounted transmitter: 1.14 g RMS	18 ... 1000 Hz random in x, y, z, directions for 2 hours according to EN 60068-2-36 Sensor: 3.17 g RMS Sensor with compact MAG 5000/6000 mounted transmitter: 3.17 g RMS Sensor with compact MAG 6000 I mounted transmitter: 1.14 g RMS

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Flow sensor MAG 5100 W

Product characteristic	Mainly for the European market (7ME6520)	Mainly for the non-European market (7ME6580)
	EPDM or NBR lining	**Ebonite lining**
Medium conditions		
Temperature of medium		
• NBR	-10 ... +70 °C (14 ... 158 °F)	-
• EPDM	-10 ... +70 °C (14 ... 158 °F)	-
• EPDM/NBR (MI-001)	0.1 ... 30 °C (32 ... 76 °F)	-
• Ebonite	-	-10 ... +70 °C (14 ... 158 °F)
EMC	2004/108/EC	2004/108/EC
Design		
Material		
• Housing and flanges	Carbon steel ASTM A 105, with corrosion-resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4, according to ISO 12944-2	Carbon steel ASTM A 105, with corrosion-resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4, according to ISO 12944-2
• Measuring pipe	Stainless steel AISI 304/1.4301	Stainless steel AISI 304/1.4301
• Electrode	Hastelloy C	Hastelloy C
• Grounding electrode	Hastelloy C	Hastelloy C
• Terminal box	Fibre glass reinforced polyamide	Fibre glass reinforced polyamide
Certificates and approvals		
Calibration		
• Standard production calibration (default), calibration report shipped with sensor	Zero-point, 2 x 25 % and 2 x 90 %	Zero-point, 2 x 25 % and 2 x 90 %
• Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}
	10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}	10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}
	Matched-pair calibration: default, 5-point or 10-point	Matched-pair calibration: default, 5-point or 10-point
Material certificate EN 10204 3.1	Available when ordering together with meter[5)]	Available when ordering together with meter[5)]
Custody Transfer (only together with MAG 6000 CT)	OIML R 49 pattern approval cold water (Denmark and Germany): DN 50 ... 300 (2“ ... 12")	
	MI-001 cold water (EU): DN 50 ... 300 (2“ ... 12")	
	PTB K7.2: Chilled water energy metering DN 50-300 (order as special) Certificate number: 22 76.10 02	
Drinking water approvals	EPDM liner: NSF/ANSI Standard 61[6)] (Cold water, US) WRAS (WRc, BS6920 cold water, GB) ACS (F), DVGW W270 (D) Belgaqua (B)	NSF/ANSI Standard 61[6)] (Cold water, US) WRAS (WRc, BS6920 cold water, GB)
Other approvals	MCERTS	
	PED conforming: All EN1092-1 flanges and ANSI Class 150 (< DN 300 (<12")) – 97/23/EC[7)]	PED conforming: All EN1092-1 flanges (≤ DN 600 (≤ 24") – 97/23/EC[7)]
	CRN (DN 50 - DN 1200 (2" ... 48"))	CRN
	CSA Class I, Div 2[8)]	CSA Class I, Div 2[8)]
	FM Class I, Div 2[8)]	FM Class I, Div 2[8)]
	FM Fire Service Approval according to class 1044[8)9)]	
	VdS: Extinguishing systems DN 50 ... 300	

1) DN 750, DN 1050 and DN 1100 (30", 42" and 44") not available with EN 1092-1 (PN 10 and PN 16) and AS4087 flanges
2) Type 01 (SORF)
3) DN ≤ 600 type 01 (SORF); DN > 600 type 11
4) With compact transmitter MAG 5000 CT/6000 CT -20 ... +50 °C (-4 ... +122 °F); with compact MI-001 approved transmitter -25 ... +55 °C (-13 ... +131 °F)
5) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
6) Including Annex G
7) For sizes larger than 600 mm (24”) in PN 16 PED conformity is available as a cost-added option. The basic unit will carry the LVD (Low Voltage Directive) and EMC approval. All products sold outside of EU and EFTA are excluded from the directive, also products sold into certain market sectors are excluded. These include:
a) Meters used in networks for the supply, distribution and discharge of water.
b) Meters used in pipelines for the conveyance of any fluid from offshore to onshore.
c) Meters used in the extraction of petroleum or gas, including Christmas tree and manifold equipment.
d) Any meter mounted on a ship or mobile offshore platform. For further information on the PED standard and requirements see page 9/6.
8) Not for sensors with 300 µm coating.
9) DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges

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MAG 5100 W (7ME6520) with MAG 6000 CT (Revenue program) MI-001

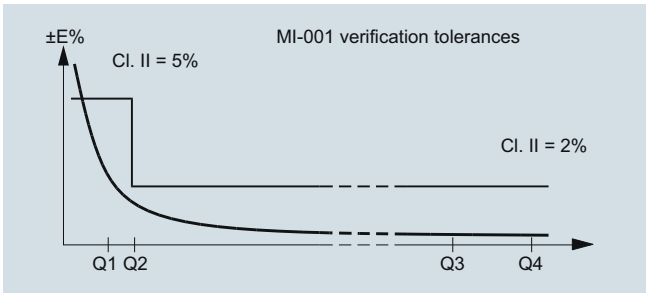
MAG 5100 W CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 5100 W MI-001 verified and labeled products are a Class II approval according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-001 in the sizes from DN 50 to DN 300 (Article No. 7ME6520).

The MID certification is obtained as a modul B + D module approval according to the above mentioned directive.

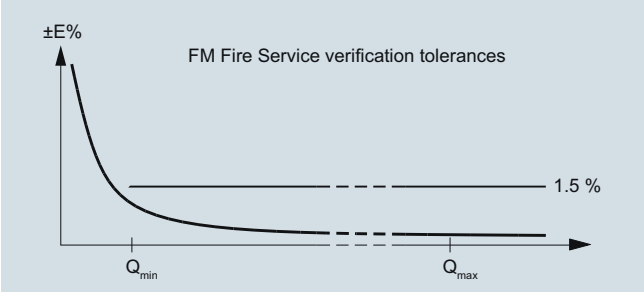
Module B : Type approval according to OIML R 49

Module D : Quality insurance approval of production



MAG 5100 W (7ME6520) with MAG 5000/MAG 6000 or MAG 6000 CT for Fire Service applications

MAG 5100 W (7ME6520) is FM Fire Service approved for automatic fire protection systems. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250 and DN 300 (2", 3", 4", 6", 8", 10" and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



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Flow sensor MAG 5100 W

MAG 5100 W (7ME6520) MI-001 verified and labeled products at a given Q3 and Q3/Q4 = 1.25 and Q2/Q1 = 1.6 measuring ranges see table below:

Order code: P11	**DN 50 (2“)**	**DN 65 (2½“)**	**DN 80 (3“)**	**DN 100 (4“)**	**DN 125 (5“)**	**DN 150 (6“)**	**DN 200 (8“)**	**DN 250 (10“)**	**DN 300 (12“)**
„R“ Q3/Q1	25	25	25	25	25	25	25	25	25
Q4 [m^3/h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m^3/h]	**16**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**630**
Q2 [m^3/h]	1.02	1.6	2.6	4.03	6.4	10.24	16	25.6	40.32
Q1 [m^3/h]	0.64	1.00	1.60	2.52	4.0	6.4	10.0	16.0	25.2

Order code: P12	**DN 50 (2“)**	**DN 65 (2½“)**	**DN 80 (3“)**	**DN 100 (4“)**	**DN 125 (5“)**	**DN 150 (6“)**	**DN 200 (8“)**	**DN 250 (10“)**	**DN 300 (12“)**
„R“ Q3/Q1	63	63	63	63	63	63	63	63	63
Q4 [m^3/h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m^3/h]	**16**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**630**
Q2 [m^3/h]	0.41	0.63	1.02	1.6	2.54	4.06	6.35	10.2	16.0
Q1 [m^3/h]	0.25	0.40	0.63	1.00	1.59	2.54	3.97	6.35	10.0

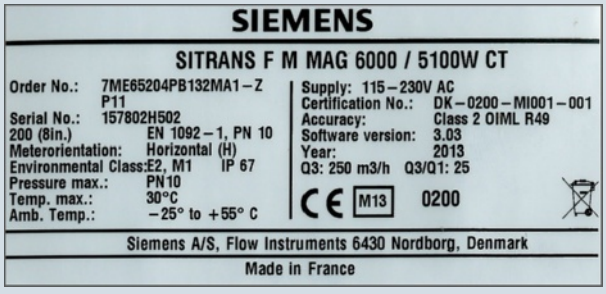
Order code: P13	**DN 50 (2“)**	**DN 65 (2½“)**	**DN 80 (3“)**	**DN 100 (4“)**	**DN 125 (5“)**	**DN 150 (6“)**	**DN 200 (8“)**	**DN 250 (10“)**	**DN 300 (12“)**
„R“ Q3/Q1	80	80	80	80	80	80	80	80	80
Q4 [m^3/h]	20	31.25	50	78.75	125	200	312.5	500	787.5
Q3 [m^3/h]	**16**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**630**
Q2 [m^3/h]	0.32	0.50	0.80	1.20	2.00	3.20	5.0	8.0	12.6
Q1 [m^3/h]	0.20	0.31	0.50	0.75	1.25	2.00	3.13	5.0	7.90

Order code: P16	**DN 50 (2“)**	**DN 65 (2½“)**	**DN 80 (3“)**	**DN 100 (4“)**	**DN 125 (5“)**	**DN 150 (6“)**	**DN 200 (8“)**	**DN 250 (10“)**	**DN 300 (12“)**
„R“ Q3/Q1	160	160	160	160	160	160	160	160	160
Q4 [m^3/h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m^3/h]	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**
Q2 [m^3/h]	0.40	0.63	1.00	1.60	2.50	4.00	6.3	10.0	16.0
Q1 [m^3/h]	0.25	0.39	0.63	1.00	1.56	2.50	3.94	6.3	10.0

Order code: P17	**DN 50 (2“)**	**DN 65 (2½“)**	**DN 80 (3“)**	**DN 100 (4“)**	**DN 125 (5“)**	**DN 150 (6“)**	**DN 200 (8“)**	**DN 250 (10“)**	**DN 300 (12“)**
„R“ Q3/Q1	200	200	200	200	200	200	200	200	200
Q4 [m^3/h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m^3/h]	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**
Q2 [m^3/h]	0.32	0.50	0.80	1.28	2.00	3.20	5.0	8.0	12.8
Q1 [m^3/h]	0.20	0.32	0.50	0.80	1.25	2.00	3.15	5.0	8.0

Order code: P18	**DN 50 (2“)**	**DN 65 (2½“)**	**DN 80 (3“)**	**DN 100 (4“)**	**DN 125 (5“)**	**DN 150 (6“)**	**DN 200 (8“)**	**DN 250 (10“)**	**DN 300 (12“)**
„R“ Q3/Q1	250	250	250	250	250	250	250	250	250
Q4 [m^3/h]	50	78.75	125	200	312.5	500	787.5	1250	2000
Q3 [m^3/h]	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**
Q2 [m^3/h]	0.26	0.40	0.64	1.02	1.60	2.56	4.0	6.4	10.24
Q1 [m^3/h]	0.16	0.25	0.40	0.64	1.00	1.60	2.52	4.0	6.4

The Label is placed on the side of the encapsulation. An example of the product label is shown below:



OIML R 49/MI-001 approvals valid for:

- DN 50 to 300 mm (2" to 12")
- Horizontal installation
- Compact or remote with max. 3 m cable
- Power supply 115/230 V AC

Other restrictions may apply (see certificate).

Special OIML / MI-001 settings:

- Unit: m^3
- Qmax: Q3
- Digital output: Frequency

For other factory settings, see Operating Instructions.

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Selection and Ordering data		Article No.
Sensor SITRANS F M MAG 5100 W	↗	7 M E 6 5 2 0 -
Hastelloy electrodes, carbon steel flanges, EU water markets and low flow applications		■■■■■ - 2 ■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter		
DN 15 (½")	⬟	1 V
DN 25 (1")	⬟	2 D
DN 40 (1½")	⬟	2 R
DN 50 (2")	⬟	2 Y
DN 65 (2½")	⬟	3 F
DN 80 (3")	⬟	3 M
DN 100 (4")	⬟	3 T
DN 125 (5")	⬟	4 B
DN 150 (6")	⬟	4 H
DN 200 (8")	⬟	4 P
DN 250 (10")	⬟	4 V
DN 300 (12")	⬟	5 D
DN 350 (14")		5 K
DN 400 (16")		5 R
DN 450 (18")		5 Y
DN 500 (20")		6 F
DN 600 (24")		6 P
DN 700 (28")		6 Y
DN 750 (30")		7 D
DN 800 (32")		7 H
DN 900 (36")		7 M
DN 1000 (40")		7 R
(42")		7 U
(44")		7 V
DN 1200 (48")		8 B
Flange norm and pressure rating		
to EN 1092-1		
PN 10 (DN 200 ... 1200/8" ... 48")	⬟	B
PN 16 (DN 50 ... 1200/2" ... 48")	⬟	C
PN 16, non PED (DN 700 ... 1200/28" ... 48")		D
PN 40 (DN 15 ... 40/½" ... 1½")	⬟	F
to ANSI B16.5		
class 150 (½" ... 24")	⬟	J
to AWWA C-207		
Class D (28" ... 48")		L
to AS 4087		
PN 16 (DN 50 ... 1200/2" ... 48")		N
Flange material and coating		
Carbon steel flanges ASTM A 105, 150 µm coating	⬟	1
Carbon steel flanges ASTM A 105, 300 µm coating		4
Liner material		
EPDM	⬟	2
NBR Hard Rubber	⬟	3
Transmitter		
Sensor for remote transmitter (Order transmitter separately)	⬟	A
MAG 6000 I, Aluminum, 18 ... 90 V DC, 115 ... 230 V AC	⬟	C
MAG 6000, Polyamid, 11 ... 30 V DC/11 ... 24 V AC	⬟	H
MAG 6000, Polyamid, 115 ... 230 V AC	⬟	J
MAG 5000, Polyamid, 11 ... 30 V DC/11 ... 24 V AC	⬟	K
MAG 5000, Polyamid, 115 ... 230 V AC	⬟	L
MAG 6000 CT, Polyamid, 115 ... 230 V AC		M

Selection and Ordering data		Article No.
Sensor SITRANS F M MAG 5100 W		7 M E 6 5 2 0 -
Hastelloy electrodes, carbon steel flanges, EU water markets and low flow applications		■■■■■ - 2 ■■■
Communication		
None	⬟	A
HART	⬟	B
PROFIBUS PA Profile 3 (only MAG 6000/MAG 6000 I)	⬟	F
PROFIBUS DP Profile 3 (only MAG 6000/MAG 6000 I)	⬟	G
Modbus RTU/RS 485 (only MAG 6000/MAG 6000 I)	⬟	E
FOUNDATION Fieldbus H1 (only MAG 6000/ MAG 6000 I)	⬟	J
Cable glands/terminal box		
Metric/Polyamid terminal box or 6000 I compact	⬟	1
½" NPT/Polyamid terminal box or 6000 I compact	⬟	2

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

3

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3

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	**C12**
Factory certificate according to EN 10204-2.2	**C14**
Factory certificate according to EN 10204-2.1	**C15**
FP2E marking (only France)	**C17**
Special calibration	
• 5-point calibration for DN 15 ... DN 200[1)]	**D01**
• 5-point calibration for DN 250 ... DN 600[1)]	**D02**
• 5-point calibration for DN 700 ... DN 1200[1)]	**D03**
• 10-point calibration for DN 15 ... DN 200[2)]	**D06**
• 10-point calibration for DN 250 ... DN 600[2)]	**D07**
• 10-point calibration for DN 700 ... DN 1200[2)]	**D08**
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 ... DN 200	**D11**
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 ... DN 600	**D12**
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 ... DN 1200	**D13**
• 5-point, matched-pair calibration for DN 15 ... DN 200[1)]	**D15**
• 5-point, matched-pair calibration for DN 250 ... DN 600[1)]	**D16**
• 5-point, matched-pair calibration for DN 700 ... DN 1200[1)]	**D17**
• 10-point, matched-pair calibration for DN 15 ... DN 200[2)]	**D18**
• 10-point, matched-pair calibration for DN 250 ... DN 600[2)]	**D19**
• 10-point, matched-pair calibration for DN 700 ... DN 1200[2)]	**D20**
Approval/Verification[3)] (MI-001 : DN 50 ... 300 (compact only), EN 1092-1 PN10 and PN16 flanges with MAG 6000 CT)[4)]	
• Without verification according to OIML R 49	**P10**
• MI-001 Q3/Q1 = 25	**P11**
• MI-001 Q3/Q1 = 63	**P12**
• MI-001 Q3/Q1 = 80	**P13**
• MI-001 Q3/Q1 = 160	**P16**
• MI-001 Q3/Q1 = 200	**P17**
• MI-001 Q3/Q1 = 250	**P18**
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
• DN 50, DN 80 and DN 100 (2", 3" and 4")	**P20**
• DN 150 and DN 200 (6" and 8")	**P21**
• DN 250 and DN 300 (10" and 12")	**P22**
Tag name plate, stainless steel fixed with SS wire (add plain text)	**Y17**
Tag name plate, plastic (self-adhesive)	**Y18**
Customer-specific converter setup	**Y20**
Sensor cables wired (specify cable Article No.)	**Y40**
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.)	**Y41**
Other postproduction requirements (add desired text)	**Y99**

Selection and Ordering data	Order code
Additional Calibrations	
Accredited Siemens Flow Instruments matched pair Calibration acc. to ISO/IEC 17025:2005	**On request[5)]**
Customer-witnessed calibration Any of above calibration	**On request[5)]**

1) 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

2) Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

3) For more details and references of the ranges please see the tables on page 3/96.

4) For remote version submit Product Variation Request.

5) Ordering On request as dedicated information from the customer on the individual sensors is required. Please fill in the calibration form found on http://pi.khe.siemens.de/index.aspx?Nr=17460 and send together with the order. (Size dependent restriction on maximum flow rates may apply)

Operating instructions for SITRANS F M MAG 5100 W

Description	Article No.
• English	**A5E03063678**
• German	**A5E03376527**
• Spanish	**A5E00376529**
• French	**A5E03376521**
• Chinese	**A5E03376501**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P ⬟	**FDK:085U0220**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place. MAG 6000 I transmitters and sensors are delivered compact mounted from factory.
Communication module will be pre-mounted in the transmitter.

Please use online Product selector to get latest updates.

Product selector link:
www.pia-selector.automation.siemens.com

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Selection and Ordering data		Article No.
Sensor SITRANS F M MAG 5100 W	↗	7ME6580-
Hastelloy electrodes, carbon steel flanges, Non EU water markets		■■■■■-■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter		
DN 25 (1")	⬟	2D
DN 40 (1½")	⬟	2R
DN 50 (2")	⬟	2Y
DN 65 (2½")	⬟	3F
DN 80 (3")	⬟	3M
DN 100 (4")	⬟	3T
DN 125 (5")	⬟	4B
DN 150 (6")	⬟	4H
DN 200 (8")	⬟	4P
DN 250 (10")	⬟	4V
DN 300 (12")	⬟	5D
DN 350 (14")		5K
DN 400 (16")		5R
DN 450 (18")		5Y
DN 500 (20")		6F
DN 600 (24")		6P
DN 700 (28")		6Y
DN 750 (30")		7D
DN 800 (32")		7H
DN 900 (36")		7M
DN 1000 (40")		7R
(42")		7U
(44")		7V
DN 1200 (48")		8B
DN 1400 (54")		8F
DN 1500 (60")		8K
DN 1600 (66")		8P
DN 1800 (72")		8T
DN 2000 (78")		8Y
Flange norm and pressure rating		
to EN 1092-1		
PN 6 (DN 1400 ... 2000 (54" ... 78"))[1]		A
PN 10 (DN 200 ... 2000 (8" ... 78"))[1]	⬟	B
PN 16 (DN 65 ... 600 (2½" ... 24"))	⬟	C
PN 16, non-PED (DN 700 ... 2000 (28" ... 78"))		D
PN 40 (DN 25 ... 50 (1" ... 2"))	⬟	F
to ANSI B16.5		
class 150 (1" ... 24")	⬟	J
to AWWA C-207		
Class D (28" ... 78")[1]		L
to AS 4087		
PN 16 (DN 50 ... 1200 (2" ... 48"))		N
to JIS		
B 2220:2004 K10 (1" ... 24")		R
Flange material and coating		
Carbon steel flanges ASTM A 105, 150 µm coating	⬟	1
Carbon steel flanges ASTM A 105, 300 µm coating		4
Liner material		
Ebonite Hard Rubber	⬟	4
Electrode material		
Hastelloy	⬟	2

Selection and Ordering data		Article No.
Sensor SITRANS F M MAG 5100 W		7ME6580-
Hastelloy electrodes, carbon steel flanges, Non EU water markets		■■■■■-■■■■
Transmitter with display		
Sensor for remote transmitter (Order transmitter separately)	⬟	A
MAG 6000, Polyamid, 11 ... 30 V DC/11 ... 24V AC	⬟	H
MAG 6000, Polyamid, 115 ... 230 V AC	⬟	J
MAG 5000, Polyamid, 11 ... 30 V DC/11 ... 24V AC	⬟	K
MAG 5000, Polyamid, 115 ... 230 V AC	⬟	L
Communication		
No communication, add-on possible	⬟	A
HART	⬟	B
PROFIBUS PA Profile 3 (only MAG 6000)	⬟	F
PROFIBUS DP Profile 3 (only MAG 6000)	⬟	G
Modbus RTU/RS 485 (only MAG 6000)	⬟	E
FOUNDATION Fieldbus H1 (only MAG 6000)	⬟	J
Cable glands/terminal box		
Metric	⬟	1
½" NPT	⬟	2

[1] DN 1400 to DN 2000 (54" to 78") do not conform to PED or CRN.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

3

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Flow sensor MAG 5100 W

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	**C12**[1]
Factory certificate according to EN 10204-2.2	**C14**
Factory certificate according to EN 10204-2.1	**C15**
Special calibration	
• 5-point calibration for DN 15 ... DN 200[2]	**D01**
• 5-point calibration for DN 250 ... DN 600[2]	**D02**
• 5-point calibration for DN 700 ... DN 1200[2]	**D03**
• 10-point calibration for DN 15 ... DN 200[3]	**D06**
• 10-point calibration for DN 250 ... DN 600[3]	**D07**
• 10-point calibration for DN 700 ... DN 1200[3]	**D08**
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 ... DN 200	**D11**
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 ... DN 600	**D12**
• Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 ... DN 1200	**D13**
• 5-point, matched-pair calibration for DN 15 ... DN 200[2]	**D15**
• 5-point, matched-pair calibration for DN 250 ... DN 600[2]	**D16**
• 5-point, matched-pair calibration for DN 700 ... DN 1200[2]	**D17**
• 10-point, matched-pair calibration for DN 15 ... DN 200[3]	**D18**
• 10-point, matched-pair calibration for DN 250 ... DN 600[3]	**D19**
• 10-point, matched-pair calibration for DN 700 ... DN 1200[3]	**D20**
Tag name plate, stainless steel fixed with SS wire	**Y17**
Tag name plate, plastic (self-adhesive)	**Y18**
Customer-specific converter setup	**Y20**
Sensor cables wired (specify cable Article No.)	**Y40**
Sensor for remote transmitter's junction box potted to IP68 with wired cable (specify cable Article No.)	**Y41**
Other postproduction requirements (add desired text)	**Y99**

[1] Under preparation

[2] 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

[3] Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Operating instructions for SITRANS F M MAG 5100 W

Description	Article No.
• German	**A5E03376527**
• English	**A5E03063678**
• French	**A5E03376521**
• Spanish	**A5E03376529**
• Chinese	**A5E03376501**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P ⬟	**FDK:085U0220**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

MAG 5000/6000 transmitters and sensors are packed in separate boxes, the final assembly takes place during installation at the customer's place.
Communication module will be pre-mounted in the transmitter.

Please use online Product selector to get latest updates.

Product selector link: www.pia-selector.automation.siemens.com

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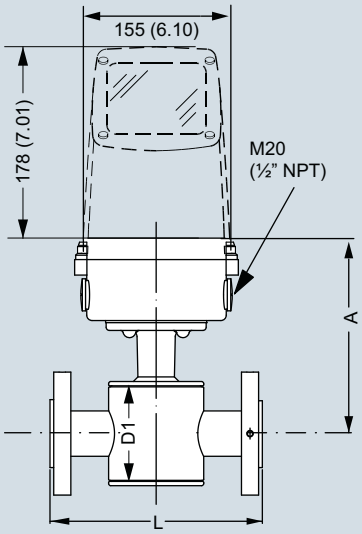
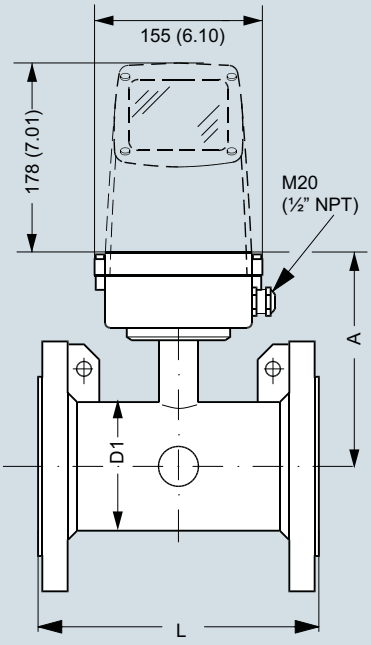
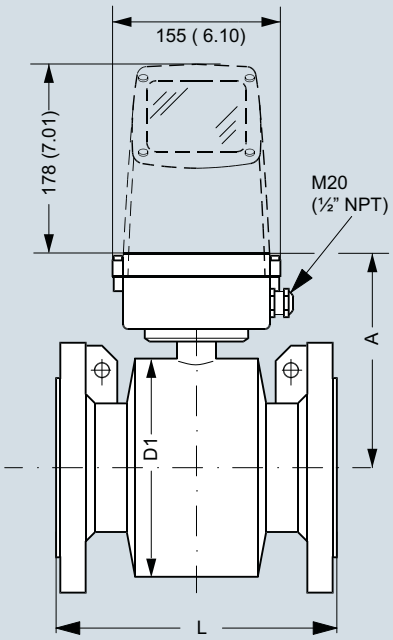
Dimensional drawings



7ME6520: DN 15 ... 40 (½" ... 1½")



7ME6520: DN 50 ... 300 (2" ... 12")



7ME6520: DN 350 ... 1200 (14" ... 48")
7ME6580: DN 25 ... 2000 (1" ... 78")

7ME6520 NBR or EPDM liner						7ME6580 Ebonite liner					
Nominal size		A		D1		A		D1		L	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
15	½	177	7.0	77	3.0	-	-	-	-	200	7.9
25	1	187	7.4	96	3.8	187	7.4	104	4.09	200	7.9
40	1½	202	8.0	127	5.0	197	7.8	124	4.88	200	7.9
50	2	188	7.4	76	3.0	205	8.1	139	5.47	200	7.9
65	2½	194	7.6	89	3.5	212	8.3	154	6.06	200	7.9
80	3	200	7.9	102	4.0	222	8.7	174	6.85	200	7.9
100	4	207	8.1	114	4.5	242	9.5	214	8.43	250	9.8
125	5	217	8.5	140	5.5	255	10.0	239	9.41	250	9.8
150	6	232	9.1	168	6.6	276	10.9	282	11.1	300	11.8
200	8	257	10.1	219	8.6	304	12.0	338	13.31	350	13.8
250	10	284	11.2	273	10.8	332	13.1	393	15.47	450	17.7
300	12	310	12.2	324	12.8	357	14.1	444	17.48	500	19.7
350	14	382	15.0	451	17.8	362	14.3	451	17.76	550	21.7
400	16	407	16.0	502	19.8	387	15.2	502	19.76	600	23.6
450	18	438	17.2	563	22.2	418	16.5	563	22.16	600	23.6
500	20	463	18.2	614	24.2	443	17.4	614	24.17	600	23.6
600	24	514	20.2	715	28.2	494	19.4	715	28.15	600	23.6
700	28	564	22.2	816	32.1	544	21.4	816	32.13	700	27.6
750	30	591	23.3	869	34.2	571	22.5	869	34.21	750	29.5
800	32	616	24.3	927	36.5	606	23.9	927	36.5	800	31.5
900	36	663	26.1	1032	40.6	653	25.7	1032	40.63	900	35.4
1000	40	714	28.1	1136	44.7	704	27.7	1136	44.72	1000	39.4
	42	714	28.1	1136	44.7	704	27.7	1136	44.72	1000	39.4
	44	765	30.1	1238	48.7	755	29.7	1238	48.74	1100	43.3
1200	48	820	32.3	1348	53.1	810	31.9	1348	53.07	1200	47.2
1400	54	-	-	-	-	925	36.4	1574	65.94	1400	55.1
1500	60	-	-	-	-	972	38.2	1672	65.83	1500	59.1
1600	66	-	-	-	-	1025	40.4	1774	75.39	1600	63
1800	72	-	-	-	-	1123	44.2	1974	77.72	1800	70.9
2000	78	-	-	-	-	1223	48.1	2174	85.59	2000	78.7

- not available

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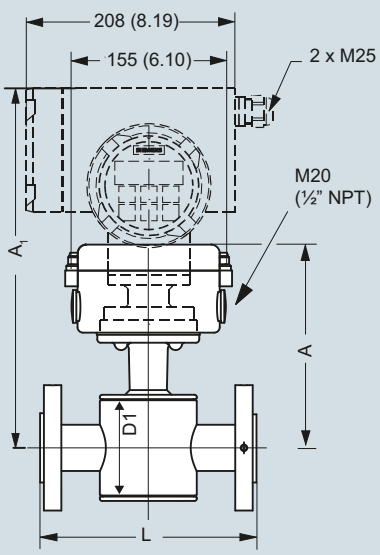
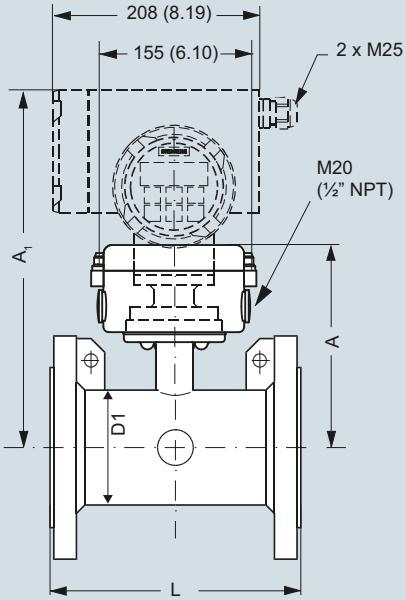
Flow sensor MAG 5100 W

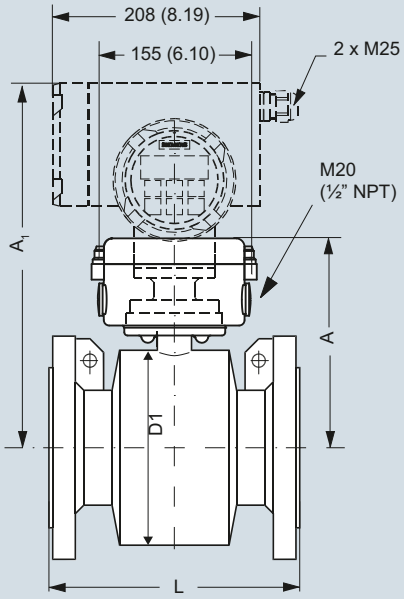
MAG 5100 W/6000 I Compact



7ME6520: DN 15 ... 40 (½" ... 1½")



7ME6520: DN 50 ... 300 (2" ... 12")



7ME6520: DN 350 ... 2000 (14" ... 78")
7ME6580: DN 25 ... 2000 (1" ... 78")

		7ME6520 NBR or EPDM liner						7ME6580 Ebonite liner							
Nominal size		A		A1		D1		A		A1		D1		L	
[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]
15	½	177	7.0	331	13.0	77	3.0	187	7.4	-	-	-	-	200	7.9
25	1	187	7.4	341	13.4	96	3.8	187	7.4	341	13.4	104	4.09	200	7.9
40	1½	202	8.0	356	14.0	127	5.0	197	7.8	351	13.8	124	4.88	200	7.9
50	2	188	7.4	342	13.5	76	3.0	205	8.1	359	14.1	139	5.47	200	7.9
65	2½	194	7.6	348	13.7	89	3.5	212	8.3	366	14.4	154	6.06	200	7.9
80	3	200	7.9	354	14.0	102	4.0	222	8.7	376	14.8	174	6.85	200	7.9
100	4	207	8.1	361	14.2	114	4.5	242	9.5	396	15.6	214	8.43	250	9.8
125	5	217	8.5	371	14.6	140	5.5	255	10.0	409	16.1	239	9.41	250	9.8
150	6	232	9.1	386	15.2	168	6.6	276	10.9	430	16.9	282	11.1	300	11.8
200	8	257	10.1	411	16.2	219	8.6	304	12.0	458	18.0	338	13.31	350	13.8
250	10	284	11.2	438	17.2	273	10.8	332	13.1	486	19.1	393	15.47	450	17.7
300	12	310	12.2	464	18.3	324	12.8	357	14.1	511	20.1	444	17.48	500	19.7
350	14	382	15.0	536	21.1	451	17.8	362	14.3	516	20.3	451	17.76	550	21.7
400	16	407	16.0	561	22.1	502	19.8	387	15.2	541	21.3	502	19.76	600	23.6
450	18	438	17.2	592	23.3	563	22.2	418	16.5	572	22.5	563	22.16	600	23.6
500	20	463	18.2	617	24.3	614	24.2	443	17.4	597	23.5	614	24.17	600	23.6
600	24	514	20.2	668	26.3	715	28.2	494	19.4	648	25.5	715	28.15	600	23.6
700	28	564	22.2	718	28.3	816	32.1	544	21.4	698	27.5	816	32.13	700	27.6
750	30	591	23.3	745	29.3	869	34.2	571	22.5	725	28.5	869	34.21	750	29.5
800	32	616	24.3	770	30.3	927	36.5	606	23.9	760	29.9	927	36.5	800	31.5
900	36	663	26.1	817	32.2	1032	40.6	653	25.7	807	31.8	1032	40.63	900	35.4
1000	40	714	28.1	868	34.2	1136	44.7	704	27.7	858	33.8	1136	44.72	1000	39.4
	42	714	28.1	868	34.2	1136	44.7	704	27.7	858	33.8	1136	44.72	1000	39.4
	44	765	30.1	919	36.2	1238	48.7	755	29.7	904	35.6	1238	48.74	1100	43.3
1200	48	820	32.3	974	38.3	1348	53.1	810	31.9	964	38.0	1348	53.07	1200	47.2
1400	54	-	-	-	-	-	-	925	36.4	1079	42.5	1574	61.97	1400	55.1
1500	60	-	-	-	-	-	-	972	38.2	1126	44.3	1672	65.83	1500	59.1
1600	66	-	-	-	-	-	-	1025	40.4	1179	46.4	1774	69.84	1600	63.0
1800	72	-	-	-	-	-	-	1123	44.2	1277	50.3	1974	77.72	1800	70.9
2000	78	-	-	-	-	-	-	1223	48.1	1377	54.2	2174	85.59	2000	78.7

- not available

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Weight

		7ME6520 NBR or EPDM liner										7ME6580 Ebonite liner	
Nominal size		**PN 10**		**PN 16**		**PN 40**		**Class 150/AWWA**		**AS**		**PN 16**	
[mm]	**[inch]**	**[kg]**	**[lb]**	**[kg]**	**[lb]**	**[kg]**	**[lb]**	**[kg]**	**[lb]**	**[kg]**	**[lb]**	**[kg]**	**[lb]**
15	½	-	-	-	-	4	9	4	9	4	9	5	11
25	1	-	-	-	-	6	12	5	11	4	9	5	11
40	1½	-	-	-	-	8	18	7	15	7	15	8	17
50	2	-	-	9	20	-	-	8	20	9	20	9	20
65	2½	-	-	10.7	24	-	-	11	24	10.7	24	11	24
80	3	-	-	11.6	26	-	-	13	28	11.6	26	12	26
100	4	-	-	15.2	33	-	-	19	41	15.2	33	16	35
125	5	-	-	20.4	45	-	-	24	52	-	-	19	42
150	6	-	-	26	57	-	-	29	64	26	57	27	60
200	8	48	106	48	106	-	-	56	124	48	106	40	88
250	10	64	141	69	152	-	-	79	174	69	152	60	132
300	12	76	167	86	189	-	-	110	243	86	189	80	176
350	14	104	229	125	274	-	-	139	307	115	254	110	242
400	16	119	263	143	314	-	-	159	351	125	277	125	275
450	18	136	299	173	381	-	-	182	400	141	311	175	385
500	20	163	359	223	491	-	-	225	495	189	418	200	440
600	24	236	519	338	744	-	-	320	704	301	664	287	633
700	28	270	595	314	692	-	-	273	602	320	704	330	728
750	30	-	-	-	-	-	-	329	725	-	-	360	794
800	32	346	763	396	873	-	-	365	804	428	944	450	992
900	36	432	951	474	1043	-	-	495	1089	619	1362	530	1168
1000	40	513	1130	600	1321	-	-	583	1282	636	1399	660	1455
	42	-	-	-	-	-	-	687	1512	-	-	-	-
	44	-	-	-	-	-	-	763	1680	-	-	1140	2513
1200	48	643	1415	885	1948	-	-	861	1896	813	1789	1180	2601
1400	54	1592	3510	-	-	-	-	-	-	-	-	1600	3528
1500	60	-	-	-	-	-	-	-	-	-	-	2460	5423
1600	66	2110	4652	-	-	-	-	-	-	-	-	2525	5566
1800	72	2560	5644	-	-	-	-	-	-	-	-	2930	6460
2000	78	3640	8025	-	-	-	-	-	-	-	-	3665	8080

- not available

With transmitter MAG 5000 and MAG 6000 compact, weight is increased by approximately 0.8 kg (1.8 lb), with MAG 6000 I, weight is increased by 5.5 kg (12.1 lb).

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Transmitter TRANSMAG 2 with sensor 911/E

Overview

SITRANS F M TRANSMAG 2 with the SITRANS F M 911/E sensor is a pulsed alternating field magnetic flowmeter where the magnetic field strength is much higher than conventional DC pulsed magnetic flowmeters.

Benefits

- Wide range of sizes DN 15 to DN 1000 (½" to 40")
- Broad range of liner and electrode materials for extreme process medias
- Fully welded construction provides a ruggedness that suits the toughest applications and environments.
- Automatic reading of SmartPLUG for easy commissioning
- Simple menu operation with two-line display
- Comprehensiv self-diagnostic with selfmonitoring and internal simulation

Application

The main applications of the SITRANS F M transmitter TRANSMAG 2 can be found in the following sectors:

- Pulp and Paper industry
- Mining industry

The pulse alternating field technology is ideal for difficult applications like:

- High concentrated paper stock > 3 %
- Heavy mining slurries
- Mining slurries with magnetic particles.
- Low conductive medias ≥1 µS/cm (0.1 µS/cm depending on medium)

Design

- Available for remote mounting
- PROFIBUS PA (profile 2.0) / HART communication
- Analog output and digital outputs for pulses, device status, limits, flow direction, frequency output

Mode of operation

The flow measuring principle is based on Faraday's law of electromagnetic induction according to which the sensor converts the flow into an electrical voltage proportional to the velocity of the flow.

Function

The TRANSMAG 2 is a microprocessor-based transmitter with a build-in alphanumeric display in several languages. The transmitters evaluate the signals from the associated electromagnetic sensors and also fulfil the task of a power supply unit which provides the magnet coils with a constant current.

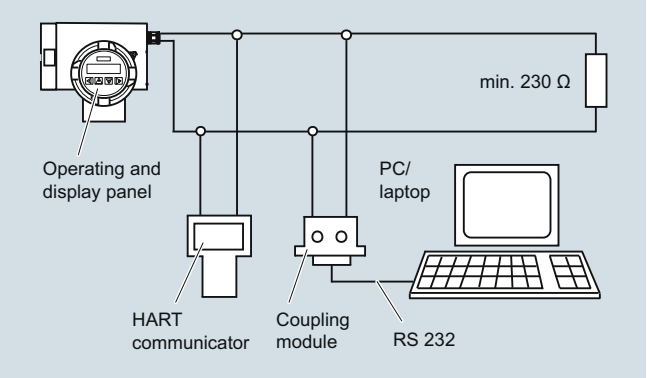
The magnetic flux density in the sensor is additionally monitored by reference coils.

Further information on connection, mode of operation and installation can be found in the data sheets for the sensors.

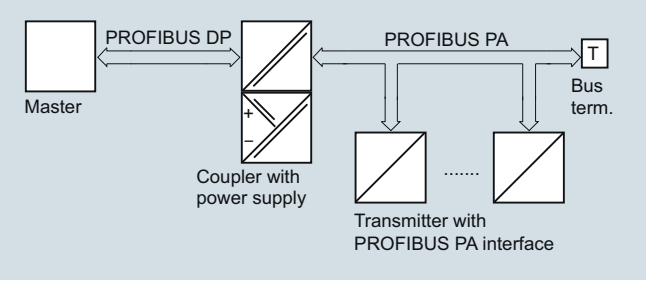
Displays and keypad

Operation of the transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication



HART communication



PROFIBUS PA communication

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Technical specifications

Transmitter TRANSMAG 2	
Mode of operation and design	
Measuring principle	Electromagnetic with pulsed alternating field (PAC)
Magnetic field excitation	Automatic power supply synchronization
- 50 Hz AC power supply	Bipolar (16.7 Hz) Bipolar with prepulse (10 Hz) Unipolar (8.33 Hz)
- 60 Hz AC power supply	Bipolar (20 Hz) Bipolar with prepulse (12 Hz) Unipolar (10 Hz)
Accuracy under reference conditions	
Measuring tolerance of pulse output	
• With v > 0.25 m/s (0.82 ft/s)	≤ ± 0.5 % of measured value ± 1.2 mm/s (0.05 inch/s)
• With v < 0.25 m/s (0.82 ft/s)	± 2.5 mm/s (0.1 inch/s)
Measuring tolerance of analog output	As pulse output plus ± 0.1 % conversion error ± 20 µA
Repeatability	0.2 % of measured value
Reference conditions	
• Process temperature	25 °C ± 5 °C (77 °F ± 9 °F)
• Ambient temperature	25 °C ± 5 °C (77 °F ± 9 °F)
• Warm-up time	Min. 30 min
• Installation conditions	Inlet pipe section ≥ 10 x DN Outlet pipe section ≥ 5 x DN Installed centered in pipe
• Medium	Water without gaseous or solid components
Calibration	
Standard production calibration, calibration report shipped with sensor	Zero-point, 2 x 25 % and 2 x 90 %
Output	
Electrical isolation	Outputs electrically isolated from one another and from the power supply, max. 60 V permissible against PE/equipotential bonding
Current output	0/4 ... 20 mA (7ME5034-0…. or 7ME5034-2….)
• Signal	
- Upper limit	0/4 … 20 mA, selectable
- Failure	20 … 22.5 mA, optional 3.6; 20 or 24 mA
• Load	
- Output	max. 600 Ω, max. load voltage 15 V DC
- For HART communication	≥ 250 Ω
Communication	Via analog output with PC coupling module or HART communicator
• Protocol	HART, version 5.1
Digital output	
Signal	
• Output	Configurable as active or passive signals
- Active signal	24 V DC, ≤ 24 mA, R_i = 170 Ω
- Passive signal	Open collector, max. 30 V DC, 200 mA
Output configuration	
• Pulse	
- Pulse significance	≤ 5000 pulses/s
- Pulse width	≥ 0.1 ms
• Limit frequency	≤ 10000 Hz
• Limits	Limits for flow and quantity, flow direction, alarm
Digital output 2 (relay) (only 7ME5034-0….)	
Relay	NC or NO function
• Rating	Max. 5 W, max. 50 V AC/DC, max. 200 mA
• Output configuration	Limits for flow and quantity, flow direction, alarm
Digital input (optional to digital output 2) (only 7ME5034-2….)	
• Input function configurable as high-active or low-active	Set measured value or counter to zero
• Signal voltage	Max. 30 V DC, R_i = 3 kΩ: High level: +11 ... +30 V DC Low level: -30 ... +5 V DC
For PROFIBUS devices	
PROFIBUS PA (for PROFIBUS-devices 7ME5034-1….)	
• Communication	Layer 1 and 2 according to PROFIBUS PA Transmission according to IEC 1158-2 Layer 7 (protocol layer) according to PROFIBUS PA and DP V1 (EN 50170) Device class B, device profile 2.0 Max. 4 simultaneous C2 connections
• Bus voltage	9 ... 32 V DC permissible
• Current consumption from bus	10 mA; limited to ≤ 15 mA in event of fault by electrical current limitation
Rated operating conditions	
Installation conditions	See also sensor
Ambient temperature	
• Operation	-20 ... +60 °C (-4 ... +140 °F)
• Display module	0 ... 50 °C (32 ... 122 °F)
Storage	-25 ... +80 °C (-13 ... +176 °F)
Degree of protection	IP67/NEMA 4X
Electromagnetic compatibility (EMC)	
• Emitted interference	To IEC/EN 61326 for use in industrial areas
• Noise immunity	To IEC/EN 61326 for use in industrial areas

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Transmitter TRANSMAG 2 with sensor 911/E

Medium conditions	
• Process temperature	-20 ... +150 °C (-4 ... 302 °F) depending on the liner
Minimum conductivity of medium	
• With SITRANS F M 911/E sensors	≥ 1 µS/cm (0.1 µS/cm depending on medium)
Design	
Weight of transmitter	4.4 kg (9.7 lb)
Remote version	Transmitter must be connected to sensor using shielded cable
Maximum cable length	100 m (328 ft)
Housing	Die-cast aluminum, painted
Displays and keypad	
General display	LCD, backlid, two lines with 16 characters each
Multi-display for	Flow, totalizer, flow velocity
Keypad	4 keys for entering parameters
Power supply	
corresponding to rating plate	
• AC supply	100 ... 250 V AC ± 15 %, 47 ... 63 Hz
• Power consumption	Approx. 120 ... 630 VA, depending on sensor
Line fuse	100 ... 230 V AC: T1.6A
Magnet current fuse	F5A/250 V

Sensor cables between sensor and transmitter

The signal voltage proportional to the flow and present at the electrodes of the EMF is only a few µV to mV. Superimposed on this are electrochemical interferences resulting from the contact between the electrodes and liquid, and which can be up to several Volt. Also frequently superimposed are line frequency interferences, interferences resulting from vibrations on the pipelines or signal cables, as well as strong magnetic fields in the vicinity. Sufficient shielding must therefore be provided, as well as fixed routing of the signal cables (electrode and magnet current cable) in the case of remote versions. This also applies to devices with integral preamplifier (smartPLUG). The cable length between the sensor and transmitter must not exceed 100 m (328 ft).

Attention must also be paid to the cable routing. Signal cables must be routed free of vibration, and protected against strong magnetic and stray fields. In case of doubt, the sensor cables must be routed in earthed steel conduit.

Selection and Ordering data	Article No.
SITRANS F M electromagnetic transmitter TRANSMAG 2 for alternating field, remote version, 110 ... 230 V AC	7ME5034-■AA■1-■AA0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Output/communication	
4 ... 20 mA with HART protocol	0
PROFIBUS PA connection	1
4 ... 20 mA with HART protocol, digital input	2
Operator display and keypad	
Without	0
With	1
Cable glands	
M20/M16 x 1.5	1
½" NPT	2

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Strengthened mounting bracket for wall and pipeline installation	**A02**
Measuring range, specify in plain text: Y01: 0 to ... m^3/h	**Y01**
Pulse significance, specify in plain text: Y02: 0 to ... pulses/l	**Y02**
Setting of digital outputs, specify in plain text: Y03: Setting of digital outputs: ...	**Y03**
Measuring-point number (max. 8 characters), specify in plain text: Y15:	**Y15**
Measuring-point description (max. 16 characters), specify in plain text: Y16:	**Y16**
Stainless steel tag plate	**Y17**
Other post-production requirements (add plain text)	**Y99**

Operating instructions for SITRANS F M TRANSMAG 2

Description	Article No.
• English	**A5E00102775**
• German	**A5E00192774**
• Spanish	**A5E00135276**
• French	**A5E00135275**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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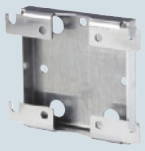
Accessories

Description	Article No.	
Standard wall mounting bracket. Steel AISI 316L/ EN10088-2-1.4404	**7ME5933-0AC04**	
Special wall-/pipe mounting bracket kit. BI 2.5 DIN 59382 X6Cr17	**7ME5933-0AC05**	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P ⬟	**FDK:085U0220**	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Spare parts

Description	Article No.	
Operating/Display module	**7ME5933-0AC00**	
Electronics cover with glass plate (non Ex). Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	**7ME5933-0AC01**	
Cover for sensor cable and gasket. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	**7ME5933-0AC02**	
Cover for mains supply/communication. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	**7ME5933-0AC03**	
Safety clamp for electronic cover with glass plate (7ME5933-0AC01)	**7ME5933-0AC06**	
M20 cable gland set for power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	**A5E02246350**	
1/2" NPT cable gland set for power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	**A5E02246396**	
M16 x 1.5 cable gland set for sensor connection, brass chrome, 2 pcs. and 2 pcs. blind • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +105°C (-4 ... +221 °F)	**A5E02246369**	

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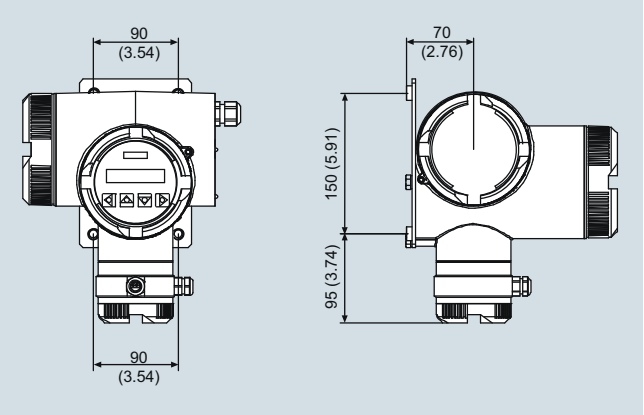
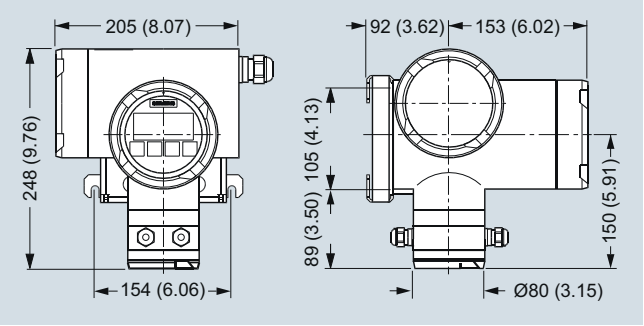
Transmitter TRANSMAG 2 with sensor 911/E

Dimensional drawings

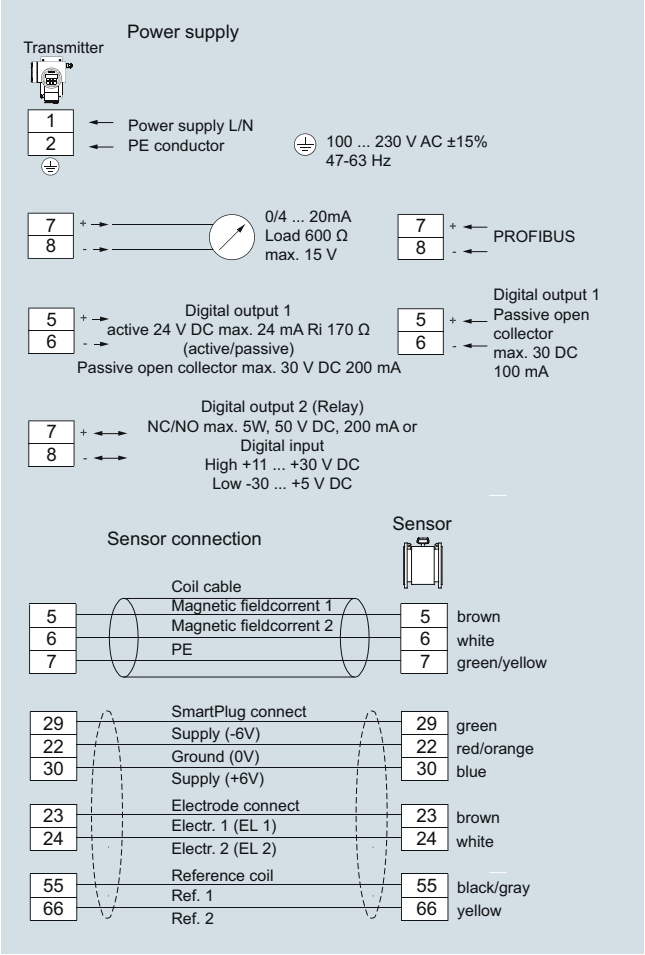


SITRANS F M transmitter TRANSMAG 2 with wall mounting bracket, dimensions in mm (inch)



SITRANS F M transmitter TRANSMAG 2 with wall and pipeline mounting bracket, dimensions in mm (inch)

Schematics



SITRANS F M transmitter TRANSMAG 2, connection diagram

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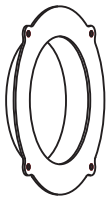
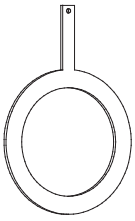
911/E sensor	
Process connection	
Nominal diameters	DN 15 ... 1000 (½" ... 40")
Metering tube connections	EN 1092-1, ANSI B16.5, AWWA C-207 and JIS 10 K
Rated operating conditions	
Installation conditions	See system information
• Soft rubber liner	0 ... 70 °C (32 ... 158 °F)
• Hard rubber liner	0 ... 90 °C (32 ... 194 °F) Option: 100 °C (212 °F)
• PTFE liner	• -20 ... +150 °C (-4 ... +302 °F) at 25 bar (363 psi) • -20 ... +100 °C (-4 ... +212 °F) at 40 bar (580 psi)
• Linatex (rubber) liner	-40 ... +70 °C (-40 ... +158 °F) (for temperatures below -20 °C (-4 °F) AISI 316L/1.4404 flanges must be used)
• Novolak liner	130 °C (266 °F) at 40 bar (580 psi)
Degree of protection	IP67/NEMA 4X Optional IP68/NEMA 6
Medium conditions	
Maximum flow velocity	12 m/s (39.4 ft/s)
Full scale value of flow velocity	0.15 ... 12 m/s (0.49 ... 39.4 ft/s)
Design	
Weight	See dimensional drawings
Flange and housing material	Mild steel (1.0460/1.0570, with corrosion resistant two component epoxy coating (min. 150 µm) or AISI 316L/1.4404 flanges and carbon steel housing, with corrosion-resistant two-component epoxy coating (min. 150 µm)
Measuring pipe material	Stainless steel AISI 304 or higher
Electrode material	• AISI 316Ti/1.4571 • PTFE: Hastelloy C276/2.4819 • Platinum • Titanium • Tantalum
Grounding electrode material	Defined via the Order code

Protection rings for liners



Function	To protect the edges of liners from abrasion (e.g. gravel, sand etc.). Used mainly with soft rubber liners and for PTFE liners at high temperatures from 100 to 150 °C (212 to 302 °F).
Contact with medium	Yes, please always check resistance to measured medium.
Material	Stainless steel AISI 316Ti/1.4571, optionally Hastelloy C276/2.4819
Material thickness	The overall length of the sensor is increased by •6 mm for DN 15 to DN 150 (0.24" for ½" to 6") or •10 mm for DN 200 to DN 600 (0.4" for 8" to 24")
Standard	Optional for all liners. Must be ordered separately.
Article No.	**7ME5912-....**

Earthing rings



Function	Electrical reference and earthing of the medium. Required if the pipelines are not electrically conducting or are lined (plastic pipelines, concrete pipelines etc.). All earthing rings must be connected to the earthing screw present on the sensor.
Contact with medium	Yes, please always check resistance to measured medium.
Material	Stainless steel AISI 316Ti/1.4571 or Hastelloy C4/2.4610
Material thickness	The overall length of the sensor is increased by 2 mm (0.08") per earthing ring.
Standard	Optional for all liners. Required between the medium and sensor for equipotential bonding between non-conducting pipelines or lined pipelines.
Article No.	**7ME5902-....**

Important:

The rings must be ordered together with the sensor.
In case of replacement please include the sensor MLFB code on the order.

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Transmitter TRANSMAG 2 with sensor 911/E

Notes on pressure equipment directive

The devices are designed for liquids of danger group "Gases of fluid group 1". The categories differ according to the version, and are listed in the table below.

The minimum temperature is defined at -10 °C (14 °F) for the flange materials C22.8 (1.0460).
The minimum temperature is defined at -20 °C (-4 °F) for the flange material 1.4404/316L. For further information on the PED standard and requirements, see page 9/6.

Classification according to pressure equipment directive (PED 97/23/EC)					
Nominal diameter		**Nominal pressure**		**Permissible media**	**Category**
DN	**(inch)**	**PN**	**(MWP psi)**		
15 ... 25	(½" ... 1")	40	(580)	Gases fluid group 1 and liquids fluid group 1	Article 3.3
200 ... 300	(8" ... 12")	10	(145)	Gases fluid group 1 and liquids fluid group 1	II
65 ... 250	(2½" ... 10")	16	(232)	Gases fluid group 1 and liquids fluid group 1	II
40 ... 100	(1½" ... 4")	40	(580)	Gases fluid group 1 and liquids fluid group 1	II
350 ... 1000	(14" ... 40")	10	(145)	Gases fluid group 1 and liquids fluid group 1	III
300 ... 1000	(12" ... 40")	16	(232)	Gases fluid group 1 and liquids fluid group 1	III
200 ... 600	(8" ... 24")	25	(363)	Gases fluid group 1 and liquids fluid group 1	III
125 ... 600	(5" ... 24")	40	(580)	Gases fluid group 1 and liquids fluid group 1	III

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Selection and Ordering data	Article No.
Flowsensor SITRANS F M 911/E ↗	**7 M E 5 6 1 0 -** ■■■■■ - ■ **A A** ■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Nominal diameter	
DN 15 (½")	**1 V**
DN 25 (1")	**2 D**
DN 40 (1½")	**2 R**
DN 50 (2")	**2 Y**
DN 65 (2½")	**3 F**
DN 80 (3")	**3 M**
DN 100 (4")	**3 T**
DN 125 (5")	**4 B**
DN 150 (6")	**4 H**
DN 200 (8")	**4 P**
DN 250 (10")	**4 V**
DN 300 (12")	**5 D**
DN 350 (14")	**5 K**
DN 400 (16")	**5 R**
DN 450 (18")	**5 Y**
DN 500 (20")	**6 F**
DN 600 (24")	**6 P**
DN 700 (28")	**6 Y**
DN 750 (30")	**7 D**
DN 800 (32")	**7 H**
DN 900 (36")	**7 M**
DN 1000 (40")	**7 R**
Flange norm and pressure rating	
EN 1092-1, PN 10 (DN 200 ... 1000 (8" ... 40"))	**B**
EN 1092-1, PN 16 (DN 65 ... 1000 (2½" ... 40"))	**C**
EN 1092-1, PN 25 (DN 200 ... 1000 (8" ... 40"))	**E**
EN 1092-1, PN 40 (DN 15 ... 1000 (½" ... 40"))	**F**
ANSI B16.5, Class 150 (½" ... 24")[1]	**J**
ANSI B16.5, Class 300 (½" ... 24")[2]	**K**
AWWA C-207 Class D (28" ... 40")	**L**
JIS 10 K (½" ... 24")	**R**
Flange material	
Mid steel flanges 1.0460/1.0570	**1**
Stainless steel flanges, AISI 316L/1.4404	**3**
Liner material	
Soft rubber (DN 25 to DN 1000)	**1**
PTFE (DN 15 to DN 600)	**3**
Hardrubber (DN 15 to DN 1000)	**4**
Linatex (DN 40 to DN 1000)	**5**
Novolak (sealing material FFKM) (from DN 50 to DN 1000)	**6**
Electrode material	
AISI 316Ti/1.4571	**1**
Hastelloy C276/2.4819	**2**
Platinum	**3**
Titanium	**4**
Tantalum	**5**
Cable glands/terminal box	
Metric: Polyamide terminal box	**1**
½" NPT: Polyamide terminal box	**2**

Selection and Ordering data	Order Code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Two earthing (grounding) electrodes made of stainless steel AISI 316Ti/1.4571	**A02**
Two earthing (grounding) electrodes made of Hastelloy C276/2.4819	**A04**
Two earthing (grounding) electrodes made of Platinum	**A05**
Two earthing (grounding) electrodes made of Titanum	**A06**
Two earthing (grounding) electrodes made of Tantalum	**A07**
Factory certificate to EN 10204-2.2	**C14**
Acceptance test B to DIN 50049, section 3.1 and EN 10204	**C16**
Tag name plate, stainless steel, add plain text	**Y17**
Other postproduction requirements, add plain text	**Y99**

[1] 20 °C (68 °F), max. 19.6 bar (285 psi) for steel flanges and max. 15.9 bar (231 psi) for stainless seel flanges

[2] 20 °C (68 °F), max. 51.1 bar (741 psi) for steel flanges and max. 41.4 bar (600 psi) for stainless seel flanges

Selection and Ordering data	Article No.	Order code
SITRANS F M TRANSMAG 2 and sensor 911/E ↗	**7 M E 5 9 3 0 -**	
Cable	**5** ■ **A 0 0 - 0 A A 0**	■ ■ ■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Cable kit for sensor 911/E with alternating field, Magnet current cable 3 x 1.0 mm² (3 x 0.0016 inch²), electrode/reference cable 7 x 0.5 mm² (7 x 0.0008 inch²) with shield PVC		
• Length: 5 m (16.4 ft)	**B**	
• Length: 10 m (32.8 ft)	**C**	
• Length: 20 m (65.6 ft)	**D**	
• Length: 30 m (98.4 ft)	**E**	
• Other length (specify in plain text): max. 100 m (328 ft)	**Z**	**J 1 Y**

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Transmitter TRANSMAG 2 with sensor 911/E

Selection and Ordering data	Article No.	Order code
SITRANS F M electromagnetic flowmeter		
Protection rings for flow sensor 911E (per pair) ↗	7ME5912-	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Liner		
Hard rubber/soft rubber/Linatex		1
Novolak		7
PTFE		0
Nominal diameter		
for PTFE, mat. no. 1.4571/316 Ti		
DN 15 (½")		A A
DN 25 (1")		C A
DN 40 (1½")		E A
DN 50 (2")		F A
DN 65 (2½")		G A
DN 80 (3")		H A
DN 100 (4")		J A
DN 125 (5")		K A
DN 150 (6")		L A
DN 200 (8")		M A
DN 250 (10")		N A
DN 300 (12")		P A
Other nominal diameters: specify in plain text		Z A J 1 Y
for Hard/Soft rubber, Novolak, mat. no. 1.471/316 Ti		
DN 15 (½")		A B
DN 25 (1")		C B
DN 40 (1½")		E B
DN 50 (2")		F B
DN 65 (2½")		G B
DN 80 (3")		H B
DN 100 (4")		J B
DN 125 (5")		K B
DN 150 (6")		L B
DN 200 (8")		M B
DN 250 (10")		N B
DN 300 (12")		P B
Other nominal diameters: specify in plain text		Z B J 1 Y
Flange design		
Flange to DIN		1
Flange to ANSI		2
Flange to JIS		3

Selection and Ordering data	Article No.	Order code
SITRANS F M electromagnetic flowmeter		
Earthing rings for flow sensor 911E (per unit) ↗	7ME5902-	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Liner		
Hard rubber/soft rubber		1
Novolak		7
PTFE		0
Nominal diameter		
Mat. no. 1.4571/316 Ti		
DN 15 (½")		A A
DN 25 (1")		C A
DN 40 (1½")		E A
DN 50 (2")		F A
DN 65 (2½")		G A
DN 80 (3")		H A
DN 100 (4")		J A
DN 125 (5")		K A
DN 150 (6")		L A
DN 200 (8")		M A
DN 250 (10")		N A
DN 300 (12")		P A
DN 350 (14")		Q A
DN 400 (16")		R A
DN 500 (20")		S A
DN 600 (24")		T A
DN 700 (28")		U A
DN 800 (32")		V A
DN 900 (36")		W A
DN 1000 (40")		X A
Other nominal diam.: specify in plain text		Z A J 1 Y
Material Hastelloy C4/2.4610		
DN 15 (½")		A B
DN 25 (1")		C B
DN 40 (1½")		E B
DN 50 (2")		F B
DN 65 (2½")		G B
DN 80 (3")		H B
DN 100 (4")		J B
DN 125 (5")		K B
DN 150 (6")		L B
DN 200 (8")		M B
DN 250 (10")		N B
DN 300 (12")		P B
DN 350 (14")		Q B
DN 400 (16")		R B
DN 500 (20")		S B
DN 600 (24")		T B
Other nominal diam.: specify in plain text		Z B J 1 Y
Flange design		
Flange to DIN		1
Flange to ANSI		2
Flange to JIS		3

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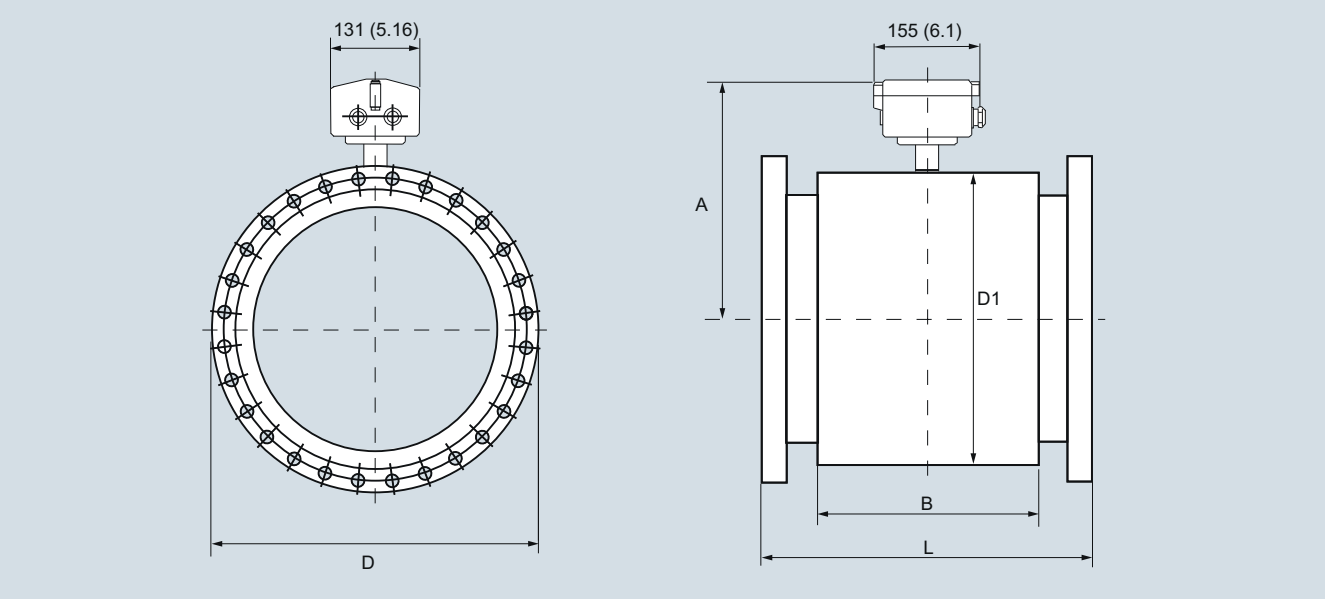
Dimensional drawings



SITRANS F M flow sensor 911/E, remote version, dimensions in mm (inch)

Build-in length 911/E [in mm and inch]

Nominal diameter	**DN 15 ½“**	**DN 25 1“**	**DN 40 1 ½“**	**DN 50 2“**	**DN 65 2 ½“**	**DN 80 3“**	**DN 100 4“**	**DN 125 5“**	**DN 150 6“**	**DN 200 8“**	**DN 250 10“**
					Build-in length L[1)]						
Hard rubber version Linatex/soft rubber version	270 (10.63)		280 (11.02)		330 (12.99)	340 (13.39)		370 (14.57)		410 (16.14)	470 (18.50)
PTFE-liner without protection rings	270 (10.63)		280 (11.02)		330 (12.99)	340 (13.39)		370 (14.57)		410 (16.14)	470 (18.50)
Novolak-version	-		275 (10.83)		325 (12.79)	335 (13.19)	333 (13.11)	362 (14.25)		401 (15.79)	460 (18.11)
					Dimensions of sensor housing						
Housing width B	170 (6.69)									240 (9.45)	
Height A	206 (8.11)		222 (8.74)	229 (9.02)	262 (10.32)		274 (10.79)	286 (11.26)	299 (11.78)	334 (13.15)	358 (14.10)
Housing diameter D_1	135 (5.35)		167 (6.58)	182 (7.17)	247 (9.73)		272 (10.71)	296 (11.65)	322 (12.68)	392 (15.43)	440 (17.32)
Weight of PN16 version in kg (MWP 232 psi version in lb) approx.	8.0 (17.64)	8.5 (18.74)	11.5 (25.35)	25.0 (55.12)	26 (57.32)	27 (59.53)	28 (61.73)	34 (74.95)	38 (83.78)	68 (149.9)	81 (178.6)

Nominal diameter	**DN 300 12“**	**DN 350 14“**	**DN 400 16“**	**DN 450 18“**	**DN 500 20“**	**DN 600 24“**	**DN 700 28“**	**DN 750 30“**	**DN 800 32“**	**DN 900 36“**	**DN 1000 40“**
					Build-in length L[1)]						
Hard rubber version Linatex/soft rubber version	500 (19.68)	550 (21.65)	600 (23.62)	650 (25.59)	650 (25.59)	780 (30.71)	910 (35.83)		1040 (40.95)	1170 (46.06)	1300 (51.18)
PTFE-liner without protection rings	500 (19.68)	550 (21.65)	600 (23.62)	660 (25.98)	650 (25.59)	780 (30.71)	-				
Novolak-version	489 (19.25)	538 (21.18)	592 (23.31)	638 (25.12)	638 (25.12)	772 (30.39)	903 (35.55)		1033 (40.63)	1163 (45.79)	1293 (50.91)
					Dimensions of sensor housing						
Housing width B	240 (9.45)	225 (8.86)	250 (9.84)	270 (10.63)	300 (11.81)	360 (14.17)	420 (16.54)		500 (19.69)	560 (22.05)	620 (24.41)
Height A	383 (15.08)	375 (14.76)	400 (15.75)	433 (17.05)	453 (17.84)	505 (19.88)	558 (21.97)	590 (23.23)	608 (23.94)	658 (25.91)	713 (28.07)
Housing diameter D_1	490 (19.29)	474 (18.66)	524 (20.63)	591 (23.26)	629 (24.76)	734 (28.90)	839 (33.03)	904 (35.59)	939 (36.97)	1039 (40.91)	1150 (45.28)
Weight of PN10 Version in kg (MWP 145 psi version in lb) approx.	95 (209.4)	118 (260.2)	161 (354.9)	185 (407.9)	233 (513.7)	401 (884.1)	420 (925.9)	450 (992.1)	500 (1102.3)	560 (1234.6)	620 (1366.9)

[1)] Tolerance for build-in lenght: L + 0.0/-4.0 mm (+0.00/-0.157 inch)
With protection rings for > DN25 + 6.0 mm, > DN200 + 10.0 mm (> 1” + 0.236 inch, > 8” + 0.394 inch)

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Battery-operated water meter MAG 8000

Overview

MAG 8000 is a comprehensive meter which intelligent information and high performance measurement as well as the easy to install concept take cost of ownership and customer service to a new level for water meter.

Benefits

Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities
- Superior measurement
- Down to 0.2 % maximum uncertainty
- OIML R 49 type approval
- PTB K7.2
- FM Fire Service Approval
- Bi-directional measurement

Long lasting performance/Low cost of Ownership

- Verification according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-001
- No moving parts means less wear and tear
- Up to 6 to 10 years maintenance-free operation in typical revenue application
- Robust construction built for the application

Intelligent information, easy to access

- Advanced information on site
- Data logger
- Advanced statistics and diagnostics
- Add-on communication modules

Application

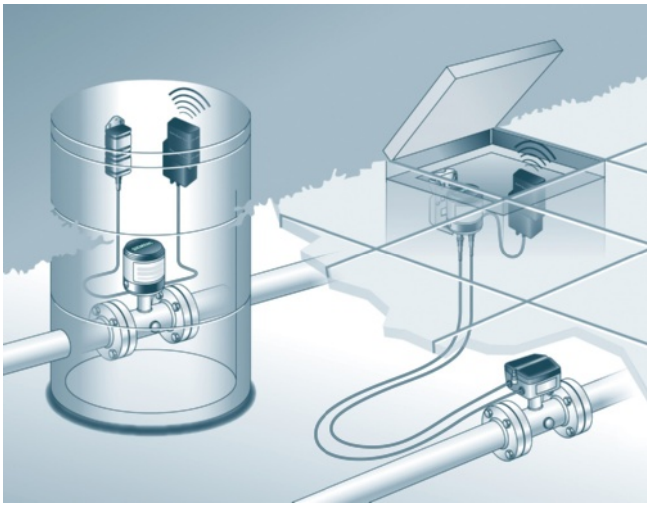
The following MAG 8000 versions are available as stand-alone water meters:

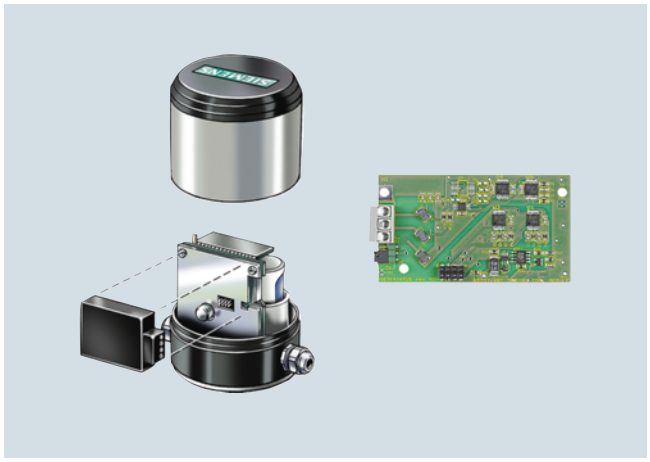
- MAG 8000 (7ME6810) for abstraction and distribution network
- MAG 8000 CT (7ME6820) for revenue and bulk metering
- MAG 8000 (7ME6880) for irrigation

Design

MAG 8000 is designed to minimize power consumption.
The product program consists of

- Basic and advanced version
- Sensor sizes from DN 25 to 1200 (1" to 48")
- Compact and remote installation in IP68/NEMA 6P enclosure and factory-mounted cable
- SIMATIC PDM and Flow Tool PC configuration softwares





Modbus/Encoder module

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GSM/GPRS communication module

PC-IrDA connection

MAG 8000 GSM/GPRS Wireless Communication Module

The MAG 8000 GSM/GPRS wireless communication module provides the latest mobile technology using a Quad Band (850/900/1800/1900 MHz) module.

The GSM/GPRS module logs data from the MAG 8000 memory and from the two analog inputs (one 4 to 20 mA not powered by the module and one 5 V ratiometric powered by the module) and storage in the internal memory and later transmit it into a system or PC via email or SMS.

An additional synchronization function secures the initial collection time of the data independent of the sample rate used (minimum collection time: 1 per minute).

The package of information retrieved via the csv file includes:

- Time stamp
- Flow rate
- Tot 1
- Tot 2
- Tot 3
- Analog 1 (mA)
- Analog 2 (V)
- Battery lifetime
- Alarm list (as decimal format)

The GPRS technology makes it possible to send a higher amount of data via email. The data is secured using a POP 3 server configuration avoiding encryptions that require additional software. The configuration of the module is performed via SMS commands that allow you to define the users, email accounts, transmission settings, collection, etc.

The GSM/GPRS module is a compact built-in solution which can be installed in the existing MAG 8000 with SW version 3.02 and higher.

The battery lifetime will depend on signal strength and especially on the number of transmissions. Therefore we recommend an optimal setting of transmission once a day (see page 3/119). The module also includes the same power management algorithm that secures a very good calculation of the remaining battery lifetime.

The OPC server specifically designed for the MAG 8000 GSM/GPRS module is offered free of charge. With this value-added package, the opportunity for measurement data collection and further processing/analyzing for system integration and automation is offered.

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Function

MAG 8000 is a microprocessor-based water meter with graphical display and key for optimum customer operation and information on site. The transmitter drives the magnetic field in the sensor, evaluates the flow signal from the sensor and calculates the volume passing through. It delivers the required information via the integrated pulse output or communication interfaces as part of a system solution. Its intelligent functionality, information and diagnostics ensure optimum meter performance and information to optimize water supply and billing.

MAG 8000 can be ordered as a Basic or an Advanced version.

Features / Version	MAG 8000 Basic/ MAG 8000 Irrigation	MAG 8000 Advanced
Measuring frequency in battery power mode (Manually selected)[1)]	1/15, 1/30 or 1/60 Hz	from 6.25 to 1/60 Hz depending of sensor size
Output MAG 8000	2 FW/RV/AI/CA (max. 50 Hz pulse rate)	2 FW/RV/AI/CA (max. 100 Hz pulse rate)
Communication	Add-on	Add-on
Data logger	Yes	Yes
Insulation test	No	Yes
Leakage detection	No	Yes
Meter utilization	No	Yes
Statistics	No	Yes
Tariff	No	Yes
Settle date (Revenue)	No	Yes

1) Excitation frequency settings with mains power supply, see technical specifications for each version

Some information is accessible via the display whereas all information is accessible via the IrDA communication interface with the PDM software. Data and parameters are registered in a EEPROM. They can all be read, but changing the information demands a software password or a hardware key attached to the printed circuit board.

The SIMATIC PDM tool gives the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with all specific data that define the quality status of the measurement.

The Qualification Certificate consists of two pages with information about the actual status of the sensor:

Part 1 provides general settings, sensor and battery info, totalizer values and pulse output settings.

Part 2 provides detailed information about electronic and sensor functionality and a main parameter list for evaluating the functionality of the MAG 8000 water meter.

SIMATIC PDM

Details about the SIMATIC PDM tool can be found in chapter "Communication and Software" (see page 8/11).

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Technical specifications

Transmitter	
Installation	Compact (integral) Remote with factory-mounted cable 5, 10, 20 or 30 m (16.4, 32.8, 65.6 or 98.4 ft)
Enclosure	Stainl. steel top housing (AISI 316) and coated brass bottom. Remote wall mount bracket in stainless steel (AISI 304).
Cable entries	2 x M20 (one gland for one cable of size 6 … 8 mm (0.02 ... 0.026 ft) is included in the standard delivery)
Display	Display with 8 digits for main information. Index, menu and status symbols for dedicated information
Resolution	Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)
Flow unit	
Europe	Volume in m^3 and flow rate in m^3/h
US	Volume in Gallon and flow rate in GPM
Australia	Volume in Ml and flow rate as Ml/d
Optional display units	Volume: m^3 x 100, l x 100, G x 100, G x 1000, MG, CF x 100, CF x 1000, AF, Al, kl, BBL42 Flow: m^3/min, m^3/d, l/s, l/min, GPS, GPH, GPD, MGD, CFS, CFM, CFH, BBL42/s, BBL42/min, BBL42/h, BBL42/d
Digital output	2 passive outputs (MOS), individual galvanically isolated Maximum load ± 35 V DC, 50 mA short circuit protected
Output A function	Programmable as pulse volume – forward – reverse – forward/net – reverse/net
Output B function	Programmable as pulse volume (like output A), alarm
Output	Max. pulse rate of 50 Hz (only Basic version) and 100 Hz (only Advanced version), pulse width of 5, 10, 50, 100, 500 ms
Communication	IrDA: Standard integrated infrared communication interface with Modbus RTU protocol
Add-on modules	• RS 232 serial interface with Modbus RTU (Rx/Tx/GND), point to point with max. 15 m cable • RS 485 serial interface with Modbus RTU (+/-/GND), multidrop with up to 32 devices with max. 1000 m cable • Encoder interface module (for Itron 200WP) "Sensus protocol" • GSM/GPRS module with or without analog input cable
Power supply	Auto detection of power source with display symbol for operation power.
Internal battery pack	1 D-Cell 3.6 V/16.5 Ah 2 D-Cell 3.6 V/33 Ah
External battery pack	4 D-Cell 3.6 V/66 Ah

Mains power supply	• 12 ... 24 V AC/DC (10 … 32 V) 2 VA • 115 ... 230 V AC (85 … 264 V) 2 VA Both mains power supply systems are upgradable for battery backup via internal D-Cell (3.6 V 16.5 Ah) or external battery pack.
Cable	3 m (9.8 ft) for external connection to mains supply (without cable plug)

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Battery-operated water meter MAG 8000

Features	
Application identification	Tag number up to 15 characters
Time and date	Real time clock
Totalizer	
MAG 8000	3 totalizer: Configurable to Forward, Reverse and Bidirectional netflow 1 totalizer (following totalizer 1 setting) resetable via display key
Measurement	
Low flow cut-off	0.05 % of Q3 free adjustable
Empty pipe detection	Symbolised in display
Data logger	Logging of 26 records: selectable as daily, weekly or monthly logging
Alarm	Active alarm is indicated on the display
Data protection	All data stored in an EEPROM. Totalizers 1 and 2 are backed up every 10 min, statistic every hour and power consumption and temperature measurement every 4 hour. Password protection of all parameters and hardware protection of calibration and revenue parameters.
Battery power management	Optimal battery information on remaining capacity. Calculated capacity includes all consuming elements and available battery capacity is adjusted related to change in ambient temperature. Numbers of power-ups Date and time registered for first and last time power alarm.
Diagnostic	
Continuous self test including	Coil current to drive the magnetic field Signal input circuit Data calculation, handling and storing
Alarm statistics and logging for fault analyzing	Electrode impedance to check actual media contact Flow simulation to check pulse and communication signal chain for correct scaling Number of sensor measurements (excitations) Transmitter temperature (battery capacity calculation) Low impedance alarm for change in media Flow alarm when defined high flow exceeds Verification mode for fast measure performance check
Insulation test (only Advanced version)	Test of signal immunity against disturbance and bad installation. Test interval is selectable and measurement is interrupted during the test period of 4 min.
Leakage detection (only Advanced version)	Monitoring the lowest flow or volume during selected time window within 24 hours. Leakage is detected over a selectable period where monitored value exceed the possible leakage level. Min and max values are stored with date registration. Last store value visible on the display.
Meter Utilization (only Advanced version)	6 registers for monitoring total time the meter has operated in different flow intervals. Registered intervals are free selectable as % of Q_n (Q3)
Tariff (only Advanced version)	6 tariff registers count the volume delivered within the selected tariff windows, based on time of day or flow rates or a combination. Tariff can also be used for consumption profile where consumption is related to different time intervals or flow rates. Tariff values visible on the display.
Settling date (only Advanced version)	On a predefined date the totalizer 1 index value is stored. Old values are stored to show the latest two totalized 1 index values. Settling values visible on the display.
Statistic (only Advanced version)	Min. flow rate with time and date registration Max. flow rate with time and date registration Min. daily consumption with date registration Max. daily consumption with date registration Latest 7 days total and daily consumption Actual month consumption Latest month consumption
PC Configuration Software PDM	• Meter configuration – online and offline mode • Own parameter settings • Parameter documentation • Print and export of data and parameters PDM 6.0 Service Pack 2 – Basic and Online version

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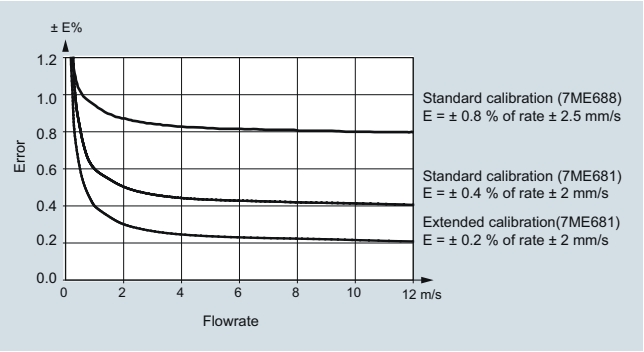
MAG 8000 water meter uncertainty

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

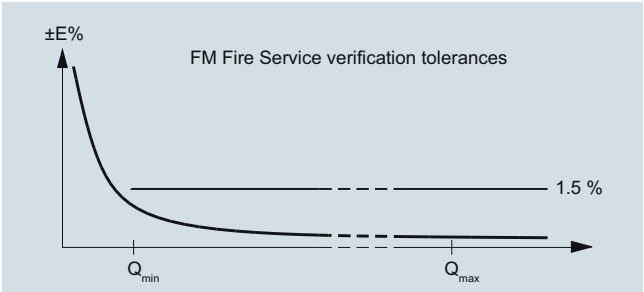
Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m^3/h to 10 000 m^3/h.
Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

The selected calibration determines the accuracy of the meter. A standard calibration results in max. ± 0.4 % uncertainty and an extended calibration ± 0.2 % (for MAG 8000 irrigation ± 0.8 %). A calibration certificate follows every sensor and calibration data are stored in the meter unit.



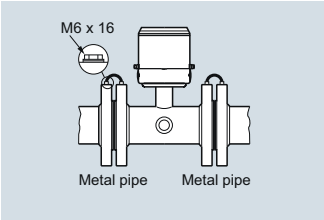
MAG 8000 (7ME6810) for Fire Service applications

MAG 8000 (7ME6810) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22



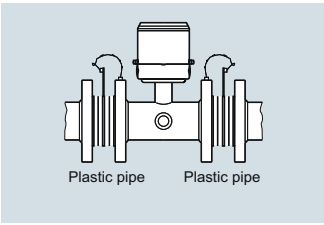
Grounding

The sensor body must be grounded using grounding straps and/or grounding rings to protect the flow signal against stray electrical noise. This ensures that the noise is carried through the sensor body and a noise-free measuring area within the sensor body. For MAG 8000 Irrigation grounding rings on both sides are factory-mounted.



Metal pipes

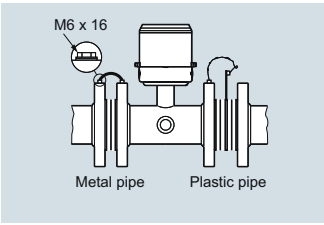
On metal pipes, connect the straps to both flanges.



Plastic pipes

On plastic pipes and lined metal pipes, optional grounding rings must be used at both ends.

Grounding rings has to be ordered separately see „Grounding ring kit“



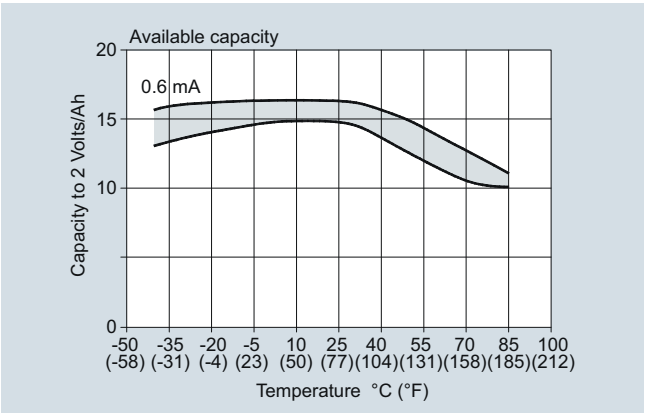
Combination of metal and plastic pipes

A combination of metal and plastic requires straps for metal pipe and grounding rings for plastic pipe.

Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity.



The graphic shows the effect from other temperatures.
A variation in temperature from 15 °C to 55 °C (59 to 131 °F) reduces the capacity by 17 % from 15 Ah to 12.5 Ah.

At typical revenue scenario of expected battery operation time can be seen in the table below.

The measurement for calculating the rest capacity of the battery life time is only completed if the system has no active fatal faults or the empty pipe is active. Maximum battery specification is 10 years operation.

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Battery-operated water meter MAG 8000

Scenario - Revenue application	
Output A	Pulse rate max. 10 Hz
Output B	Alarm or call-up
Meter dialog	1 hour per month
Add-com	None
Temperature	• 5 % at 0 °C (32 °F) • 80 % at 15 °C (59 °F) • 15 % at 50 °C (122 °F)

Battery lifetime (subject to the assumptions mentioned above)

MAG 8000 for abstraction and distribution network applications (7ME6810) and MAG 8000 CT for revenue and bulk metering (7ME6820)								
Excitation frequency (24 h operation)		**1/60 Hz**	**1/30 Hz**	**1/15 Hz**	**1/5 Hz**	**1.5625 Hz**	**3.125 Hz**	**6.25 Hz**
2 D-Cell battery 33 Ah Internal battery pack	DN 25 ... 200 (1" ... 8")	8 years	8 years	6 years	40 months	8 months	4 months	2 months
	DN 250 … 600 (10" ... 24")	8 years	6 years	4 years	20 months	4 months	2 months	N/A
	DN 700 ... 1 200 (28" ... 48")	6 years	4 years	2 years	1 year	2 months	N/A	N/A
4 D-Cell battery 66 Ah External battery pack	DN 25 ... 200 (1" ... 8")	N/A	10 years	10 years	80 months	16 months	8 months	4 months
	DN 250 ... 600 (10" ... 24")	N/A	10 years	10 years	40 months	8 months	4 months	N/A
	DN 700 ... 1 200 (28" ... 48")	10 years	8 years	4 years	2 years	4 months	N/A	N/A

MAG 8000 for irrigation applications (7ME6880)							
Excitation frequency (24 h operation)		**1/60 Hz**	**1/30 Hz**	**1/15 Hz**	**1/5 Hz**	**1.5625 Hz**	**3.125 Hz**
1 D-Cell battery Internal battery pack	DN 25 ... 600 (1" ... 24")	52 months	40 months	25 months	12 months	2 months	1 month
	DN 700 ... 1 200 (28" ... 48")	3 years	2 years	1 years	6 months	1 month	N/A
2 D-Cell battery 33 Ah Internal battery pack	DN 50 … 600 (2" ... 24")	8 years	80 months	50 months	24 months	4 months	2 months
	DN 700 ... 1 200 (28" ... 48")	6 years	4 years	2 years	1 year	2 months	N/A
4 D-Cell battery 66 Ah External battery pack	DN 50 ... 600 (2" ... 24")	10 years	10 years	8 years	48 months	8 months	4 months
	DN 700 ... 1 200 (28" ... 48")	10 years	8 years	4 years	2 years	4 months	N/A

MAG 8000 GSM/GPRS battery lifetime scenario	
Transmission once a day and MAG 8000 factory settings	
2 D-Cell battery 33 Ah Internal battery pack	3 years
4 D-Cell battery 66 Ah Internal battery pack	7 years

External battery pack can be used as battery backup for mains power supply (if two cable entries in one cable gland are needed, order cable glands with two entries, see accessories on page 3/137).

Serial RS 232/RS 485 add-on communication modules are designed for mains powered systems as the battery operation time will be reduced. At 1 hour communication per month (all meter data collected 2 times per day) and the module is connected, the operation time is reduced to:

- RS 232 at low excitation frequency to 10 % and at high excitation frequency to 80 % of calculated operation time
- RS 485 at low excitation frequency to 50 % and at high excitation frequency to 90 % of calculated operation time

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Overview

Benefits

Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried.
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities

Long-term stability/Low cost of ownership

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfil various customer requirements for high cost efficiency
- Up to 0.2 % maximum uncertainty
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications

Intelligent information, easy to access

- Advanced information on site
- Advanced statistics and diagnostics
- Optional high-performance GSM/GPRS module offers an efficient solution for remote measurement and monitor via wireless communication.

Technical specifications

Meter	
Accuracy	Standard calibration: ± 0.4 % of rate ± 2 mm/s Extended calibration DN 50 ... DN 300 (2" ... 12"): ± 0.2 % of rate ± 2 mm/s
Low flow cut-off (default)	0.05 %
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F)
Media	0 ... 70 °C (32 ... 158 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH_2O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH_2O for six months
Certificates and approvals	
Calibration	
• Standard calibration	2 x 25 % and 2 x 90 % (default)
• Special calibration	5-point calibration: 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max} 10-point calibration: ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max} Matched-pair calibration: default, 5-point, 10-point
Material certificate EN 10204-3.1	Available when ordering together with meter[1)]
Drinking water approvals	• NSF/ANSI Standard 61[2)] (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)
Fire Service Approvals	FM Fire Service Meter (Class Number 1044)[3)]
Conformity	• PED: 97/23EC[4)] For pressure/temperature curves see MAG 3100 on page 3/70. • EMC: IEC/EN 61326
Sensor version	DN 25 … 1200 (1" … 48")
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4, according to ISO 12944-2
Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	
• Battery-powered	DN 25 ... 150 (1" ... 6"): 1/15 Hz DN 200 … 600 (8" … 24"): 1/30 Hz DN 700 ... 1200 (28" ... 48"): 1/60 Hz
• Mains-powered	DN 25 ... 150 (1" ... 6"): 6.25 Hz DN 200 … 600 (8" … 24"): 3.125 Hz DN 700 ... 1200 (28" ... 48"): 1.5625 Hz

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Advanced version	
• Battery-powered	DN 25 ... 150 (1" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 … 600 (8" … 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime) DN 700 ... 1200 (28“ ... 48“): 1/60 Hz (adjustable up to 1.5625 Hz; reduced battery lifetime)
• Mains-powered	DN 25 ... 150 (1" ... 6"): 6.25 Hz DN 200 … 600 (8" … 24"): 3.125 Hz DN 700 ... 1200 (28“ ... 48“): 1.5625 Hz
Flanges	
EN 1092-1 (DIN 2501)	DN 25 and DN 40 (1" and 1½"): PN 40 (580 psi) DN 50 … 150 (2" … 6"): PN 16 (232 psi) DN 200 … 1200 (8" … 48"): PN 10 or PN 16 (145 psi or 232 psi)
ANSI 16.5 Class 150	1" … 24": 20 bar (290 psi)
AWWA C-207	28" … 48": PN 10 (145 psi)
AS 4087	DN 50 … 1200 (2" … 48"): PN 16 (232 psi)
Liner	EPDM
Electrode and grounding electrodes	Hastelloy C276/2.4819
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor.

1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.

2) Including Annex G

3) Not for sensors with 300 µm coating.

4) For further information on the PED standard and requirements see page 9/6.

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Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter ↗	**7ME6810-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 25 (1“) ⬟	2D
DN 40 (1½“) ⬟	2R
DN 50 (2“) ⬟	2Y
DN 65 (2½“) ⬟	3F
DN 80 (3“) ⬟	3M
DN 100 (4“) ⬟	3T
DN 125 (5“) ⬟	4B
DN 150 (6“) ⬟	4H
DN 200 (8“) ⬟	4P
DN 250 (10“) ⬟	4V
DN 300 (12“) ⬟	5D
DN 350 (14“)	5K
DN 400 (16“)	5R
DN 450 (18“)	5Y
DN 500 (20“)	6F
DN 600 (24“)	6P
DN 700 (28“)[1]	6Y
DN 750 (30“)[1]	7D
DN 800 (32“)[1]	7H
DN 900 (36“)[1]	7M
DN 1000 (40“)[1]	7R
DN 1050 (42“)[1]	7U
DN 1100 (44“)[1]	7V
DN 1200 (48“)[1]	8B
Flange norm and pressure rating	
EN 1092-1	
PN 10 (DN 200 ... 1200 (8" ... 48"))	B
PN 16 (DN 50 ... 1200 (2" ... 48")) ⬟	C
PN 16 non-PED (DN 700 .... 1200 (28"... 48"))	D
PN 40 (DN 25 ... 40 (1" ... 1½"))	F
ANSI B16.5	
Class 150 ⬟	J
AWWA C-207	
Class D (28" ... 48")	L
AS4087	
PN 16 (DN 50 ... 1200 (2" ... 48"))	N
Sensor version	
EPDM liner and Hastelloy electrodes, 150 µm coating ⬟	3
EPDM liner and Hastelloy electrodes , 300 µm coating ⬟	4
Calibration	
Standard ± 0.4 % of rate ± 2 mm/s ⬟	1
Extended ± 0.2 % of rate ± 2 mm/s DN 50... 300 (2" ... 12")	2
Region version	
Europe (m^3, m^3/h, 50 Hz)	1
USA (Gallon, GPM, 60 Hz)	2
Australia (Ml, Ml/d, 50 Hz)	3
Transmitter type and installation	
Basic version integral on sensor ⬟	A
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs:	
• 5 m (16.4 ft)	B
• 10 m (32.8 ft) ⬟	C
• 20 m (65.6 ft)	D
• 30 m (98.4 ft)	E
Advanced version integral on sensor	K

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter	**7ME6810-**
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs:	
• 5 m (16.4 ft)	L
• 10 m (32.8 ft)	M
• 20 m (65.6 ft)	N
• 30 m (98.4 ft)	P
Communication interface	
No additional "add-on" communication module installed ⬟	A
Serial RS 485 with Modbus RTU (Terminated as end device)	B
Serial RS 232 with Modbus RTU	C
Encoder interface with Sensus protocol	D
GSM/GPRS communication module with remote antenna; 5 m (16.4 ft) cable	S
GSM/GPRS communication module with analog inputs and remote antenna; 5 m (16.4 ft) cable	T
Power supply	
Internal battery (no battery included) ⬟	0
Internal battery pack installed[2] ⬟	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included) ⬟	2
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	3
115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included) ⬟	4

[1] The Diameter DN 700 (28") to DN 1200 (48") is only available as remote transmitter type installation.

[2] Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Operating instructions for SITRANS F M MAG 8000

Description	Article No.
• English	**A5E03071515**
• German	**A5E00740986**
• Spanish	**A5E00741031**
• French	**A5E00741021**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Operating instructions for MAG 8000 GSM/GPRS communication module

Description	Article No.
• English	**A5E03644134**

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MAG 8000 for abstraction and distribution network applications (7ME6810)

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Certificate	
Material certificate according to EN 10204-3.1	**C12**[1]
Special calibration	
5-point calibration for DN 15 ... DN 200[2]	**D01**
5-point calibration for DN 250 ... DN 600[2]	**D02**
5-point calibration for DN 700 ... DN 1200[2]	**D03**
10-point calibration for DN 15 ... DN 200[3]	**D06**
10-point calibration for DN 250 ... DN 600[3]	**D07**
10-point calibration for DN 700 ... DN 1200[3]	**D08**
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 15 ... DN 200	**D11**
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 250 ... DN 600	**D12**
Default (2 x 25 % and 2 x 90 %) match-pair calibration for DN 700 ... DN 1200	**D13**
5-point, matched-pair calibration for DN 15 ... DN 200[2]	**D15**
5-point, matched-pair calibration for DN 250 ... DN 600[2]	**D16**
5-point, matched-pair calibration for DN 700 ... DN 1200[2]	**D17**
10-point, matched-pair calibration for DN 15 ... DN 200[3]	**D18**
10-point, matched-pair calibration for DN 250 ... DN 600[3]	**D19**
10-point, matched-pair calibration for DN 700 ... DN 1200 [3]	**D20**
Flow unit	
l/s	**L00**
MGD	**L01**
CFS	**L02**
l/min	**L03**
m^3/min	**L04**
GPM	**L05**
CFM	**L06**
l/h	**L07**
m^3/h	**L08**
GPH	**L09**
CFH	**L10**
GPS	**L11**
Ml/d	**L12**
m^3/d	**L13**
GPD	**L14**
BBL42/s	**L15**
BBL42/min	**L16**
BBL42/h	**L17**
BBL42/d	**L18**
Totalizer Volume calculation (default totalizer 1= forward and totalizer 2 = reverse)	
Totalizer 1 = RV, reverse flow	**L20**
Totalizer 1 = NET, net flow	**L22**
Totalizer 2 = FW, forward flow	**L30**
Totalizer 2 = NET, net flow	**L31**
Volume unit	
m^3	**L40**
Ml	**L41**
G	**L42**
AF	**L43**
l x 100	**L44**
m^3 x 100	**L45**
G x 100	**L46**
CF x 100	**L47**
MG	**L48**
G x 1000	**L49**
CF x 1000	**L50**
AI	**L51**
kl	**L52**
BBL42 (US oil barrel, 1 barrel = 42 US gallons)	**L54**
Pulse set up (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
A function = RV, reverse flow	**L62**
A function = FWnet, forward net flow	**L63**
A function = RVnet, reverse net flow	**L64**
A function = Off	**L65**
Volume per pulse A = x 0.0001[4]	**L70**
Volume per pulse A = x 0.001[4]	**L71**
Volume per pulse A = x 0.01[4]	**L72**
Volume per pulse A = x 0.1[4]	**L73**
Volume per pulse A = x 1[4]	**L74**
B function = FW, forward flow	**L80**
B function = RV, verse flow	**L81**
B function = FWnet, forward net flow	**L82**
B function = RVnet, reverse net flow	**L83**
B function = Alarm	**L84**
B function = Call up	**L85**
Volume per pulse B = x 0.0001[4]	**L90**
Volume per pulse B = x 0.001[4]	**L91**
Volume per pulse B = x 0.01[4]	**L92**
Volume per pulse B = x 0.1[4]	**L93**
Volume per pulse B = x 1[4]	**L94**
Data logger set up (default month logging)	
DataloggerInterval = Daily	**M31**
DataloggerInterval = Weekly	**M32**
Factory mounted cables	
5 m (16.4 ft) pulse cable A+B	**M81**
5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	**M82**
20 m (65.6 ft) pulse cable A+B	**M84**
20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	**M85**
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	**M87**
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	**M89**
Encoder interface cable with connector for ITRON 200WP radio, lenght 25 ft	**M90**
Encoder interface cable with connector for ITRON 200WP radio, length 5 ft	**M91**
SOFREL data logger cable 2 m with connector for SOFREL GSM module	**M92**
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
DN 50, DN 80 and DN 100 (2", 3" and 4")	**P20**
DN 150 and DN 200 (6" and 8")	**P21**
DN 250 and DN 300 (10" and 12")	**P22**

[1] Under preparation

[2] 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

[3] Ascending and descending at 20 %, 40 %, 60 %, 80 %, 100 % of factory Q_{max}

[4] Pulse width = 10 ms

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Overview

Benefits

Approvals

- MI-001, OIML R 49/OIML R 49 MAA
- PTB K7.2
- FM Fire Service

Easy to install

- Compact or remote solution with factory mounted cable and customer setting from factory
- IP68/NEMA 6P enclosure. Sensor can be buried
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities

Long-term stability/Low cost of ownership

- No moving parts in a robust construction means less wear and tear
- Basic and advanced transmitter versions with different optional add-on communication modules fulfil various customer requirements for high cost efficiency
- Bi-directional measurement with an outstanding low flow performance
- Up to 10 years maintenance-free operation in typical applications
- Insignificant pressure drop

Intelligent information, easy to access

- Advanced information on site
- Advanced statistics and diagnostics
- Connectable to common AMR systems

Technical specifications

Meter	
Accuracy	OIML R 49/OIML R 49 MAA for DN 50 ... DN 300 (2" ... 12"), Class I and II with turn down up to Q3/Q1 = 400 at Q2/Q1 =1.6 MI-001 verification for DN 50 … DN 400 (2" ... 16"), Class II with turn down ratio Q3/Q1 = 250, Q3/Q1 = 200 or Q3/Q1 = 160 at Q2/Q1 = 1.6 FM Fire Service for DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") ± 1.5% (Q_{min} to Q_{max})
Low flow cut-off (default)	0.25 %
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F) MI-001: -25 ... +55 °C (-13 ... +131 °F)
Media	0.1 ... 50 °C (32 ... 122 °F)
Storage	-40 ... +70 °C (-22 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH_2O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH_2O for six months
Certificates and approvals	
Calibration (standard)	2 x 25 % and 2 x 90 %
Material certificate EN 10204 3.1	Available when ordering together with meter[1]
Drinking water approvals	• NSF/ANSI Standard 61[2] (cold water) USA • WRAS (BS 6920 cold water) UK • ACS Listed France • DVGW W270 Germany • Belgaqua (B) • MCERTS (GB)
Fire Service approval	FM Fire Service (1044)[3]
Custody transfer approval	• OIML R 49 and OIML R 49 MAA approval (DN 50 ... DN 300 (2" ... 12")) • MI-001 approval (DN 50 ... DN 600 (2" ... 24")) (DK-0200-MI-001-011) • PTB K7.2
Conformity	• CEN EN 14154, ISO 4064 • PED: 97/23/EC[4] For pressure/temperature curves, see MAG 3100 on page 3/70. • EMC: IEC/EN 61326
Sensor version	DN 50 ... 600 (2" ... 24")
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4, according to ISO 12944-2
Measuring principle	Electromagnetic induction
Excitation frequency	
Basic version	
• Battery-powered	DN 50 ... 150 (2" ... 6"): 1/15 Hz DN 200 … 600 (8" … 24"): 1/30 Hz
• Mains-powered	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 … 600 (8" … 24"): 3.125 Hz

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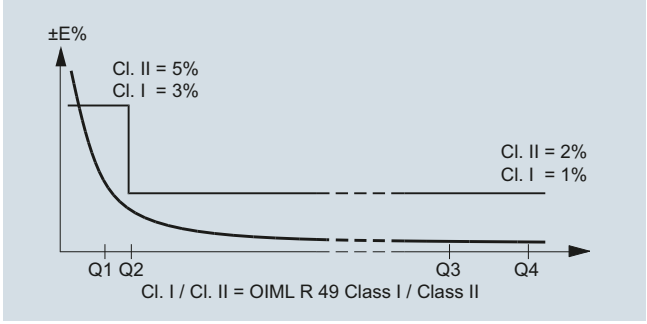
Advanced version	
• Battery-powered	DN 50 ... 150 (2" ... 6"): 1/15 Hz (adjustable up to 6.25 Hz; reduced battery lifetime) DN 200 … 600 (8" … 24"): 1/30 Hz (adjustable up to 3.125 Hz; reduced battery lifetime)
• Mains-powered	DN 50 ... 150 (2" ... 6"): 6.25 Hz DN 200 … 600 (8" … 24"): 3.125 Hz
Flanges	
EN 1092-1 (DIN 2501)	DN 50 … 150 (2" … 6"): PN 16 (232 psi) DN 200 … 300 (8" … 12"): PN 10 or PN 16 (145 psi or 232 psi) up to DN 600 (24") in preparation
ANSI 16.5 Class 150	2" … 12": 20 bar (290 psi) up to DN 600 (24") in preparation
AWWA C-207	28" … 48": PN 10 (145 psi)
AS 4087	DN 50 … 300 (2" … 12"): PN 16 (232 psi) up to DN 600 (24") in preparation
Liner	EPDM
Electrode and grounding electrodes	Hastelloy C276/2.4819
Grounding straps	Grounding straps are premounted from the factory on each side of the sensor

1) Has to be ordered with the meter. It is not possible to order the certificate afterwards.
2) Including Annex G
3) Not for sensors with 300 µm coating.
4) For further information on the PED standard and requirements see page 9/6.

MAG 8000 CT (Revenue program) water meter type approval

MAG 8000 CT program is type approved and verified according to international water meter standard OIML R 49. The Custody Transfer program is approved as Class I and Class II, for the sensor program from DN 50 to DN 300, at different Q3 and Q3/Q1. Q2/Q1 = 1.6 and follows OIML R 49 specification.



OIML R 49/2006-DK2-10.01 Revision 1 approval specification for Class I (1 %)[1)]

Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R" Q3/Q1	250	250	250	250	250	250	250	250	125	-	-	-	-	-
Q1 [m^3/h]	0.25	0.40	0.63	1.00	160	2.50	4.00	6.40	12.8	-	-	-	-	-
Q2 [m^3/h]	0.40	0.64	1.00	1.60	2.60	4.00	6.40	10.24	20.48	-	-	-	-	-
Q3 [m^3/h]	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**	**1600**	-	-	-	-	-
Q4 [m^3/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000	-	-	-	-	-

OIML R 49/2006-DK2-10.01 Revision 1 approval specification for Class II (2 %)[1)]

Size	DN 50 (2")	DN 65 (2½")	DN 80 (3")	DN 100 (4")	DN 125 (5")	DN 150 (6")	DN 200 (8")	DN 250 (10")	DN 300 (12")	DN 350 (14")	DN 400 (16")	DN 450 (18")	DN 500 (20")	DN 600 (24")
„R" Q3/Q1	400	400	400	400	400	400	400	400	200	-	-	-	-	-
Q1 [m^3/h]	0.16	0.25	0.40	0.63	1.00	1.60	2.50	4.00	10.00	-	-	-	-	-
Q2 [m^3/h]	0.25	0.40	0.63	1.00	1.60	2.50	4.00	6.40	16.00	-	-	-	-	-
Q3 [m^3/h]	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**	**1600**	-	-	-	-	-
Q4 [m^3/h]	78.75	125	200	312.5	500	787.5	1250	2000	2000	-	-	-	-	-

1) The product will be delivered according to requested specifications, which may deviate from the specifications of the approval frame described in tables below.

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MAG 8000 CT (Revenue program) MI-001

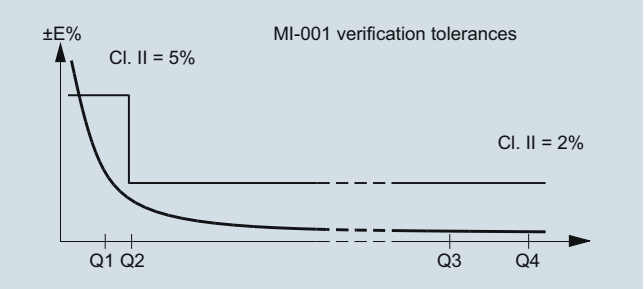
MAG 8000 CT program is type approved according to international water meter standard OIML R 49. Since the first November 2006 the MI-001 water meter directive is in force, which means that all water meters can be sold across the EU borders if the water meters contain a MI-001 label.

The MAG 8000 CT MI-001 verified and labeled products are a Class II aproval according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-001 in the sizes from DN 50 to DN 400.

The MID certification is obtained as a B + D module approval according to the above mentioned directive.

Module B : Type approval according to OIML R 49

Module D : Quality insurance approval of production



MAG 8000 CT MI-001 verified and labeled products at a given Q3 and Q4/Q3 = 1.25 and Q2/Q1 = 1.6 measuring ranges see below table:

7ME6820-xxxx1	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**	**DN 125 (5")**	**DN 150 (6")**	**DN 200 (8")**	**DN 250 (10")**	**DN 300 (12")**	**DN 350 (14")**	**DN 400 (16")**	**DN 450 (18")**	**DN 500 (20")**	**DN 600 (24")**
„R" Q3/Q1	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Q4 [m^3/h]	20	31.25	50	78.75	125	200	312.5	500	750	1250	1250	1250	2000	3125
Q3 [m^3/h]	**16**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1000**	**1000**	**1600**	**2500**
Q2 [m^3/h]	0.96	1.60	2.60	4.03	6.40	10.24	16	25.60	38.4	64	64	64	102.4	160
Q1 [m^3/h]	0.60	1	1.60	2.52	4	6.40	10	16	24	40	40	40	64	100

7ME6820-xxxx2	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**	**DN 125 (5")**	**DN 150 (6")**	**DN 200 (8")**	**DN 250 (10")**	**DN 300 (12")**	**DN 350 (14")**	**DN 400 (16")**	**DN 450 (18")**	**DN 500 (20")**	**DN 600 (24")**
„R" Q3/Q1	63	63	63	63	63	63	63	63	63	63	63	63	63	63
Q4 [m^3/h]	20	31.25	50	78.75	125	200	312.5	500	750	1250	1250	3125	3125	5000
Q3 [m^3/h]	**16**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1000**	**2500**	**2500**	**4000**
Q2 [m^3/h]	0.41	0.63	1.02	1.60	2.54	4.06	6.35	10.16	16	25.4	25.4	63.49	63.49	101.6
Q1 [m^3/h]	0.25	0.40	0.63	1	1.59	2.54	3.97	6.35	10	15.9	15.9	39.68	39.68	63.49

7ME6820-xxxx3	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**	**DN 125 (5")**	**DN 150 (6")**	**DN 200 (8")**	**DN 250 (10")**	**DN 300 (12")**	**DN 350 (14")**	**DN 400 (16")**	**DN 450 (18")**	**DN 500 (20")**	**DN 600 (24")**
„R" Q3/Q1	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Q4 [m^3/h]	20	31.25	50	78.75	125	200	312.5	500	750	1250	1250	5000	5000	7875
Q3 [m^3/h]	**16**	**25**	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1000**	**4000**	**4000**	**6300**
Q2 [m^3/h]	0.32	0.50	0.80	1.20	2	3.20	5	8	12.6	20	20	80	80	126
Q1 [m^3/h]	0.20	0.31	0.50	0.75	1.25	2	3.13	5	7.88	12.5	12.5	50	50	78.75

7ME6820-xxxx4	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**	**DN 125 (5")**	**DN 150 (6")**	**DN 200 (8")**	**DN 250 (10")**	**DN 300 (12")**	**DN 350 (14")**	**DN 400 (16")**	**DN 450 (18")**	**DN 500 (20")**	**DN 600 (24")**
„R" Q3/Q1	160	160	160	160	160	160	160	160	160	160	160	-	160	-
Q4 [m^3/h]	50	78.75	125	200	312.5	500	787.5	1250	2000	2000	2000	-	7875	-
Q3 [m^3/h]	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**1600**	**1600**	**1600**	-	**6300**	-
Q2 [m^3/h]	0.40	0.63	1	1.60	2.50	4	6.30	10	16	16	16	-	63	-
Q1 [m^3/h]	0.25	0.39	0.63	1	1.56	2.50	3.94	6.25	10	10	10	-	39.38	-

7ME6820-xxxx5	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**	**DN 125 (5")**	**DN 150 (6")**	**DN 200 (8")**	**DN 250 (10")**	**DN 300 (12")**	**DN 350 (14")**	**DN 400 (16")**	**DN 450 (18")**	**DN 500 (20")**	**DN 600 (24")**
„R" Q3/Q1	200	200	200	200	200	200	200	200	-	-	-	-	-	-
Q4 [m^3/h]	50	78.75	125	200	312.5	500	787.5	1250	-	-	-	-	-	-
Q3 [m^3/h]	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	-	-	-	-	-	-
Q2 [m^3/h]	0.32	0.50	0.80	1.28	2	3.20	5.04	8	-	-	-	-	-	-
Q1 [m^3/h]	0.20	0.32	0.50	0.80	1.25	2	3.15	5	-	-	-	-	-	-

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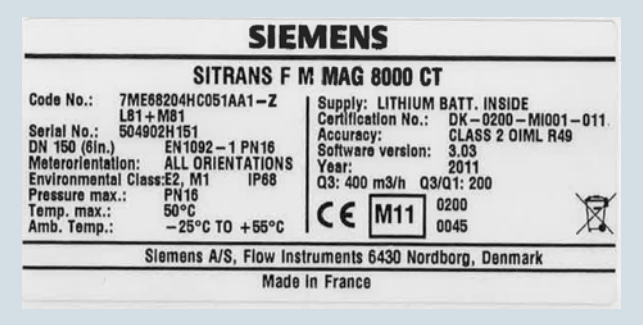
MAG 8000 CT for revenue and bulk metering (7ME6820)

7ME6820-xxxx6	DN 50 (2“)	DN 65 (2½“)	DN 80 (3“)	DN 100 (4“)	DN 125 (5“)	DN 150 (6“)	DN 200 (8“)	DN 250 (10“)	DN 300 (12“)	DN 350 (14“)	DN 400 (16“)	DN 450 (18“)	DN 500 (20“)	DN 600 (24“)
„R“ Q3/Q1	250	250	250	250	250	250	250	250	-	-	-	-	-	-
Q4 [m^3/h]	50	78.75	125	200	312.5	500	787.5	1250	-	-	-	-	-	-
Q3 [m^3/h]	**40**	**63**	**100**	**160**	**250**	**400**	**630**	**1000**	**-**	**-**	**-**	-	-	-
Q2 [m^3/h]	0.26	0.40	0.64	1.02	1.60	2.56	4	6.40	-	-	-	-	-	-
Q1 [m^3/h]	0.16	0.25	0.40	0.64	1	1.60	2.52	4	-	-	-	-	-	-

The Label is placed on the side of the encapsulation.
An example of the product label is shown below:



Installation conditions

Please refer to “System information SITRANS F M electromagnetic flowmeters”.

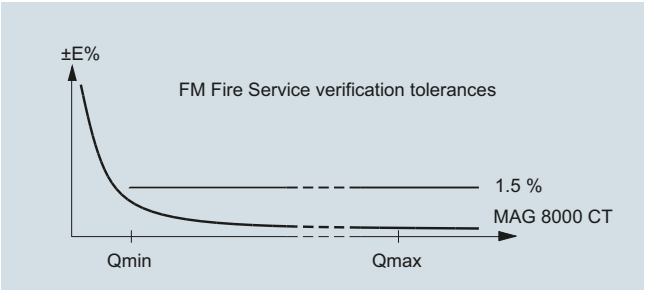
Battery operation time and calculation

The battery operation time depends on the connected battery pack as well as the operation condition of the meter.

MAG 8000 calculates the remaining capacity every 4 hours and includes all consuming elements. Calculation compensates for temperature influence on battery capacity (drawing).

MAG 8000 CT (7ME6820) for Fire Service applications

MAG 8000 CT (7ME6820) is FM Fire Service approved for automatic fire protection systems according to the Fire Service Meters Standard, Class Number 1044. The approval is applicable for the sizes DN 50, DN 80, DN 100, DN 150, DN 200, DN 250, and DN 300 (2", 3", 4", 6", 8", 10", and 12") with ANSI B16.5 Class 150 flanges. The FM Fire Service approved product can be ordered via the Z-options P20, P21 and P22.



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Selection and Ordering data	Article No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes ↗	**7ME6820-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 50 (2")	**2Y**
DN 65 (2½")	**3F**
DN 80 (3")	**3M**
DN 100 (4")	**3T**
DN 125 (5")	**4B**
DN 150 (6")	**4H**
DN 200 (8")	**4P**
DN 250 (10")	**4V**
DN 300 (12")	**5D**
DN 350 (14")[1]	**5K**
DN 400 (16")[1]	**5R**
DN 450 (18")[1]	**5Y**
DN 500 (20")[1]	**6F**
DN 600 (24")[1]	**6P**
Flange norm and pressure rating	
EN 1092-1	
PN 16	**C**
ANSI B16.5	
Class 150	**J**
AS4087	
PN 16	**N**
Sensor version	
EPDM liner and Hastelloy electrodes, 150 µm coating	**0**
EPDM liner and Hastelloy electrodes, 300 µm coating	**4**
Approval/Verification[3]	
Without verification according to OIML R 49[4]	**0**
MI-001 Q3/Q1 = 25	**1**
MI-001 Q3/Q1 = 63	**2**
MI-001 Q3/Q1 = 80	**3**
MI-001 Q3/Q1 = 160	**4**
MI-001 Q3/Q1 = 200	**5**
MI-001 Q3/Q1 = 250	**6**
Without verification calibrated to OIML R 49-Class II (Q3/Q1 = 100)	**7**
Without verification calibrated to OIML R 49-Class II (Q3/Q1 = 250)	**8**
Region version	
Europe (m^3, m^3/h, 50 Hz)	**1**
USA (m^3, m^3/h, 60 Hz)	**2**
Transmitter type and installation	
Basic version integral on sensor	**A**
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs	
5 m (16.4 ft)	**B**
10 m (32.8 ft)	**C**
20 m (65.6 ft)	**D**
30 m (98.4 ft)	**E**
Advanced version integral on sensor	**K**
Advanced version, remote cables mounted on sensor with IP68/NEMA 6P plugs	
5 m (16.4 ft)	**L**
10 m (32.8 ft)	**M**
20 m (65.6 ft)	**N**
30 m (98.4 ft)	**P**

Selection and Ordering data	Article No.
SITRANS F M	
MAG 8000 CT water meter with EPDM liner and Hastelloy electrodes	**7ME6820-**
Communication interface	
No additional "add-on" communication module installed	**A**
Serial RS 485 with Modbus RTU (Terminated as end device)	**B**
Serial RS 232 with Modbus RTU	**C**
Encoder interface for ITRON 200WP radio with "Sensus" protocol"	**D**
GSM/GPRS module without analog inputs cable	**S**
GSM/GPRS module with analog inputs cable	**T**
Power supply	
Internal battery (no battery included)	**0**
Internal battery pack installed[2]	**1**
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included)	**2**
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	**3**
115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection. (no battery included)	**4**

1) Under preparation.

2) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

3) For more details and references of the ranges please see the tables on pages 3/126 to 3/128.

4) Standard calibration or according to FM Fire Service requirements if P20, P21 or P22 is selected as Z option.

Operating instructions for SITRANS F M MAG 8000

Description	Article No.
English	**A5E03071515**
German	**A5E00740986**
Spanish	**A5E00741031**
French	**A5E00741021**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.
All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Operating instructions for MAG 8000 GSM/GPRS communication module

Description	Article No.
English	**A5E03644134**

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MAG 8000 CT for revenue and bulk metering (7ME6820)

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Material certificate according to EN 10204-3.1	**C12**[1]
FP2E marking (France only)	**C17**
Totalizer Volume calculation (default totalizer 1= forward and totalizer 2 = reverse)	
Totalizer 1 = RV, reverse flow	**L20**
Totalizer 1 = NET, net flow	**L22**
Totalizer 2 = FW, forward flow	**L30**
Totalizer 2 = NET, net flow	**L31**
Pulse set up (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
A function = RV, reverse flow	**L62**
A function = FWnet, forward net flow	**L63**
A function = RVnet, reverse net flow	**L64**
A function = Off	**L65**
Volume per pulse A = x 0.001[2]	**L71**
Volume per pulse A = x 0.01[2]	**L72**
Volume per pulse A = x 0.1[2]	**L73**
Volume per pulse A = x 1[2]	**L74**
B function = FW, forward flow	**L80**
B function = RV, reverse flow	**L81**
B function = FWnet, forward net flow	**L82**
B function = RVnet, reverse net flow	**L83**
B function = Alarm	**L84**
B function = Call up	**L85**
Volume per pulse B = x 0.001[2]	**L91**
Volume per pulse B = x 0.01[2]	**L92**
Volume per pulse B = x 0.1[2]	**L93**
Volume per pulse B = x 1[2]	**L94**
Data logger set up (default month logging)	
DataloggerInterval = Daily	**M31**
DataloggerInterval = Weekly	**M32**
Factory mounted cables	
5 m (16.4 ft) pulse cable A+B	**M81**
5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	**M82**
20 m (65.6 ft) pulse cable A+B	**M84**
20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	**M85**
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	**M87**
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	**M89**
5 ft. Encoder interface cable with connector for ITRON 200WP radio	**M91**
25 ft. Encoder interface cable with connector for ITRON 200WP radio	**M90**
SOFREL data logger cable 2 m with connector for SOFREL GSM module	**M92**
FM Fire Service Approval (with ANSI B16.5 Class 150 flanges)	
DN 50, DN 80 and DN 100 (2", 3" and 4")	**P20**
DN 150 and DN 200 (6" and 8")	**P21**
DN 250 and DN 300 (10" and 12")	**P22**

[1] Under preparation

[2] Pulse width = 10 ms

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Overview

Benefits

- IP68/NEMA 6P rating with tamper proof
- Flexible power supply - internal or external battery pack or mains power supply with battery back-up possibilities
- No moving parts in a robust construction means less wear and tear
- Up to 8 years maintenance-free operation in typical application
- Connectable to AMR systems
- Adaptor for conduit installation to provide a clean, protected pathway for device cables

Technical specifications

Meter	
Accuracy	± 0.8 % ± 2.5 mm/s ± 0.4 % ± 2.5 mm/s NMI (class 2.5)
Low flow cut-off (default)	1.0 %
Media conductivity	Clean water > 20 µs/cm
Temperature	
Ambient	-20 ... +60 °C (-4 ... +140 °F)
Media	0 ... 70 °C (32 ... 158 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F)
Enclosure rating	
Remote sensor	IP68 to EN 60529/NEMA 6P, 10 mH_2O cont.
Compact version	IP68 to EN 60529/NEMA 6P, 3 mH_2O for six months
Approvals	
Drinking water approvals	• ANSI/NSF 61[1] (cold water) USA • WRAS (BS 6920 cold water) UK
Custody transfer approval	NMI10 Australia
Sensor material	Carbon steel ASTM A 105, with corrosion resistant two-component epoxy coating (150 µm/300 µm) Corrosivity category C4, according to ISO 12944-2
Conformity	IEC/EN 61326
Flanges	
EN 1092-1 (DIN 2501) PN 10 drilled pattern	DN 50 ... 600 (2" ... 24") (max. pressure 7 bar (101.5 psi))
ANSI 16.5 Class 150 drilled pattern	2" ... 24" (max. pressure 7 bar (101.5 psi))
AS 2091-1 Table D drilled pattern	DN 50 ... 600 (2" ... 24") (max. pressure 7 bar (101.5 psi))
AS 2129	DN 25, DN 40, DN 125 (1", 1½", 5")
AS 4087 PN 16	DN 50 ... DN 1200 (2" ... 48")
Excitation frequency	
Battery-powered	DN 50 … 600 (2" … 24"): 1/15 Hz DN 700 … 1200 (28" … 48"): 1/60 Hz
Mains-powered	DN 50 … 600 (2" … 24"): 3.125 Hz DN 700 … 1200 (28" … 48"): 1.5625 Hz
Liner	Ebonite
Electrodes	Stainless steel

[1] Including Annex G

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MAG 8000 for irrigation applications (7ME6880)

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter including factory-mounted grounding rings ↗	**7ME6880-** ■■■■■-■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Diameter	
DN 25 (1“)	2D
DN 40 (1½“)	2R
DN 50 (2“)	2Y
DN 65 (2½“)	3F
DN 80 (3“)	3M
DN 100 (4“)	3T
DN 125 (5“)	4B
DN 150 (6“)	4H
DN 200 (8“)	4P
DN 250 (10“)	4V
DN 300 (12“)	5D
DN 350 (14“)	5K
DN 400 (16“)	5R
DN 450 (18“)	5Y
DN 500 (20“)	6F
DN 600 (24“)	6P
DN 700 (28“)	6Y
DN 750 (30“)	7D
DN 800 (32“)	7H
DN 900 (36“)	7M
DN 1000 (40“)	7R
DN 1050 (42“)	7U
DN 1100 (44“)	7V
DN 1200 (48“)	8B
Flange norm and pressure rating	
EN 1092-1 drilled pattern PN 10/max. 7 bar (101 psi)	B
ANSI B16.5 drilled pattern Cl 150/max. 7 bar (101 psi)	J
AS2129 drilled pattern table D/max. 7 bar (101 psi)	M
AS2129 table E (DN 25, DN 40, DN 125)	G
AS4087 PN 16 (DN 50 ... DN 1200)	N
Sensor version	
Ebonite liner and stainless steel electrodes	4
Calibration	
± 0.8 %, ± 2.5 mm/s	0
± 0.4 %, ± 2.5 mm/s	1
NMI (2.5 %)	3
Region version	
Europe (m^3, m^3/h, 50 Hz)	1
USA (Gallon, GPM, 60 Hz)	2
Australia (Ml, Ml/d, 50 Hz)	3
Transmitter type and installation	
Basic version integral on sensor	A
Basic version, remote cables mounted on sensor with IP68/NEMA 6P plugs	
2 m (6.56 ft)	T
5 m (16.4 ft)	B
10 m (32.8 ft)	C
20 m (65.6 ft)	D
30 m (98.4 ft)	E

Selection and Ordering data	Article No.
SITRANS F M MAG 8000 water meter including factory-mounted grounding rings	**7ME6880-** ■■■■■-■■■
Communication interface	
No additional "add-on" communication module installed	A
Serial RS 485 with Modbus RTU (Terminated as end device)	B
Serial RS 232 with Modbus RTU	C
Encoder inferface	D
GSM module with remote antenna and 5 m (16.4 ft) cable	S
GSM module with analog input, remote antenna and 5 m (16.4 ft) cable	T
Power supply	
Internal battery (no battery included)	0
Internal battery pack installed 2 D-cell[1) 2)]	1
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included)	2
12/24 V AC/DC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	3
115 ... 230 V AC power supply with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included)	4
Internal battery pack installed 1 D-cell[1) 2)]	5

1) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

2) Can be ordered by US region only.

Operating instructions for SITRANS F M MAG 8000

Description	Article No.
• English	**A5E03071515**
• German	**A5E00740986**
• Spanish	**A5E00741031**
• French	**A5E00741021**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Flow unit	
l/s	**L00**
MGD	**L01**
CFS	**L02**
l/min	**L03**
m^3/min	**L04**
GPM	**L05**
CFM	**L06**
l/h	**L07**
m^3/h	**L08**
GPH	**L09**
CFH	**L10**
GPS	**L11**
Ml/d	**L12**
m^3/d	**L13**
GPD	**L14**
Totalizer Volume calculation (default totalizer 1= forward and totalizer 2 = reverse)	
Totalizer 1 = RV, reverse flow	**L20**
Totalizer 1 = NET, net flow	**L22**
Totalizer 2 = FW, forward flow	**L30**
Totalizer 2 = NET, net flow	**L31**
Volume unit	
m^3	**L40**
Ml	**L41**
G	**L42**
AF	**L43**
l x 100	**L44**
m^3 x 100	**L45**
G x 100	**L46**
CF x 100	**L47**
MG	**L48**
G x 1000	**L49**
CF x 1000	**L50**
Al	**L51**
kl	**L52**
Pulse set up (default pulse A = forward and pulse B = Alarm, pulse width = 50 ms)	
A function = RV, reverse flow	**L62**
A function = FWnet, forward net flow	**L63**
A function = RVnet, reverse net flow	**L64**
A function = Off	**L65**
Volume per pulse A = x 0.0001[1)]	**L70**
Volume per pulse A = x 0.001[1)]	**L71**
Volume per pulse A = x 0.01[1)]	**L72**
Volume per pulse A = x 0.1[1)]	**L73**
Volume per pulse A = x 1[1)]	**L74**
Pulse A pulse width 5 ms (volume per pulse x 1)	**L75**
Pulse A pulse width 10 ms (volume per pulse x 1)	**L76**
Pulse A pulse width 50 ms (volume per pulse x 1)	**L77**
Pulse A pulse width 100 ms (volume per pulse x 1)	**L78**
Pulse A pulse width 500 ms (volume per pulse x 1)	**L79**
B function = FW, forward flow	**L80**
B function = RV, verse flow	**L81**
B function = FWnet, forward net flow	**L82**
B function = RVnet, reverse net flow	**L83**
B function = Alarm	**L84**
B function = Call up	**L85**

Selection and Ordering data	Order code
Additional information	
Please add **"-Z"** to Article No. and specify Order code(s) and plain text.	
Volume per pulse B = x 0.0001[1)]	**L90**
Volume per pulse B = x 0.001[1)]	**L91**
Volume per pulse B = x 0.01[1)]	**L92**
Volume per pulse B = x 0.1[1)]	**L93**
Volume per pulse B = x 1[1)]	**L94**
Device operation	
Only operator menu activated	**M11**
Data logger set up (default month logging)	
DataloggerInterval = Daily	**M31**
DataloggerInterval = Weekly	**M32**
Factory mounted cables	
5 m (16.4 ft) pulse cable A+B	**M81**
5 m (16.4 ft) communication cable RS 232/RS 485 terminated as end device	**M82**
20 m (65.6 ft) pulse cable A+B	**M84**
20 m (65.6 ft) communication cable RS 232/RS 485 terminated as end device	**M85**
Cello 2 channel, input cable 3 m (9.84 ft) with Brad Harrison micro-change 3 way connector	**M87**
Cello 2 channel, input cable 5 m (16.4 ft) with MIL-C-26482 spec. connectors	**M89**
5 ft Encoder interface cable with connector for ITRON 200WP radio	**M91**
25 ft Encoder interface cable with connector for ITRON 200WP radio	**M90**
SOFREL data logger cable 2 m with connector for SOFREL GSM module	**M92**
Adaptors for conduit installation	**M94**

[1)] Pulse width = 10 ms

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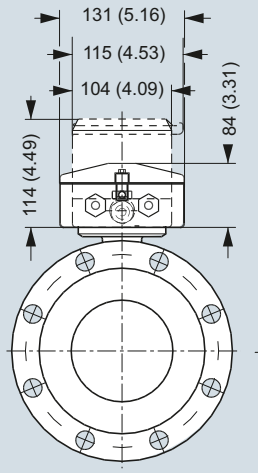
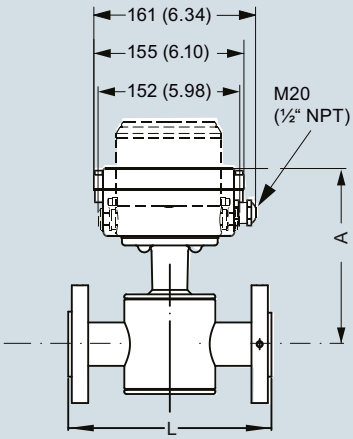
3

Dimensional drawings



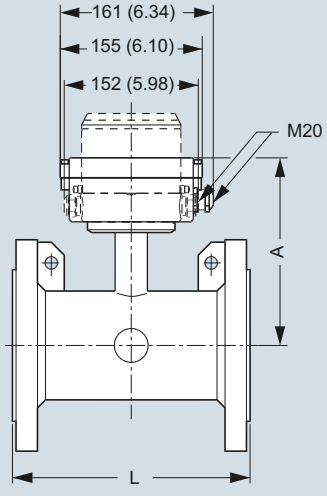
7ME6810/7ME6820

7ME6880



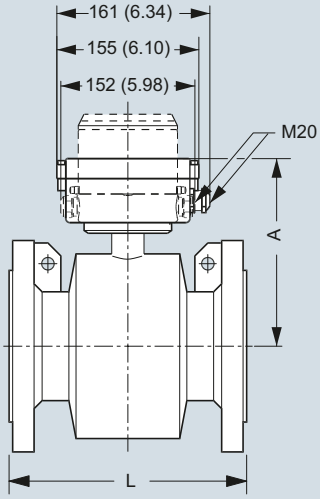
DN 25 and 40 (1" and 1½")

N/A



DN 50 ... 300 (2" ... 12")

N/A



DN 350 ... 1200 (14" ... 48")

DN 25 ... 600 (1" ... 24")
For DN 50 ... 300 (2" ... 12"):
Add 7 mm (0.28") to length (L)
For DN 350 ... 1200 (14" ... 48"):
Add 8 mm (0.31") to length (L)

Dimensions in mm (inch)

Nominal DN size	A	L, lenghts							Weight[1]	
	EPDM (7ME6810 and 7ME6820)	EN 1092-1 PN 10	EN 1092-1 PN 16/ PN 16 non-PED	EN 1092-1 PN 40	ANSI 16.5 Class 150	AS 4087 PN 16	AWWA C-207 Class D	AS 2129 Table E		
mm (inch)	mm (inch)	mm	mm	mm	inch	mm	mm	mm	kg	lb
25 (1)	188 (7.4)	-	-	200	7.9	200	-	200	6	13
40 (1½)	203 (8.0)	-	-	200	7.9	200	-	200	9	20
50 (2)	178 (7.0)	-	200	-	7.9	200	-	-	11	25
65 (2½)	181 (7.1)	-	200	-	7.9	200	-	-	13	29
80 (3)	191 (7.5)	-	200	-	7.9	200	-	-	15	34
100 (4)	197 (7.8)	-	250	-	9.8	250	-	-	17	38
125 (5)	210 (8.3)	-	250	-	9.8	250	-	250	22	50
150 (6)	224 (8.8)	-	300	-	11.8	300	-	-	28	63
200 (8)	249 (9.8)	350	350	-	13.8	350	-	-	50	113
250 (10)	276 (10.9)	450	450	-	17.7	450	-	-	71	160
300 (12)	303 (11.9)	500	500	-	19.7	500	-	-	88	198
350 (14)	365 (14.4)	550	550	-	21.7	550	-	-	127	279
400 (16)	391 (15.4)	600	600	-	23.6	600	-	-	145	318
450 (18)	421 (16.6)	600	600	-	23.6	600	-	-	175	384
500 (20)	447 (17.6)	600	600	-	26.8	600	-	-	225	494
600 (24)	497 (19.6)	600	600	-	32.3	600	-	-	340	747
700 (28)	548 (21.6)	700	875/700	-	N/A	700	700	-	316	694
750 (30)	573 (22.6)	N/A	N/A	-	N/A	N/A	750	-	N/A	N/A
800 (32)	603 (23.7)	800	1000/800	-	N/A	800	800	-	398	1045
900 (36)	656 (25.8)	900	1125/900	-	N/A	900	900	-	476	1045
1000 (40)	708 (27.9)	1000	1250/1000	-	N/A	1000	1000	-	602	1322
1050 (42)	708 (27.9)	N/A	N/A	-	N/A	N/A	1050	-	N/A	N/A
1100 (44)	759 (29.9)	N/A	N/A	-	N/A	N/A	1100	-	N/A	N/A
1200 (48)	814 (32.0)	1200	1500/1200	-	N/A	1200	1200	-	887	1996

[1] For remote version the sensor weight is reduced with 2 kg (4.5 lb)

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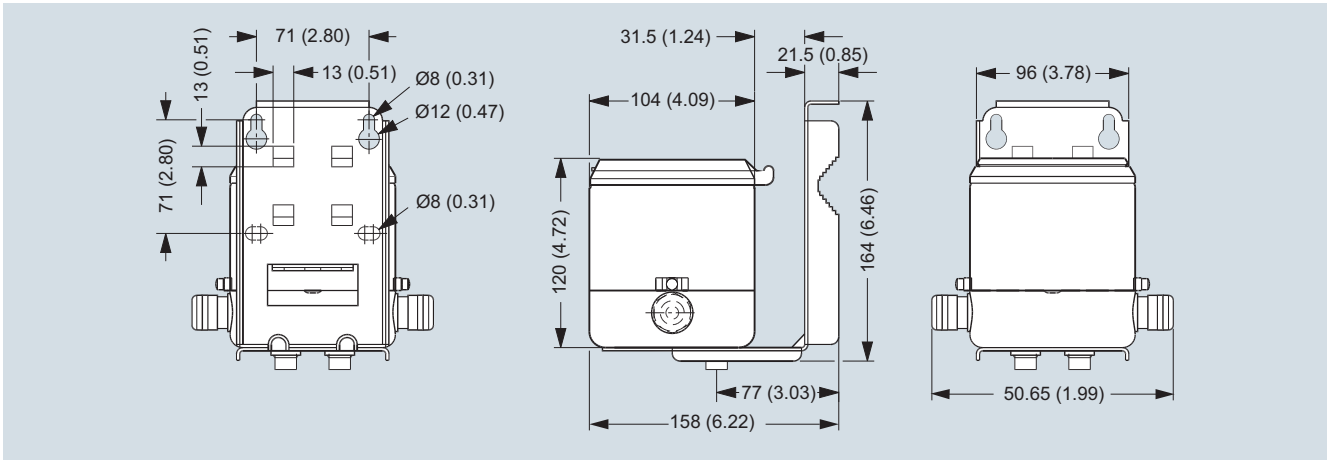
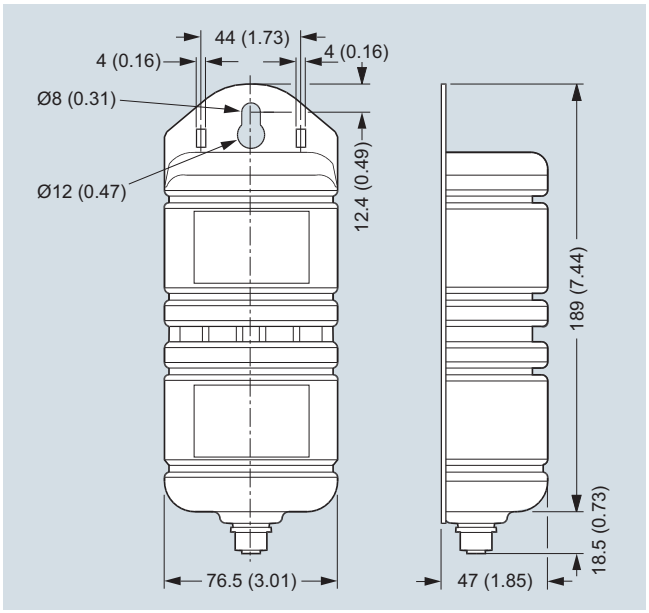
Remote version



Dimensions in mm (inch), weight 3.5 kg (8 lb)

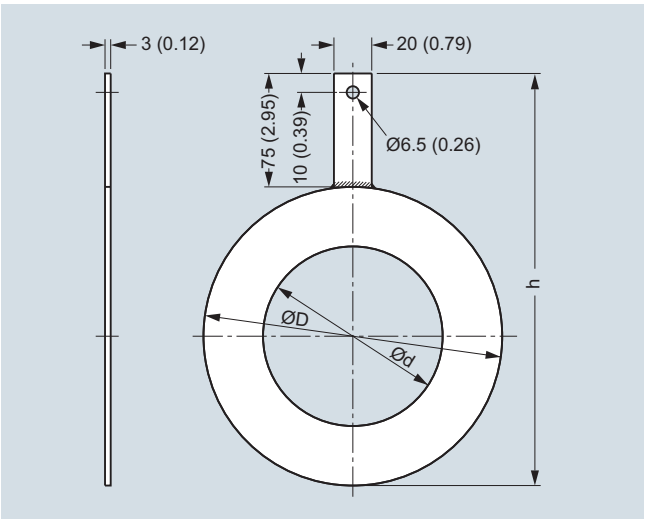
External battery pack



Dimensions in mm (inch), weight 2.0 kg (4.5 lb)

Battery pack has to be mounted in upwards position to ensure maximum battery capacity.

Grounding rings



Dimensions in mm (inch) for grounding rings MAG 8000 with EPDM lining (7ME6810 and 7ME6820) DN 25 to DN 300

Dimension	Internal diameter (d)	Outside diameter (D)	h
DN 25	27	68	143
DN 40	38	88	163
DN 50	52	100	175
DN 65	64	120	195
DN 80	79	133	208
DN 100	95	158	233
DN 125	115	188	263
DN 150	145	216	291
DN 200	193	268	343
DN 250	246	324	399
DN 300	295	374	449

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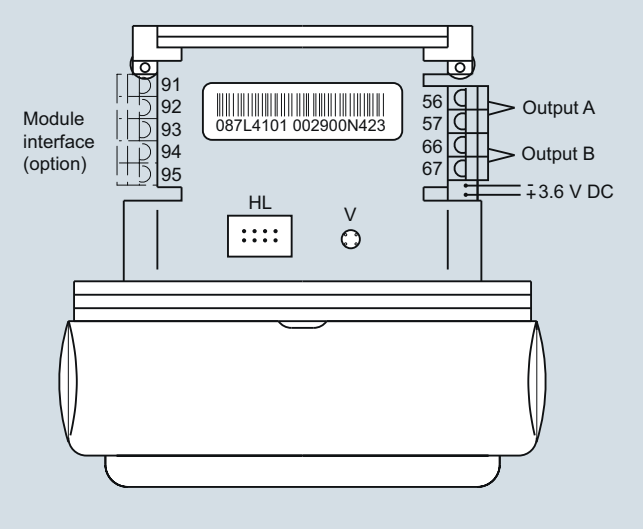
3

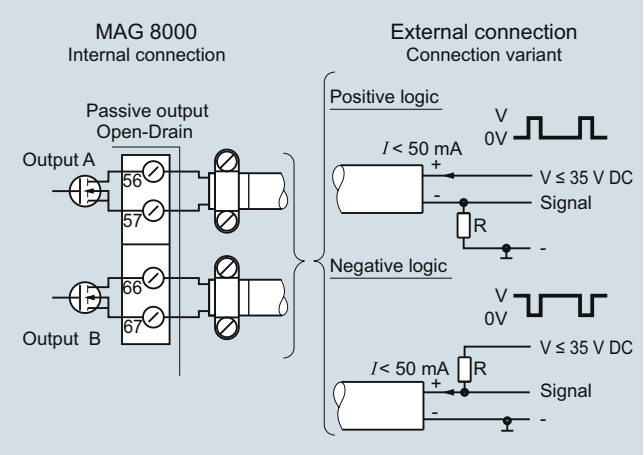
Schematics

Electrical installation and pulse output – Connection diagram



HL = Hardware lock key connection
V = Push button for verification mode

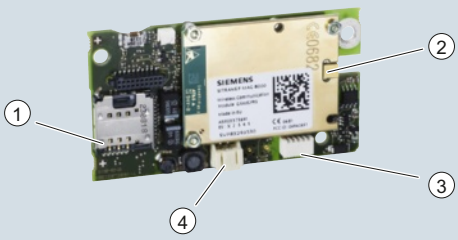
Pulse wire connection



The pulse output can be configured as volume, alarm or call-up. The output can be connected as positive or negative logic.
R = pull up/down is selected in relation to the Vx power supply and with a max. current I of 50 mA.

Use shielded cable to avoid EMC problems. Make sure the shield is correctly mounted under the cable clamp (no pig tail).

Electrical installation of GSM/GPRS module



1. SIM card slot
2. GSM/GPRS antenna connector
3. Analog inputs inlet
4. Rechargeable battery inlet

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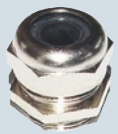
Accessories

Description	Article No.	
PC Flow Tool on CD (Download for free from www.siemens.com/flow)	**FDK:087L6001**	
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable	**FDK:087L4163**	
Battery backup for mains power supply, 1 pc. D-cell (3.6 V, 16.5 Ah)[1]	**A5E03354392**	
Rechargeable Lithium battery for MAG 8000 GSM/GPRS communication module[1]	**A5E03436686**	
Internal battery pack, one set of 2 D-cell (3.6 V, 33 Ah) and accessories for replacement[1], incl. NBR O-ring	**FDK:087L4150**	
External battery pack IP68/NEMA 6P with connector, 4 D-cell (3.6 V, 66 Ah)[1]. Order cable FDK:087L4152 separately.	**FDK:087L4151**	
Mains power supply 12 ... 24 V AC/DC (average power consumption during line ≤ 0.1 VA) with battery backup and 3 m (9.8 ft) power cable for external connection (no battery included) Temperature range: Fixed laying: -40 ... +90 °C (-40 ... +194 °F) Flexible application: -30 ... +80 °C (-22 ... +176 °F)	**FDK:087L4210**	
Mains power supply 115 ... 230 V AC, 50/60 Hz, with battery backup up and 3 m (9.8 ft) power cable for external connection (no battery included)	**FDK:087L4211**	
RS 232 add-on module, point to point communication interface with Modbus RTU protocol	**FDK:087L4212**	
RS 485 add-on module, multidrop communication interface with Modbus RTU protocol	**FDK:087L4213**	
Encoder interface module, with "Sensus" protocol for ITRON 200WP and 100W radio	**A5E02475650**	

Description	Article No.	
MAG 8000 GSM/GPRS communication module. Rechargeable battery, antenna and analog cable input must be ordered separately	**A5E03412758**	
One cable entry 6 ... 8 mm (0.24 ... 0.31 ") M20 brass glands package[2] (1 pc)	**FDK:087L4196**	
One cable entry 2 ... 5 mm (0.08 ... 0.20 ") M12 brass glands with M20 reduction[2] . Package of 10 pcs	**FDK:087L4154**	
One cable entry 6 ... 8 mm (0.24 ... 0.31 ") M20 brass glands package[2] (10 pcs)	**FDK:087L4155**	
One cable entry 8 ... 11 mm (0.31 ... 0.43 ") M20 brass glands package[2] (10 pcs)	**FDK:087L4156**	
One cable entry 11 ... 15 mm (0.43 ... 0.59 ") M20 brass glands package[2] (10 pcs)	**FDK:087L4157**	
Two cable entries 3.5 ... 5 mm (0.14 ... 0.20 ") M20 brass glands package[2] (10 pcs)	**FDK:087L4158**	
Two cable entries 5.5 ... 7.5 mm (0.22 ... 0.30 "), M20 brass glands package[2] (10 pcs)	**FDK:087L4159**	
High gain antenna for MAG 8000 GSM/GPRS (PVC, IP68, cable length 5 m (16.4 ft), with SMA male connector (type RG 58) and internal SMA to SMP female cable adapter, and single entry cable gland)	**A5E03436689**	
Analog input cable for MAG 8000 GSM/GPRS (3 m (9.8 ft) cable with M12 connector A-Coding female 5 pins, and two-entry cable gland)	**A5E03436698**	
Potting kit for terminal box of flow sensors for IP68/NEMA 6P	**FDK:085U0220**	
MAG 8000 Hardware key to access protected parameters	**FDK:087L4165**	
MAG 8000 demo - training unit pack operating on Alkaline batteries. Transmitter with Flow tool CD, IrDA interface adapter and hardware key (No dangerous goods limitations)	**FDK:087L4080**	

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Battery-operated water meter MAG 8000

Description	Article No.	
Alkaline battery for MAG 8000 demo transmitter (3 V 13 Ah) (No dangerous goods limitations)	**FDK:087L4142**	

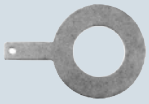
⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

2) For cable connection through MAG 8000 transmitter bottom part.

When MAG 8000 (7ME6810 and 7ME6820) is installed in PVC or coated pipelines, grounding rings must be installed additionally.

Grounding rings, type C must be used for the 7ME6810 and 7ME6820 routes (sizes > DN 300). Please see grounding rings in the section MAG 3100 Grounding rings and be aware that the mentioned MLFB codes include only 1 grounding ring. Grounding rings DN 25 to DN 300 in stainless steel are packed in pairs and sold as a “grounding ring kit”.

Dimension	Article No.	
DN 25	**A5E01002946**	
DN 40	**A5E01002947**	
DN 50	**A5E01002948**	
DN 65	**A5E01002950**	
DN 80	**A5E01002952**	
DN 100	**A5E01002953**	
DN 125	**A5E01002954**	
DN 150	**A5E01002955**	
DN 200	**A5E01002957**	
DN 250	**A5E01002958**	
DN 300	**A5E01002962**	

Spare parts

Description	Article No.	
MAG 8000 transmitter compact replacement kit[1]. No battery included. System number specified by ordering.	**FDK:087L4166**	
MAG 8000 transmitter remote replacement kit[1]. System number specified by ordering.	**FDK:087L4202**	
MAG 8000 (Advanced version) transmitter compact replacement kit[1]. No battery included. No system number required.	**FDK:087L4203**	

Description	Article No.	
MAG 8000 (Advanced version) transmitter remote replacement kit[1]. No battery included. No system number required.	**FDK:087L4204**	
MAG 8000 (Basic version) transmitter PCB replacement kit[1]. No system number required.	**A5E01171569**	
MAG 8000 (Advanced version) transmitter PCB replacement kit[1]. No system number required.	**FDK:087L4168**	
Enclosure top including plastic lid, screws and blank product label	**FDK:087L4167**	
Power cable (1.5 m (4.9 ft)) with IP68/NEMA 6P plugs for external battery (no battery included); PE jacket, ambient temperature: -20 ... +60 °C (-4 ... +140 °F)	**FDK:087L4152**	
5 ft. Encoder interface cable with IP68/NEMA 6P plugs included, for ITRON 200WP and 100W radio; 22 AWG stranded TC conductors, polypropylene insulation, twisted pair, overall Beldfoil shield, 22 AWG stranded TC drain wire, PVC jacket	**A5E02551263**	
25 ft. Encoder interface cable with IP68/NEMA 6P plugs included, for ITRON 200WP radio; 22 AWG stranded TC conductors, polypropylene insulation, twisted pair, overall Beldfoil shield, 22 AWG stranded TC drain wire, PVC jacket	**A5E02551182**	

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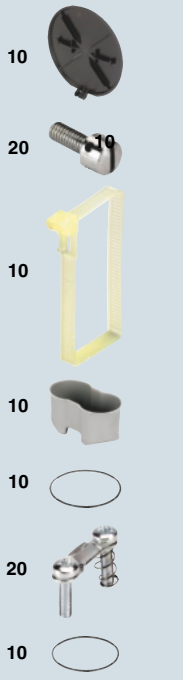
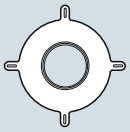
Description	Article No.	
Service tool kit package with various component for service and replacement.	**FDK:087L4162**	
Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - PG 13.5[2)]	**FDK:087L4108**	
Remote cable set 5 m (16.4 ft) with IP68/NEMA 6P plugs - M20	**A5E00862482**	
Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - PG 13.5[2)]	**FDK:087L4109**	
Remote cable set 10 m (32.8 ft) with IP68/NEMA 6P plugs - M20	**A5E00862487**	
Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - PG 13.5[2)]	**FDK:087L4110**	
Remote cable set 20 m (65.6 ft) with IP68/NEMA 6P plugs - M20	**A5E00862492**	
Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - PG 13.5[2)]	**FDK:087L4111**	
Remote cable set 30 m (98.4 ft) with IP68/NEMA 6P plugs - M20	**A5E00862497**	
10 m cable set with pre-mounted conduit adaptor	**A5E33400834**	
20 m cable set with pre-mounted conduit adaptor	**A5E33400836**	

[1)] Not applicable to Custody Transfer (CT) verified systems without re-verification

[2)] For sensors produced before October 2007.

MAG 8000 (7ME6880) grounding ring service kit, consisting of 2 pcs. grounding rings, screws and gaskets

Dimension		Article No.	
Drilled pattern flanges (7 bar)			
DN 50	2"	**A5E03082907**	
DN 65	2½"	**A5E03082908**	
DN 80	3"	**A5E03082909**	
DN 100	4"	**A5E03082910**	
DN 125	5"	**A5E03082911**	
DN 150	6"	**A5E32877967**	
DN 200	8"	**A5E03082913**	
DN 250	10"	**A5E03082914**	
DN 300	12"	**A5E03082915**	
DN 350	14"	**A5E03082916**	
DN 400	16"	**A5E03082917**	
DN 450	18"	**A5E03082918**	
DN 500	20"	**A5E03082919**	
DN 600	24"	**A5E03082920**	
AS 2191 table E flanges			
DN 25	1"	**A5E33474999**	
DN 40	1½"	**A5E33475000**	
DN 125	5"	**A5E33475006**	
AS 4087 PN 16 flanges			
DN 50	2"	**A5E33475001**	
DN 65	2½"	**A5E33475002**	
DN 80	3"	**A5E33475003**	
DN 100	4"	**A5E33475004**	
DN 150	6"	**A5E33475007**	
DN 200	8"	**A5E33475008**	
DN 250	10"	**A5E33475009**	
DN 300	12"	**A5E33475010**	
DN 350	14"	**A5E33475011**	
DN 400	16"	**A5E33475012**	
DN 450	18"	**A5E34240921**	
DN 500	20"	**A5E33475013**	
DN 600	24"	**A5E33475014**	
DN 700	28"	**A5E33414889**	
DN 800	32"	**A5E33414890**	
DN 900	36"	**A5E33414891**	
DN 1000	40"	**A5E33414892**	
DN 1200	48"	**A5E33414893**	

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System information SITRANS F C Coriolis mass flowmeters

Overview

SITRANS F C Coriolis mass flowmeters are designed for measurement of a variety of liquids and gases. The meter offers accurate measurement of mass flow, volume flow, density, temperature and fraction.

Compatibility between transmitters and sensors

Transmitter	Page	Compact	Remote	Ex-Approval	Sensor	Page
FCT030	3/173	Yes	Yes	Yes	FCS400 Standard, DN 15 ... DN 80	3/163
		Yes	Yes	Yes	FCS400 Hygienic, DN 15 ... DN 80	3/163
		Yes	Yes	Yes	FCS400 NAMUR, DN 15 ... DN 80	3/163
FCT010 (only compact - FC410)	3/156	Yes	No	Yes	FCS400 Standard, DN 15 ... DN 80	3/163
		Yes	No	Yes	FCS400 Hygienic, DN 15 ... DN 80	3/163
		Yes	No	Yes	FCS400 NAMUR, DN 15 ... DN 80	3/163
MASS 6000 IP67 Polyamide enclosure	3/180	No	Yes	No	FCS200, DN 10 ... DN 25	3/203
		No	Yes	No	FC300, DN 4	3/212
		No	Yes	No	MASS 2100, DI 1.5	3/208
		Yes	Yes	No	MASS 2100, DI 3 ... DI 40	3/217
		No	Yes	No	MASS MC2, DN 100...DN 150	3/228
		No	Yes	Yes	MASS MC2 Ex, DN 100...DN 150	3/228
MASS 6000 19"	3/185	No	Yes	No	FCS200, DN 10 ... DN 25	3/203
		No	Yes	No	FC300, DN 4	3/212
		No	Yes	No	MASS 2100, DI 1.5	3/208
		No	Yes	No	MASS 2100, DI 3 ... DI 40	3/217
		No	Yes	No	MASS MC2, DN 100...DN 150	3/228
		No	Yes	Yes	MASS MC2 Ex, DN 100...DN 150	3/228
MASS 6000 Ex 19"	3/185	No	Yes	Yes	FCS200, DN 10 ... DN 25	3/203
		No	Yes	Yes	FC300, DN 4	3/212
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/208
		No	Yes	Yes	MASS 2100 Ex, DI 3 ... DI 40	3/217
MASS 6000 Ex d Stainless steel enclosure	3/194	No	Yes	Yes	FCS200, DN 10 ... DN 25	3/203
		No	Yes	Yes	FC300, DN 4	3/212
		No	Yes	Yes	MASS 2100 Ex, DI 1.5	3/208
		Yes	Yes	Yes	MASS 2100 Ex, DI 3 ... DI 40	3/217
SIFLOW FC070 Standard	3/199	No	Yes	No	all	
SIFLOW FC070 Ex CT	3/199	No	Yes	Yes	all except MC2	

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Benefits

Greater flexibility

- Wide product program
- High performance and top-end flowmeters
- Compact or remote installation using the same transmitters and sensors within their flowmeter series

Easier commissioning

All SITRANS F C Coriolis flowmeters feature a sensor related memory unit SENSORPROM or SensorFlash which stores calibration data and transmitter settings for the lifetime of the product.

At commissioning the flowmeter commences measurement without any initial programming.

Easier service

- Comprehensive self-diagnosis and service menu enhances troubleshooting and meter verification.
- Transmitter replacement requires no programming. SENSORPROM automatically updates all settings after initialization.

Room for growth

- FC430:
  Digital platform allows for any sensor in the range to be matched in compact or remote. The wide range of sensors are all certified to SIL2 or SIL3 (redundant) with the FCT030 transmitter in compact mode.
- MASS 6000:
  USM II the Universal Signal Module with "plug & play" simplicity makes it easy to access and integrate the flowmeter with almost any system and bus-protocol and it ensures the flowmeter will be easy to upgrade to future communication/bus platforms.
- SIFLOW:
  Direct integration into SIMATIC S7-300 systems as a flowmeter specific I/O module ensures fast and smooth startup, seamless integration, fast operation.

Application

Coriolis flowmeters are generally suitable for measuring liquids and gases. The flow measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and use. The Coriolis flowmeter is recognized for its high accuracy over a wide turn-down ratio.

The main applications of the Coriolis flowmeter can be found in all industries, such as:	
Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis, filling and dosing
Food and beverage	Dairy products, beer, wine, soft-drinks, °Plato/°Brix, fruit juices and pulps, bottling, CO_2 dosing, CIP-liquids
Automotive	Fuel injection nozzle and pump testing, filling of AC units, engine consumption measurement, paint robots
Oil and gas	Filling of gas bottles, furnace control, CNG-dispensers, test separators, LPG, well-head water-cut monitoring
Water and waste water	Dosing of chemicals for water treatment

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System information SITRANS F C Coriolis mass flowmeters

Please see Product selector www.pia-selector.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**

	FC430	FC410	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 100 to DN 150	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
	7ME4613 7ME4623 7ME4713	7ME4611 7ME4621 7ME4711	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120
Design											
Compact	●	●		●				●		●	
Remote	●		●	●	●	●	●	●	●	●	●
Transmitter enclosure											
Polyamide, IP67/NEMA 6								●			
Noryl (SIMATIC S7-300), IP20/NEMA 2											●
Stainless steel IP67/NEMA 6										●	
19" rack IP20/NEMA 2 aluminum									●		
Back of panel IP20 aluminum									●		
Wall mounting IP65 ABS plastic									●		
Front of panel IP65 ABS plastic									●		
Aluminium IP67	●	●									
Communication											
HART	●							●	●	●	
PROFIBUS PA								●	●	●	
PROFIBUS DP								●	●		
Modbus RTU/RS 485		●						●	●		●
Modbus RTU/RS 232											●
FOUNDATION Fieldbus H1								●	●	●	
DeviceNet								●	●		
Supply voltage											
24 V DC	●	●									●
24 V AC/DC								●	●	●	
115/230 V AC	●							●	●		
Pipe size											
DI 1.5 (1/16")			●								
DI 3 (1/8")				●							
DN 4 (1/6")					●						
DI 6 (¼")				●							
DN 10 (3/8")							●				
DI 15 (½")				●							
DN 15 (½")	●	●					●				
DI 25 (1")	●	●		●							
DI 40 (1½")				●							
DN 50 (2")	●	●									
DN 80 (3")	●	●									
DN 100 (4")						●					
DN 150 (6")						●					
Process connection norms and pressure											
Pipe thread											
NPT ANSI/ASME B.20.1; PN 100	●	●	●	●	●						
NPT ANSI/ASME B.20.1; PN 350							●				
VCO	●	●					●				
ISO 228/1; PN 100	●	●	●	●	●						

● = available

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Please see Product selector www.pia-selector.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**

	FC430	FC410	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 100 to DN 150	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
	7ME4613 7ME4623 7ME4713	7ME4611 7ME4621 7ME4711	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120
Flange											
EN 1092-1 PN 40	●	●		●		●					
EN 1092-1 PN 100	●	●		●		●[1]					
EN 1092-1 PN 160[7]	●	●									
ANSI B16.5 Class 150	●	●		●		●					
ANSI B16.5 Class 300	●					●					
ANSI B16.5 Class 600	●	●		●		●[1]					
ANSI B16.5 Class 900[8]	●	●									
Dairy											
DIN 11851 PN 25	●	●		●		●[1]					
DIN 11851 PN 40	●	●		●							
DIN 11864-1A	●	●									
DIN 11864-2A	●	●									
DIN 11864-3A	●	●									
Clamp ISO 2852 PN 16	●	●		●							
ISO 2853 PN 16	●	●		●							
DIN 32676 Tri-Clamp PN 10/PN 16	●					●					
Others on request	●	●	●	●	●	●					
Pipe material											
Stainless steel AISI 316L/1.4435	●	●	●	●	●						
Stainless steel AISI 316Ti/1.4571						●					
Hastelloy C22/2.4602	●	●	●	●[4]	●		●[6]				
Hastelloy C4/2.4610						●					
With heating jacket											
Internal U - tube				●							
External electric jacket	●	●									
Pressure rating											
PN 40	●	●		●		●					
PN 100	●	●	●	●	●	●[1]					
PN 160	●	●									
PN 214							●				
PN 350							●				
High-pressure version[2]			●	●	●						
Accuracy											
Flow error ≤ 0.1 % of rate	●	●	●	●	●						
Flow error ≤ 0.15 % of rate						●					
Flow error ≤ 0.5 % of rate							●				
Density error ≤ 0.0005 g/cm³				●							
Density error ≤ 0.001 g/cm³	●	●	●			●					
Density error ≤ 0.0015 g/cm³				●[3]	●						
Cable glands											
PG 13.5									●[5]		
½" NPT	●	●						●			
M20	●	●				●		●		●	

● = available

1) Not available for DN 150 sensor.
2) See technical specifications.
3) DI 3 and DI 6
4) DI 15, DI 25 and DI 40 are not available for Hastelloy C22/2.4602.
5) Only when mounted in enclosure.
6) Process connectors in AISI 316Ti/1.4571
7) Sensor pressure limited to 100 bar (AISI 316L) and 160 bar (Hastelloy C22)
8) Sensor pressure limited to 100 bar (AISI 316L) and 150 bar (Hastelloy C22)

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System information SITRANS F C Coriolis mass flowmeters

Please see Product selector www.pia-selector.automation.siemens.com **on the Internet, since some constrains might be related to some of the features**

	FC430	FC410	MASS 2100 DI 1.5	MASS 2100 DI 3 to DI 40	FC300 DN 4	MC2 DN 100 to DN 150	FCS200 DN 10 to DN 25	MASS 6000 IP67	MASS 6000 19"	MASS 6000 Ex d	SIFLOW FC070 Std/Ex CT
	7ME4613 7ME4623 7ME4713	7ME4611 7ME4621 7ME4711	7ME4100	7ME4100, 7ME4200, 7ME4210	7ME4400	7ME4300	7ME4500	7ME4110	7ME4110	7ME4110	7ME4120
Approvals											
Custody Transfer											
Compressed gaseous fuel measuring systems for vehicles - OIML R 139							●				●[10]
Other media than water pattern approval - OIML R 117	●										
Harzardous locations											
ATEX	●	●	●	●	●	●[9]	●		●	●	●[3][4]
IECEx	●	●					●				●[4]
FM	●	●					●				●[9]
UL			●[1]	●[1]	●			●[2]			
CSA	●	●									●[4]
NEPSI	●	●					●				
INMETRO	●	●									
Ordinary locations											
USL, CNL-Flowmeter c-UL-us								●[2]	●[7]		
USR, CNR-Flowmeter c-UL-us								●[2]	●[5][6]		
PED											
Fluid group 1 Category II, Module H PED Directive 97/23/EC	●	●		●[8]							
Module B1 + D 0/25 ... 100 bar, -80/200°C, DN 20 ...150 PED Directive 97/23/EC						●					
CRN											
Category F OF10769.5C CRN	●	●	●	●[11]	●						
Pharma											
EHEDG TUM	●	●									
3A	●	●									

Note: Special conditions for safe use might be specified in certificates or operating instructions.

● = available

1) Sensor pressure max. 100 bar (1450 psi)
2) Only remote version
3) Can be placed in zone 2 if mounted in minimum IP54 cabinet.
4) Only Ex version
5) 24 V; IP20
6) 115 ... 230 V; IP20
7) 115 ... 230 V; IP65
8) Only DI 25 and DI 40
9) For sizes ≥ DN 100 only
10) Install in Div. 2, sensor interface into Div. 1, only Ex CT version
11) Only DI 6 is CRN

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Function

The flow measuring principle is based on the Coriolis effect. The flowmeter consists of a system FC410 or FC430 or a combination of a sensor type MASS 2100/FC300/FCS200/MC2 and a transmitter type MASS 6000/SIFLOW FC070.

The SITRANS F C sensors are energized by an electro-mechanical driver circuit which oscillates the pipe at its resonant frequency.

Two pick-ups, 1 and 2 are placed symmetrically on both sides of the driver. When liquid or gas flows through the sensor, Coriolis force will act on the measuring pipe and cause a pipe deflection which can be measured as a phase shift on pick-up 1 and 2. The phase shift is proportional to the mass flow rate.

The amplitude of the driver is automatically regulated to ensure a stable output from the 2 pick-ups.

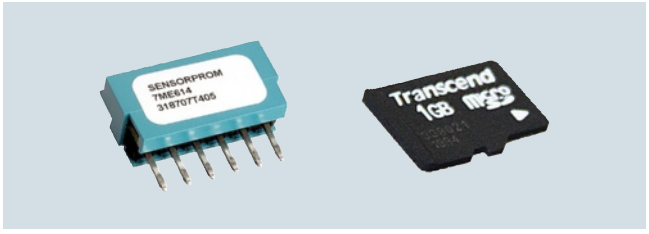
The temperature of the sensor is measured by a Pt1000. For MC2 the temperature is measured with a Pt100.

The flow-proportional signal from the 2 pick-ups, the temperature measurement and the driver frequency are fed into the SITRANS F C transmitter for calculations of mass, volume, fraction, temperature and density.

The signal transfer function is based on a DFT technology (Discrete Fourier Transformation).

The transmitter has a built-in noise filter, which can be used to improve the meter's performance if the installation and application conditions are not ideal. Typically influence from process noise such as pump pulsations, mechanical vibrations, oscillating valves can be reduced considerably.

For communication purposes the SITRANS F C MASS 6000 transmitters have a CAN interface with a Siemens specific protocol. This concept is known as the USM II (Universal Signal Module) concept. The idea is that extra output modules or communication modules can be connected to this bus, making it possible to configure the flowmeter for the precise task in hand. When the internal CAN bus detects the installed module, it is automatically programmed to factory settings via the SENSORPROM memory unit, and the new menu is visible in the MASS 6000 display.



SENSORPROM and SensorFlash flow memory units

FC410 flow transmitters communicate via Modbus RTU and FC430 via HART. Currently the USM platform handles all present and future communication protocols, e.g., PROFIBUS DP, PROFIBUS PA, HART, Modbus, FOUNDATION Fieldbus H1 and DeviceNet.

Integration

Installation of MASS 2100/FC300 and MC2 sensors

Installation requirements/System design information

The SITRANS F C mass flowmeter is suitable for in- and outdoor installations. The standard instrument meets the requirements of Protection Class IP67/NEMA 6 or IP65. The flowmeter is bidirectional and can be installed in any orientation, however, the sensor is not self-emptying in all positions.
It is important to ensure that the meter tubes are always completely filled with homogeneous fluid. Otherwise measuring errors may occur.

The corrosion resistance of the fluid-wetted materials must be evaluated.
The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. The **Sizing Program** (download from https://pia.khe.siemens.com/index.aspx?nr=11501) can be used to calculate the pressure drop.

The preferred flow direction is indicated by the arrow on the flowmeter. Flow in this direction will be indicated as positive.

Installation orientation

- FCS400 – sensors
  The optimal installation orientation is vertical with flow upwards (liquids) and up to 10° off vertical for self-draining.
- MASS 2100/FC300 – sensors
  The optimal installation orientation is horizontal.
- MC2 – sensors
  The optimal installation orientation is vertical with the flow upwards.

Supports

- In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. vibrations), the sensor should be installed in well-supported pipelines. Supports or hangers should be installed symmetrically and stress-free in close proximity to the process connections. FCS400 sensors can be supported at the junction between the process connection and the main body of the sensor.

Shut-off devices

- To conduct a system zero adjustment, shut-off devices are required in the pipeline.
  - In horizontal installations at the outlet for FC300 and MC2 and the inlet for MASS 2100.
  - In vertical installations at the inlet.
- When possible, shut-off devices should be installed both up- and downstream of the flowmeter. A bypass valve is recommended where regular zero adjustment is planned to avoid disruption of the flowing system.

Installation: straight run requirements

- The mass flowmeter does not require any flow condition or straight inlet sections. Care should be exercised to ensure that any valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flowmeter.

System design information

- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the highest point in the system where bubbles are possibly largest.
- Long drop lines downstream from the flowmeter should be avoided to prevent the meter tube from draining during operation.
- The flowmeter should not come into contact with any other objects. Avoid attachments to the housing.
- When the cross-section of the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section and outside the section between the shut-off devices.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi).
- Assure that operation below the vapor pressure cannot occur when a vacuum exists in the meter tube or for fluids which boil readily.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, transformers etc.

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- When operating more than one meter in one or multiple interconnected pipelines, the sensors should be spaced distant from each other or the pipelines should be decoupled to prevent cross talk.

Zero adjustment

- In order to adjust the zero under operating conditions it must be possible to reduce the flow rate to „ZERO“ while the meter tube is completely filled. It is important for accurate measurements that during the zero adjustment there are no gas bubbles in the flowmeter. It is also important that the pressure and temperature in the meter tube be the same as that which exists during operation.

Technical specifications

Flowmeter uncertainty/specifications

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities accredited according to ISO/IEC 17025 by DANAK.

The accreditation body DANAK has signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries worldwide, including the US (NIST traceability).

A calibration certificate is shipped with every sensor and calibration data are stored in the SENSORPROM memory unit. FC410 and FC430 meters have the calibration data written to the front end section. A backup of all calibrations and PDF copies of all certificates are stored in the SensorFlash.

FCS400 sensors and FCT030/FCT010 transmitters

	5 %		50 %		100 %	
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)
DN 15 (½")	185	(408)	1 850	(4 079)	3 700	(8 157)
DN 25 (1")	575	(1 268)	5 750	(12 677)	11 500	(25 353)
DN 50 (2")	2 600	(5 732)	26 000	(57 320)	52 000	(114 640)
DN 80 (3")	6 800	(15 000)	68 000	(150 000)	136 000	(300 000)

MASS 2100 sensors and MASS 6000 transmitters

	5 %		50 %		100 %	
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)
DI 1.5 (1/16")	1.5	(3.3)	15	(33)	30	(66)
DI 3 (1/8")	12	(26)	125	(275)	250	(550)
DN 4 (1/6")	17.5	(38)	175	(386)	350	(770)
DI 6 (¼")	50	(110)	500	(1 102)	1 000	(2 200)
DI 15 (½")	280	(617)	2 800	(6 173)	5 600	(12 345)
DI 25 (1")	1 250	(2 756)	12 500	(27 558)	25 000	(55 100)
DI 40 (1½")	2 600	(5 732)	26 000	(57 320)	52 000	(114 600)

MC2 sensors and MASS 6000 transmitters

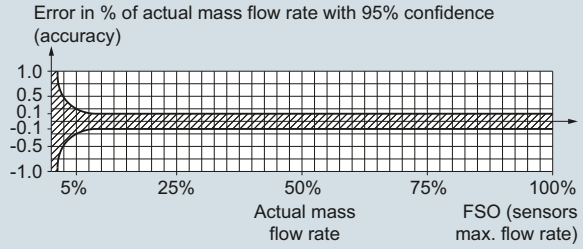
	5 %		50 %		100 %	
	kg/h	(lb/h)	kg/h	(lb/h)	kg/h	(lb/h)
DN 100 (4")	10 175	(22 432)	101 750	(224 320)	203 500	(448 640)
DN 150 (6")	30 100	(66 359)	301 000	(663 590)	602 000	(1 327 181)

- Q_{max} (100%) is calibrated with water at:
  - FCS400 sensors: a pressure drop of 1 bar (14.5 psi)
  - MASS 2100 sensors (all except Di 1.5): a flow speed of 10 m/s (Di 1.5: a flow speed of 4.7 m/s)
  - MC2 sensors: a pressure drop of 2 bar (29 psi).
- For flow > 5 % of the sensors max. flow rate, the error can be read directly from the curve below.
- For flow < 5 % of the sensors max. flow rate, use the formula to calculate the error.
- The error curve is plotted from the formula:

$$E = \pm\sqrt{(Cal.)^2 + \left(\frac{z \times 100}{qm}\right)^2}$$

E = Error [%]
Z = Zero point error [kg/h][1)]
qm = Mass flow [kg/h]
Cal. = Calibrated flow accuracy: 0.10 or 0.15

[1)] Zero point error for each sensor is shown in the tables below.



Reference conditions for flow calibrations (ISO 9104 and DIN/EN 29104)	
Flow conditions	Fully developed flow profile
Temperature, medium	20 °C ± 2 °C (68 °F ± 3.6 °F)
Temperature, ambient	20 °C ± 2 °C (68 °F ± 3.6 °F)
Liquid pressure	2 ± 1 bar
Density	0.997 g/cm^3
Brix	40 °Brix
Supply voltage	U_n ±1 %
Warming-up time	30 min.
Cable length	5 m between transmitter and sensor

Additions in the event of deviations from reference conditions	
Current output	As pulse output ± (0.1% of actual flow +0.05 % FSO)
Effect of ambient temperature	• Display/frequency/pulse output: < ± 0.003%/K act. • Current output: < ± 0.005 %/K act.
Effect of supply voltage	< 0.005 % of measuring value on 1 % alteration

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Sensor type		**FC300**	**MASS 2100**					
Sensor size		DN 4 (1/6")	DI 1.5 (1/16")	DI 3 (1/8")	DI 6 (¼")	DI 15 (½")	DI 25 (1")	DI 40 (1½")
Number of measuring pipes		1	1	1	1	1	1	1
Mass flow								
Linearity error	% of rate	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Repeatability error	% of rate	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Max. zero point error	[kg/h]	0.010	0.001	0.010	0.050	0.200	1.500	6.000
Density								
Density error[1)]	[g/cm^3]	0.0025[2)]	0.001	0.0015	0.0015	0.0005	0.0005	0.0005
Repeatability error	[g/cm^3]	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001
Range	[g/cm^3]	0 ... 2.9	0 ... 2.9	0 ... 2.9	0 ... 2.9	0 ... 2.9	0 ... 2.9	0 ... 2.9
Temperature								
Error	[°C (°F)]	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)
Brix								
Error	[°Brix]	0.3	0.2	0.3	0.3	0.1	0.1	0.1

1) Accuracy is only valid when sensor is density-calibrated.
2) Hastelloy C22 version.

Sensor type		**FCS400**				**MC2**	
Sensor size		DN 15 (½")	DN 25 (1")	DN 50 (2")	DN 80 (3")	DN 100 (4")	DN 150 (6")
Number of measuring pipes		2	2	2	2	2	2
Mass flow:							
Linearity error	% of rate	0.1	0.1	0.1	0.1	0.15	0.15
Reproducibility of flowrate at rates > 5 % of Q_{max}	% of rate	0.05	0.05	0.05	0.05	0.1	0.1
Max. zero point error	[kg/h (lb/h)]	0.2 (0.44)	2 (4.41)	7.5 (16.5)	18.0 (39.7)	24.96 (55.03)	330 (727.53)
Density							
Density error	(Standard) [g/cm^3]	0.005	0.005	0.005	0.005	0.005	0.005
	(Extended) [g/cm^3]	0.001	0.001	0.001	0.001	0.001	Not available
Range	[kg/dm^3]	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.001 ... 5.0	0.5 ... 3.5	0.5 ... 3.5
Repeatability error	[g/l]	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1	± 0.1
Temperature							
Error	[°C (°F)]	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	0.5 (0.9)	1.0 (1.8)	1.0 (1.8)
Brix[1)]							
Error	[°Brix]	0.1	0.1	0.1	0.1	On request[1)]	Not available

1) Flow and density calibration (1 kg/m^3) required. Brix/Plato and Fraction available as PVR.

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Technical specifications PROFIBUS PA/DP

General specifications	
PROFIBUS device profile	3.00 Class B
Certified	Yes, according to Profile for process control devices V3.00.
MS0 connections	1
MS1 connections	1
MS2 connections	2

Electrical specification DP

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	RS 485
Transmission speed	≤ 1.5 Mbit/s
Number of stations	Up to 32 per line segment, (maximum total of 126)
Cable specification (Type A)	
Cable design	Two wire twisted pair
Shielding	CU shielding braid or shielding braid and shielding foil
Impedance	35 up to 165 Ω at frequencies from 3 ... 20 MHz
Cable capacity	< 30 pF per meter
Core diameter	> 0.34 mm², corresponds to AWG 22
Resistance	< 110 Ω per km
Signal attenuation	Max. 9 dB over total length of line section
Max. bus length	200 m at 1500 kbit/s, up to 1.2 km at 93.75 kbit/s. Extendable by repeaters

Electrical specification PA

Physical layer specifications	
Applicable standard	IEC 61158/EN 50170
Physical Layer (Transmission technology)	IEC-61158-2
Transmission speed	31.25 kbit/s
Number of stations	Up to 32 per line segment, maximum total of 126)
Max. basic current [I_B]	14 mA
Fault current [I_{FDE}]	0 mA
Bus voltage	9 ... 32 V (non Ex)
Preferred cable specification (Type A)	
Cable design	Two wire twisted pair
Conductor area (nominal)	0.8 mm² (AWG 18)
Loop resistance	44 Ω/km
Impedance	100 Ω ± 20 %
Wave attenuation at 39 kHz	3 dB/km
Capacitive asymmetry	2 nF/km
Bus termination	Passive line terminated at both ends
Max. bus length	Up to 1.9 km. Extendable by repeaters

IS (Intrinsic Safety) data	
Required sensor electronics	Compact mounted SITRANS F C MASS 6000 Ex d
FISCO	Yes
Max. U_I	17.5 V
Max. I_I	380 mA
Max. P_I	5.32 V
Max. L_I	10 µH
Max. C_I	5 nF
Max. U_o	1.3 V
Max. I_o	50 µA
FISCO cable requirements	
Loop resistance R_C	15 ... 150 Ω/km
Loop inductance L_C	0.4 ... 1 mH/km
Capacitance C_C	80 ... 200 nF/km
Max. Spur length in IIC and IIB	30 m
Max. Trunk length in IIC	1 km
Max. Trunk length in IIB	5 km

PROFIBUS parameter support

The following parameters are accessible using a MS0 relationship from a Class 1 Master.
MS0 specifies cyclic Data Exchange between a Master and a Slave.

Cyclic services:		
Input (Master view)	**Parameter**	**MASS 6000**
	Mass flow	✓
	Volume flow	✓
	Temperature	✓
	Density	✓
	Fraction A[1)]	✓
	Fraction B[1)]	✓
	Pct Fraction A[1)]	✓
	Totalizer 1	✓
	Totalizer 2[2)]	✓
	Batch progress[2)]	✓
	Batch setpoint	✓
	Batch compensation	✓
	Batch status (running ...)	✓
Output (Master view)	Set Totalizer 1+2	✓
	Set Mode Totalizer 1+2	✓
	Batch control (start, stop ...)	✓
	Batch setpoint	✓
	Batch compensation	✓

1) Requires a SENSORPROM containing valid fraction data.

2) Value returned is dependent on the BATCH function.
When ON, Batch progress is returned.
When OFF, TOTALIZER 2 is returned.

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Overview

The complete flowmeter system SITRANS FC430 can be ordered for standard, hygienic or NAMUR service. All versions can be ordered for CT service, according to OIML R 117 (Liquids other than water).

SIL specified compact variants can be validated and configured for SIL 2 or SIL 3 operation. SIL 3 operation requires two flowmeters in series and monitored by a SIL-rated control system. Series mounting must not introduce cross-talk between the sensors. Refer to installation guidelines.

The flowmeter is based on the latest developments within digital signal processing technology – engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

FC430 is available as standard with 4 to 20 mA analog output with HART 7.2. Additional functions can be freely configured for analog, pulse, frequency, relay or status output or binary input.

The transmitter comes with a user-configurable graphical display and SensorFlash, a micro SD card for configuration backup, firmware update and data storage.

The SITRANS FC430 flowmeter system consists of a SITRANS FCS400 sensor and a SITRANS FCT030 transmitter.

Benefits

- It is narrow and light, fitting neatly into dense piping arrangements
- Easy maintenance because modules can be exchanged rapidly
- Effective separation of measurement from plant vibration
- Highly secure operation in safety critical applications
- Non-volatile memory of all setup and operation data
- Reliable measurements due to high signal to noise ratio
- Secure, digital transfer of measurement data from the sensor
- Short overall length; easy drop-in replacement into most existing installations
- Functional Safety (SIL X). Device suitable for use in accordance with IEC 61508 and IEC 61511.

Technical specifications

Sizes	DN 15 (½"), DN 25 (1"), DN 50 (2"), DN 80 (3")
Accuracy	± 0.10 %
Repeatability	± 0.05 %
Flow range (water @ 1 bar pressure loss)	DN 15: 3 700 kg/h (8 157 lb/h) DN 25: 11 500 kg/h (25 353 lb/h) DN 50: 52 000 kg/h (114 640 lb/h) DN 80: 136 000 kg/h (300 000 lb/h)
Architecture	Compact or remote configuration with selection of twelve languages including Chinese and Russian
Display	Full graphical display, 240 x 160 pixels
Power supply	20 ... 27 V DC ± 10%; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz ± 10%
Weight	4.6 ... 50 kg
Material	
• Sensor	
- Wetted parts	316L stainless steel or Hastelloy C22
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating
Enclosure rating	IP67
Pressure ratings	
• Measuring tubes	
- 316L	100 bar (1450 psi)
- Hastelloy C22	160 bar (2321 psi)
• Sensor enclosure	20 bar (DN15, DN 25) 17 bar (DN 50, DN 80)
• Sensor enclosure burst pressure	>160 bar (all sizes)
Temperature ratings	
• Process medium	-50 ... +200 °C (-58 ... +392 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F)
• Display	-20 ... +60 °C (-4 ... +140 °F)
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2
• Pipe threads	ASME B1.20 (NPT), ISO228-1 G (BSPP), VCO Quick-connect
• Hygienic threads	DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145
• Hygienic clamps	DIN 11864-3A, DIN 32676, ISO 2852
Approvals	
• Hazardous area	ATEX, IECEx, FM, NEPSI, CSA, INMETRO
• Pressure equipment	PED, CRN
• Hygienic	3A, EHEDG
• Custody transfer	OIML R 117
• Operational safety (compact system only)	SIL 2 Single SIL 3 Redundant system
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41 and NE 132)
I/O	Up to 4 channels combining analog, relay or digital outputs and binary input
Communication	HART 7.2
EMC performance	EN 61326-3-2
Mechanical load	18 to 400 Hz random The flow meter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

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Flowmeter SITRANS FC430

3

Selection and Ordering data		Article No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter ↗ with SITRANS FCS400 Standard flow sensor with hygienic and flange/pipe thread connections and compact or remote mounting with FCT030 transmitter		7ME4613 -	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size, connection size			
DN 15, DN 10 (½", 3/8")		3F	
DN 15, DN 15 (½", ½")	⬟	3G	
DN 15, DN 20 (½", ¾")	⬟	3H	
DN 15, DN 25 (½", 1")	⬟	3J	
DN 25, DN 15 (1", ½")		3K	
DN 25, DN 25 (1", 1")	⬟	3L	
DN 25, DN 40 (1", 1½")	⬟	3N	
DN 50, DN 40 (2", 1½")	⬟	4B	
DN 50, DN 50 (2", 2")	⬟	4C	
DN 80, DN 65 (3", 2½")	⬟	4J	
DN 80, DN 80 (3", 3")	⬟	4K	
DN 80, DN 100 (3", 4")		4L	
Process connection			
EN 1092-1 B1, PN 16		A0	
EN 1092-1 B1, PN 40	⬟	A1	
EN 1092-1 B1, PN 63		A2	
EN 1092-1 B1, PN 100	⬟	A3	
EN 1092-1 B1, PN 160		B1	
EN 1092-1 D NUT, PN 40		A5	
EN 1092-1 D NUT, PN 63		A6	
EN 1092-1 D NUT, PN 100		A7	
EN 1092-1 D NUT, PN 160		A8	
ANSI B16.5-2009, class 150	⬟	D1	
ANSI B16.5-2009, class 300		D2	
ANSI B16.5-2009, class 600	⬟	D3	
ANSI B16.5-2009, class 900		D4	
ISO228-1 G pipe thread	⬟	E1	
ASME B1.20.1 NPT pipe thread	⬟	E3	
DIN 11851 hygienic screwed	⬟	F1	
DIN 32676 hygienic Tri-Clamp	⬟	G1	
DIN 11864-1A aseptic screwed	⬟	H1	
DIN 11864-2A aseptic flanged	⬟	H2	
DIN 11864-3A clamped		H3	
ISO 2852 hygienic clamped	⬟	J1	
ISO 2853 hygienic screwed	⬟	J5	
SMS 1145 hygienic screwed		K1	
12-VCO-4 quick connect		K5	
JIS B2200:2004/10K		L2	
JIS B2220:2004/20K		L4	
JIS B2220:2004/40K		L6	
JIS B2220:2004/63K		L7	
Wetted parts material			
AISI 316L/W1.4435/W1.4404 (100 barg max.)	⬟	1	
Hastelloy C22 (only for 7ME461)		3	
Calibration/Accuracy class			
0.1 % flow, 5 kg/m³ density	⬟	1	
0.1 % flow, 1 kg/m³ density	⬟	4	
Standard fraction calibration		8	
Transmitter/DSL material & mounting style			
Compact, IP67, aluminum	⬟	D	
Remote, IP67, aluminum, M12	⬟	G	
Remote, IP67, aluminum, T/Box	⬟	K	

Selection and Ordering data		Article No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter with SITRANS FCS400 Standard flow sensor with hygienic and flange/pipe thread connections and compact or remote mounting with FCT030 transmitter		7ME4613 -	
Ex approval			
Non-Ex	⬟	A	
ATEX II 2GD	⬟	C	
IECEx GDb	⬟	F	
FM, Class 1, Div 1	⬟	H	
CSA, Class 1, Zone 1		M	
Local User Interface			
Blind	⬟	1	
Graphical, 240 x 160 pxl	⬟	3	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Cable glands		
Metric, no glands	⬟	**A01**
Metric, plastic	⬟	**A02**
Metric, brass/Ni plated		**A05**
Metric, stainless steel		**A06**
NPT, no glands		**A11**
NPT, Plastic		**A12**
NPT, brass/Ni plated		**A15**
NPT, stainless steel		**A16**
Sofware functions and CT approvals		
Standard	⬟	**B11**
CT standard		**B31**
I/O configuration Ch1		
Ca 4 ... 20 mA HART active SIL certified	⬟	**E04**
Cp 4 ... 20 mA HART passive SIL certified	⬟	**E05**
Ca 4 ... 20 mA HART active	⬟	**E06**
Cp 4 ... 20 mA HART passive	⬟	**E07**
Only compact versions can be used in SIL applications.		

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Selection and Ordering data	Order code
I/O configuration Ch2, Ch3 and Ch4	
None ⬟	**F00**
aSignal, None, None	**F40**
aSignal, aSignal, None	**F41**
aSignal, aSignal, aSignal	**F42**
aSignal, aSignal, Ia	**F43**
aSignal, aSignal, R	**F44**
aSignal, Ia, None	**F45**
aSignal, Ia, Ia	**F46**
aSignal, Ia, R	**F47**
aSignal, R, None	**F50**
aSignal, R, R	**F51**
pSignal, None, None	**F60**
pSignal, pSignal, None	**F61**
pSignal, pSignal, pSignal	**F62**
pSignal, pSignal, Ip	**F63**
pSignal, pSignal, R	**F64**
pSignal, Ip, None	**F65**
pSignal, Ip, Ip	**F66**
pSignal, Ip, R	**F67**
pSignal, R, None	**F70**
pSignal, R, R	**F71**
aSignal, aSignal, pSignal	**F80**
aSignal, aSignal, Ip	**F81**
aSignal, pSignal, None	**F82**
aSignal, pSignal, pSignal	**F83**
aSignal, pSignal, Ia	**F84**
aSignal, pSignal, Ip	**F85**
aSignal, pSignal, R	**F86**
aSignal, Ia, Ip	**F87**
aSignal, Ip, None	**F90**
aSignal, Ip, Ip	**F91**
aSignal, Ip, R	**F92**
pSignal, pSignal, Ia	**F93**
pSignal, Ia, None	**F94**
pSignal, Ia, Ia	**F95**
pSignal, Ia, Ip	**F96**
pSignal, Ia, R	**F97**

Notes on I/O configurations:

a or p suffix: The I/O module is selected at ordering with either active or passive function.

Signal: The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu.

I: Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer'.

R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.

The MLFB structure for FC430 systems must be filled to **this level**, including **"-Z"** options A.., B.., E.. and F..

Selection and Ordering data	Order code
Add-on options and accessories	
Please add "**-Z**" to Article No. and specify Order code(s).	
Certificates	
Pressure test certificate CRN	**C01**
Pressure test certificate PED	**C02**
Material certificate EN 10204-3.1	**C05**
Welding inspection report	**C07**
Factory certificate to EN 10204 2.1 ⬟	**C10**
Factory certificate to EN 10204 2.2	**C11**
Cable	
None	**L50**
5 m (16.4 ft), standard with M12 plugs fitted	**L51**
5 m (16.4 ft), standard	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	**L55**
10 m (32.8 ft), standard	**L56**
25 m (82 ft), standard with M12 plugs fitted	**L59**
25 m (82 ft), standard	**L60**
50 m (164 ft), standard with M12 plugs fitted	**L63**
50 m (164 ft), standard	**L64**
75 m (246 ft), standard with M12 plugs fitted	**L67**
75 m (246 ft), standard	**L68**
150 m (492 ft), standard with M12 plugs fitted	**L71**
150 m (492 ft), standard	**L72**
Additional data	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	**Y17**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Operating instructions for SITRANS FC430

Description	Article No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
• Chinese	**A5E03922773**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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Flowmeter SITRANS FC430

Selection and Ordering data		Article No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter ↗		7ME4623 -	
with SITRANS FCS400 Flow sensor Hygienic version with Ra < 0.8 µm, 3A approved, and compact or remote mounting with FCT030 transmitter		-	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size, connection size			
DN 15, DN 10 (½", 3/8")		3F	
DN 15, DN 15 (½", ½")	⬟	3G	
DN 15, DN 20 (½", ¾")	⬟	3H	
DN 15, DN 25 (½", 1")	⬟	3J	
DN 25, DN 25 (1", 1")	⬟	3L	
DN 25, DN 32 (1", 1¼")		3M	
DN 25, DN 40 (1", 1½")	⬟	3N	
DN 50, DN 40 (2", 1½")	⬟	4B	
DN 50, DN 50 (2", 2")	⬟	4C	
DN 80, DN 65 (3", 2½")	⬟	4J	
DN 80, DN 80 (3", 3")	⬟	4K	
Process connection			
DIN 11851 0.8 µm hygienic screwed	⬟	F1	
DIN 32676 0.8 µm hygienic Tri-Clamp	⬟	G1	
DIN 11864-1 0.8 µm hygienic screwed	⬟	H1	
DIN 11864-2A BF-A 0.8 µm hygienic screwed (metric)		H2	
DIN 11864-3A BF-A 0.8 µm hygienic clamped	⬟	H3	
DIN 11864-2B BF-A 0.8 µm hygienic flanged (NPS)		H4	
ISO 2852 0.8 µm hygienic clamped	⬟	J1	
ISO 2853 0.8 µm hygienic screwed	⬟	J5	
Wetted parts material			
AISI 316L/1.4435 (40 bar max.)	⬟	1	
Calibration/Accuracy class			
0.1 % flow, 5 kg/m³ density	⬟	1	
0.1 % flow, 1 kg/m³ density		4	
Standard fraction calibration		8	
Transmitter/DSL material and mounting style			
Compact, IP67, aluminum	⬟	D	
Remote, IP67, aluminum, M12	⬟	G	
Remote, IP67, aluminum, T/Box	⬟	K	
Ex approval			
Non-Ex	⬟	A	
ATEX II 2GD	⬟	C	
IECEx GDb	⬟	F	
FM, Class 1, Div 1	⬟	H	
CSA, Class 1, Zone 1		M	
Local User Interface			
Blind	⬟		1
Graphical, 240 x 160 pxl	⬟		3

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Cable glands		
Metric, no glands	⬟	**A01**
Metric, plastic	⬟	**A02**
Metric, brass/Ni plated		**A05**
Metric, stainless steel	⬟	**A06**
NPT, no glands		**A11**
NPT, plastic		**A12**
NPT, brass/Ni plated		**A15**
NPT, stainless steel		**A16**
Sofware functions and CT approvals		
Standard	⬟	**B11**
CT standard		**B31**
I/O configuration Ch1		
Ca 4 ... 20 mA HART active SIL certified	⬟	**E04**
Cp 4 ... 20 mA HART passive SIL certified	⬟	**E05**
Ca 4 ... 20 mA HART active	⬟	**E06**
Cp 4 ... 20 mA HART passive	⬟	**E07**

Only compact versions can be used in SIL applications.

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Selection and Ordering data	Order code
I/O configuration Ch2, Ch3 and Ch4	
None ⬟	**F00**
aSignal, None, None	**F40**
aSignal, aSignal, None	**F41**
aSignal, aSignal, aSignal	**F42**
aSignal, aSignal, Ia	**F43**
aSignal, aSignal, R	**F44**
aSignal, Ia, None	**F45**
aSignal, Ia, Ia	**F46**
aSignal, Ia, R	**F47**
aSignal, R, None	**F50**
aSignal, R, R	**F51**
pSignal, None, None	**F60**
pSignal, pSignal, None	**F61**
pSignal, pSignal, pSignal	**F62**
pSignal, pSignal, Ip	**F63**
pSignal, pSignal, R	**F64**
pSignal, Ip, None	**F65**
pSignal, Ip, Ip	**F66**
pSignal, Ip, R	**F67**
pSignal, R, None	**F70**
pSignal, R, R	**F71**
aSignal, aSignal, pSignal	**F80**
aSignal, aSignal, Ip	**F81**
aSignal, pSignal, None	**F82**
aSignal, pSignal, pSignal	**F83**
aSignal, pSignal, Ia	**F84**
aSignal, pSignal, Ip	**F85**
aSignal, pSignal, R	**F86**
aSignal, Ia, Ip	**F87**
aSignal, Ip, None	**F90**
aSignal, Ip, Ip	**F91**
aSignal, Ip, R	**F92**
pSignal, pSignal, Ia	**F93**
pSignal, Ia, None	**F94**
pSignal, Ia, Ia	**F95**
pSignal, Ia, Ip	**F96**
pSignal, Ia, R	**F97**

Notes on I/O configurations:

a or p suffix: The I/O module is selected at ordering with either active or passive function.

Signal: The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu.

I: Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer'.

R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.

The MLFB structure for FC430 systems must be filled to **this level**, including **"-Z"** options A.., B.., E.. and F..

Selection and Ordering data	Order code
Add-on options and accessories	
Please add "**-Z**" to Article No. and specify Order code(s).	
Certificates	
Pressure test certificate CRN	**C01**
Pressure test certificate PED	**C02**
Material certificate EN 10204-3.1	**C05**
Welding inspection report	**C07**
Factory certificate to EN 10204 2.1 ⬟	**C10**
Factory certificate to EN 10204 2.2	**C11**
Cable	
None	**L50**
5 m (16.4 ft), standard with M12 plugs fitted	**L51**
5 m (16.4 ft), standard	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	**L55**
10 m (32.8 ft), standard	**L56**
25 m (82 ft), standard with M12 plugs fitted	**L59**
25 m (82 ft), standard	**L60**
50 m (164 ft), standard with M12 plugs fitted	**L63**
50 m (164 ft), standard	**L64**
75 m (246 ft), standard with M12 plugs fitted	**L67**
75 m (246 ft), standard	**L68**
150 m (492 ft), standard with M12 plugs fitted	**L71**
150 m (492 ft), standard	**L72**
Additional data	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	**Y17**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Operating instructions for SITRANS FC430

Description	Article No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
• Chinese	**A5E03922773**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

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http://www.siemens.com/flowdocumentation

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Flowmeter SITRANS FC430

3

Selection and Ordering data		Article No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter ↗		7ME4713 -	
with SITRANS FCS400 NAMUR compliant flow sensor with flange/pipe thread connections and compact or remote mounting with FCT030 transmitter		■■■■■ - ■■■	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size, Connection size			
DN 15, DN 6 (½", ¼")	⬟	3E	
DN 15, DN 10 (½", 3/8")	⬟	3F	
DN 15, DN 15 (½", ½")	⬟	3G	
DN 15, DN 20 (½", ¾")	⬟	3H	
DN 15, DN 25 (½", 1")	⬟	3J	
DN 25, DN 25 (1", 1")	⬟	3L	
DN 25, DN 32 (1", 1¼")	⬟	3M	
DN 25, DN 40 (1", 1½")	⬟	3N	
DN 50, DN 40 (2", 1½")	⬟	4B	
DN 50, DN 50 (2", 2")	⬟	4C	
DN 80, DN 65 (3", 2½")	⬟	4J	
DN 80, DN 80 (3", 3")	⬟	4K	
DN 80, DN 100 (4", 4")	⬟	4L	
Process connection			
EN 1092-1 B1, PN 16		A0	
EN 1092-1 B1, PN 40	⬟	A1	
EN 1092-1 B1, PN 63		A2	
EN 1092-1 B1, PN 100	⬟	A3	
EN 1092-1 B1, PN 160		B1	
EN 1092-1 D, PN 40		A5	
EN 1092-1 D, PN 63		A6	
EN 1092-1 D, PN 100		A7	
EN 1092-1 D, PN 160		A8	
ANSI B16.5, RF, class 150	⬟	D1	
ANSI B16.5, RF, class 300		D2	
ANSI B16.5, RF, class 600	⬟	D3	
ANSI B16.5, RF, class 900	⬟	D4	
ISO228-1 G pipe thread	⬟	E1	
ASME B1.20.1 NPT pipe thread	⬟	E3	
DIN 11851 Hygienic screwed	⬟	F1	
DIN 32676-C (inch) Hygienic clamped	⬟	G1	
DIN 11864-1 Hygienic screwed	⬟	H1	
DIN 11864-2A BF-A Hygienic flanged metric		H2	
DIN 11864-3A Hygienic clamped		H3	
DIN 11864-2B BF-A Hygienic flanged NPS		H4	
ISO 2852 Hygienic clamped		J1	
ISO 2853 Hygienic screwed		J5	
SMS 1145 Hygienic screwed	⬟	K1	
Swagelok Quick Connect		K5	
JIS B2200/10K		L2	
JIS B2200/20K		L4	
JIS B2200/40K		L6	
JIS B2200/63K		L7	
Wetted parts material			
AISI 316L/W1.4435/W1.4404 (100 barg max.)	⬟	1	
Calibration/Accuracy class			
0.1 % flow, 5 kg/m³ density	⬟	1	
0.1 % flow, 1 kg/m³ density	⬟	4	
Standard fraction calibration		8	
Transmitter/DSL material & mounting style			
Compact, IP67, aluminum	⬟	D	
Remote, IP67, aluminum, M12	⬟	G	
Remote, IP67, aluminum, T/Box	⬟	K	

Selection and Ordering data		Article No.	Ord. code
SITRANS FC430 Digital coriolis flowmeter		7ME4713 -	
with SITRANS FCS400 NAMUR compliant flow sensor with flange/pipe thread connections and compact or remote mounting with FCT030 transmitter		■■■■■ - ■■■	■■■
Ex approval			
Non-Ex	⬟		A
ATEX II 2GD	⬟		C
IECEx GDb	⬟		F
FM, Class 1, Div 1	⬟		H
CSA, Class 1, Zone 1			M
Local User Interface			
Blind	⬟		1
Graphical, 240 x 160 pxl	⬟		3

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Cable glands		
Metric, no glands	⬟	**A01**
Metric, plastic	⬟	**A02**
Metric, brass/Ni plated		**A05**
Metric, stainless steel	⬟	**A06**
NPT, no glands		**A11**
NPT, plastic		**A12**
NPT, brass/Ni plated		**A15**
NPT, stainless steel		**A16**
Sofware functions and CT approvals		
Standard	⬟	**B11**
CT standard		**B31**
I/O configuration Ch1		
Ca 4 ... 20 mA HART active, SIL certified	⬟	**E04**
Cp 4 ... 20 mA HART passive, SIL certified	⬟	**E05**
Ca 4 ... 20 mA HART active	⬟	**E06**
Cp 4 ... 20 mA HART passive	⬟	**E07**

Only compact versions can be used in SIL applications.

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Selection and Ordering data	Order code
I/O configuration Ch2, Ch3 and Ch4	
None ⬟	**F00**
aSignal, None, None	**F40**
aSignal, aSignal, None	**F41**
aSignal, aSignal, aSignal	**F42**
aSignal, aSignal, Ia	**F43**
aSignal, aSignal, R	**F44**
aSignal, Ia, None	**F45**
aSignal, Ia, Ia	**F46**
aSignal, Ia, R	**F47**
aSignal, R, None	**F50**
aSignal, R, R	**F51**
pSignal, None, None	**F60**
pSignal, pSignal, None	**F61**
pSignal, pSignal, pSignal	**F62**
pSignal, pSignal, Ip	**F63**
pSignal, pSignal, R	**F64**
pSignal, Ip, None	**F65**
pSignal, Ip, Ip	**F66**
pSignal, Ip, R	**F67**
pSignal, R, None	**F70**
pSignal, R, R	**F71**
aSignal, aSignal, pSignal	**F80**
aSignal, aSignal, Ip	**F81**
aSignal, pSignal, None	**F82**
aSignal, pSignal, pSignal	**F83**
aSignal, pSignal, Ia	**F84**
aSignal, pSignal, Ip	**F85**
aSignal, pSignal, R	**F86**
aSignal, Ia, Ip	**F87**
aSignal, Ip, None	**F90**
aSignal, Ip, Ip	**F91**
aSignal, Ip, R	**F92**
pSignal, pSignal, Ia	**F93**
pSignal, Ia, None	**F94**
pSignal, Ia, Ia	**F95**
pSignal, Ia, Ip	**F96**
pSignal, Ia, R	**F97**

Notes on I/O configurations:

a or p suffix: The I/O module is selected at ordering with either active or passive function.

Signal: The output can be selected for Current (0 or 4 to 20 mA), frequency or pulse function in the menu.

I: Discrete status input to the flowmeter. Functions are selected in the menu including 'Freeze output', 'Reset totalizer'.

R: Relay output for discrete status reporting. Function is selected in the menu, including 'Error', 'High flow warning'.

The MLFB structure for FC430 systems must be filled to **this level**, including **"-Z"** options A..., B..., E... and F...

Selection and Ordering data	Order code
Add-on options and accessories	
Please add "**-Z**" to Article No. and specify Order code(s).	
Certificates	
Pressure test certificate CRN	**C01**
Pressure test certificate PED	**C02**
Material certificate EN 10204-3.1	**C05**
Welding inspection report	**C07**
Factory certificate to EN 10204 2.1 ⬟	**C10**
Factory certificate to EN 10204 2.2	**C11**
Cable	
None	**L50**
5 m (16.4 ft), standard with M12 plugs fitted	**L51**
5 m (16.4 ft), standard	**L52**
10 m (32.8 ft) standard with M12 plugs fitted	**L55**
10 m (32.8 ft), standard	**L56**
25 m (82 ft), standard with M12 plugs fitted	**L59**
25 m (82 ft), standard	**L60**
50 m (164 ft), standard with M12 plugs fitted	**L63**
50 m (164 ft), standard	**L64**
75 m (246 ft), standard with M12 plugs fitted	**L67**
75 m (246 ft), standard	**L68**
150 m (492 ft), standard with M12 plugs fitted	**L71**
150 m (492 ft), standard	**L72**
Additional data	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Tag name	
Tag name plate, stainless steel	**Y17**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Operating instructions for SITRANS FC430

Description	Article No.
• English	**A5E03361511**
• German	**A5E03651143**
• Spanish	**A5E03651152**
• French	**A5E03651188**
• Italian	**A5E03651190**
• Chinese	**A5E03922773**

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http://www.siemens.com/flowdocumentation

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Flowmeter SITRANS FC410

Overview

The compact flowmeter SITRANS FC410 can be ordered for industrial, hygienic or NAMUR service.

Intended for integration into OEM skids, machines or pre-assembled plant systems, the flowmeter is based on the latest developments within digital signal processing technology - engineered for high measuring performance:

- Fast response to rapid changes in flow
- Fast dosing applications with control in host system
- High immunity against process noise
- High turndown ratio of flowrates
- Suitable for liquid and gas service
- Easy to install, commission and maintain

FC410 is available with Modbus RTU (RS 485) multi-drop serial communication.

The flowmeter is supplied with SensorFlash, a micro SD card containing all relevant certificates.

The SITRANS FC410 flowmeter system consists of a SITRANS FCS400 sensor and a SITRANS FCT010 transmitter always compact mounted.

Benefits

- It is narrow and light, fitting neatly into dense piping arrangements
- Effective separation of measurement from plant vibration
- Reliable measurements due to high signal to noise ratio
- Short overall length; easy drop-in replacement into most existing installations
- Direct connection to host with high-speed Modbus simplifies machine or skid construction and set-up.

Technical specifications

Sizes	DN 15 (½"), DN 25 (1"), DN 50 (2"), DN 80 (3")
Accuracy	± 0.10 %
Repeatability	± 0.05 %
Flow range (water @ 1 bar pressure loss)	DN 15: 3 700 kg/h (8 157 lb/h) DN 25: 11 500 kg/h (25 353 lb/h) DN 50: 52 000 kg/h (114 640 lb/h) DN 80: 136 000 kg/h (300 000 lb/h)
Power supply	24 V DC ± 20 %; 110 mA
Weight	4.6 ... 50 kg
Material	
• Sensor	
- Measuring tubes	316L stainless steel or Hastelloy C22
- Enclosure	304 stainless steel
• Transmitter	Aluminum with corrosion-resistant coating
Enclosure rating	IP67
Pressure ratings	
• Measuring tubes	
- 316L	100 bar (1450 psi)
- Hastelloy C22	160 bar (2321 psi)
• Sensor enclosure	20 bar (DN15, DN 25) 17 bar (DN 50, DN 80)
• Sensor enclosure burst pressure	>160 bar (all sizes)
Temperature ratings	
• Process medium	-50 ... +200 °C (-58 ... +392 °F)
• Ambient	-40 ... +60 °C (-40 ... +140 °F)
Process connections	
• Flanges	EN 1092-1 B1, EN 1092-1 D, ANSI/ASME B16.5, JIS B 2220, DIN 11864-2
• Pipe threads	ASME B1.20 (NPT), ISO228-1 G (BSPP), VCO Quick-connect
• Hygienic threads	DIN 11851, DIN 11864-1A, ISO 2853, SMS 1145
• Hygienic clamps	DIN 11864-3A, DIN 32676, ISO 2852
Approvals	
• Hazardous area	ATEX, IECEx, FM, NEPSI, CSA, INMETRO (installed with flameproof conduit)
• Pressure equipment	PED, CRN
• Hygienic	3A, EHEDG
• Marine	Germanischer Lloyd/det Norske Veritas, Bureau Veritas, Lloyds of London, American Bureau of Shipping
NAMUR	NAMUR-compliant (e.g. NE 21, NE 41 and NE 132)
Communication	Modbus RTU
EMC performance	EN 61326-3-2
Mechanical load	18 to 400 Hz random The flow meter will mechanically tolerate 3.17 g RMS in all directions. Flow accuracy cannot be guaranteed under all conditions.

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Selection and Ordering data		Article No.	Ord. code
SITRANS FC410 Digital coriolis flowmeter ↗ with SITRANS FCS400 Standard flow sensor with hygienic and flange/pipe thread connections and compact mounting with FCT010 transmitter		7ME461 1 - ■■■■■ - ■D■1	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size, connection size			
DN 15, DN 10 (½", 3/8")		3F	
DN 15, DN 15 (½", ½")	⬟	3G	
DN 15, DN 20 (½", ¾")	⬟	3H	
DN 15, DN 25 (½", 1")	⬟	3J	
DN 25, DN 15 (1", ½")		3K	
DN 25, DN 25 (1", 1")	⬟	3L	
DN 25, DN 40 (1", 1½")	⬟	3N	
DN 50, DN 40 (2", 1½")	⬟	4B	
DN 50, DN 50 (2", 2")	⬟	4C	
DN 80, DN 65 (3", 2½")	⬟	4J	
DN 80, DN 80 (3", 3")	⬟	4K	
DN 80, DN 100 (3", 4")		4L	
Process connection			
EN 1092-1 B1, PN 16		A0	
EN 1092-1 B1, PN 40	⬟	A1	
EN 1092-1 B1, PN 63		A2	
EN 1092-1 B1, PN 100	⬟	A3	
EN 1092-1 B1, PN 160		B1	
EN 1092-1 D NUT, PN 40		A5	
EN 1092-1 D NUT, PN 63		A6	
EN 1092-1 D NUT, PN 100		A7	
EN 1092-1 D NUT, PN 160		A8	
ANSI B16.5-2009, class 150	⬟	D1	
ANSI B16.5-2009, class 300		D2	
ANSI B16.5-2009, class 600	⬟	D3	
ANSI B16.5-2009, class 900		D4	
ISO228-1 G pipe thread	⬟	E1	
ASME B1.20.1 NPT pipe thread	⬟	E3	
DIN 11851 hygienic screwed	⬟	F1	
DIN 32676 hygienic Tri-Clamp	⬟	G1	
DIN 11864-1A aseptic screwed	⬟	H1	
DIN 11864-2A aseptic flanged	⬟	H2	
DIN 11864-3A clamped		H3	
ISO 2852 hygienic clamped	⬟	J1	
ISO 2853 hygienic screwed	⬟	J5	
SMS 1145 hygienic screwed		K1	
12-VCO-4 quick connect		K5	
JIS B2200:2004/10K		L2	
JIS B2220:2004/20K		L4	
JIS B2220:2004/40K		L6	
JIS B2220:2004/63K		L7	
Wetted parts material			
AISI 316L/W1.4435/W1.4404 (100 barg max.)	⬟	1	
Hastelloy C22 (only for 7ME461)		3	
Calibration/Accuracy class			
0.1 % flow, 5 kg/m³ density	⬟	1	
0.1 % flow, 1 kg/m³ density	⬟	4	
Standard fraction calibration		8	
Ex approval			
Non-Ex	⬟	A	
ATEX II 2GD	⬟	C	
IECEx GDb	⬟	F	
FM, Class 1, Div 1	⬟	H	
CSA, Class 1, Zone 1		M	

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Cable glands		
Metric, no glands	⬟	**A01**
Metric, plastic	⬟	**A02**
Metric, brass/Ni plated		**A05**
Metric, stainless steel		**A06**
NPT, no glands		**A11**
NPT, Plastic		**A12**
NPT, brass/Ni plated		**A15**
NPT, stainless steel		**A16**
Integral M12 socket		**A20**
Sofware functions and CT approvals		
Standard	⬟	**B11**
I/O configuration Ch1		
Modbus RTU RS 485	⬟	**E14**
I/O configuration Ch2, Ch3 and Ch4		
None	⬟	**F00**
The Article No. for FC410 systems must be filled to **this level**, including **"-Z"** options A.., B.., E.. and F..		

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and Ordering data		Order code
Add-on options and accessories		
Please add "**-Z**" to Article No. and specify Order code(s).		
Certificates		
Pressure test certificate CRN		**C01**
Pressure test certificate PED		**C02**
Material certificate EN 10204-3.1		**C05**
Welding inspection report		**C07**
Factory certificate to EN 10204 2.1	⬟	**C10**
Factory certificate to EN 10204 2.2		**C11**
Cable[1)]		
None		**L50**
5 m (16.4 ft), standard with M12 plugs fitted		**L51**
5 m (16.4 ft), standard		**L52**
10 m (32.8 ft) standard with M12 plugs fitted		**L55**
10 m (32.8 ft), standard		**L56**
25 m (82 ft), standard with M12 plugs fitted		**L59**
25 m (82 ft), standard		**L60**
50 m (164 ft), standard with M12 plugs fitted		**L63**
50 m (164 ft), standard		**L64**
75 m (246 ft), standard with M12 plugs fitted		**L67**
75 m (246 ft), standard		**L68**
150 m (492 ft), standard with M12 plugs fitted		**L71**
150 m (492 ft), standard		**L72**
Additional data		
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**

[1)] M12 versions of cable have a plug at both ends.

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Operating instructions for SITRANS FC410

Description	Article No.
• English	**A5E33120874**
• German	**A5E33124885**
• Spanish	**A5E33209358**
• French	**A5E33209377**
• Italian	**A5E33209408**
• Chinese	**A5E33209431**

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All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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Selection and Ordering data		Article No.	Ord. code
SITRANS FC410 Digital coriolis flowmeter ↗		**7ME4621-**	
with SITRANS FCS400 Flow sensor Hygienic version with Ra < 0.8 µm, 3A approved, and compact mounting with FCT010 transmitter		■■■■■-■D■1	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size, connection size			
DN 15, DN 10 (½", 3/8")		**3F**	
DN 15, DN 15 (½", ½")	⬟	**3G**	
DN 15, DN 20 (½", ¾")	⬟	**3H**	
DN 15, DN 25 (½", 1")	⬟	**3J**	
DN 25, DN 25 (1", 1")	⬟	**3L**	
DN 25, DN 32 (1", 1¼")		**3M**	
DN 25, DN 40 (1", 1½")	⬟	**3N**	
DN 50, DN 40 (2", 1½")	⬟	**4B**	
DN 50, DN 50 (2", 2")	⬟	**4C**	
DN 80, DN 65 (3", 2½")	⬟	**4J**	
DN 80, DN 80 (3", 3")	⬟	**4K**	
Process connection			
DIN 11851 0.8 µm hygienic screwed	⬟	**F1**	
DIN 32676 0.8 µm hygienic Tri-Clamp	⬟	**G1**	
DIN 11864-1 0.8 µm hygienic screwed	⬟	**H1**	
DIN 11864-2A BF-A 0.8 µm hygienic flanged (metric)		**H2**	
DIN 11864-3A BF-A0.8 µm hygienic clamped	⬟	**H3**	
DIN 11864-2B BF-A0.8 µm hygienic flanged (NPS)		**H4**	
ISO 2852 0.8 µm hygienic clamped	⬟	**J1**	
ISO 2853 0.8 µm hygienic screwed	⬟	**J5**	
Wetted parts material			
AISI 316L/1.4435 (40 bar max.)	⬟	**1**	
Calibration/Accuracy class			
0.1 % flow, 5 kg/m³ density	⬟	**1**	
0.1 % flow, 1 kg/m³ density		**4**	
Standard fraction calibration		**8**	
Ex approval			
Non-Ex	⬟	**A**	
ATEX II 2GD	⬟	**C**	
IECEx GDb	⬟	**F**	
FM, Class 1, Div 1	⬟	**H**	
CSA, Class 1, Zone 1		**M**	

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Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Cable glands		
Metric, no glands	⬟	**A01**
Metric, plastic	⬟	**A02**
Metric, brass/Ni plated		**A05**
Metric, stainless steel	⬟	**A06**
NPT, no glands		**A11**
NPT, plastic		**A12**
NPT, brass/Ni plated		**A15**
NPT, stainless steel		**A16**
Integral M12 socket		**A20**
Sofware functions and CT approvals		
Standard	⬟	**B11**
I/O configuration Ch1		
Modbus RTU RS 485	⬟	**E14**
I/O configuration Ch2, Ch3 and Ch4		
None	⬟	**F00**
The Article No. for FC410 systems must be filled to **this level**, including **"-Z"** options A.., B.., E.. and F..		

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Selection and Ordering data		Order code
Add-on options and accessories		
Please add "**-Z**" to Article No. and specify Order code(s).		
Certificates		
Pressure test certificate CRN		**C01**
Pressure test certificate PED		**C02**
Material certificate EN 10204-3.1		**C05**
Welding inspection report		**C07**
Factory certificate to EN 10204 2.1	⬟	**C10**
Factory certificate to EN 10204 2.2		**C11**
Cable[1)]		
None		**L50**
5 m (16.4 ft), standard with M12 plugs fitted		**L51**
5 m (16.4 ft), standard		**L52**
10 m (32.8 ft) standard with M12 plugs fitted		**L55**
10 m (32.8 ft), standard		**L56**
25 m (82 ft), standard with M12 plugs fitted		**L59**
25 m (82 ft), standard		**L60**
50 m (164 ft), standard with M12 plugs fitted		**L63**
50 m (164 ft), standard		**L64**
75 m (246 ft), standard with M12 plugs fitted		**L67**
75 m (246 ft), standard		**L68**
150 m (492 ft), standard with M12 plugs fitted		**L71**
150 m (492 ft), standard		**L72**
Additional data		
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**

[1)] M12 versions of cable have a plug at both ends.

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Operating instructions for SITRANS FC410

Description	Article No.
• English	**A5E33120874**
• German	**A5E33124885**
• Spanish	**A5E33209358**
• French	**A5E33209377**
• Italian	**A5E33209408**
• Chinese	**A5E33209431**

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http://www.siemens.com/flowdocumentation

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Selection and Ordering data		Article No.	Ord. code
SITRANS FC410 Digital coriolis flowmeter with SITRANS FCS400 NAMUR compliant flow sensor with flange/pipe thread connections and compact mounting with FCT010 transmitter		7ME4711 - ■■■■■ - ■D■1	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size, Connection size			
DN 15, DN 6 (½", ¼")	⬟	3E	
DN 15, DN 10 (½", 3/8")	⬟	3F	
DN 15, DN 15 (½", ½")	⬟	3G	
DN 15, DN 20 (½", ¾")	⬟	3H	
DN 15, DN 25 (½", 1")	⬟	3J	
DN 25, DN 25 (1", 1")	⬟	3L	
DN 25, DN 32 (1", 1¼")	⬟	3M	
DN 25, DN 40 (1", 1½")	⬟	3N	
DN 50, DN 40 (2", 1½")	⬟	4B	
DN 50, DN 50 (2", 2")	⬟	4C	
DN 80, DN 65 (3", 2½")	⬟	4J	
DN 80, DN 80 (3", 3")	⬟	4K	
DN 80, DN 100 (3", 4")	⬟	4L	
Process connection			
EN1092-1 B1, PN 16		A0	
EN1092-1 B1, PN 40	⬟	A1	
EN1092-1 B1, PN 63		A2	
EN1092-1 B1, PN 100	⬟	A3	
EN1092-1 B1, PN 160		B1	
EN1092-1 D, PN 40		A5	
EN1092-1 D, PN 63		A6	
EN1092-1 D, PN 100		A7	
EN1092-1 D, PN 160		A8	
ANSI B16.5, RF, class 150	⬟	D1	
ANSI B16.5, RF, class 300		D2	
ANSI B16.5, RF, class 600	⬟	D3	
ANSI B16.5, RF, class 900	⬟	D4	
ISO228-1 G pipe thread	⬟	E1	
ASME B1.20.1 NPT pipe thread	⬟	E3	
DIN 11851 Hygienic screwed	⬟	F1	
DIN 32676-C (inch) Hygienic clamped	⬟	G1	
DIN 11864-1 Hygienic screwed	⬟	H1	
DIN 11864-2A BF-A Hygienic flanged metric		H2	
DIN 11864-3A Hygienic clamped		H3	
DIN 11864-2B BF-A Hygienic flanged NPS		H4	
ISO 2852 Hygienic clamped		J1	
ISO 2853 Hygienic screwed		J5	
SMS 1145 Hygienic screwed	⬟	K1	
Swagelok Quick Connect	⬟	K5	
JIS B2200/10K		L2	
JIS B2200/20K		L4	
JIS B2200/40K		L6	
JIS B2200/63K		L7	
Wetted parts material			
AISI 316L/W1.4435/W1.4404 (100 barg max.)	⬟	1	
Calibration/Accuracy class			
0.1 % flow, 5 kg/m³ density	⬟	1	
0.1 % flow, 1 kg/m³ density	⬟	4	
Standard fraction calibration		8	
Ex approval			
Non-Ex	⬟	A	
ATEX II 2GD	⬟	C	
IECEx GDb	⬟	F	
FM, Class 1, Div 1	⬟	H	
CSA, Class 1, Zone 1		M	

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Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Cable glands		
Metric, no glands	⬟	**A01**
Metric, plastic	⬟	**A02**
Metric, brass/Ni plated		**A05**
Metric, stainless steel	⬟	**A06**
NPT, no glands		**A11**
NPT, plastic		**A12**
NPT, brass/Ni plated		**A15**
NPT, stainless steel		**A16**
Sofware functions and CT approvals		
Standard	⬟	**B11**
I/O configuration Ch1		
Modbus RTU RS 485	⬟	**E14**
I/O configuration Ch2, Ch3 and Ch4		
None	⬟	**F00**
The Article No. structure for FC410 systems must be filled to **this level**, including **"-Z"** options A..., B..., E... and F...		

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Selection and Ordering data		Order code
Add-on options and accessories		
Please add "**-Z**" to Article No. and specify Order code(s).		
Certificates		
Pressure test certificate CRN		**C01**
Pressure test certificate PED		**C02**
Material certificate EN 10204-3.1		**C05**
Welding inspection report		**C07**
Factory certificate to EN 10204 2.1	⬟	**C10**
Factory certificate to EN 10204 2.2		**C11**
Cable[1)]		
None		**L50**
5 m (16.4 ft), standard with M12 plugs fitted		**L51**
5 m (16.4 ft), standard		**L52**
10 m (32.8 ft) standard with M12 plugs fitted		**L55**
10 m (32.8 ft), standard		**L56**
25 m (82 ft), standard with M12 plugs fitted		**L59**
25 m (82 ft), standard		**L60**
50 m (164 ft), standard with M12 plugs fitted		**L63**
50 m (164 ft), standard		**L64**
75 m (246 ft), standard with M12 plugs fitted		**L67**
75 m (246 ft), standard		**L68**
150 m (492 ft), standard with M12 plugs fitted		**L71**
150 m (492 ft), standard		**L72**
Additional data		
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.		
Tag name		
Tag name plate, stainless steel		**Y17**

[1)] M12 versions of cable have a plug at both ends.

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Operating instructions for SITRANS FC410

Description	Article No.
• English	**A5E33120874**
• German	**A5E33124885**
• Spanish	**A5E33209358**
• French	**A5E33209377**
• Italian	**A5E33209408**
• Chinese	**A5E33209431**

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Overview

The flow measuring principle is based on the Coriolis Effect. The FCS400 sensor's measuring tubes are energized by an electromechanical driver circuit which oscillates them at their resonance frequency.

Two pick-ups are placed symmetrically upstream and downstream of the central driver. When a process fluid passes through the sensor, the Coriolis Effect will act on the vibrating tubes and cause deflection which can be measured as a phase shift between pick-ups 1 and 2. The phase shift is proportional to the mass flow rate.

The amplitude of the driver is automatically regulated to ensure a stable output from both of the pickups.

The temperatures of the sensor tubes and frame are measured with high precision to provide compensation for changes with temperature in the measuring properties.

The sensor signals are analyzed for flow, density and fluid temperature in the sensor front end. The digital signal is controlled to conform to high Safety Integrated Level (SIL) and sent digitally to the transmitter via standard cable. The FCT030 further calculates total mass and volume, fraction, dosing control and many other functions.

The front-end module has a process noise filter, which can be used to improve the meter's performance when installation and application conditions are not ideal. Typical interferences from process conditions such as pump pulsations, mechanical vibrations, oscillating valves can be reduced considerably.

Integration

The SITRANS FCS400 Massflow sensor is suitable for both indoor and outdoor installation and meets the requirements of Protection Class IP67/NEMA 4X. Optionally the sensor can be supplied with hazardous certification to Class 1 Zone 1 (ATEX, IECEx) or Class 1 Div. 1 (FM).

The flowmeter is bidirectional and can be installed in any orientation. The sensor is self-draining in many positions, with vertical mounting preferred.

It is important to ensure that the sensor tubes are always completely filled with homogeneous fluid; otherwise measuring errors may occur. Suitable fluids are clean liquids, pastes, light slurries or gases. Condensing vapours, aerated liquids or slush are not recommended.

The materials in contact with the process medium must be evaluated for corrosion and erosion resistances for long sensor life.

The pressure drop through the sensor is a function of the properties of the fluid and the flow rate. A pressure loss and accuracy calculator can be found on the Siemens Internet site www.siemens.com/fc430/sizer

The preferred flow direction is indicated by an arrow on the sensor. Flow in the direction of the arrow will be measured as positive. The flow direction can be adjusted at the transmitter to compensate for reverse installation.

Installation orientation

The optimal installation orientation is vertical with the flow upwards. This ensures that suspended solids or bubbles are completely pushed through the sensor. A drain valve below the sensor will allow the pipe and sensor to drain completely.

Supports

In order to support the weight of the flowmeter and to ensure reliable measurements when external effects exist (e.g. plant vibrations), the sensor should be installed in rigidly supported pipelines.

Supports or hangers should be installed symmetrically and stress-free in close proximity to both of the process connections.

Shut-off devices

To conduct a system zero adjustment, secure shut-off devices are required in the pipeline.

Where possible, shut-off devices should be installed both upstream and downstream of the flowmeter.

System design

- The sensor design consists of process connections, inlet and outlet manifolds mounted in a stiff frame and two parallel tubes equally sharing the process medium flow. The meter is protected in a pressure-rated stainless steel enclosure with two purge ports to support a pressure guard in non-Ex applications.
- The sensing tubes are curved in the CompactCurve shape which gives high sensitivity and low pressure loss. The CompactCurve shape was selected to ensure that the smallest flows are measured with optimal signal to noise ratio.
- Vibration mode separation creates a controlled measuring environment only within the CompactCurve part of the tubes. As a result the sensor has high immunity to plant vibration while avoiding large mass balancing of the meter components.
- The 15° slope of the CompactCurve shape ensures secure self-draining when the sensor axis is mounted vertically or up to 10° off vertical.
- The sensor frame is designed to conduct plant vibrations directly through the sensor body to adjacent pipeline while providing isolation of the metering section from the vibration. Careful mounting of the pipeline with regard to minimizing vibration at the meter will ensure a secure measurement environment.

Installation guidelines

- The mass flowmeter does not require any flow conditioning or straight inlet pipe sections. Care should be exercised however to ensure that any upstream valves, gates, sight glasses etc. do not cavitate and are not set into vibration by the flow.
- It is always preferred to place the flowmeter upstream of any control valve (what goes in, comes out) or other pipeline component which may cause flashing, cavitation or vibrations.
- The presence of gas bubbles in the fluid may result in erroneous measurements, particularly in the density measurement. Therefore the flowmeter should not be installed at the lowest pressure point in the liquid piping system or where vapour can collect. Install the meter in pipeline sections with high pressure to maintain system pressure and compress any bubbles.
- Drop lines downstream from the flow sensor should be avoided to prevent the meter tube from draining during flowing conditions. A back-pressure device or orifice is recommended to ensure that flow does not separate within the flow sensor but the metering section remains at positive pressure at all times while there is flow.

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- The flowmeter should not come into contact with any other objects. Avoid making attachments to the housing except for the pressure guard components (if required).
- When the connecting pipeline is larger than the sensor size, suitable standard reducers may be installed. A selection of oversize and undersize connections can be ordered - refer to the sizes tables below.
- The flow sensor may be supported at the junction between process connection and the manifold, but should not be used to support adjacent piping. Ensure that the piping is also supported on both sides so that connection stresses are neutral.
- If strong vibrations exist in the pipeline, they should be damped using elastic pipeline elements. The damping devices must be installed outside the supported flowmeter section. Direct connection of flexible elements to the sensor should be avoided.
- Make sure that any dissolved gases, which are present in many liquids, do not outgas. The back pressure at the outlet should be at least 0.2 bar (3 psi) above the vapour pressure of the process fluid.
- Assure that operation below the vapour pressure cannot occur particularly for fluids with low latent heat of vaporisation.
- The sensor should not be installed in the vicinity of strong electromagnetic fields, e.g. near motors, pumps, variable frequency drives, transformers etc.
- When operating meters on a common mounting base the sensors should be mounted and spaced separate from each other to avoid cross-talk and other vibration interferences.
- When operating meters in interconnected pipelines the pipes should be decoupled to prevent cross talk.

Remote system cabling

The system is designed so that standard instrumentation cable with four cores and overall screen or two screened pairs can be used, or cable sets can be ordered with the flowmeter. The cable can be ordered in various set lengths and terminated in the field.

The maximum design length for the sensor cable is 200 m (656 ft), limited to 150 m (492 ft) for Ex applications with Class IIC gases. Data transmission speed and process variable update rates may be affected by the cable characteristics. For best results, choose a cable with the following electrical characteristics:

Property	Unit	Value
Resistance	[Ω/km]	59
Characteristic impedance	[Ω]	100 @ 1 MHz
Insulation resistance	[MΩ/km]	200
Maximum voltage	[V]	300

The flowmeter system applies maximum 15 V DC in operation and is certified intrinsically safe. The complete system is insulation tested to 1500 V in production.

Cabling solutions which can be ordered with the flowmeter are as follows:

1. High performance plugged cable using M12 plugs into prepared sockets
2. Cable glands for either metric or NPT threaded terminal housings.
3. Plain cable in set lengths to be passed through flexible and rigid conduit (not supplied) for metric or NPT threaded terminal housings

Cable for items 1, 2 and 3 are available either gray for standard applications or light blue for Ex applications to identify the circuit as intrinsically safe.

Insulation and heating

For applications where pipeline insulation is required for personnel protection or process temperature maintenance, the SITRANS FCS400 flow sensor may also be insulated. The form and material of insulation is not prescribed and entirely depends on the practices at the application location or plant.

Insulation must not be crowded around the sensor pedestal but shaped at a 45° cone to allow the pedestal to radiate excess heat and maintain a suitable working temperature within the front-end housing.

Where trace heating is employed, an electric heating jacket can be ordered as an accessory. It is shaped to the sensor body and controlled from a weatherproof setpoint device.

The jacket can heat the sensor enclosure up to 200 °C (392 °F). However further insulation is also recommended for personnel protection or low loss temperature maintenance.

Calibration

To ensure accurate measurement all flowmeters must be initially calibrated. The calibration of each SITRANS FCS400 coriolis sensor is conducted at SIEMENS flow facilities accredited according to ISO/IEC 17025 by DANAK. A calibration certificate is shipped with every sensor and calibration data are stored in the SensorFlash memory unit. The accreditation body DANAK has signed the ILAC MRA agreement (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement). Therefore the accreditation ensures international traceability and recognition of the test results in 39 countries worldwide, including the US (NIST traceability).

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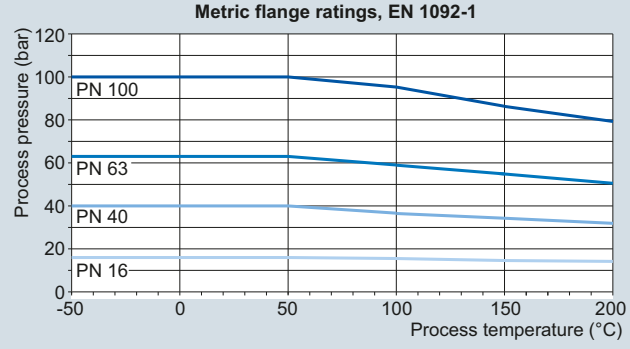
Technical specifications

Flow sensor FCS400		
Parameter	**Unit**	**Value**
Process pressure range	[barg (psi)]	316L: 0 ... 100 (0 ... 1450) Hastelloy C22: 0 ... 160 (0 ... 2321)
Process temperature range	[°C (°F)]	-50 ... +200 (-58 ... +392)
Ambient temperature range	[°C (°F)]	-40 ... +60 (-40 ... +140)
Transport temperature range	[°C (°F)]	-40 ... +70 (-40 ... +158)
Density range	[kg/m^3 (lb/ft^3)]	1 ... 5000 (0.062 ... 312.2)
Process media	Fluid group	1 (suitable for dangerous fluids)
	Form	Light slurry, liquid and non-condensing gas
No. of process values		
• Primary process values		• Mass flow • Density • Process medium temperature
• Derieved process values		• Volume flow • Corrected volume flow (with reference density) • Fraction A:B • Fraction % A:B

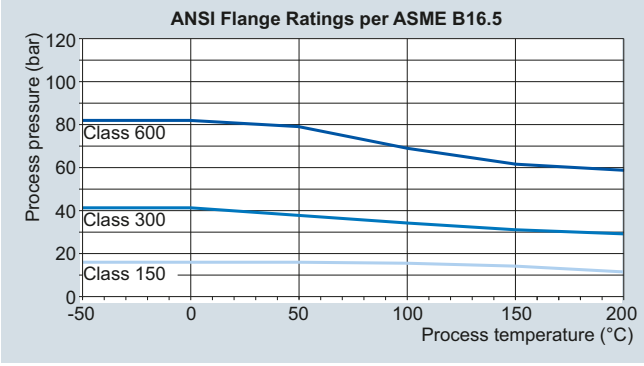
Performance specifications		**Sensor**			
Parameter	**Unit**	**DN 15**	**DN 25**	**DN 50**	**DN 80**
Max. zero point error	[kg/h (lb/min)]	0.2 (0.007)	2.0 (0.072)	7.5 (0.276)	18 (0.66)
Qmin	[kg/h (lb/min)]	20 (0.735)	200 (7.35)	750 (27.6)	900 (33.1)
Qnom	[kg/h (lb/min)]	3 700 (136.0)	11 500 (422.6)	52 000 (1 911)	136 000 (4 997)
Qmax	[kg/h (lb/min)]	6 400 (14 110)	17 700 (39 022)	70 700 (155 867)	181 000 (399 036)
Linearity error	[%]	± 0.1	± 0.1	± 0.1	± 0.1
Repeatability	[%]	± 0.05	± 0.05	± 0.05	± 0.05
Density error	[kg/m^3 (lb/ft^3)]	± 5 (± 0.31)	± 5 (± 0.31)	± 5 (± 0.31)	± 5 (± 0.31)
Extended density calibration	[kg/m^3 (lb/ft^3)]	± 1 (± 0.062)	± 1 (± 0.062)	± 1 (± 0.062)	± 1 (± 0.062)
Temperature error	[°C (°F)]	± 0.5 (± 0.9)	± 0.5 (± 0.9)	± 0.5 (± 0.9)	± 0.5 (± 0.9)

Pressure/temperature curves

With two major exceptions, the pressure rating of the flow sensors is independent of the process medium temperature. Design rules for flange connections in both the EN1092-1 and ASME B16.5 standards dictate pressure derating with increasing temperature. The charts below show the effect of process medium temperature on the pressure ratings for the flanges within the FCS400 product program.



EN1092-1 flanged sensors



ASME B16.5 flanged sensors

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Flow sensor SITRANS FCS400

Sensor variants

SITRANS FCS400 sensors are available in three main variants: Standard, hygienic and NAMUR. A wide range of process connections is available for the FCS400 sensors. The available combinations of type, sensor size and connection size are shown in the tables below.

Standard sensors

Sensor	Connection	EN 1092-1 B1, PN 16	EN 1092-1 B1, PN 40	EN 1092-1 B1, PN 63	EN 1092-1 B1, PN 100	EN 1092-1 D Nut, PN 40	EN 1092-1 D Nut, PN 63	EN 1092-1 D Nut, PN 100	ANSI B16.5-2009, class 150	ANSI B16.5-2009, class 300	ANSI B16.5-2009, class 600	ISO 228-1 G pipe thread	ASME B1.20.1 NPT pipe thread	DIN 11851 Hygienic screwed	DIN 32676 Hygienic Tri-clamp	DIN 11864-1A Aseptic secrewed	DIN 11864-2A Aseptic flanged	ISO 2852 Hygienic clamped	ISO 2853 Hygienic screwed	SMS 1145 Hygineic screwed	12-VCO-4 Quick connect	JIS B2200:2004/10K	JIS B2200:2004/20K	JIS B2200:2004/40K
316 Stainless - Standard: 7ME461.-...																								
DN 15 (½")	DN 6 (¼")											o	o											
	DN 10 ($^3/_8$")													o										
	DN 15 (½")	●	●	o	●	o	o	o	●	●	●	●	●	●	●	●	●				o	o	o	o
	DN 20 (¾")		●						●	o	●				●									
	DN 25 (1")	●	●		●									o				●	●	o				
DN 25 (1")	DN 15 (½")																							
	DN 25 (1")	●	●	o	●	o	o	o	●	o	●	●	●	●	●	●	●	●	●	o		o	o	o
	DN 32 (1¼")		●											o										
	DN 40 (1½")	o	●		o				o	o	o				●			o	o					
DN 50 (2")	DN 25 (1")																							
	DN 40 (1½")	o	●	o	●	o	o	o						o		●	●	o	o	o				
	DN 50 (2")	●	●	o	●	o	o	o	●	●	●	●	●	●	●	●	●	●	●	o		o	o	o
	DN 65 (2½")																							
DN 80 (3")	DN 50 (2")																							
	DN 65 (2½")	o	●	o	o				●	o	●			●										
	DN 80 (3")	●	●	o	●	o	o	o	●	●	●			●	●	●	●	●	●	o		o	o	o
	DN 100 (4")	●	o	o	o																			

- Combinations shown ● are Mainstream products with delivery time of up to 15 days depending on the combination and production stock levels.
- Combinations shown **o** are Sidestream products with delivery from 45 to 90 days. Not all components are held in production stock for Sidestream products.

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Hygienic sensor variants

The hygienic sensors all have maximum internal surface roughness < 0.8 µm and are EHEDG and 3A approved. Hygienic sensors are offered with process connection conforming to various international quick-connect clamps or threaded connectors. Pressure ratings are according to the relevant standard and the sensor size. Maximum pressure in the hygienic program is PN 40.

Sensor	Connection	DIN 11851 0.8 µm screwed	DIN 32676 0.8 µm Tri-clamp	DIN 11864-1 0.8 µm screwed	DIN 11864-2 0.8 µm flanged	ISO 2852 0.8 µm clamped	ISO 2853 0.8 µm screwed
316 SS - Hygienic: 7ME462.-...							
DN 15 (½")	DN 6 (¼")						
	DN 10 ($^3/_8$")	o					
	DN 15 (½")	●	●	●	●		
	DN 20 (¾")		●				
	DN 25 (1")	o				●	●
DN 25 (1")	DN 15 (½")						
	DN 25 (1")	●	●	●	●	●	●
	DN 32 (1¼")	o					
	DN 40 (1½")		●			o	o
DN 50 (2")	DN 25 (1")						
	DN 40 (1½")	o		o	●	o	o
	DN 50 (2")	●	●	●	●	●	●
	DN 65 (2½")						
DN 80 (3")	DN 50 (2")						
	DN 65 (2½")	●					
	DN 80 (3")	●	●	●	●	●	●
	DN 100 (4")						

- Combinations shown ● are Mainstream products with delivery time of up to 15 days depending on the combination and production stock levels.
- Combinations shown **o** are Sidestream products with delivery from 45 to 90 days. Not all components are held in production stock for Sidestream products.

Aseptic flanged process connections

The aseptic flanges offered for FCS400 conform with the standard DIN 11864-2A BF-A. The flange fitted to the sensor is therefore the back flange and the seal is an O-ring.

The flange dimensions in the FCS400 program are as follows:

Size DN	Pipe	Bore d_1	Ring OD d_{11}	Bolt Circle d_5	Bolt holes	Flange diameter d_{10}
10	13 x 1.5	10	22.4	37	4 x Ø9	54
15	19 x 1.5	16	28.4	42	4 x Ø9	59
20	23 x 1.5	20	32.4	47	4 x Ø9	64
25	29 x 1.5	26	38.4	53	4 x Ø9	70
32	35 x 1.5	32	47.7	59	4 x Ø9	76
40	41 x 1.5	38	53.7	65	4 x Ø9	82
50	53 x 1.5	50	65.7	77	4 x Ø9	94
65	70 x 2.0	66	81.7	95	8 x Ø9	107
80	85 x 2.0	81	97.7	112	8 x Ø11	113

DIN 11864-2A BF-A flange dimensions

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Flow sensor SITRANS FCS400

NAMUR sensor variants

The NAMUR variants have build-in lengths according to NAMUR recommendation NE 132. The recommendations of NE 132 are stated for sensors with flanges the same size as the sensor nominal size, and for flanges to EN1092-1 PN 40 with B1 flange facing. For couplings of other standards such as ASME B16.5 Class 150, the overall length incorporates the difference in length between standard EN and ASME flanges. NAMUR variants are offered with flange and pipe thread connections according to EN, ISO oand ASME standards, as shown in the table below.

Sensor	Connection	EN 1092-1 B1, PN 16	EN 1092-1 B1, PN 40	EN 1092-1 B1, PN 63	EN 1092-1 B1, PN 100	EN 1092-1 D Nut, PN 40	EN 1092-1 D Nut, PN 63	EN 1092-1 D Nut, PN 100	ANSI B16.5-2009, class 150	ANSI B16.5-2009, class 300	ANSI B16.5-2009, class 600	ISO 228-1 G pipe thread	ASME B1.20.1 NPT pipe thread	DIN 11851 Hygienic screwed	DIN 32676 Hygienic Tri-clamp	DIN 11864-1A Aseptic secrewed	DIN 11864-2A Aseptic flanged	ISO 2852 Hygienic clamped	ISO 2853 Hygienic screwed
316 Stainless - NAMUR: 7ME471.-...																			
DN 15 (½")	DN 6 (¼")											o	o						
	DN 10 (3/8")													o					
	DN 15 (½")	o	●	o	●	o	o	o	●	o	●	●	●	●	●	●	●		
	DN 20 (¾")								●	o	●				●				
	DN 25 (1")	o	●		●									o				●	●
DN 25 (1")	DN 15 (½")																		
	DN 25 (1")	o	●	o	●	o	o	o	●	o	●	●	●	●	●	●	●	●	●
	DN 32 (1¼")													o					
	DN 40 (1½")	o	●		o				o	o	o				●			o	o
DN 50 (2")	DN 25 (1")																		
	DN 40 (1½")	o	●	o	●	o	o	o						o		o	●	o	o
	DN 50 (2")	o	●	o	●	o	o	o	●	o	●	●	●	●	●	●	●	●	●
	DN 65 (2½")	o																	
DN 80 (3")	DN 50 (2")																		
	DN 65 (2½")	o	●	o	o				●	o	●			●					
	DN 80 (3")	o	●	o	●	o	o	o	●	o	●			●	●	●	●	●	●
	DN 100 (4")	o	o	o	o														

- Combinations shown ● are Mainstream products with delivery time of up to 15 days depending on the combination and production stock levels.
- Combinations shown **o** are Sidestream products with delivery from 45 to 90 days. Not all components are held in production stock for Sidestream products.

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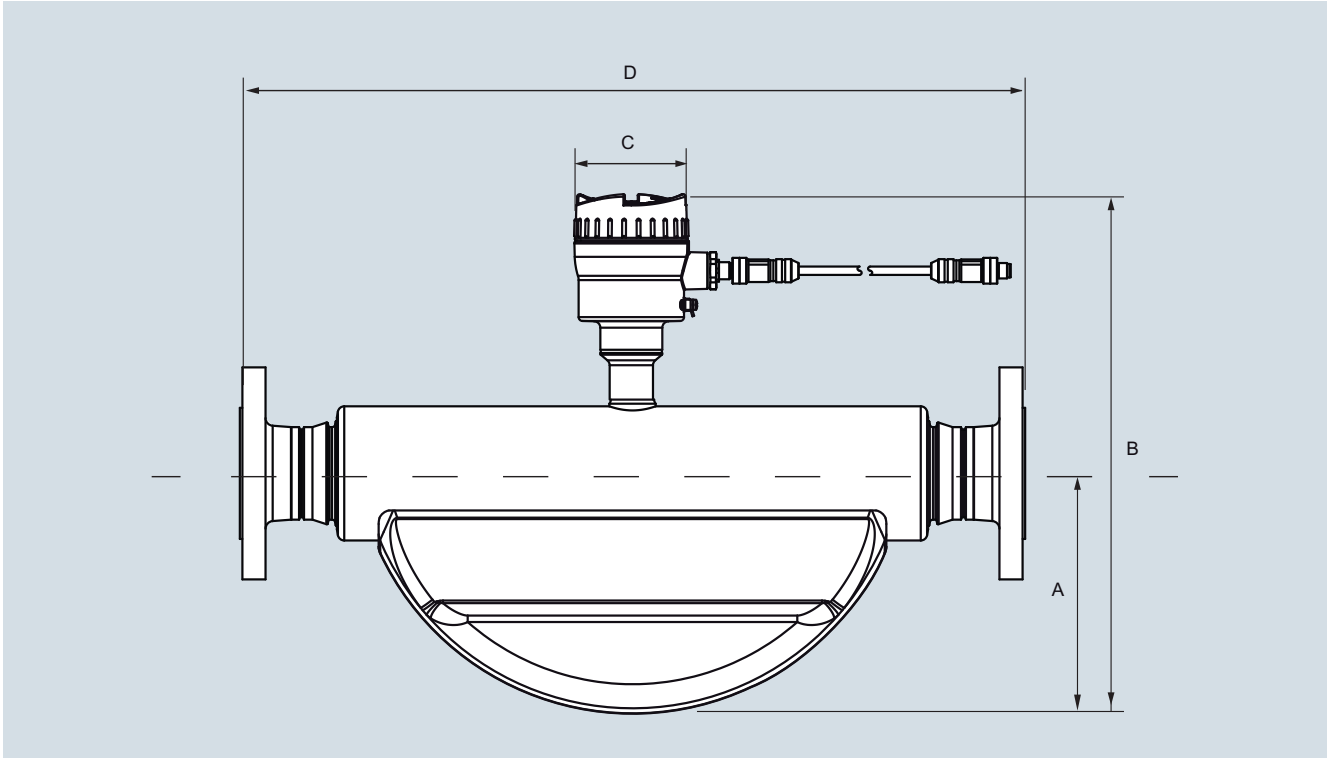
Dimensional drawings



Sensor		A		B		C		Weight	
[DN]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[kg]	[lb]
15	½	90	3.54	280	11.02	90	3.54	4.6	10.14
25	1	115	4.53	315	12.40	90	3.54	7.9	17.42
50	2	180	7.09	390	15.35	90	3.54	15	33.07
80	3	294	11.57	424	16.69	90	3.54	53	116.84

SITRANS FCS400, dimensions in mm (inch), weights in kg (lb), for a EN 1092 PN 40 flanged version.

The build-in length D depends on the flange.

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Flow sensor SITRANS FCS400

Overall length

The overall length (build-in length) of each sensor depends on the connection standard and the pressure rating. The tables below summarize the dimensions available at the time of publishing. Please contact Siemens for further information about our desired process connection specification.

316L stainless - Standard: 7ME461.-...

Sensor	DN 15 (½")					DN 25 (1")			DN 50 (2")		DN 80 (3")		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**
EN 1092-1 B1, PN 16			265		265	360			610	610	915	840	840
EN 1092-1 B1, PN 40			265		265	360		365	610	610	915	840	840
EN 1092-1 B1, PN 63			265			360			610	610	915	915	915
EN 1092-1 B1, PN 100			270		275	360			610	610	915	915	915
ANSI B16.5, class 150			270	270		360		365		620	915	875	
ANSI B16.5, class 300			270	270		360		380		620	915	875	
ANSI B16.5, class 600			270	285		360		380		620	915	875	
ISO 228-1 GH pipe thread	265		265			365				620			
ANSI B1.20.1 NPT pipe thread	265		270			365				620			
DIN 11851 Hygienic screwed		265	265		193	360	360		610	610	840	840	
DIN 32676-C Hygienic clamp			265	265		360		360		610		875	
DIN 11864-1 Aseptic screwed			265	265		360				610		875	
DIN 11864-2 Aseptic flange			265	265		360		274	620	610		875	
ISO 2852 Hygienic clamp					265	360			610	610		840	
ISO 2853 Hygienic screwed			265			360		274		610		860	

SITRANS FCS400, overall length, dimensions in mm

Sensor	DN 15 (½")					DN 25 (1")			DN 50 (2")		DN 80 (3")		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**
EN 1092-1 B1, PN 16			10.43		10.43	14.17			24.02	24.02	36.02	33.07	33.07
EN 1092-1 B1, PN 40			10.43		10.43	14.17		14.37	24.02	24.02	36.02	33.07	33.07
EN 1092-1 B1, PN 63			10.43			14.17			24.02	24.02	36.02	36.02	36.02
EN 1092-1 B1, PN 100			10.63		10.83	14.17			24.02	24.02	36.02	36.02	36.02
ANSI B16.5, class 150			10.63	10.63		14.17		14.37		24.41	36.02	34.45	
ANSI B16.5, class 300			10.63	10.63		14.17		14.96		24.41	36.02	34.45	
ANSI B16.5, class 600			10.63	11.22		14.17		14.96		24.41	36.02	34.45	
ISO 228-1 GH pipe thread	10.43		10.43			14.37				24.41			
ANSI B1.20.1 NPT pipe thread	10.43		10.63			14.37				24.41			
DIN 11851 Hygienic screwed		10.43	10.43		7.60	14.17	14.17		24.02	24.02	33.07	33.07	
DIN 32676-C Hygienic clamp			10.43	10.43		14.17		14.17		24.02		34.45	
DIN 11864-1 Aseptic screwed			10.43	10.43		14.17				24.02		34.45	
DIN 11864-2 Aseptic flange			10.43	10.43		14.17		10.78	24.41	24.02		34.45	
ISO 2852 Hygienic clamp					10.43	14.17			24.02	24.02		33.07	
ISO 2853 Hygienic screwed			10.43			14.17		10.78		24.02		33.86	

SITRANS FCS400, overall length, dimensions in inch

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316L stainless - Hygienic 0.8 µm: 7ME462.-...

Sensor	**DN 15 (½")**				**DN 25 (1")**			**DN 50 (2")**		**DN 80 (3")**	
Connection	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**
DIN 11851 Hygienic screwed	265	265			360	360		610	610	840	840
DIN 32676-C Hygienic clamp		265	265		360		360		610		875
DIN 11864-1 Aseptic screwed		265			360				610		875
DIN 11864-2 Aseptic flange		265			360			620	610		875
ISO 2852 Hygienic clamp				265	360			610	610		840
ISO 2853 Hygienic screwed				265	360				610		860

SITRANS FCS400, overall length, dimensions in mm

Sensor	**DN 15 (½")**				**DN 25 (1")**			**DN 50 (2")**		**DN 80 (3")**	
Connection	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**
DIN 11851 Hygienic screwed	10.43	10.43		7.60	14.17	14.17		24.20	24.20	33.07	33.07
DIN 32676-C Hygienic clamp		10.43	10.43		14.17		14.17		24.20		34.45
DIN 11864-1 Aseptic screwed		10.43			14.17				24.20		34.45
DIN 11864-2 Aseptic flange		10.43			14.17			24.41	24.20		34.45
ISO 2852 Hygienic clamp				10.43	14.17			24.20	24.20		33.07
ISO 2853 Hygienic screwed				10.43	14.17				24.20		33.86

SITRANS FCS400, overall length, dimensions in inch

© Siemens AG 2015

Flow sensor SITRANS FCS400

316L stainless - NAMUR: 7ME471.-...

Sensor	DN 15 (½")					DN 25 (1")			DN 50 (2")		DN 80 (3")		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**
EN 1092-1 B1, PN 16			510		510	600			715	715	915	915	915
EN 1092-1 B1, PN 40			510		510	600			715	715	915	915	915
EN 1092-1 B1, PN 63			510			600			715	715	915	915	915
EN 1092-1 B1, PN 100						600			715	715	915	915	915
EN 1092-1 D, PN 16			510			600			715	715		915	
EN 1092-1 D, PN 40			510			600			715	715		915	
EN 1092-1 D, PN 63						600			715	715		915	
ANSI B16.5, class 150						600					915		
ANSI B16.5, class 300						600					915		
ANSI B16.5, class 600						600					915		
ISO 228-1 GH pipe thread	510		510										
ANSI B1.20.1 NPT pipe thread	510												
DIN 11851 Hygienic screwed		510	510			600	600		715	715	915	915	
DIN 32676-C Hygienic clamp			510	510		600		600		715			
DIN 11864-1 Aseptic screwed			510			600				715			
DIN 11864-2 Aseptic flange													
ISO 2852 Hygienic clamp					510	600			715	715		915	
ISO 2853 Hygienic screwed					510	600				715			

SITRANS FCS400, overall length, dimensions in mm

Sensor	DN 15 (½")					DN 25 (1")			DN 50 (2")		DN 80 (3")		
Connection	**DN 6 (¼")**	**DN 10 (3/8")**	**DN 15 (½")**	**DN 20 (¾")**	**DN 25 (1")**	**DN 25 (1")**	**DN 32 (1¼")**	**DN 40 (1½")**	**DN 40 (1½")**	**DN 50 (2")**	**DN 65 (2½")**	**DN 80 (3")**	**DN 100 (4")**
EN 1091-1 B1, PN 16			20.08		20.08	23.62			28.15	28.15	36.02	36.02	36.02
EN 1091-1 B1, PN 40			20.08		20.08	23.62			28.15	28.15	36.02	36.02	36.02
EN 1091-1 B1, PN 63			20.08			23.62			28.15	28.15	36.02	36.02	36.02
EN 1091-1 B1, PN 100						23.62			28.15	28.15	36.02	36.02	36.02
EN 1092-1 D, PN 16			20.08			23.62			28.15	28.15		36.02	
EN 1092-1 D, PN 40			20.08			23.62			28.15	28.15		36.02	
EN 1092-1 D, PN 63						23.62			28.15	28.15		36.02	
ANSI B16.5, class 150						23.62					36.02		
ANSI B16.5, class 300						23.62					36.02		
ANSI B16.5, class 600						23.62					36.02		
ISO 228-1 GH pipe thread	20.08		20.08										
ANSI B1.20.1 NPT pipe thread	20.08												
DIN 11851 Hygienic screwed		20.08	20.08			23.62	23.62		28.15	28.15	36.02	36.02	
DIN 32676-C Hygienic clamp			20.08	20.08		23.62		23.62		28.15			
DIN 11864-1 Aseptic screwed			20.08			23.62				28.15			
DIN 11864-2 Aseptic flange													
ISO 2852 Hygienic clamp					20.08	23.62			28.15	28.15		36.02	
ISO 2853 Hygienic screwed					20.08	23.62				28.15			

SITRANS FCS400, overall length, dimensions in inch

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Overview

FCT030 is based on the latest developments within digital signal processing technology – engineered for high measuring performance, fast response to step changes in flow, fast dosing applications, high immunity against process noise, easy to install commission and maintain.

The FCT030 transmitter delivers true multi-parameter measurements i.e. massflow, volumeflow, corrected volumeflow, density, temperature and fraction.

The FCT030 IP67 transmitter can be remote connected or compact mounted with all sensors of type FCS400, sizes DN 15 to DN 80.

Fraction

The transmitter FCT030 can be set up at works to measure and report various fraction concentrations of two-part mixtures or solutions. Where a discrete relationship exists between concentration and density at particular temperatures a calculation is performed and the percentage concentration by volume or mass of Part A or Part B (100 % minus Part A) is measured. For solutions and some mixtures the total mass, or dry weight, is also available.

In some industries, a selection of standard density scales has been adopted to represent the density or relative density of the process fluid.

If "Standard fractions" option is chosen at ordering, the following fraction or standard density scales can be selected in the setup menu:

- API number
- Balling
- °Baumé light
- °Baumé heavy
- °Brix
- °Oeschlé°
- Plato
- Specific Gravity
- °Twaddell
- %HFCS42
- %HFCS55
- %HFCS90
- Ethanol-Water 0 % to 20 %
- Ethanol-Water 15 % to 35 %
- Ethanol-Water 30 % to 55 %
- Ethanol-Water 50 % to 100 %

Application

SITRANS FC430 mass flowmeters are suitable for applications within the entire process industry where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

Coriolis flowmeters can be applied in all industries, such as:

- Chemical & Pharma: detergents, bulk chemicals, acids, alkalis, pharmaceuticals, blood products, vaccines, insulin production
- Food & Beverage: dairy products, beer, wine, soft drinks, °Brix/°Plato, fruit juices and pulps, bottling, CO_2 dosing, CIP/SIP-liquids, mixture recipe control
- Automotive: fuel injection nozzle & pump testing, filling of AC units, engine consumption
- Oil & Gas: filling of gas bottles, furnace control, test separators
- Hydrocarbon processing: oil refining, derivatives manufacturing, polymerisation
- Water & Waste Water: dosing of chemicals for water treatment

The multiple outputs and bus communication mean that all of the process information can be read either instantaneously (10 ms update) or periodically as plant operation requires.

Benefits

Flow calculation and measurement

- Dedicated mass flow calculation with DSP technology
- Fast dosing and flow step response with maximum 10 ms response time.
- 100 Hz update rate to all outputs
- Maximum data age from pickup to output is 20 ms (two update cycles)
- Independent low flow cut-off settings for mass and volume flowrates
- Automatic zero-point adjustment on command from discrete input or host system
- Empty pipe monitoring

Operation and display

- User-configurable operation display
  - Full graphical display 240 x 160 pixels with up to 6 programmable views
  - Self-explaining alarm handling/log in clear text
  - Help text for all parameters appears automatically in the configuration menu
  - Keypad can be used for controlling dosing as start/stop/hold/reset
- SensorFlash technology stores production specific system documentation and provides removable memory of all flowmeter setups and functions
  - Calibration certificates
  - Pressure and material test certificates (as ordered)
  - Non-volatile memory backup of operational data
  - Transfer of user configuration to other flowmeters

Alarms and safety

- Advanced diagnosis and service menu enhances trouble-shooting and meter validation
- Configurable upper and lower alarm and warning limits for all process values
- Alarm handling can be selected between Siemens and NAMUR standard configurations
- Designed from the ground up and certified for integrated safety in accordance with IEC 61508 and IEC 61511.
  - SIL 2 (single-channel operation)
  - SIL 3 (dual-channel operation)

  Unlike many systems which are certified in practice, the SITRANS FC430 system is certified in design, which is a higher qualification and more robust for secure implementation of safety systems.

Outputs and control

- Built-in dosing controller with compensation and monitoring comprising 3 built-in totalizers
- Multi-parameter outputs, individually configurable for massflow, volumeflow, corrected volumeflow, density, temperature or fraction flow such as °Brix or °Plato

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Up to four I/O channels are configured as follows:

Channel 1

Channel 1 is 4 to 20 mA analog output with HART 7.2 which can be validated and setup for safety critical applications (SIL 2). The current signal can be configured for massflow, volumeflow or density.

Channel 2

Channel 2 is a signal output which can be freely configured for any process variable.

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Discrete one or two-valve dosing control in combination with channel 3 or 4
- Operational and alarm status

Channels 3 and 4

Channels 3 and 4 can be ordered with signal (freely configured for any process variable) or relay outputs, or signal input.

Signal

Signal output can be user configured to:

- Analog current (0/4 to 20 mA)
- 3 stage analog valve dosing control
- Frequency or pulse
- Redundant frequency or pulse (linked to Channel 2)
- Discrete one or two-valve dosing control
- Operational and alarm status

Relay

Relay output(s) can be user configured to:

- Discrete one or two-valve dosing control
- Operation status including flow direction
- Alarm status

Signal input

Signal input can be user-configured for

- Dosing control
- Totalizer reset functions
- Force or freeze output(s)
- Inititate automatic zero point adjustment

Signal outputs and inputs are individually ordered as active or passive.

During service and maintenance all outputs can be forced to a preset value for simulation, verification or calibration purposes.

Approvals and certificates

The FC430 coriolis flowmeter program was designed from the ground up to comply with or exceed the requirements of international standards and regulations.

Design

The transmitter SITRANS FCT030 is designed in an IP67/NEMA 4X aluminum enclosure with corrosion resistant coating. It can be remote connected or compact mounted with an FCS400 sensor of size DN 15, DN 25, DN 50 or DN 80.

FCT030 is available as standard with one current, HART 7.2 output and can be ordered with additional input/output functions.

The transmitter has a modular design with discrete, replaceable electronic modules and connection boards to maintain separation between functions and facilitate field service. All modules are fully traceable and their provenance is included in the transmitter setup.

SensorFlash

SensorFlash is a standard, 1 GByte micro SD card with the ability to be updated by PC. It is supplied with each sensor with the complete set of certification documents including calibration report. Material, pressure test, factory conformance certificates are optional at ordering.

The Siemens SensorFlash memory unit offers the following features and benefits:

- Automatically program any similar transmitter in seconds to the operation standard
- Transmitter replacement in less than 5 minutes
- True "plug & play" provided by integrated cross-checking data consistency and HW/SW version verification
- Permanent database of operational and functional information from the moment that the flowmeter is switched on
- New firmware updates can be downloaded from the SIEMENS internet portal for Product Support and placed onto SensorFlash (unmounted from the transmitter and inserted into a PC's SD card slot). The firmware is then inserted into the existing flowmeter and the complete system upgraded.

Function

The following functions are available:

- Mass flowrate, volume flowrate, density, process temperature, fraction flow
- Up to four output/input channels selected at ordering
- Outputs can be individually configured with mass, volume, density etc.
- Three built-in totalizers which can count positive, negative or net flows
- Low flow cut-off, adjustable
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Alarm system consisting of alarm-log, alarm pending menu
- Internal data logger is updated each 10 minutes with operational data such as system health, totalizer values, all configurations and data needed for Custody Transfer requirements to OIML R 117
- Display of operating time with real-time clock. Daylight saving time is not implemented
- Uni/bidirectional flow measurement
- Flowrate outputs are freely configurable between maximum negative and maximum positive flows according to the sensor capacity
- Limit switches programmable for flow, density, temperature or fraction process values. Limit points can be graded as warning and alarm for values both above and below nominal process conditions
- Process noise filter for optimization of measurement performance under non-ideal application conditions. 5-stage pumping filter compensates for flow fluctuations caused by e.g. single acting piston pumps
- Full dosing controller with 5 user-configurable recipes
- Automatic zero adjustment menu, with zero point evaluation display
- Full service menu for effective and straight forward application and meter troubleshooting
- Precise temperature measurement ensures optimum accuracy on massflow, density and fraction flow.
- Fraction flow computation is based on a 5th-order algorithm matching known applications. All standard fraction calculations fit within 0.1% of the true value.

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Technical specifications

Process media	• Fluid Group 1 (suitable for dangerous fluids) • Aggregate state: Paste/light slurry, liquid and gas
Number of process variables	7
Measurement of	• Mass flow • Volume flow • Density • Process media temperature • Corrected volume flow • Reference density • Fraction A flow • Fraction B flow • Fraction A % • Fraction B %
Current output	
Current	0 ... 20 mA or 4 ... 20 mA (Channel 1 only 4 ... 20 mA)
Load	< 500 Ω per channel
Time constant	0 ... 100 s adjustable
Digital output[1]	
Pulse	41.6 µs ... 5 s pulse duration
Frequency	0 ... 10 kHz, 50 % duty cycle, 120 % overscale provision
Time constant	0 ... 100 s adjustable
Active	0 ... 24 V DC, 110 mA, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA
Relay	
Type	Change-over voltage-free relay contact
Load	30 V AC/100 mA
Functions	Alarm level, alarm number, limit, flow direction
Digital input	
Voltage	15 ... 30 V DC (2 ... 15 mA)
Functionality	Start/stop/hold/continue dosing, reset totalizer 1 and 2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated, isolation voltage 500 V.
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Three eight-digit counters for forward, net or reverse flow
Display	• Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. • Time constant as current output 1 • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input

Ambient temperature	
Operation	
• Transmitter	-40 ... +60 °C (-40 ... +140 °F), (humidity max. 95 %)
• Display	-20 ... +60 °C (-4 ... +140 °F)
Storage	
• Transmitter	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
• Display	-20 ... +70 °C (-4 ... +158 °F)
Communication	HART 7.2
Enclosure	
Material	Aluminum
Rating	IP67/NEMA 4X to IEC 529 and DIN 40050 (1 mH_2O for 30 min.)
Mechanical load	18 ... 400 Hz random, 3.17 g RMS, in all directions
Supply voltage	
Supply	20 ... 27 V DC ± 10%; 100 ... 240 V AC ± 10 %, 47 ... 63 Hz
Fluctuation	No limit
Power consumption	7.5 W/15 VA
EMC performance	
Emission	EN/IEC 61326-1-4 (Industry)
Immunity	EN/IEC 61326-1-2 (Industry)
NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Environment	
Environmental conditions acc. to IEC/EN/UL 61010-1	• Altitude up to 2000 m • Pollution degree 2
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable glands	Cable gland are available in Nylon, Nickel plated brass or stainless steel (316L/W1.4404) in the following dimensions: • M20 • ½" NPT
Cable	Standard industrial signal cable up to 200 m long with 2 x screened pairs or 4-wire overall screen can be laid between the sensor and transmitter. Siemens offers cables in a selection of pre-cut lengths and prepared for either gland or plug connection.

[1] With 300 Ω internal impedance. For coil switching use the passive output option.

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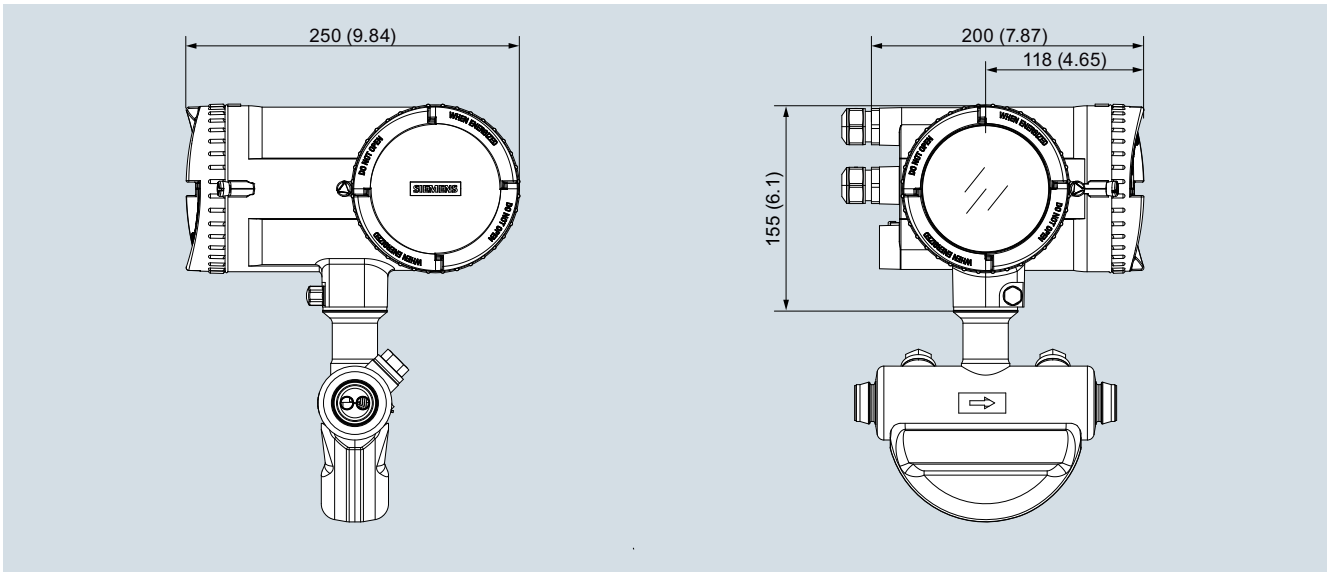
Transmitter SITRANS FCT030

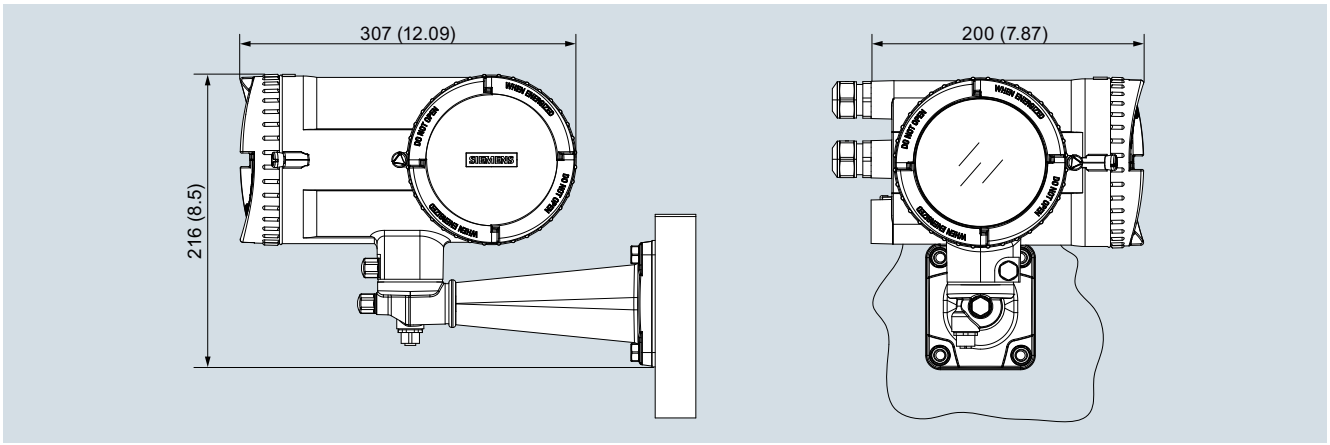
Approvals	
Hazardous area	• ATEX Ex II 2(1) GD Ex d e [ia] ia IIC T6 Gb • FM/CSA Class1 Div. 1 • IECEx II 2(1) GD Ex d e [ia] ia IIC T6 Gb
Custody transfer	• OIML R 117 type approval to a wide variety of liquids other than water
Pressure equipment	• PED • CRN
Hygienic applications	• EHEDG for hygienic variant sensors • 3A for hygienic variant sensors • External cleanability satisfies EHEDG and 3A rules

Certificates	
Safety Integration Level (applies only to compact versions)	• SIL 3 for software • SIL 2 for hardware • SIL 3 for redundant hardware systems
CE mark	• Pressure equipment • Low voltage directive • WEEE • RoHS
Regional certifications	• C-TICK (Australia and New Zealand EMC) • NEPSI (China Ex)

Dimensional drawings



SITRANS FCT030, compact version, dimensions in mm (inch)



SITRANS FCT030, remote version, dimensions in mm (inch)

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Accessories

Description	Article No.	
CT plug Tamper cover for CT locking. Fits over the M12 plug at both sensor and transmitter ends of the remote system cable	**A5E31478498**	
Bag of glands (metric) in black plastic[1)]	**A5E03907414**	
Bag of glands, (metric) in gray plastic Ex e/i[1)]	**A5E03907424**	
Bag of glands (metric) in AISI 316 SS Ex e/i[1)]	**A5E03907429**	
Bag of glands (metric) in NiPlatedBrass Ex e/i[1)]	**A5E03907430**	
Bag of glands (NPT) in black plastic[2)]	**A5E03907435**	
Bag of glands (NPT) in gray plastic Ex e/i[2)]	**A5E03907451**	
Bag of glands (NPT) in AISI 316 SS Ex e/i[2)]	**A5E03907467**	
Bag of glands (NPT) in NiPlatedBrass Ex e/i[2)]	**A5E03907473**	
Standard cable (non-Ex) with M12 plugs, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m (16.4 ft)	**A5E03914805**	
• 10 m (32.8 ft)	**A5E03914850**	
• 25 m (82 ft)	**A5E03914853**	
• 50 m (164 ft)	**A5E03914859**	
• 75 m (246 ft)	**A5E03914861**	
• 150 m (492 ft)	**A5E03914874**	
Standard cable (non-Ex) for termination, PO insulation and PUR sleeve, gray, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m (16.4 ft)	**A5E03914833**	
• 10 m (32.8 ft)	**A5E03914849**	
• 25 m (82 ft)	**A5E03914854**	
• 50 m (164 ft)	**A5E03914856**	
• 75 m (246 ft)	**A5E03914864**	
• 150 m (492 ft)	**A5E03914873**	

Description	Article No.	
Standard cable (Ex) with M12 plugs, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m	**A5E03914929**	
• 10 m	**A5E03914962**	
• 25 m	**A5E03914995**	
• 50 m	**A5E03915004**	
• 75 m	**A5E03915074**	
• 150 m	**A5E03915088**	
Standard cable (Ex) for termination, PO insulation and PUR sleeve, blue, -40 ... +80 °C (-40 ... +176 °F)		
• 5 m	**A5E03914945**	
• 10 m	**A5E03914973**	
• 25 m	**A5E03914984**	
• 50 m	**A5E03915015**	
• 75 m	**A5E03915057**	
• 150 m	**A5E03915100**	
Suitcase for comprehensive sales support and training for FC430 It comes in a special suitcase with a fan implemented that allows the flowmeter to demonstrate airflow.	**A5E31467598**	
Suitcase for comprehensive sales support and training for FC410. It comes in a special suitcase with an S7-1200 PLC and HMI touch-screen display. The operating code is open-source and can be copied to customers to assist with system integration.	**A5E33219071**	
Service toolkit for field maintenance of transmitter and sensor components. Contains all hand tools necessary for maintenance. Other tools may be required for installation.	**A5E03722877**	

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Description	Article No.	
Heating Jacket, indoor use, 0 ... 200 °C (32 ... 392 °F) max. temperature. Complete with 5 m (16.4 ft) high temperature cable fitted. Dedicated plug connection to controller		
• 230 V AC		
- DN 15 electric	**A5E33035287**	
- DN 25 electric	**A5E33035324**	
- DN 50 electric	**A5E33035325**	
- DN 80 electric	**A5E33035336**	
• 115 V AC		
- DN 15 electric	**A5E32877520**	
- DN 25 electric	**A5E32877556**	
- DN 50 electric	**A5E32877557**	
- DN 80 electric	**A5E32877561**	
Heating jacket controller, IP65. Digital display for 0 ... 200 °C (32 .. 392 °F) control setpoint		
• 230 V AC	**A5E03839193**	
• 115 V AC	**A5E03839194**	

[1] 2 pcs M20; 1 pce M25 with single and dual cable inserts

[2] 2 pcs ½" NPT; 1 pce ½" NPT with single and dual cable inserts

Description	Dimension	Article No.
Mating parts for hygienic fittings DIN 11851 Includes: • 2 unions • 2 mating parts (for welding in) • 2 EPDM gaskets	DN 10	**FDK:085U1016**
	DN 15	**FDK:085U1017**
	DN 25	**FDK:085U1019**
	DN 32	**FDK:085U1020**
	DN 40	**FDK:085U1021**
	DN 50	**FDK:085U1022**
	DN 65	**FDK:085U1023**
Mating parts for hygienic clamp ISO 2852 Includes: • 2 clamps • 2 mating parts • 2 EPDM gaskets	25 mm	**FDK:085U1029**
	40 mm	**FDK:085U1031**
	50 mm	**FDK:085U1032**
2 EPDM gaskets with collar for mounting set DIN 11851	DN 10	**FDK:085U1006**
	DN 15	**FDK:085U1007**
	DN 25	**FDK:085U1009**
	DN 32	**FDK:085U1010**
	DN 40	**FDK:085U1011**
	DN 50	**FDK:085U1012**
	DN 65	**FDK:085U1013**

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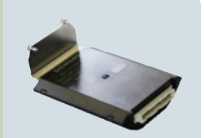
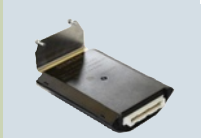
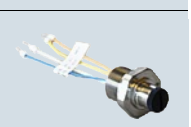
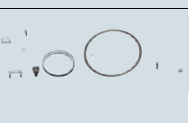
Spare parts - transmitter FCT030

Description	Article No.	
Display and keypad assembly with firewire connection to the transmitter module[1)]	**A5E03548971**	
Sensor interface (Compact). Front end flow calculator and process detection. SIL 3 approved[1)]	**A5E03549142**	
Sensor interface (Remote); barrier unit for high speed digital communication and Ex ib power supply to remote front end DSL module	**A5E03549098**	
Display lid in painted aluminum with Ex glass plate and o-ring seal	**A5E03549344**	
Transmitter cassette (active) with SIL approved 4 ... 20 mA output and HART 7.2[1)]	**A5E03549357**	
Transmitter cassette (passive) with SIL approved 4 ... 20 mA output and HART 7.2[1)]	**A5E03549383**	
Bag of loose spare parts; including cable strain relief components, mounting tool, seals and gasket, assorted screws and washers, hex cap nut, blind plugs, and o-rings	**A5E03549396**	
Power supply 240 V AC, 47 ... 63 Hz 24 ... 90 V DC	**A5E03549413**	
Blind lid in painted aluminum with o-ring seal	**A5E03549429**	
I/O assembly Advise Order code F00 to F97 from Selection and Ordering data[2)]	**A5E03939114**	
SensorFlash (micro SD card)	**A5E03915258**	

Description	Article No.	
Mounting bracket - FCT030; in painted aluminum for pipe or wall mounting of transmitter FCT030 remote version. Including lock ring, pressure pads and seal cap	**A5E03906091**	
M12 option for sensor housing in stainless steel. Pre-wired and potted to replace M12 socket in DSL housing	**A5E03906095**	
M12 option - remote - in painted aluminum. Pre-wired and potted replacement M12 connection for FCT030 transmitter remote version	**A5E03906104**	
Remote terminal house - M20	**A5E03906112**	
Remote terminal house - NPT - in painted aluminum for sensor cable termination at FCT030 transmitter remote version. Pre-wired and potted	**A5E03906130**	

Spare parts - sensor FCS400

Description	Article No.	
Blind lid in painted aluminum with o-ring seal	**A5E03549295**	
Sensor link insert. Front end flow calculator and process detection. SIL 3 approved[1)]	**A5E03549191**	
Sensor housing metric	**A5E03549313**	
Sensor housing NPT in painted aluminum	**A5E03906080**	
Bag of loose parts for sensor; including cable strain relief components, washer, seals, o-rings, and assorted screws	**A5E03549324**	

[1)] The system firmware bundle must be stated in the "Remark" field to ensure compatibility of the system. The FW revision is found on the product label and in the local display menu items 3.1.10. e.g. “2.02.01-02”

[2)] The I/O configuration must be stated in the "Remark" field. The I/O configuration is found in the F option of the ordering code. e.g. code “F40” for ordering Ch2 Active Current/Freq/Pulse, Ch3 Active Current/Freq/Pulse, Ch4 Active Input

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Transmitter MASS 6000 IP67 compact/remote

Overview

MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multiparameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

The MASS 6000 IP67 transmitter can be compact mounted on all sensors of type MASS 2100 DI 3 to DI 40, and can be used in remote version for all types of MASS 2100/MC2 and FC300 sensors.

Benefits

- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm.
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances trouble-shooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- Digital input for batch control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Self-explaining error handling/log in text format
  - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type, output settings
  - Any values or settings changed by users are stored automatically
  - Automatically re-programming any new transmitter without loss of accuracy
  - Transmitter replacement in less than 5 minutes.
  - True "plug & play"
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow.
- Fraction flow computation based on a 3rd-order algorithm matching all applications.
- USM II platform enables fitting of add-on bus modules without loss of functionality.
  - All modules can be fitted through true "plug & play"
  - Module and transmitter are automatically configured through the SENSORPROM.
- Installation of the transmitter to the sensor is simple "plug & play" via the sensor pedestal.

Application

SITRANS F C mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter is capable of measuring both liquid and gas flow.

The main applications for the MASS 6000 IP67 transmitter can be found in:

- Food and beverage industries
- Pharmaceutical industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry
- Water and waste water industry

Design

The transmitter is designed in an IP67/NEMA 6 compact polyamide enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 40 (1/8" to 1½") and remote mounted for the entire sensor series.

The MASS 6000 IP67 is available as standard with 1 current, 1 frequency/pulse and 1 relay output and can be fitted with add-on modules for bus communication.

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction adjustable
- Error system consisting of error-log, error pending menu
- Display of operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed back
- Full service menu for effective and straight forward application and meter troubleshooting

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Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m^3, (lb/ft^3)], temperature [°C (°F)]
Current output	
Current	0 ... 20 mA or 4 ... 20 mA
Load	< 800 Ω
Time constant	0 ... 99.9 s adjustable
Digital output	
Frequency	0 ... 10 kHz, 50 % duty cycle
Time constant	0 ... 99.9 s adjustable
Active	24 V DC, 30 mA, 1 KΩ ≤ R_{load} ≤ 10 KΩ, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA, 250 Ω ≤ R_{load} ≤ 10 KΩ
Relay	
Type	Change-over relay
Load	42 V/2 A peak
Functions	Error level, error number, limit, flow direction
Digital input	11 ... 30 V DC (R_i = 13.6 kΩ)
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated. Isolation voltage: • 500 V to supply • 50 V between outputs
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	• Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output 1 • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 ... +50 °C (-4 ... +122 °F), max. rel. humidity 80 % at 31 °C (87.8 °F) decreasing to 50 % at 40 °C (104 °F) according to IEC/EN/UL 61010-1
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA and DP, Modbus RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1

Enclosure	
Material	Fibre glass reinforced polyamide
Rating	IP67/NEMA 6
Mechanical load	18 ... 1000 Hz random, 3.17 g RMS, in all directions, to IEC 68-2-36
Supply voltage	
24 V version	
• Supply	18 ... 30 V DC 20 ... 30 V AC
230 V version	
• Supply	87 ... 253 V AC, 50 ... 60 Hz
Power consumption	
24 V DC	6 W
24 V AC	10 VA
230 V AC	9 VA
Fuse	
230 V version	T 400 mA, T 250 V (IEC 127) - not replaceable by operator
24 V version	T 1 A, T 250 V (IEC 127) - not replaceable by operator
EMC performance	
Emission	EN/IEC 61326-1-4 (Industry)
Immunity	EN/IEC 61326-1-2 (Industry)
NAMUR	Within the value limits according to "General requirements" with error criteria A in accordance with NE 21
Environment	
Environmental conditions acc. to IEC/EN/UL 61010-1:	• Altitude up to 2000 m • POLLUTION DEGREE 2
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable glands	Two types of cable gland are available in polyamide in the following dimensions: M20 or ½" NPT

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Transmitter MASS 6000 IP67 compact/remote

Selection and Ordering data	Article No.
SITRANS F C MASS 6000 transmitter ↗ Transmitter for wall mounting with wall mounting bracket, fibre glass reinforced polyamide (1 current output, 1 frq./pulse output, 1 relay output and connection board/PCB)	7ME4110- ■AA■0-■■A■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Version	
Remote IP67/NEMA 6 enclosure	2
Supply voltage	
115/230 V AC, 50 ... 60 Hz	1
24 V AC/DC	2
Display/Keypad	
with display	1
Serial communication	
No communication	A
HART	B
PROFIBUS PA Profile 3	F
PROFIBUS DP Profile 3	G
Modbus RTU RS 485	E
DeviceNet	H
FOUNDATION Fieldbus H1	J
Cable glands	
M20	1
½" NPT	2

Operating instructions for SITRANS F C MASS 6000 IP67

Description	Article No.
• English	**A5E03071936**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Cable glands, screwed entries type in polyamide (100 °C (212 °F)) black, 2 pcs.		
• M20	**A5E00822490**	
• ½" NPT	**A5E00822501**	
Sun lid for MASS 6000 transmitter (Frame and lid)	**A5E02328485**	

Add-on module

Description	Article No.	
HART[1] ⬟	**FDK:085U0226**	
PROFIBUS PA Profile 3[1]	**FDK:085U0236**	
PROFIBUS DP Profile 3	**FDK:085U0237**	
Modbus RTU RS 485	**FDK:085U0234**	
FOUNDATION Fieldbus H1[1]	**A5E02054250**	
DeviceNet	**FDK:085U0229**	

[1] Modules are rated Ex i when used with MASS 6000 Ex d.

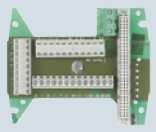
⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Operating instructions for SITRANS F add-on modules

Description	Article No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
Modbus	
• English	**A5E00753974**
• German	**A5E03089262**
• Spanish	**A5E03089278**
• French	**A5E03089265**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
• Spanish	**A5E02512177**
• French	**A5E02512169**
DeviceNet	
• English	**A5E03089720**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

Spare parts for compact or remote IP67 version

Description	Article No.	
MASS 6000 transmitter IP67/NEMA 6 Fibre glass reinforced polyamide and without connection board 1 current output 1 frq./pulse output 1 relay output		
• 115/230 V AC, 50/60 Hz	**7ME4110-1AA10-1AA0**	
• 24 V AC/DC	**7ME4110-1AA20-1AA0**	
Wall mounting unit for IP67/NEMA 6 version with wall bracket, without connection board but with		
• 4 x M20 cable glands	**FDK:085U1018**	
• 4 x ½" NPT cable glands	**A5E01164211**	
Connection board/PCB Supply voltage: 115/230 V/24 V AC/DC	**FDK:083H4260**	

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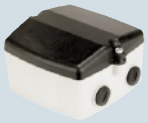
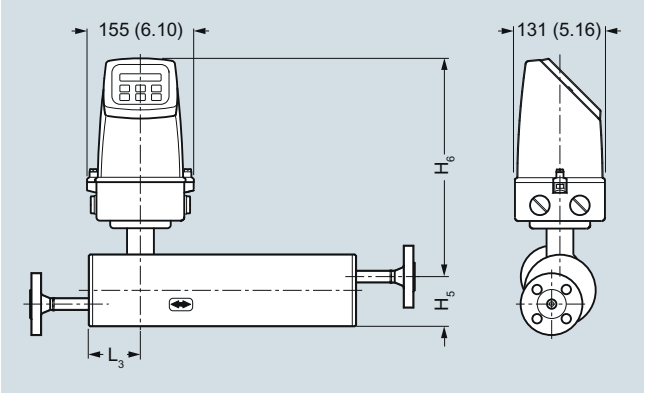
Description	Article No.	
Terminal box kit with • M20 cable glands • ½" NPT cable glands Change from remote to safe area compact mounting of MASS 6000 IP67/NEMA 6 with MASS 2100. The kit consists of a terminal box in polyamide incl. connection board, cable and connector between PCB and sensor pedestal, PCB, seal and screws (4 pcs.) for mounting on sensor. Not approved for hazardous locations	 **A5E00832338** **A5E00832342**	
Terminal box, in polyamide, inclusive lid • M20 cable glands • ½" NPT cable glands Not approved for hazardous locations	 **FDK:085U1050** **FDK:085U1052**	
Terminal box – **lid** in polyamide	**FDK:085U1003**	
Display and keypad • Siemens Front	**FDK:085U1039**	

Dimensional drawings

Compact

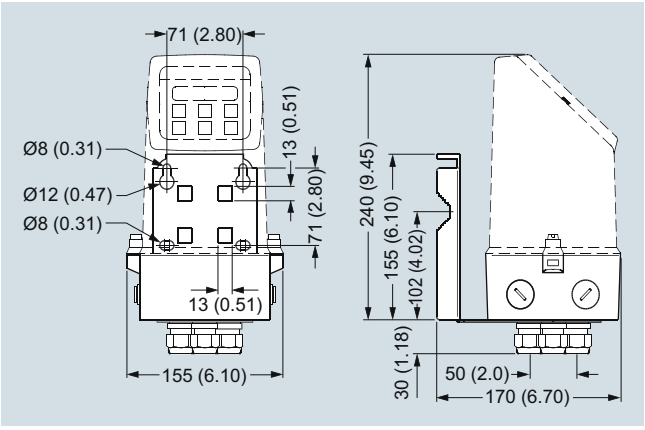


Dimensions in mm (inch)

MASS 2100

Sensor size [Di (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	306 (12.04)	388 (15.28)
6 (¼)	62 (2.44)	72 (2.83)	316 (12.44)	388 (15.28)
15 (½)	75 (2.95)	87 (3.43)	326 (12.83)	413 (16.26)
25 (1)	75 (2.95)	173 (6.81)	330 (13.00)	503 (19.80)
40 (1½)	75 (2.95)	227 (8.94)	330 (13.00)	557 (21.93)

Transmitter wall mounted



Dimensions in mm (inch)

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Schematics

Electrical connection

Grounding

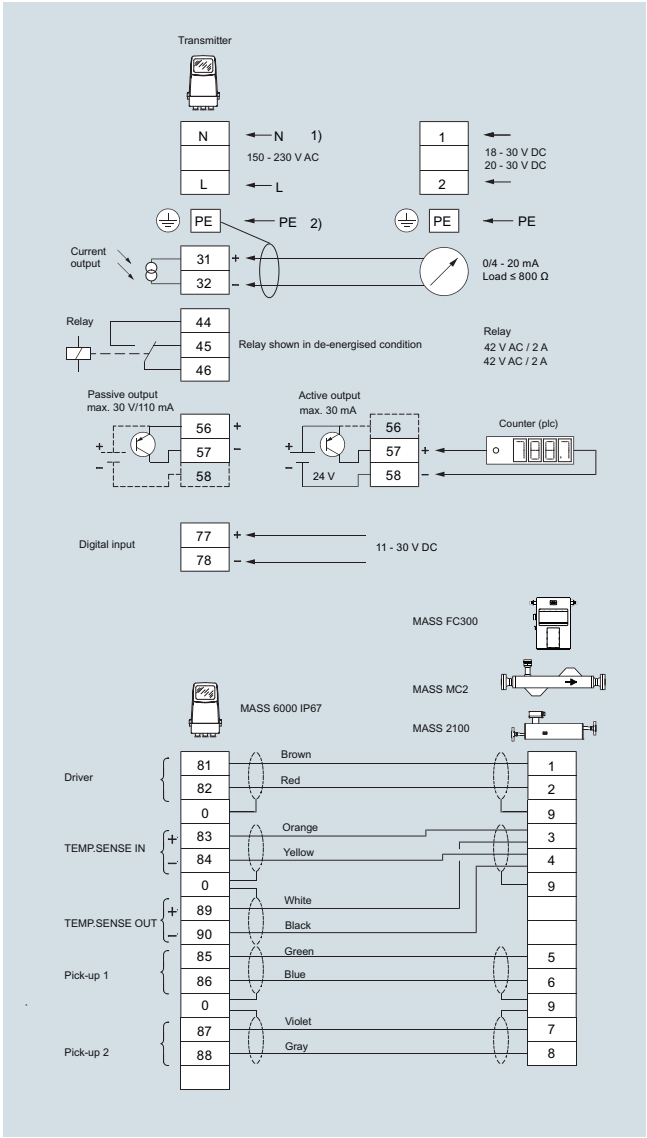
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If long cables are used in a noisy environment, it is recommended to use shielded cables.



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Overview

MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.
The MASS 6000 transmitter delivers true multi parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

The MASS 6000 19" transmitter can be connected to all sensors of types MASS 2100/MC2/FC300/FCS200 and are available in different versions depending of number of output facilities, Ex protection and grade of enclosure.

Benefits

- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm.
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances trouble-shooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- Many output capacities, up to 3 current, 2 frequency/pulse and 2 relay outputs (excludes the possibility of an add-on module)
- Digital input for batch-control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Self-explaining error handling/log in text format
  - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type, output settings
  - Any values or settings changed by users are stored automatically
  - Automatically re-programming any new transmitter without loss of accuracy
  - Transmitter replacement in less than 5 minutes. True "plug & play"
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- USM II platform enables fitting of add-on bus modules without loss of functionality.
  - All modules can be fitted as true "plug & play"
  - Module and transmitter automatically configured through the SENSORPROM.
- Transmitter available with ATEX and UL approval
- All electrical connections are easily accessible on the large back plane PCB

Application

SITRANS F C Coriolis mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meter can measure both liquids and gases.

The main applications for the MASS 6000 19" transmitter can be found in:

- Chemical and pharmaceutical industries
- Food and beverage industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry
- Water and waste water industry

Design

The transmitter is designed as a 19" insert as base to be used in:

- 19" rack system
- Panel mounting IP65
- Back of panel mounting IP20
- Wall mounting IP66

The MASS 6000 19" is available as standard or as ATEX-approved transmitter which is to be mounted in the safe area.

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Transmitter MASS 6000 for 19" insert/19" wall mounting

Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 2 output versions available as standard:
  - 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
  - 3 current outputs, 2 frequency/pulse outputs, 2 relay outputs, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction
- Error system consisting of error-log, error pending menu
- Operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed-back
- Full service menu for effective and straight forward application and meter troubleshooting

Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m^3 (lb/ft^3)], temperature [°C (°F)]
Current output	
Current	0 ... 20 mA or 4 ... 20 mA
Load	< 800 Ω
Time constant	0 ... 99.9 s adjustable
Digital output	
Frequency	0 ... 10 kHz, 50 % duty cycle
Time constant	0 ... 30 s adjustable
Active	24 V DC, 30 mA, 1 KΩ ≤ R_{load} ≤ 10 KΩ, short-circuit-protected
Passive	3 ... 30 V DC, max. 110 mA, 250 Ω ≤ R_{load} ≤ 10 KΩ
Relay	
Type	Change-over relay
Load	42 V/2 A peak
Functions	Error level, error number, limit, direction
Digital input	11 ... 30 V DC
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Galvanic isolation	All inputs and outputs are galvanically isolated. Isolation voltage: • 500 V to supply • 50 V between outputs
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Limit function	Mass flow, volume flow, fraction, density, sensor temperature
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	• Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 ... +50 °C (-4 ... +122 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA and DP, Modbus RTU RS 485, DeviceNet, FOUNDATION Fieldbus H1
Enclosure 19"	
Material	Aluminum/steel (DIN 41494)
Rating	IP20
Mechanical load	18 ... 1000 Hz random, 3.17 g RMS, in all directions, to IEC 68-2-36
Supply voltage	
24 V version	
• Supply	24 V DC/AC, 50 ... 60 Hz
• Fluctuation	18 ... 30 V DC 20 ... 30 V AC
• Power consumption	10 W I_N = 250 mA, I_{ST} = 2 A (30 ms)
230 V version	
• Supply	87 ... 253 V AC, 50 ... 60 Hz
• Power consumption	26 VA
Fuse	
230 V version	T 400 mA, T 250 V (IEC 127) - not replaceable by operator
24 V version	T 1 A, T 250 V (IEC 127) - not replaceable by operator
Power consumption	
230 V AC	9 VA max.
24 V DC	6 W
EMC performance	
Emission	EN/IEC 61236-1-4 (Industry)
Immunity	EN/IEC 61236-1-2 (Industry)
Ex approval	[Ex ia] IIC, DEMKO 03 ATEX 135251X
Maintenance	The flowmeter has a built-in error log/pending menu which should be inspected on a regular basis.
Cable	• Max. 300 m • C: max. 300 [pF/m]; L_C/R_C: max. 100 [µH/Ω] • The total cable capacity must be max. 200 nF.
Cable glands	The cable gland is available in polyamide, in dimension: PG 13.5

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Selection and Ordering data	Article No.
SITRANS F C MASS 6000 transmitter	↗ 7ME4110-
Transmitter for rack and wall mounting, incl. connection board	2 ■■■■ - ■■ A0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Enclosure	
19 inch insert IP20 (rack mount, purchase rack separately)	C
19 inch insert in IP65 (wall mount, enclosure included)	E
Output configuration	
1 current, 1 frequency, 1 relay	A
3 current, 2 frequency, 2 relay	C
Supply voltage	
115/230 V AC, 50/60 Hz	1
24 V AC/DC	2
Ex Approvals	
Standard (No Ex-approval)	0
ATEX	1
Display/Keypad	
With display	1
Serial communication (Only possible to connect to MASS 6000 version with 1 current output)	
No communication	A
HART	B
PROFIBUS PA Profile 3	F
PROFIBUS DP Profile 3	G
Modbus RTU RS 485	E
DeviceNet	H
FOUNDATION Fieldbus H1	J

Attention (Ex applications)!

MC2 Ex version sensors must only be connected to MASS 6000 standard. The MASS 6000 connection board must be replaced by a connection board approved FDK:083H4294 or FDK:083H4295 (see connection boards/PCB for MASS 6000 and MC2 sensors).

Operating instructions for SITRANS F C MASS 6000 19“

Description	Article No.
• English	**A5E02944875**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F iterature.

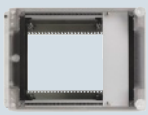
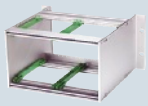
All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Enclosure (without PCB, connection board)

Description	Article No.	
IP66/NEMA 4X, wall mounting enclosure for 19“ inserts (without back plates). Use with PCB A5E02559813 or A5E02559814		
• 21 TE	**FDK:083F5037**	
• 42 TE	**FDK:083F5038**	

Enclosure

Description	Article No.	
Panel mounting enclosure for 19“ insert (21 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	**FDK:083F5030**	
Panel mounting enclosure for 19“ insert (42 TE); IP65/NEMA 2 enclosure in ABS plastic for front panel mounting	**FDK:083F5031**	
Back of panel mounting enclosure for 19“ insert (21 TE); IP20/NEMA 1 enclosure in aluminum	**FDK:083F5032**	
Back of panel mounting enclosure for 19“ insert (42 TE); IP20/NEMA 1 enclosure in aluminum	**FDK:083F5033**	
Front cover (7TE) for panel mounting enclosure	**FDK:083F4525**	

Cable glands

Description	Article No.	
Cable glands, screwed entries type PG 13.5 in nickel-plated brass, 2 pcs.	**FDK:083G3140**	
Cable glands, screwed entries type PG 13.5 in polyamide (100 °C (212 °F)) black, 2 pcs.	**FDK:083G0228**	

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Transmitter MASS 6000 for 19" insert/19" wall mounting

Add-on module

Note:
Only possible to connect to MASS 6000 versions with 1 current output.

Description	Article No.	
HART (Ex-i)	**FDK:085U0226**	
PROFIBUS PA Profile 3 (Ex-i)	**FDK:085U0236**	
PROFIBUS DP Profile 3	**FDK:085U0237**	
Modbus RTU RS 485	**FDK:085U0234**	
FOUNDATION Fieldbus H1 (Ex-i)	**A5E02054250**	
DeviceNet	**FDK:085U0229**	

Operating instructions for SITRANS F add-on modules

Description	Article No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
Modbus	
• English	**A5E00753974**
• German	**A5E03089262**
• Spanish	**A5E03089278**
• French	**A5E03089265**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
• Spanish	**A5E02512177**
• French	**A5E02512169**
DeviceNet	
• English	**A5E03089720**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

Connection boards/PCB for MASS 6000 and MASS 2100 sensors

Description	Version	Article No.	
Connection board MASS 6000 for 19“ IP20 rack mounting version	24 V 115/230 V	**FDK:083H4272**	
Connection board MASS 6000 Ex [ia] IIC for 19“ IP20 rack mounting version	24 V 115/230 V	**FDK:083H4273**	
Connection board MASS 6000 for 19“ wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	**FDK:083H4274**	
Connection board MASS 6000 Ex [ia] IIC for 19“ wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	**FDK:083H4275**	

Connection boards/PCB for MASS 6000 and MC2 sensors

Description	Version	Article No.	
Connection board MASS 6000 for 19“ IP20 rack mounting version	24 V 115/230 V	**FDK:083H4272**	
Connection board MASS 6000 for Ex application[1] and 19“ IP20 rack mounting version (connection board MASS 6000 to MC2 sensors Ex-approved)	24 V 115/230 V	**FDK:083H4294**	
Connection board MASS 6000 for 19“ wall mounting version, for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	**FDK:083H4274**	
Connection board MASS 6000 for Ex application[1] and 19“ wall mounting version (connection board MASS 6000 to MC2 sensors Ex-approved), for enclosure FDK:083F5037/FDK:083F5038	24 V 115/230 V	**FDK:083H4295**	

[1] Attention (Ex application): MC2 Ex version sensors must only be connected to connection board FDK:083H4294 or FDK:083H4295.

Description	Article No.	
Wall mounting enclosure in ABS plastic IP65 with connection board/PCB for Ex application connected to MC2 Ex sensors	**FDK:083H4296**	

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Spare parts 19" versions

Enclosure (without PCB, connection board)

Description	Article No.	
IP66/NEMA 4X, wall mounting enclosure for 19" inserts (without back plates). Use with PCB A5E02559813 or A5E02559814		
• 21 TE	**FDK:083F5037**	
• 42 TE	**FDK:083F5038**	
Display unit for 19" versions Order the Display and Keypad accessory from MASS 6000 IP67 compact/remote (FDK:085U1039) and use the display for replacement	**FDK:085U1039**	

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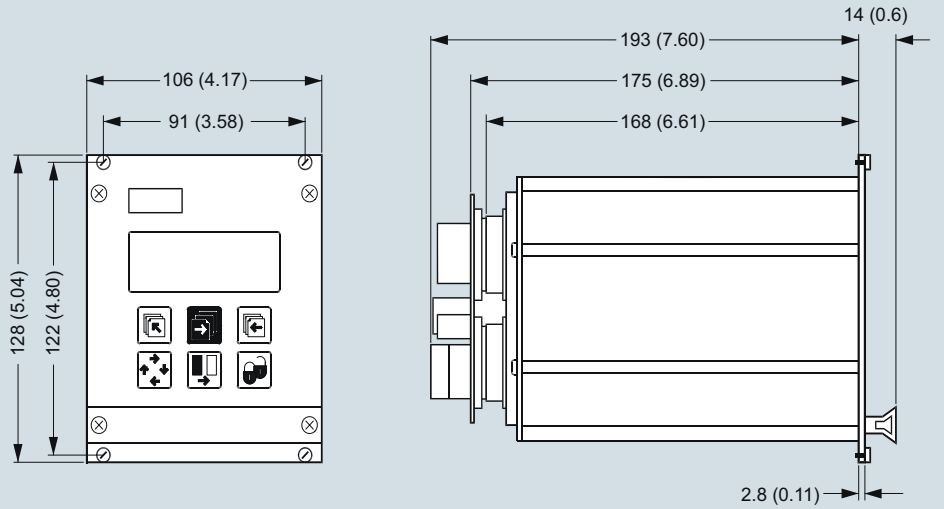
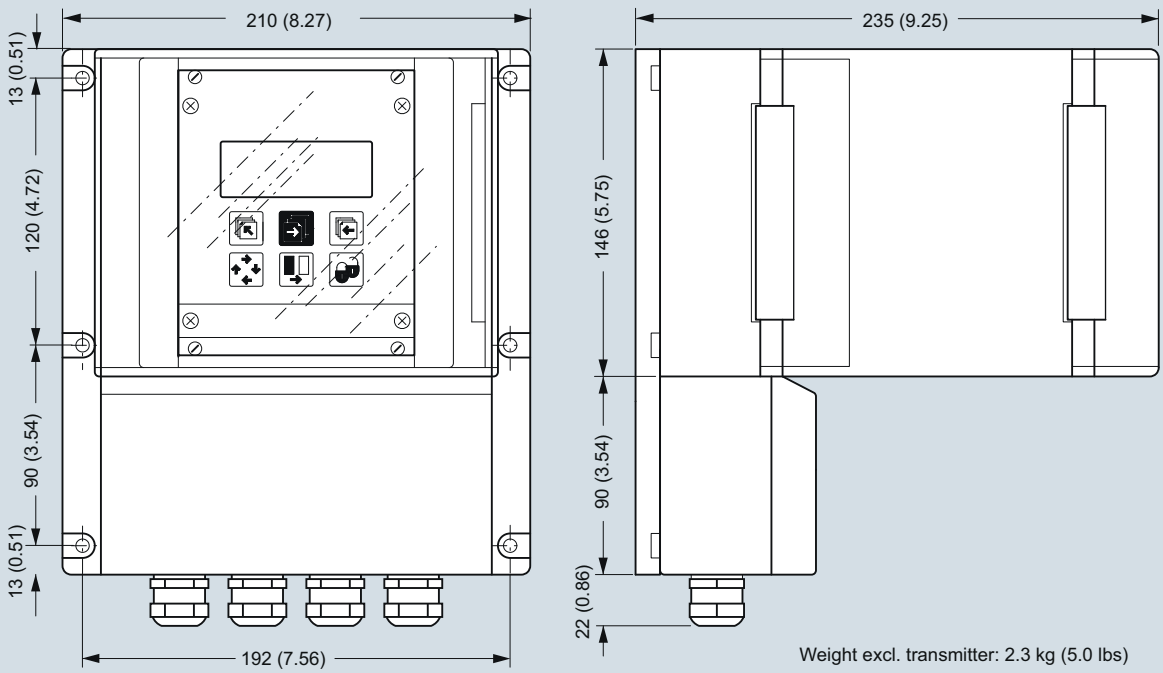
Dimensional drawings

Transmitter 19" insert



Dimensions in mm (inch)

Transmitter 19" wall mounting



Dimensions in mm (inch)

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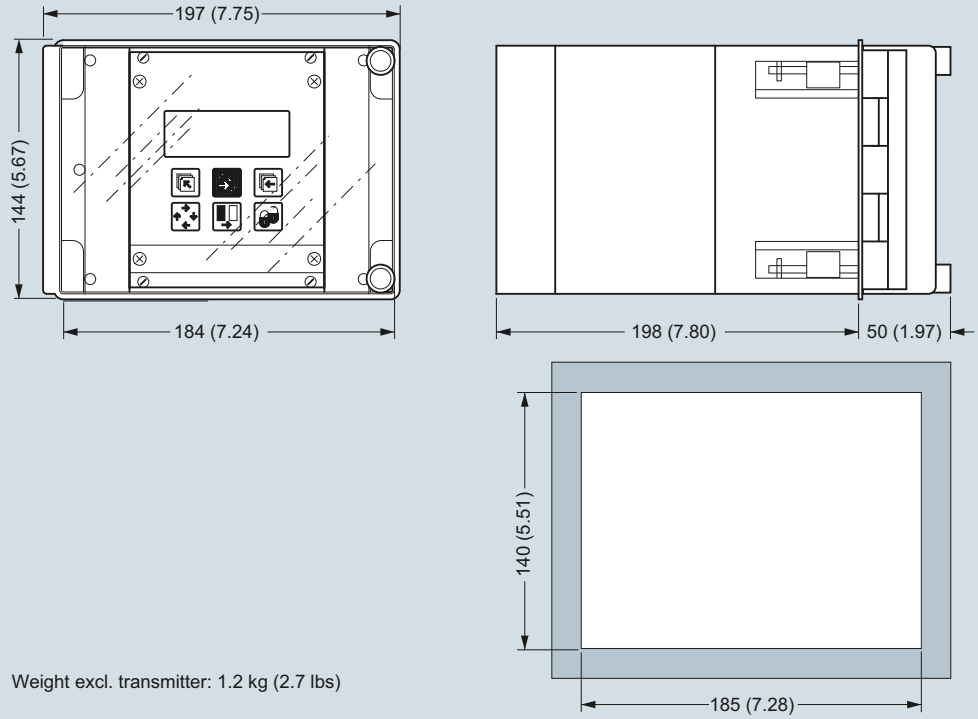
Transmitter 19“ front of panel



Weight excl. transmitter: 1.2 kg (2.7 lbs)

Dimensions in mm (inch)

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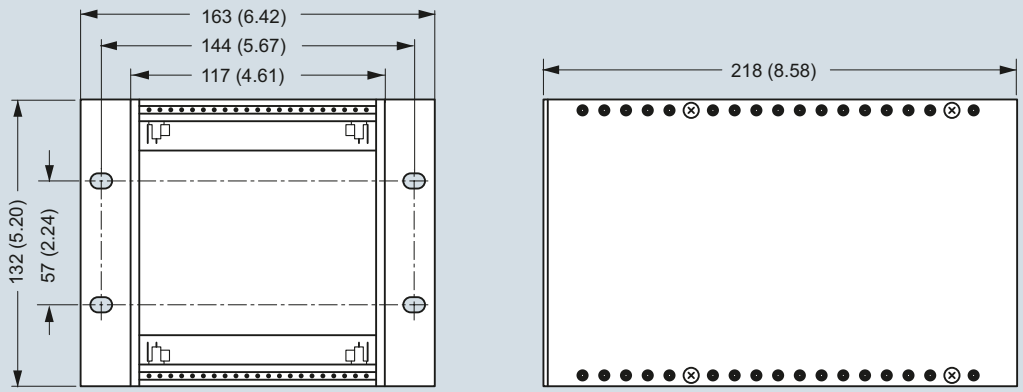
Transmitter MASS 6000 for 19" insert/19" wall mounting

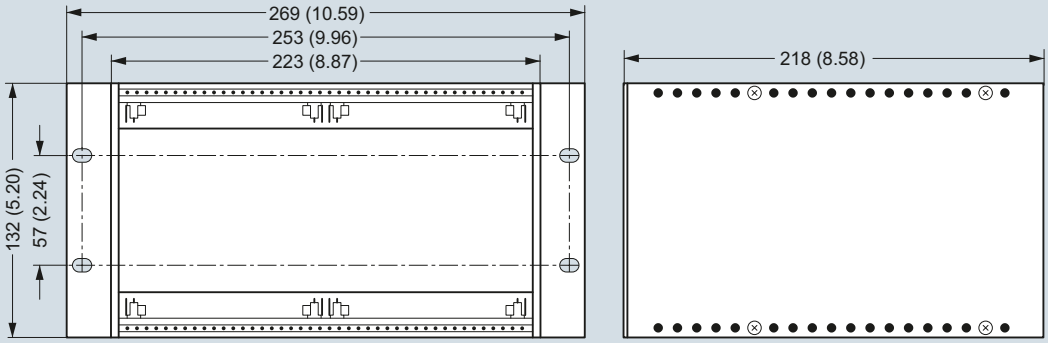
Transmitter, back of panel IP20/NEMA 1, 21 TE



Weight: 0.7 kg (1.6 lbs)

Dimensions in mm (inch)

Transmitter, back of panel IP20/NEMA 1, 42 TE



Weight: 0.9 kg (2.0 lbs)

Dimensions in mm (inch)

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Schematics

Electrical connection

Grounding

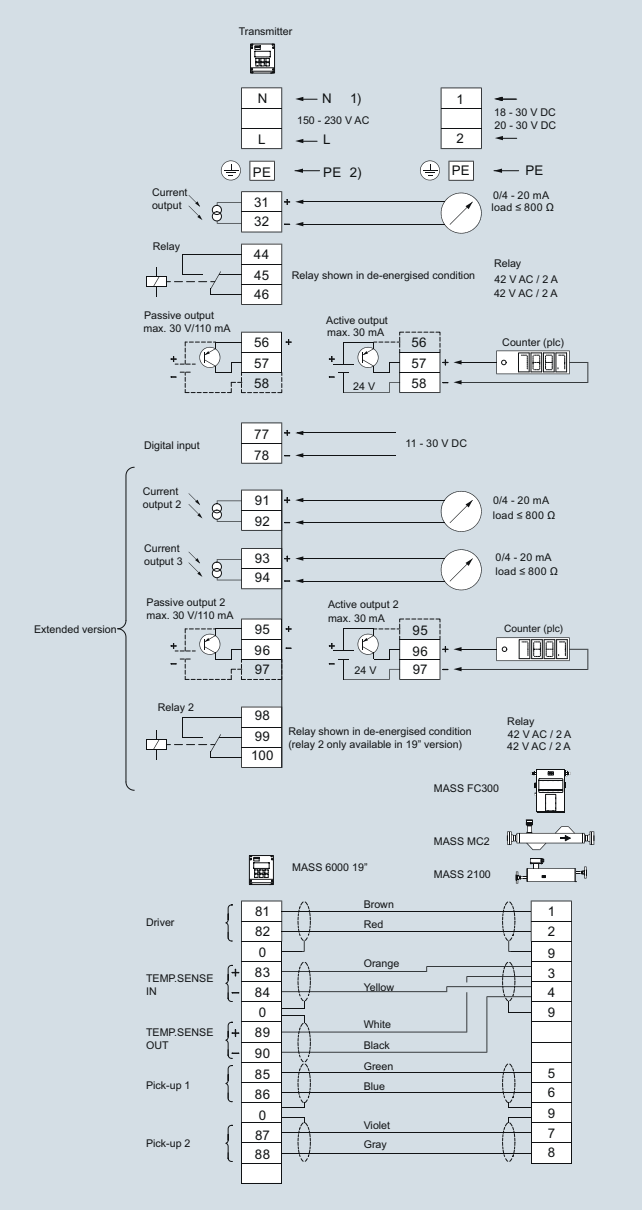
PE must be connected due to safety class 1 power supply.

Mechanical counters

When mounting a mechanical counter to terminals 57 and 58 (active output), a 1000 µF capacitor must be connected to the terminals 56 and 58. Capacitor + is connected to terminal 56 and capacitor - to terminal 58.

Output cables

If long cables are used in noisy environment, it is recommended to use shielded cables.



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Transmitter MASS 6000 Ex d compact/remote

Overview

MASS 6000 is based on digital signal processing technology – engineered for high performance, fast flow step response, fast batching applications, high immunity against process noise, easy to install, commission and maintain.

The MASS 6000 transmitter delivers true multiparameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction flow.

The MASS 6000 Ex d transmitter is manufactured in stainless steel (AISI 316L/1.4404) and able to withstand harsh installation conditions in hazardous applications within the process and chemical industry. The conservative choice of material guarantees the user a low cost of ownership and a long trouble-free lifetime.
The Ex d can be compact mounted on all sensors of type MASS 2100 DI 3 to DI 40, and can be used in remote version for all types of MASS 2100. MASS 6000 Ex d cannot be combined with MC2 sensors.

Benefits

- Fully stainless steel flameproof Ex d enclosure, ensuring optimum cost of ownership
- Intrinsically safe keypad and display directly programmable in hazardous area
- ATEX-approved transmitter which can be mounted in hazardous area Zone 1 or Zone 2.
- Sensor and transmitter interface intrinsically safe Ex ia IIC
- Exchange of transmitter directly in hazardous area without shut-down of process pipe line due to ia IIC sensor/transmitter interface.
- Dedicated mass flow chip with the latest ASIC technology
- Fast batching and flow step response with an update rate of true 30 Hz
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnosis and service menu enhances trouble-shooting and meter verification.
- Built-in batch controller with compensation and monitoring comprising 2 built-in totalizers
- Multi-parameter outputs, individual configurable for mass flow, volume flow, density, temperature or fraction flow such as Brix or Plato
- 1 current output, 1 frequency/pulse and 1 relay as standard output
- Current output can be selected as passive or active output
- Digital input for batch-control, remote zero adjust or forced output mode
- All outputs can be forced to preset value for simulation, verification or calibration purposes.
- User-configurable operation menu with password protection
  - 3 lines, 20 characters display in 11 languages
  - Self-explaining error handling/log in text format
  - Keypad can be used for controlling batch as start/stop/hold/reset
- SENSORPROM technology automatically configures transmitter at start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type, output settings
  - Any values or settings changed by users are stored automatically
  - Automatically re-programming any new transmitter without loss of accuracy
  - Transmitter replacement in less than 5 minutes. True "plug & play"
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- USM II platform enables fitting of add-on bus modules without loss of functionality:
  - All modules can be fitted as true "plug & play"
  - Module and transmitter automatically configured through the SENSORPROM
- Installation of the transmitter to the sensor is simple "plug & play" via the sensor pedestal.

Application

SITRANS F C mass flowmeters are suitable for all applications within the entire process industry where there is a demand for accurate flow measurement in hazardous area. The meter can measure both liquids and gases.

The main applications for the MASS 6000 Ex d transmitter can be found in:

- Chemical process industry
- Pharmaceutical industries
- Automotive industry
- Oil and gas industry
- Power generation and utility industry

Design

The transmitter is designed in an Ex d compact stainless steel enclosure which can be compact mounted on the MASS 2100 sensor range DI 3 to DI 40, and remote mounted for the entire sensor series except MC2.

The MASS 6000 Ex d is available as standard with 1 current, 1 frequency/pulse and 1 relay output and can be fitted with add-on modules for bus communication.

- Flameproof „d“ enclosure
- Enclosure stainless steel, IP67/NEMA 6 as compact and IP65 as remote
- Supply voltage 24 V AC/DC
- MASS 6000 Ex d is ATEX approved together with all MASS 2100 sensors, but can **not** be used together with MC2 Ex versions

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Function

The following functions are available:

- Mass flow rate, volume flow rate, density, temperature, fraction flow
- 1 current output, 1 frequency/pulse output, 1 relay output, 1 digital input
- All outputs can be individually configured with mass, volume, density etc.
- 2 built-in totalizers which can count positive, negative or net
- Low flow cut-off
- Density cut-off or empty pipe cut-off, adjustable
- Flow direction
- Error system consisting of error-log, error pending menu
- Operating time
- Uni/bidirectional flow measurement
- Limit switches with 1 or 2 limits, programmable for flow, density or temperature
- Noise filter setting for optimization of measurement performance under non-ideal application conditions
- Full batch controller
- Automatic zero adjustment menu, with zero point evaluation feed back
- Full service menu for effective and straight forward application and meter troubleshooting

Technical specifications

Measurement of	Mass flow [kg/s (lb/min)], volume flow [l/s (gpm)], fraction [%], °Brix, density [kg/m^3 (lb/ft^3)], temperature [°C (°F)]
Current output	Classified Ex ia, selectable as active or passive outputs. Default setting is active mode.
Current	0 ... 20 mA or 4 ... 20 mA
Load	< 350 Ω
Time constant	0 ... 99.9 s adjustable
Current characteristics	
Active mode	U_o = 24 V, I_o = 82 mA, P_o = 0.5 W, C_o = 125 nF, L_o = 2.5 mH
Passive mode (max input from external barrier)	U_i = 30 V, I_i = 100 mA, P_i = 0.75 W, C_i = 52 nF, L_i = 100 µH
Digital output	
Frequency	0 ... 10 kHz, 50 % duty cycle
Time constant	0.1 ... 30 s adjustable
Passive	6 ... 30 V DC, max. 110 mA, 1 KΩ ≤ R_{load} ≤ 10 kΩ
Output characteristics	
Active mode	Not available
Passive mode (max input from external barrier)	U_i = 30 V, I_i = 100 mA, P_i = 0.75 W, C_i = 52 nF, L_i = 100 µH
Relay	
Type	Change-over relay
Load	30 V/100 mA
Functionality	Error level, error number, limit, direction
Output characteristics	U_i = 30 V, I_i = 100 mA, P_i = 0.75 W, C_i = 0 nF, L_i = 0 mH
Digital input	11 ... 30 V DC (R_i = 13.6 kΩ)
Functionality	Start/hold/continue batch, zero point adjust, reset totalizer 1/2, force output, freeze output
Output characteristics	U_i = 30 V, I_i = 3.45 mA, P_i = 0.10 W, C_i = 0 nF, L_i = 0 mH
Galvanic isolation	All inputs and outputs are galvanically isolated. Isolation voltage: • 500 V to supply • 50 V between outputs
Cut-off	
Low-flow	0 ... 9.9 % of maximum flow
Empty pipe	Detection of empty sensor
Density	0 ... 2.9 g/cm^3
Totalizer	Two eight-digit counters for forward, net or reverse flow
Display	• Background illumination with alphanumerical text, 3 × 20 characters to indicate flow rate, totalized values, settings and faults. Time constant as current output • Reverse flow indicated by negative sign
Zero point adjustment	Via keypad or remote via digital input
Ambient temperature	
Operation	-20 ... +50 °C (-4 ... +122 °F)
Storage	-40 ... +70 °C (-40 ... +158 °F) (Humidity max. 95 %)
Communication	Add-on modules: HART, PROFIBUS PA, FOUNDATION Fieldbus H1
HART	
Active mode	U_o = 6.88 V, I_o = 330 mA, P_o = 0.57 W, C_o = 20 nF, L_o = 100 µH
Passive mode (max input from external barrier)	U_i = 10 V, I_i = 200 mA, P_i = 0.5 W, C_i = 0 nF, L_i = 0 µH
PROFIBUS PA	
Active mode	Not available
Passive mode	U_i = 17.5 V, I_i = 380 mA, P_i = 5.32 W, C_i = 5 nF, L_i = 10 µH
FOUNDATION Fieldbus H1	
Active mode	Not available
Passive mode	U_i = 17.5 V, I_i = 380 mA
Enclosure	
Material	Stainless steel AISI 316/1.4435
Rating	• Compact mounted on sensor: IP67/NEMA 4X • Remote mounted: IP65
Load	18 ... 1000 Hz random, 1.14 g RMS, in all directions, to IEC 68-2-36, Curve E

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Transmitter MASS 6000 Ex d compact/remote

Supply voltage	
24 V AC	
• Range	20 ... 30 V AC
• Power consumption	6 VA I_N = 250 mA, I_{ST} = 2 A (30 ms)
• Power supply	The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm^2
24 V DC	
• Range	18 ... 30 V DC
• Power consumption	6 W I_N = 250 mA, I_{ST} = 2 A (30 ms)
• Power supply	The power supply shall be from a safety isolating transformer. Maximal cable core is 1.5 mm^2.
EMC performance	
Emission	EN/IEC 61326-1-4 (Industry)
Immunity	EN/IEC 61326-1-2 (Industry)
NAMUR	Within the value limits according to "Allgemeine Anforderung" with error criteria A in accordance with NE 21
Ex approval	Ex de [ia/ib] IIC T6, DEMKO 03 ATEX 135253X
Temperature class:	Process liquid temperature:
• T6	• T < 85 °C (185 °F)
• T5	• 85 °C < T < 100 °C (185 °F < T < 212 °F)
• T4	• 100 °C < T < 135 °C (212 °F < T < 275 °F)
• T3	• 135 °C < T < 180 °C (275 °F < T < 356 °F)

Selection and Ordering data	Article No.
SITRANS F C MASS 6000 transmitter Transmitter Ex d for remote mounting inclusive of wall mounting kit	↗ 7ME4110- 2 ■■■■ - ■■ A ■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Enclosure	
Ex d SS with 5 m (16.5 ft) cable	G
Ex d SS with 10 m (32.8 ft) cable	H
Ex d SS with 25 m (82.0 ft) cable	J
Output configuration	
1 current, 1 frequency, 1 relay	A
Supply voltage	
24V AC/DC	2
Ex approvals	
ATEX	1
Display/Keypad	
With display	1
Serial communication	
No communication	A
HART	B
PROFIBUS PA Profile 3	F
FOUNDATION Fieldbus H1	J
Cable gland	
M20	1

Operating instructions for SITRANS F C MASS 6000 Ex d

Description	Article No.
• English	**A5E02944883**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Note:
Only communication modules with Ex approvals are allowed.

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Selection and Ordering data

Accessories

Add-on module for remote and compact MASS 6000 Ex d

Description	Article No.	
HART (Ex-i)	**FDK:085U0226**	
PROFIBUS PA Profile 3 (Ex-i)	**FDK:085U0236**	
FOUNDATION Fieldbus H1 (Ex-i)	**A5E02054250**	

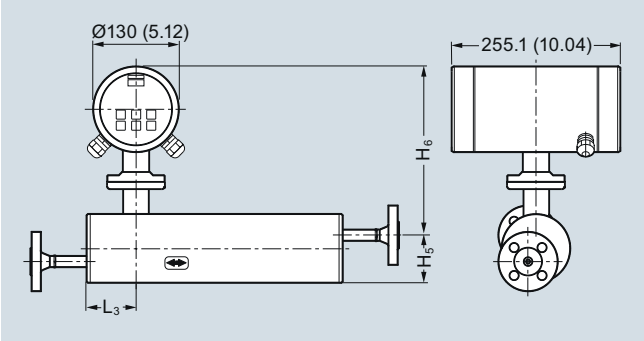
Operating instructions for SITRANS F add-on modules

Description	Article No.
HART	
• English	**A5E03089708**
PROFIBUS PA/DP	
• English	**A5E00726137**
• German	**A5E01026429**
FOUNDATION Fieldbus	
• English	**A5E02318728**
• German	**A5E02488856**
• Spanish	**A5E02512177**
• French	**A5E02512169**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F C literature.

Dimensional drawings

MASS 6000 Ex d compact version

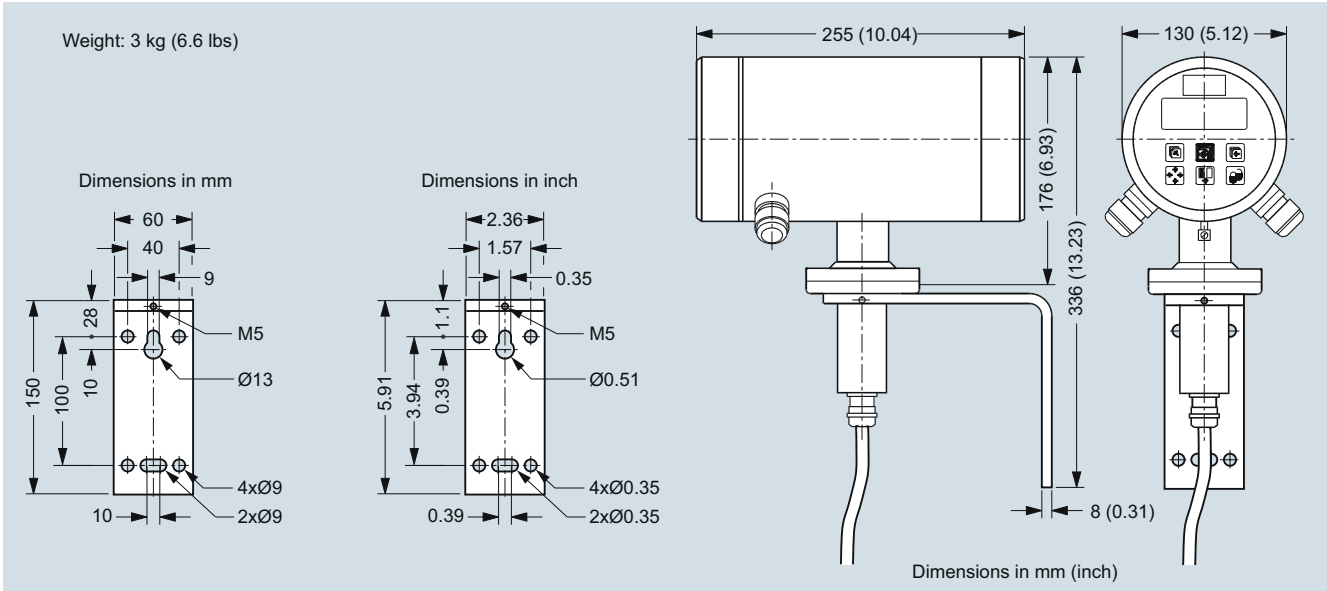


DImensions in mm (inch)

Sensor size [Di (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	247 (9.72)	329 (12.95)
6 (¼)	62 (2.44)	72 (2.83)	257 (10.12)	329 (12.95)
15 (½)	75 (2.95)	87 (3.43)	267 (10.51)	354 (13.94)
25 (1)	75 (2.95)	173 (6.81)	271 (10.67)	444 (17.48)
40 (1½)	75 (2.95)	227 (8.94)	271 (10.67)	498 (19.61)

MASS 6000 Ex d remote version

Weight: 3 kg (6.6 lbs)



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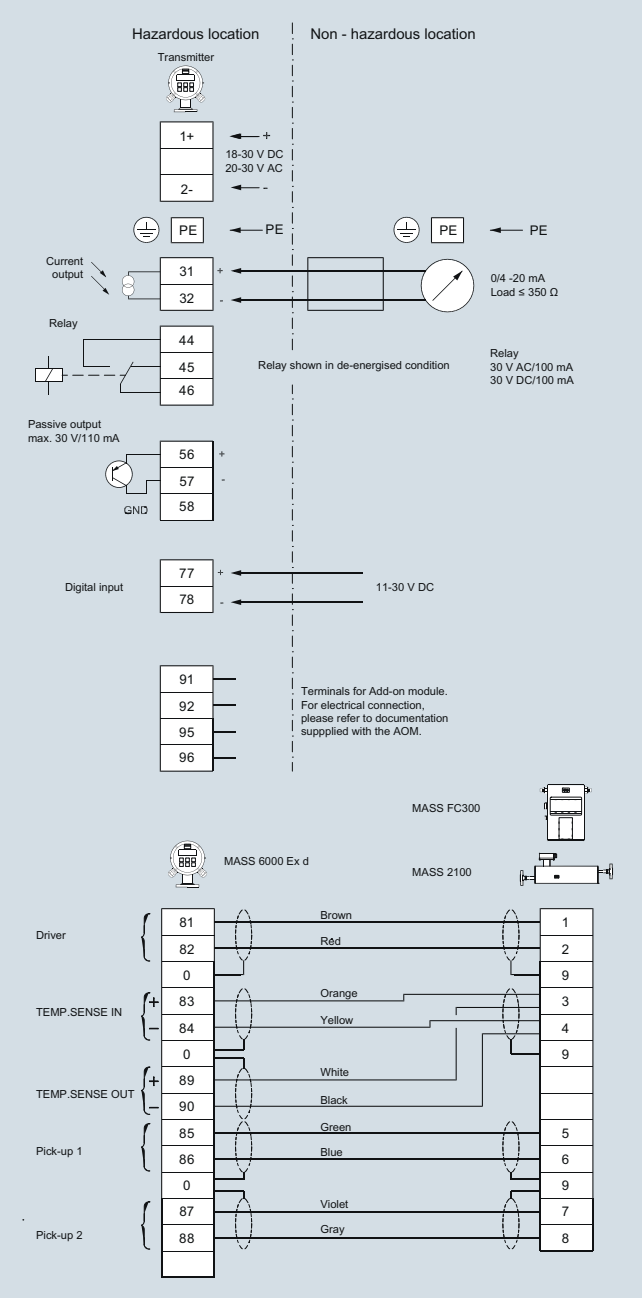
Schematics

Electrical connection compact or remote



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Overview

SIFLOW FC070 is based on the latest developments within the digital processing technology – engineered for high performance, fast flow step response, immunity against process generated noise, easy to install, commission and maintain.

SIFLOW FC070 is available in two versions:

- SIFLOW FC070 Standard
- SIFLOW FC070 Ex CT

The SIFLOW FC070 transmitter delivers true multi-parameter measurements i.e. mass flow, volume flow, density, temperature and fraction.

SIFLOW FC070 is designed for integration in a variety of automation systems, i.e.:

- Central mounted in S7-300, C7
- Decentralized in ET 200M for use with S7-300 and S7-400 as PROFIBUS DP/PROFINET masters
- Decentralized in ET 200M for use with any automation system using standardized PROFIBUS DP/PROFINET masters
- Stand-alone via a Modbus RTU master, i.e. SIMATIC PDM

The SIFLOW FC070 transmitter can be connected to all sensors of types MASS 2100, MC2, FCS200 and FC300.

Benefits

- Easy integration in SIMATIC S7 and PCS 7
- Support of SIMATIC PDM configuration tool via Modbus
- Dedicated mass flow chip with high-performance ASIC technology
- True 30 Hz update rate securing fast batching and step response
- Superior noise immunity due to a DFT (Discrete Fourier Transformation) algorithm
- Front end resolution better than 0.35 ns improves zero point stability and enhances dynamic turn-down ratio on flow and density accuracy.
- Advanced diagnostics enhancing troubleshooting and meter verification
- Built-in batch controller with two-stage control and compensation
- Digital outputs for direct batch control, frequency/pulse
- Modbus RTU RS 232/RS 485 interface for connection to SIMATIC PDM or any other Modbus master
- Digital input for batch control, zero adjust
- Extensive simulation options for measurement values, I/O and errors easy communication/fault-finding
- Multiple LED's for easy indication of flow, error and I/O state
- SENSORPROM technology automatically configures the transmitter during start-up providing:
  - Factory pre-programming with calibration data, pipe size, sensor type and I/O settings
  - Any values or settings changed by the user is stored automatically
  - Automatically re-programming of a new transmitter, without loss of settings and accuracy
  - Transmitter replacement in less than 30 seconds
- Four-wire Pt1000 measurement ensuring optimum accuracy mass flow, density and fraction flow
- Fraction flow computation based on a 3rd-order algorithm matching all applications
- SIFLOW FC070 Ex CT is Custody transfer approved, according to OIML R 139 (Compressed gaseous fuel measuring systems for vehicles), when using the redundant digital output or the encrypted ActiveX component for SIMATIC touch panels.
- Free of charge ActiveX component for SIMATIC touch panels, enables encrypted sensor process values to be communicated between SIFLOW FC070 Ex CT and SIMATIC touch panels

Application

SIFLOW FC070 mass flowmeters are suitable for all applications within the entire process industry, where there is a demand for accurate flow measurement. The meters are suitable for measuring on liquid and gas.

The main applications for the SIFLOW FC070 transmitter can be found in the following industries:

- Food and beverage
- Pharmaceutical
- Automotive
- Oil and gas
- Power generation and utility
- Water and waste water

Design

SIFLOW FC070 is designed in an IP20 SIMATIC S7-300 enclosure and for use in central and de-central cabinets where sensors: FCS200, FC300, MASS 2100 and MC2 are remotely mounted.

Function

The following key functionalities are available:

- Mass flow rate, volume flow rate, density, temperature and fraction flow
- Two built-in totalizers which can freely be set for counting mass, volume or fraction
- 1 frequency/pulse output
- 1 phase shifted 90°/180° frequency/pulse output
- Two-stage batch controller
- 1 digital input
- Low flow cut-off
- Empty pipe detection
- Noise filter settings for different applications
- Simulation
- Automatic zero point adjustment with zero point evaluation feed back
- Configurable upper and lower alarm and warning limits for all process values
- Comprehensive status and error reporting

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Technical specifications

Measurement of	Mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %
Measurement functions	
• Totalizer 1	Totalization of mass flow, volume-flow, fraction A, fraction B
• Totalizer 2	Totalization of mass flow, volume-flow, fraction A, fraction B
• Single and 2-stage batch function	Batching function with the use of one or two outputs for dosing in high and low speed
• 4 programmable limits	4 programmable high/low limits for mass flow, volume flow, density, sensor temperature, fraction A flow, fraction B flow, fraction A in %. Limits will generate an alarm if reached.
Digital input	
Functions	Start batch, stop batch, start/stop batch, hold/continue batch, reset totalizer 1, reset totalizer 2, reset totalizer 1 and 2, zero adjust, force frequency output, freeze frequency output
High signal	• Nominal voltage: 24 V DC • Lower limit: 15 V DC • Upper limit: 30 V DC • Current: 2 ... 15 mA
Low signal	• Nominal voltage: 0 V DC • Lower limit: -3 V DC • Upper limit: 5 V DC • Current: -15 ... +15 mA
Input	Approx. 10 kΩ
Switching	Max. 100 Hz.
Digital output 1 and 2	
Functions	• Output 1: Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch • Output 2: Redundancy pulse, redundancy frequency, 2-stage batch
Voltage supply	3 ... 30 V DC (passive output)
Switching current	Max. 30 mA at 30 V DC
Voltage drop	≤ 3 V DC at max. current
Leakage current	≤ 0.4 mA at max. voltage 30 V DC
Load resistance	1 ... 10 kΩ
Switching frequency	0 ... 12 kHz 50 % duty cycle
Functions	Pulse, frequency, redundancy pulse, redundancy frequency 2-stage batch, batch
Communication	
Modbus RS 232C	• Max. baud rate: 115 200 baud • Max. line length: 15 m at 115 200 baud • Signal level: according to EIA-RS 232C
Modbus RS 485	• Max. baud rate: 115 200 baud • Max. line length: 1200 m at 115 200 baud • Signal level: according to EIA-RS 485 • Bus termination: Integrated. Can be enabled by inserting wire jumpers.
Galvanic isolation	All inputs, outputs and communication interfaces are galvanically isolated. Isolation voltage: 500 V

Power	
Supply	24 V DC nominal
Tolerance	20.4 V DC ... 28.8 V DC
Consumption	Max. 7.2 W
Fuse	T1 A/125 V, not replaceable by operator
Environment	
Ambient temperature	• Storage -40 ... +70 °C (-40 ... +158 °F)
Operation conditions	Horizontally mounted rail. For SIFLOW FC070 Std.: 0 … 60 °C (32 ... 140 °F) For SIFLOW FC070 Ex CT: -40 ... +60 °C (-40 ... +140 °F) Vertically mounted rail For SIFLOW FC070 Std.: 0 … 45 °C (32 ... 113 °F) For SIFLOW FC070 Ex CT: -40 ... +45 °C (-40 ... +113 °F)
Altitude	• Operation: -1000 ... 2000 m (pressure 795 ... 1080 hPa)
Enclosure	
Material	Noryl, color: anthracite
Rating	IP20/NEMA 2 according to IEC 60529
Mechanical load	According to SIMATIC standards (S7-300 devices)
Approvals Ex	
SIFLOW FC070 Standard	CE, C-UL, ATEX II 3G Ex nA IIC
SIFLOW FC070 Ex CT	CE, C-UL, UL Haz.Loc., FM Class I, Div. 2 Groups A, B, C, D ATEX II (1)G [Ex ia] IIC Ga / II 3G Ex nA IIC T4 Gc and IECEx Ex nA [ia] IIC T4
Approvals Custody transfer	
SIFLOW FC070 Ex CT	PTB Germany approval no.: 5.4.11/11.22 OIML R 139 - Compressed gaseous fuel measuring systems for vehicles
Electromagnetic compatibility	Requirements of EMC law; Noise immunity according to EN/IEC 61326-1 Emitted interference according to EN 55011/CISPR-11
NAMUR	Within the limits according to “General recommendations” with error criteria A in accordance with NE 21
Programming tools	
SIMATIC S7	Configuration through backplane P-BUS, PLC program and WinCC flexible
SIMATIC PCS7	Configuration trough backplane P-BUS and PLC/WinCC faceplates, certified driver
SIMATIC PDM	Through Modbus port RS 232C and RS 485, certified driver

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Selection and Ordering data

Description	Article No.
SIFLOW FC070 flow transmitter Remember to order 40 pin front plug connector.	**7ME4120-2DH20-0EA0**
40 pin front plug with screw contacts	**6ES7392-1AM00-0AA0**
40 pin plug with spring contacts	**6ES7392-1BM01-0AA0**
SIFLOW FC070 Ex CT flow transmitter Remember to order 20 pin front plug connector.	**7ME4120-2DH21-0EA0**
20 pin plug with spring contacts	**6ES7392-1BJ00-0AA0**
20 pin front plug with screw contacts	**6ES7392-1AJ00-0AA0**

Operating instructions for SITRANS F C SIFLOW FC070

Description	Article No.
SIFLOW FC070 system manual	
• English	**A5E00924779**
• German	**A5E00924776**
SIFLOW FC070 with S7	
• English	**A5E02254228**
• German	**A5E02665536**
• French	**A5E02591639**
SIFLOW FC070 with PCS7	
• English	**A5E03694109**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Cable with multiplug for connecting MASS 2100, FCS200 and FC300 sensors, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 ... +110°C (-4 ... +230 °F)		
• 5 m (16.4 ft)	**FDK:083H3015**	
• 10 m (32.8 ft)	**FDK:083H3016**	
• 25 m (82 ft)	**FDK:083H3017**	
• 50 m (164 ft)	**FDK:083H3018**	
• 75 m (246 ft)	**FDK:083H3054**	
• 150 m (492 ft)	**FDK:083H3055**	
Cable without multiplug for connecting MC2 sensors, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 ... +110°C (-4 ... +230 °F)		
• 10 m (32.8 ft)	**FDK:083H3001**	
• 25 m (82 ft)	**FDK:083H3002**	
• 75 m (246 ft)	**FDK:083H3003**	
• 150 m (492 ft)	**FDK:083H3004**	
SIMATIC S7-300 rail The mechanical mounting rack of the SIMATIC S7-300		
• 160 mm (6.3")	**6ES7390-1AB60-0AA0**	
• 482 mm (18.9")	**6ES7390-1AE80-0AA0**	
• 530 mm (20.8")	**6ES7390-1AF30-0AA0**	
• 830 mm (32.7")	**6ES7390-1AJ30-0AA0**	
• 2000 mm (78.7")	**6ES7390-1BC00-0AA0**	
SIFLOW FC070 Demo suitcase with MASS 2100 DI 1.5 sensor and SIMATIC HMI TP 177B touch panel	**A5E01075465**	
SIMATIC S7-300, stabilized power supply PS307 Input: 120/230 V AC Output: 24 V DC/2 A	**6ES7307-1BA01-0AA0**	

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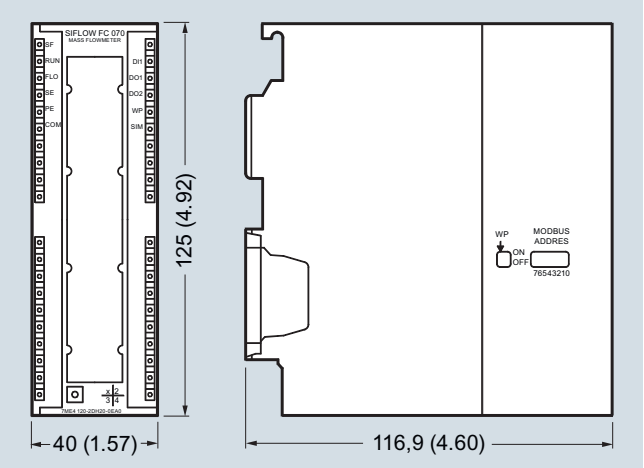
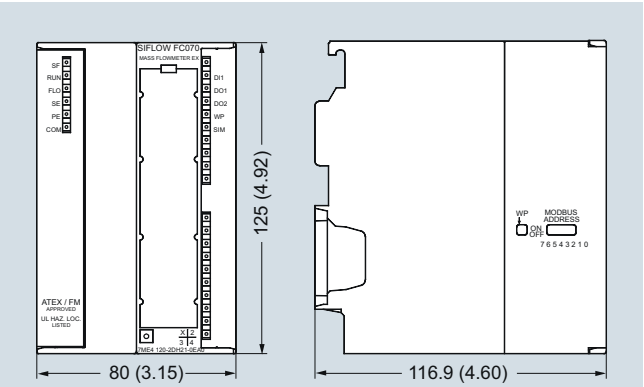
Dimensional drawings



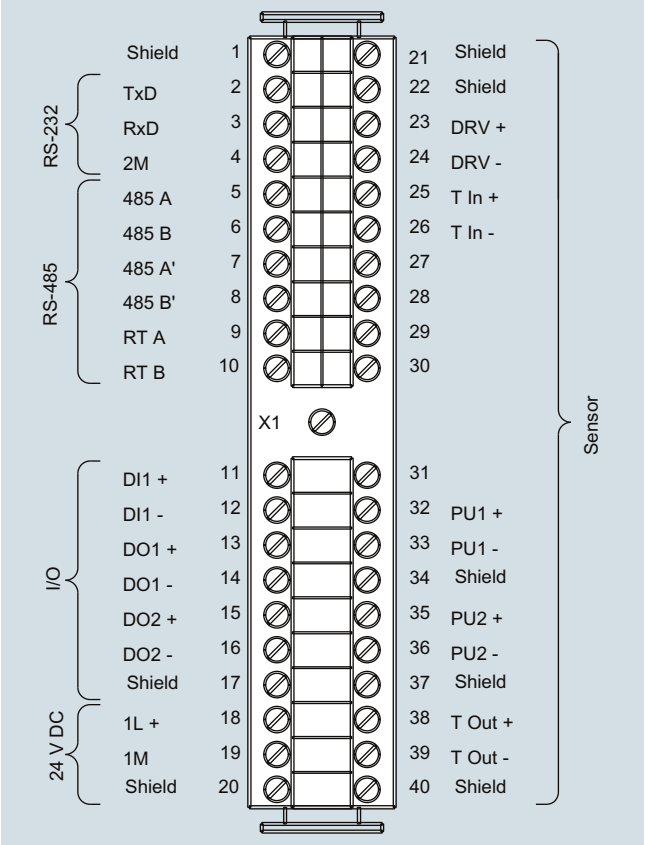
SIFLOW FC070, dimensions in mm (inch)



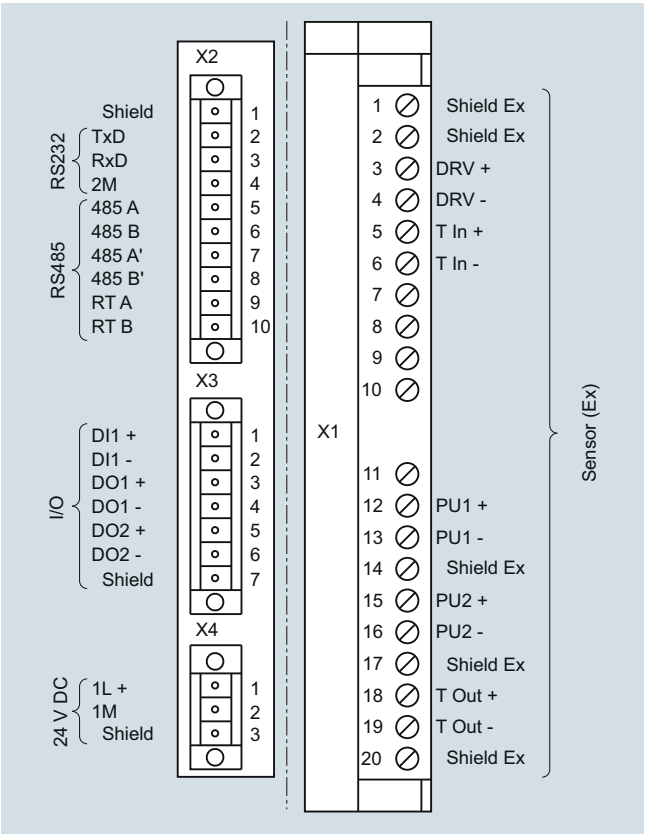
Weight of module: 0.50 kg (1.13 lbs) without front connectors

SIFLOW FC070 Ex CT, dimensions in mm (inch)

Schematics



SIFLOW FC070, electrical connection



SIFLOW FC070 Ex CT, electrical connection

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Overview

SITRANS FCS200 (DN10, DN 15 and DN 25) is a Coriolis sensor specialized for accurate mass flow measurement of gases.

The sensor offers superior performance in terms of flow accuracy and turn down ratio. The ultra compact sensor design makes installation, replacement and commissioning very straight forward and easy.

Benefits

- High accuracy gas measurement
- Approved for use in hazardous area
- DN 10 and DN 15 is custody transfer approved, according to OIML R 139 (Compressed gaseous fuel measuring systems for vehicles). For custody transfer applications SIFLOW FC070 Ex CT must be used.
- Self-draining in vertical orientation
- Pt1000 temperature measurement for optimum accuracy
- SENSORPROM enabling true "plug & play"
- Rigid enclosure design reducing influence from pipeline vibration and thermal stress
- High-pressure measurement up to 350 bar (5076 psi)
- Ultra compact sensor design with space-saving split flow

Application

SITRANS FCS200 is designed for measurement of gases and is suitable for use in the oil and gas industry:

- Filling of gas bottles
- CNG dispensers
- Metering of general gas applications

Design

SITRANS FCS200 is available in DN 10, DN 15 and DN 25.

The sensor consists of 2 parallel measuring pipes, welded directly onto a flow splitter at each end of the sensor to eliminate a direct coupling to the process connectors and significantly reduce effects from external vibrations. The flow-splitters are welded directly onto a rigid sensor housing which acts as a mechanical low pass filter.

The SITRANS FCS200 DN 10 and DN 15 wetted parts material is Hastelloy C22, and the DN 25 wetted parts material is AISI 316Ti/1.4571. The enclosure is made of stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP67.

The two black rupture discs are designed to protect the enclosure from overpressure.

Function

The flow measuring principle is based on the Coriolis effect. See "System information SITRANS F C".

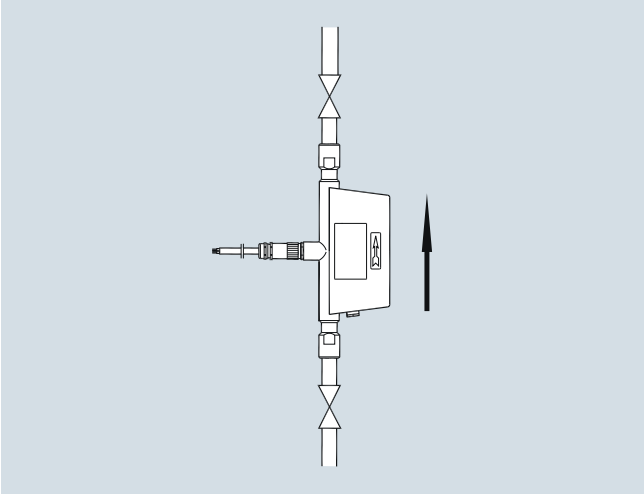
Integration

The complete flowmeter consists of the sensor (SITRANS FCS200) and a transmitter SITRANS F C MASS 6000 or SIFLOW FC070. All communication options are available for MASS 6000.

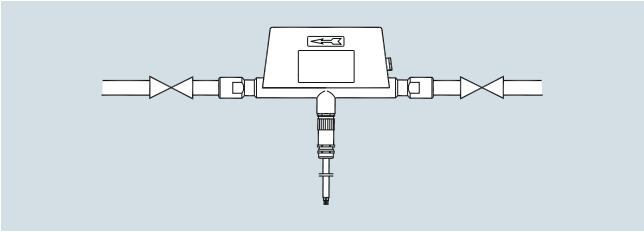
The sensor is shipped with a SENSORPROM memory unit containing all information about calibration data, device identity and factory pre-programming of transmitter settings.

Installation guidelines

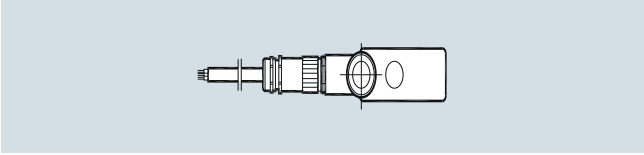
Siemens Flow Instruments recommends installing the sensor in one of the following ways:



Vertical orientation with an upwards flow



Horizontal installation, tubes up



Horizontal installation, tubes sideways

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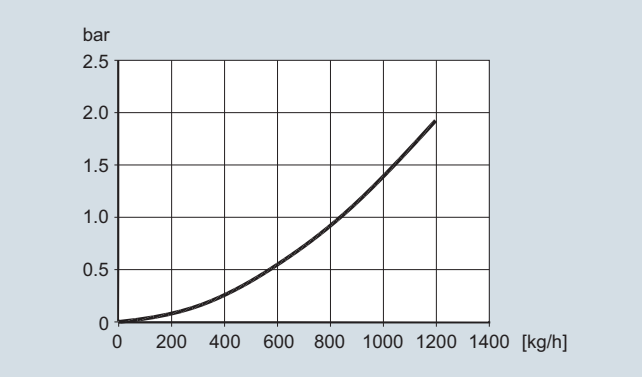
3

Technical specifications

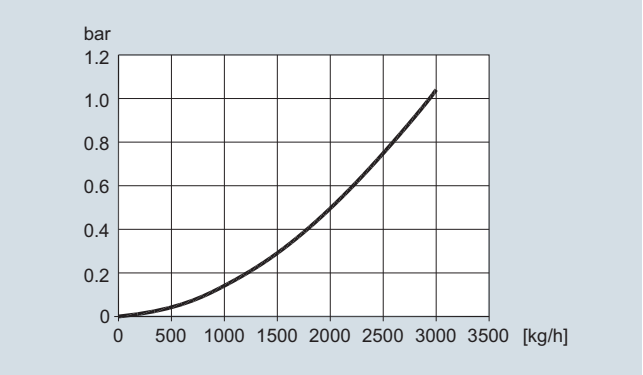
Sensor size	DN 10	DN 15	DN 25
Mass Flow			
Accuracy [% of rate]		± 0.5	
Repeatability [% of rate]		± 0.25	
Max. zero point error [kg/h (lb/h)]	0.25 (0.55)	1.2 (2.65)	3.0 (6.6)
Measuring range [kg/min (lb/min)]	0 … 42 (0 … 92.6)	0 … 200 (0 … 440.9)	0 … 500 (0 … 1102.3)
Process temperature	-40 ... +125 °C (-40 ... +257 °F)		
Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)		
Temperature error	0.5 °C (0.9 °F)		
Pressure [bar (psi)]	350 (5076)	350 (5076)	214 (3104)
Enclosure grade	IP66/IP67 (EN 60529)		
Material			
Measuring pipe	Hastelloy C22/2.4602	Hastelloy C22/2.4602	Stainless steel AISI 316L/1.4571
Splitter	Hastelloy C22/2.4602	Stainless steel AISI 316L/1.4571	Stainless steel AISI 316L/1.4571
Enclosure and connection (flanges)	Stainless steel		
Connection thread	¼" NPT ½" NPT ½" VCO	½" NPT ¾" NPT 1" NPT ¾" VCO	1" NPT 1½" NPT 1" VCO
Ex approval			
• ATEX	II 1/2 G Ex ia IIC T5/T4 Ga/Gb		
• IECEx	Ex ia IIC T5/T4 Ga/Gb		
• FM	Class I, Div 1, Groups A, B, C and D		
Weight approx.	2.8 kg (6.2 lb)	6.0 kg (13.2 lb)	11 kg (24.2 lb)
Approvals Custody transfer			
DN 10/DN 15	PTB Germany approval nr: 5.4.11/11.22 OIML R 139 - Compressed gaseous fuel measuring systems for vehicles		

Characteristic curves

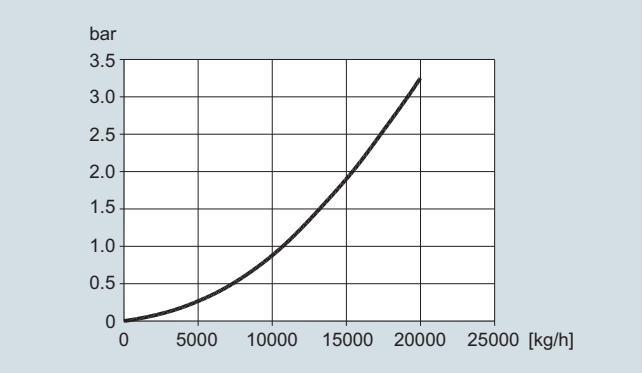
DN 10



DN 15



DN 25



The pressure drop as a function of capacity for CNG with a pressure of 200 bar (2900 psi) and an ambient temperature of 20 °C (68 °F).

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Selection and Ordering data	Article No.
SITRANS F C Flow sensors	
SITRANS FCS200 sensor, without heating jacket ↗	**7ME4500-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Sensor size and material	
DN 10, Hastelloy C22/2.4602	**2D**
DN 15, Hastelloy C22/2.4602	**2E**
DN 25, Stainless steel AISI 316Ti/1.4571	**1F**
Pressure	
PN 214 (DN 25)	**K**
PN 350 (DN 10 and DN 15)	**N**
Process connection/flange	
½"/VCO	**71**
¾"/VCO	**72**
1"/VCO	**73**
¼"/NPT pipe thread	**81**
½"/NPT pipe thread	**82**
¾"/NPT pipe thread	**83**
1"/NPT pipe thread	**84**
1½"/NPT pipe thread	**85**
Configuration	
Standard	**1**
Transmitter	
None	**A**
Cable	
No cable	**A**
Calibration	
Standard calibration	**1**

Selection and Ordering data	Order code
Additional information	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**C11**
Material certificate EN 10204-3.1	**C12**
NDT-Penetrant inspection report ISO 3452	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Tag name plate, stainless steel	**Y17**

Accessories

Description		Article No.
Cable with multiple plug	5 m (16.4 ft)	**FDK:083H3015**
Standard blue cable between SIFLOW FC070/MASS 6000 and FCS200, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)	10 m (32.8 ft)	**FDK:083H3016**
	25 m (82 ft)	**FDK:083H3017**
	50 m (164 ft)	**FDK:083H3018**
	75 m (246 ft)	**FDK:083H3054**
	150 m (492 ft)	**FDK:083H3055**

Operating instructions for SITRANS FCS200

Description	Article No.
• English	**A5E02508199**
• German	**A5E03082574**
• Spanish	**A5E03082587**
• French	**A5E03082581**
• Italian	**A5E03504933**

Spare parts

Description	Article No.
Multiple plug for cable mounting	**FDK:083H5056**
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	**FDK:083H4410**

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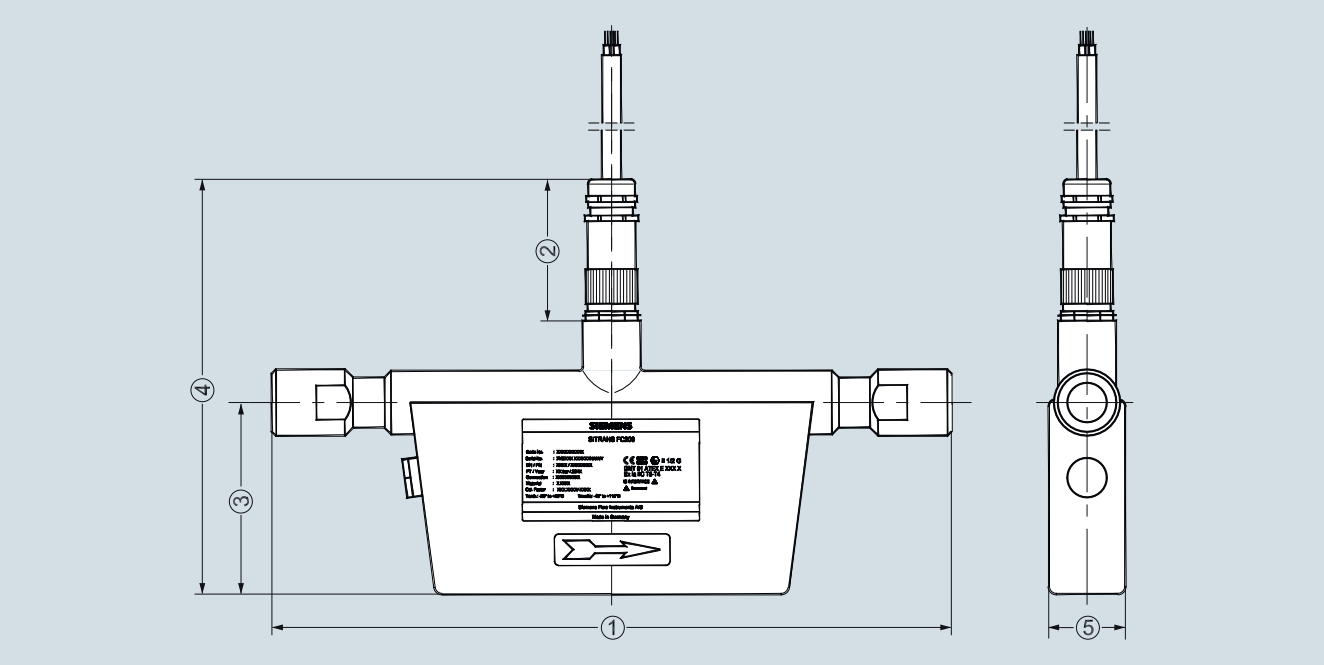
3

Dimensional drawings

SITRANS FCS200, DN 10 ... DN 15



SITRANS FCS200, DN 10 ... DN 15, dimensions in mm (inch)

Position	DN 10 with NPT connectors mm (inch)	DN 10 with VCO connectors mm (inch)	DN 15 mm (inch)
(1)	350 (13.78)	330 (12.99)	450 (17.72)
(2)	72 (2.84)	72 (2.84)	72 (2.84)
(3)	100 (3.94)	100 (3.94)	148 (5.83)
(4)	204 (8.03)	204 (8.03)	253 (9.96)
(5)	40 (1.57)	40 (1.57)	48 (1.89)

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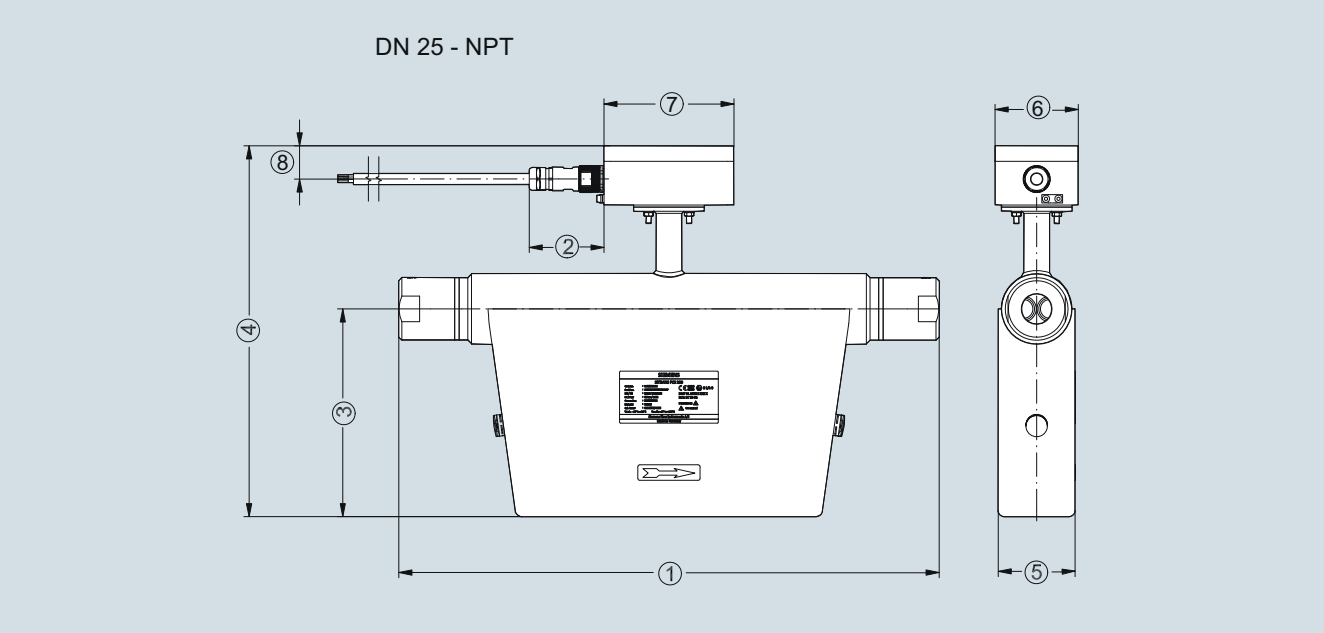
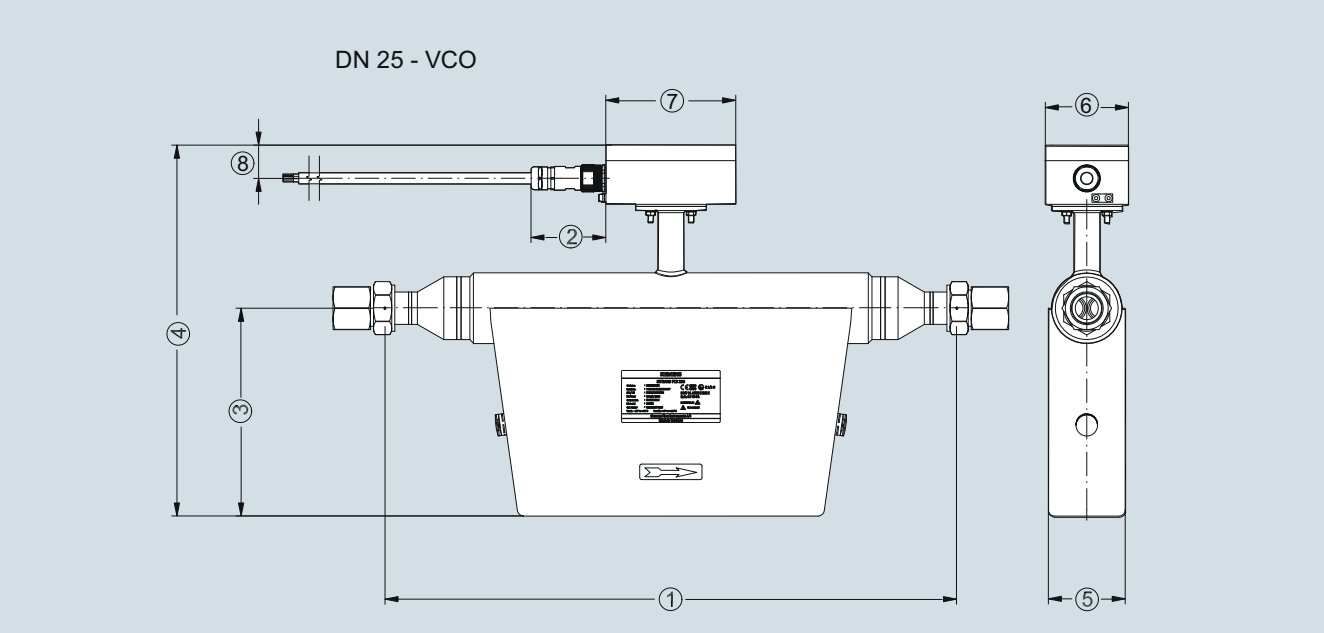
SITRANS FCS200, DN 25





SITRANS FCS200, DN 25, dimensions in mm (inch)

Position	DN 25 with NPT connection mm (inch)	DN 25 with VCO connection mm (inch)
(1)	520 (20.47)	550 (21.65)
(2)	72 (2.84)	72 (2.84)
(3)	200 (7.87)	200 (7.87)
(4)	357 (14.77)	357 (14.77)
(5)	74 (2.91)	74 (2.91)
(6)	80 (3.15)	80 (3.15)
(7)	125 (4.92)	125 (4.92)
(8)	32 (1.26)	32 (1.26)

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Flow sensor MASS 2100 DI 1.5

Overview

MASS 2100 DI 1.5 is suitable for low flow measurement applications of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a "plug & play" mechanical and electrical interface ensures optimum performance and operation.

The sensor delivers true multi-parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1, from 30 kg/h to a few g/h
- Densitometer performance available through a density accuracy better than 0.001 g/cm^3 with a repeatability better than 0.0002 g/cm^3.
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications.
- Market's biggest wall thickness, ensuring optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy-loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.).
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enables true "plug & play". Installation and commissioning in less than 10 minutes
- Intrinsically safe Ex ia design as standard
- Sensor pipe available in high-quality stainless steel AISI 316L/ 1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Dual-drive pick-up and driver construction facilitate ultra low-weight pipe construction giving the markets' smallest and most stable zero point.
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement.

Application

In many industries such as the food and beverage or pharamceutical industry, accurate recipe control means everything. The MASS 2100 DI 1.5 has demonstrated superiour performance in numerous applications and field trails relating to accuracy and turn-down ratio. It is today the preferred meter for research and development and mini-plant applications for liquid or gas measurement, where measuring small quantities is important.

The main applications for the MASS 2100 DI 1.5 sensor can be found in:	
Chemical industry	Liquid and gas measurement within Miniplant and R & D, dosing of additives and catalysts
Cosmetic industry	Dosing of essence and fragrances
Pharmaceutical industry	High-speed dosing and coating of pills, filling of ampuls/injectors
Food and beverage industry	Dosing of flavourings, colours and additives, density measurement, inline measurement of liquid or gaseous CO_2
Automotive industry	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds

Design

The MASS 2100 sensor consists of a single bent tube in a double omega pipe configuration, welded directly to the process connectors at each end.

The sensor is available in 2 material configurations, AISI 316L/ 1.4404 or Hastelloy C22/2.4602 with ¼" NPT or ¼" ISO process connections.

The enclosure is made in stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP65/NEMA 4.

The sensor is available in either a standard version with a maximum liquid temperature of 125 °C (257 °F) or a high-temperature version, with raised electrical connector for 180 °C (356 °F).

The sensor can be installed in horizontal or vertical position. The enclosed single quick release clamp fitting which, along with its compact design and single multi-plug electrical connector, will keep installation costs and time to a minimum as shown below.

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Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

Integration

The sensor can be connected to all MASS 6000 transmitters for remote installation only.

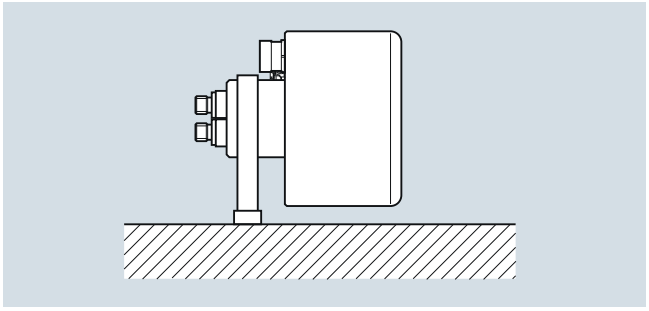
All sensors are delivered with a SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings

Installation guidelines MASS 2100 DI 1.5 (1/16")

Installation of MASS 2100 sensor

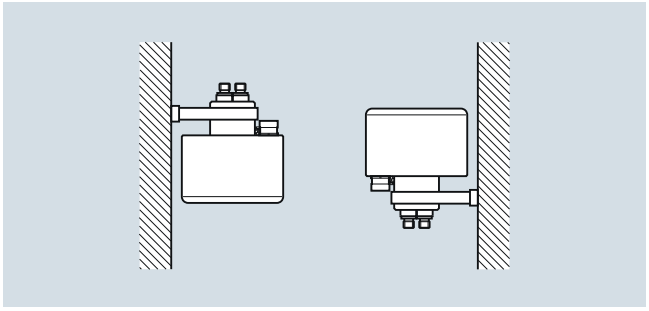
- The optimal installation is horizontal.
  If vertical mounting is necessary, upward flow is recommended to facilitate the removal of air bubbles. To remove the air from the sensor the flow speed in the sensor must be at least 1 m/s.
  If there are solid particles in the liquid, especially in connection with low flow, it is recommended that the sensor be mounted horizontally with inlet flange uppermost so that particles are more easily flushed out. To ensure that the sensor does not become partially empty, there must be sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).
- Mount the sensor on a vibration-free wall or steel frame.
- Locate the sensor low in the system in order to avoid an underpressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

Horizontal



Liquid and gas application

Vertical



Liquid application (left), gas application (right)

Technical specifications

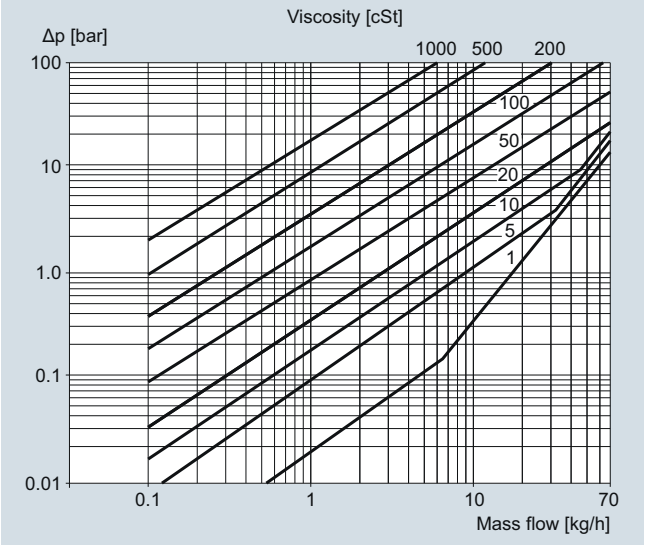
Inside pipe diameter (sensor consists of one continuous pipe)	1.5 mm (0.06")
Pipe wall thickness	0.25 mm (0.010")
Mass flow measuring range	0 ... 30 kg/h (0 ... 66 lb/h)
Density	0 ... 2.9 g/cm^3 (0 ... 0.10 lb/inch^3)
Fraction e.g.	0 ... 100 °Brix
Temperature	
Standard	-50 ... +125 °C (-58 ... +257 °F)
High-temperature version	-50 ... +180 °C (-58 ... +356 °F)
Liquid pressure measuring pipe[1]	
Stainless steel	230 bar (3336 psi) at 20 °C (68 °F)
Hastelloy C22/2.4602	365 bar (5294 psi) at 20 °C (68 °F)
Materials	
Measuring pipe and connection	Stainless steel AISI 316L/1.4435 Hastelloy C22/2.4602
Enclosure and enclosure material[2]	IP65 and stainless steel AISI316L/1.4404
Connection thread	
ISO 228/1	G¼" male
ANSI/ASME B1.20.1	¼" NPT male
Cable connection	Multiple plug connection to sensor 5 x 2 x 0.35 mm^2 twisted and screened in pairs, ext. Ø 12 mm
Ex-version	II 1G Eex ia IIC T3-T6, DEMKO 03 ATEX 135252X c-UL-us Ex ia IIC T3-T6 UL WYMG.E232147
Weight approx.	2.6 kg (5.73 lb)

[1] According to DIN 2413, DIN 17457

[2] Housing is not rated for pressure containment.

For accuracy specifications see "System information SITRANS F C".

Pressure drop



MASS 2100 DI 1.5 (1/16"), pressure drop for density = 1000 kg/m^3

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Flow sensor MASS 2100 DI 1.5

Selection and Ordering data	Article No.	Ord. code
SITRANS F C Flow sensors	7ME4100 -	
MASS 2100 DI 1.5 (1/16“) sensor	■■■■■ -	■■■■ ■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter		
Stainless steel AISI 316L/1.4435		
DI 1.5, max. 125 °C (257 °F)	1A	
DI 1.5, max. 180 °C (356 °F)	1B	
Hastelloy C22/2.4602		
DI 1.5, max. 125 °C (257 °F)	2A	
DI 1.5, max. 180 °C (356 °F)	2B	
Pressure		
PN 100	D	
PN 230 (AISI 316L/1.4404)	L	
PN 365 (C22/2.4602)	P	
Process connection/flange		
Pipe thread		
G ¼“ male	10	
¼“ NPT male	11	
Configuration		
Standard	1	
Density	2	
Brix/Plato	3	
Fraction (specification required)	9	N0Y
Transmitter compact mounted on sensor		
No transmitter, sensor and adapter only	A	
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex de [ia/ib] T3 -T6 Ex-approval.	B	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC.	C	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz	D	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	E	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz, ½" NPT	F	
Cable		
No cable		A
5 m (16.4 ft) cable		B
10 m (32.8 ft) cable		C
25 m (82 ft) cable		D
50 m (164 ft) cable		E
75 m (246 ft) cable		F
150 m (492 ft) cable		G
Calibration		
Standard calibration 3 flow x 2 points		1
Standard calibration matched pair 3 flow x 2 points		2
Accredited calibration matched pair 5 flow x 2 points (DANAK)		3
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)		8

Selection and Ordering data	Order code
Additional information	
Please add “**-Z**“ to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**C11**
Material certificate EN 10204-3.1	**C12**
Welding certificate NDT-Penetrant: ISO 3452	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Tag name plate, stainless steel	**Y17**
Tag name plate, plastic	**Y18**
Customer-specific transmitter setup	**Y20**
Customer-specified, matched pair (5 x 2)	**Y60**
Customer-specified calibration (5 x 2)	**Y61**
Customer-specified, matched pair (10 x 1)	**Y62**
Customer-specified calibration (10 x 1)	**Y63**
Cleaned for oil and grease	**Y80**
Special version	**Y99**

Operating instructions for SITRANS F C MASS 2100 DI 1.5

Description	Article No.
• English	**A5E03089952**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)		
• 5 m (16.4 ft)	**FDK:083H3015**	
• 10 m (32.8 ft)	**FDK:083H3016**	
• 25 m (82 ft)	**FDK:083H3017**	
• 50 m (164 ft)	**FDK:083H3018**	
• 75 m (246 ft)	**FDK:083H3054**	
• 150 m (492 ft)	**FDK:083H3055**	

Spare parts

Description	Article No.	
Multiple plug for cable mounting	**FDK:083H5056**	
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	**FDK:083H4410**	
Bracket	**A5E02590427**	

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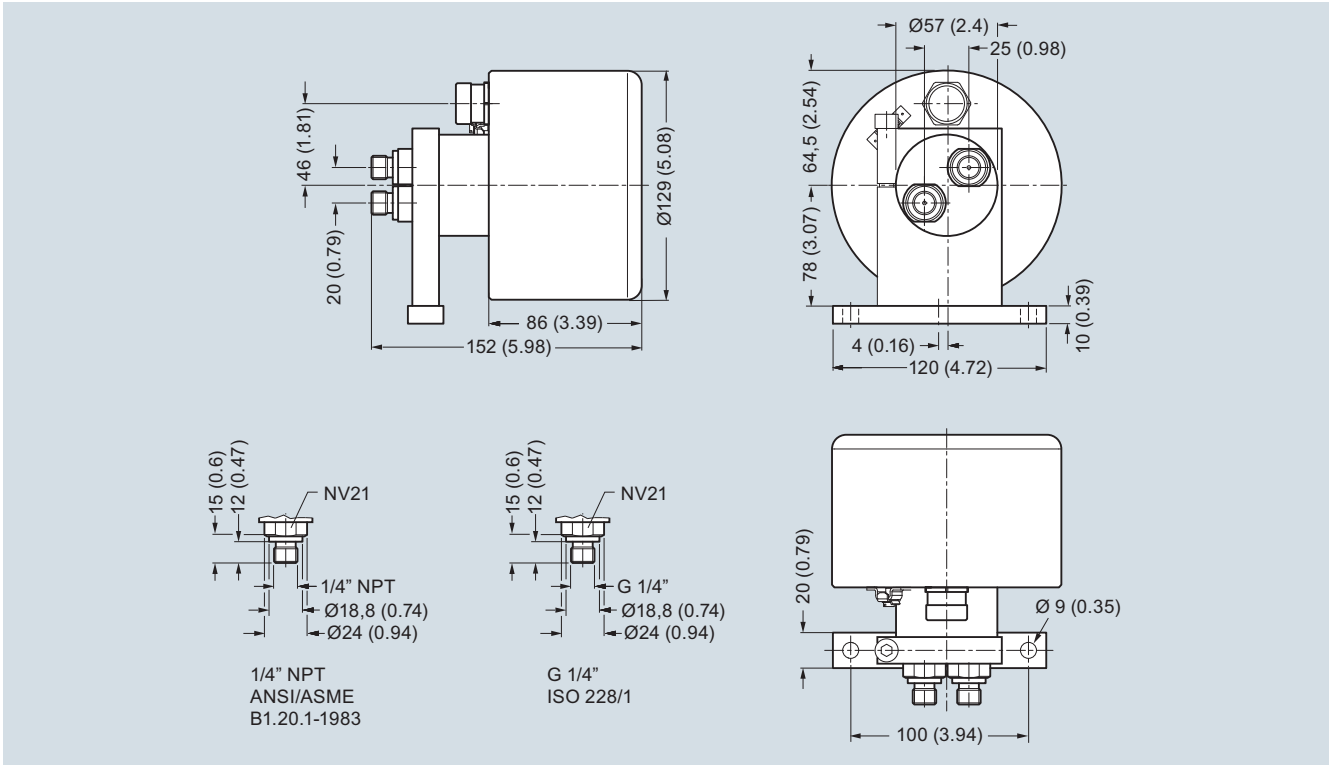
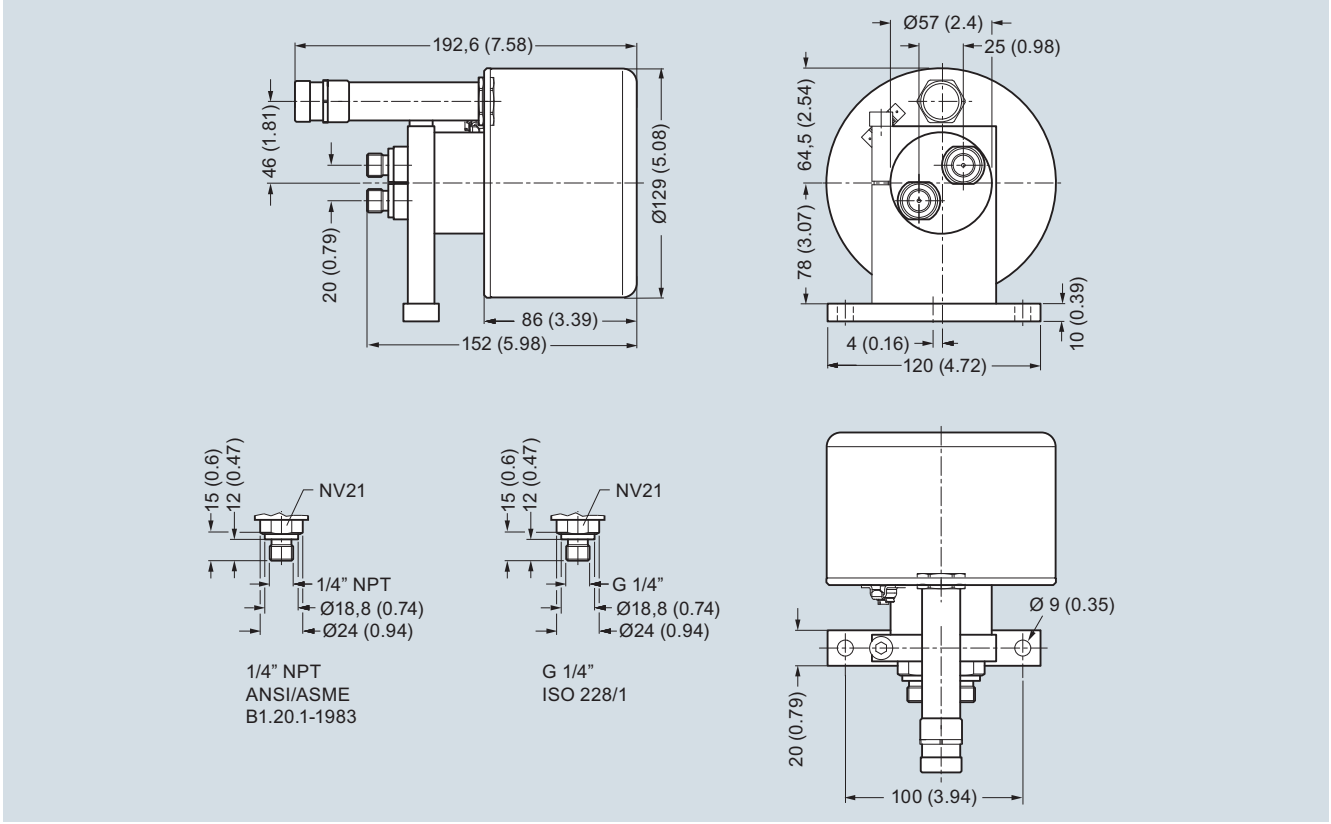
Dimensional drawings

MASS 2100 DI 1.5 (1/16“)



Dimensions in mm (inch)

MASS 2100 DI 1.5 High-temperature version to 180 °C (356 °F)



Dimensions in mm (inch)

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Flow sensor SITRANS FC300

Overview

SITRANS FC300 is a compact Coriolis mass sensor suitable for flow measurement of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a „plug & play“ interface ensures optimum performance and operation.

A new designed encapsulation in stainless steel with a surprisingly low weight of only 3.5 kg (7.7 lb), ensures a rigid and robust sensor performance for a wide range of applications.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through a density accuracy as follows:
  - For 316L/1.4404 version better than 0.0015 g/cm^3 (0.000036 lb/inch^3) with repeatability better than 0.0002 g/cm^3 (0.0000072 lb/inch^3)
  - For C22/2.4602 version better than 0.0025 g/cm^3 (0.000090 lb/inch^3) with repeatability better than 0.001 g/cm^3 (0.000036 lb/inch^3)
- One tube without internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Larger wall thickness, ensures optimal life-time and corrosion resistance and high-pressure durability
- Balanced pipe design with little mechanical energy loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density-changes etc.).
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enable true „plug & play“. Installation and commissioning in less than 10 minutes.
- Intrinsically safe Ex design ia IIC as standard
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance.
- Rugged and space-saving sensor design in stainless steel matching all applications.
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement.

Application

The industry today has an increasing demand for mass flowmeters with a reduced physical size without loss of performance. The meters must be suitable for installation in traditional process industry environment as well as OEM equipment for instance within automotive or appliance industry. Independent of industry application the meter must deliver accurate and reliable measurements. The new and versatile design of the FC300 offers this flexibility.

The main applications for the SITRANS FC300 DN 4 can be found in:	
Chemical industry	Liquid and gas measurement in normal as well as corrosive environments
Cosmetic industry	Dosing of essence and fragrances
Pharmaceutical industry	High-speed dosing and coating of pills, filling of ampuls/injectors
Food and beverage industry	Filling, dosing of flavorings, colors and additives, inline density measurement Measurement and dosing of liquid or gaseous CO_2
Automotive industry	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots, ABS test-beds

Design

The FC300 sensor consists of a single tube bent in double omega pipe geometry, welded directly to the process connectors at each end. The sensor is available in 2 material configurations, AISI 316L/1.4404 or Hastelloy C22/2.4602 with ¼”-NPT or G¼”-ISO process connections.

The enclosure is made of stainless steel AISI 316L/1.4409 with a grade of encapsulation of IP67/NEMA 4. The enclosure has a very robust design and with an overall size of 130 x 200 x 60 mm (5.12“ x 7.87“ x 2.36“) the sensor is very compact and requires only little installation space.

The sensor can be delivered in a standard version with a maximum liquid temperature of 115 °C (239 °F) or a high-temperature version, with raised electrical connector for 180 °C (356 °F).

The sensor can be installed in horizontal or vertical position. The sensor can be mounted directly on any given plane surface or if desired with the enclosed quick release clamp fitting which, along with its compact design and multi-plug electrical connector, will keep installation costs and time to a minimum.

Function

The measuring principle is based on the Coriolis effect. See “System information SITRANS F C Coriolis mass flowmeters”.

Integration

The sensor can be connected to all MASS 6000 and SIFLOW FC070 (standard and Ex types) transmitters for remote installation only.

All sensors are delivered with a SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings

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Installation guidelines for SITRANS FC300 sensor

Horizontal installation as shown in figure A is recommended with gas or liquid applications.

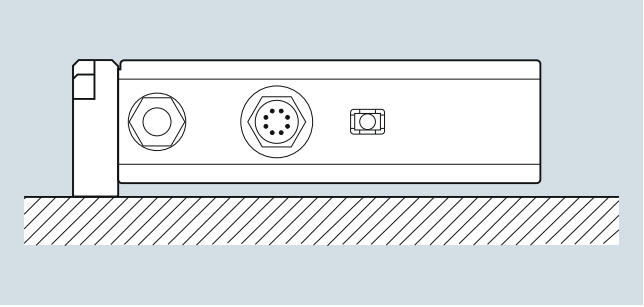
This installation is also recommended when the flow velocity is low (< 1 m/s) or the liquid contains solid particles or air bubbles.

Vertical installation as shown in figure B can be used for liquid or gas applications.

For liquid applications upwards flow is recommended to facilitate the removal of air bubbles and to avoid partly emptying of the sensor.
For gas applications we recommend to place the flow inlet on the sensor high and the outlet low to remove impurities and oil films.

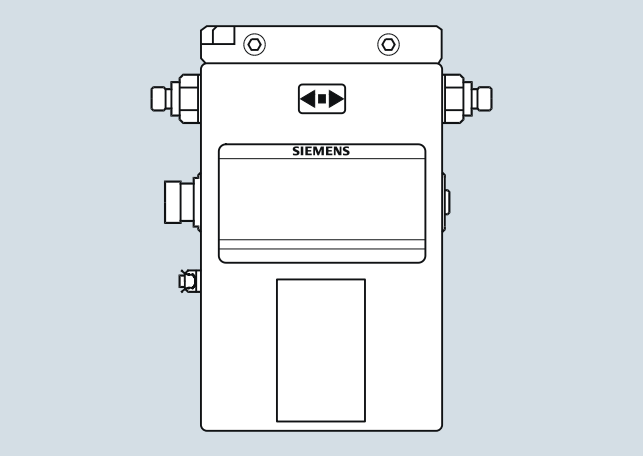
- To ensure that the sensor does not become partly empty, there must be a sufficient counter-pressure on the unit min. 0.2 bar (2.9 psi).
- Mount the sensor on a vibration-free and plane wall or steel frame.
- Locate the sensor low in the system in order to avoid underpressure in the sensor separating air/gas in the liquid.
- Ensure that the sensor is not emptied of liquid (during normal operation) otherwise incorrect measurement will occur.

Horizontal mounting (recommended) (fig. A)



Liquid or gas (low to high flow)

Vertical mounting (fig. B)



Liquid or gas (medium to high flow)

Technical specifications

Sensor size	DN 4 (1/6“)
Mass flow	
Measuring range	0 ... 350 kg/h (0 ... 772 lb/h)
Accuracy, mass flow	0.1 % of rate
Repeatability	0.05 % of rate
Max. zero point error	0.010 kg/h (0.022 lb/h)
Density	
Density range	0 ... 2.9 g/cm^3 (0 ... 0.105 lb/inch^3)
Density error	
• Stainless steel	0.007 g/cm^3 (0.00025 lb/inch^3)
• Hastelloy C22/2.4602	0.0025 g/cm^3 (0.00009 lb/inch^3)
Repeatability error	0.0002 g/cm^3 (0.0000072 lb/inch^3)
Temperature	
Standard	-40 ... +115 °C (-40 ... +239 °F)
High-temperature version	-40 ... +180 °C (-40 ... +356 °F)
Temperature error	0.5 °C (0.9 °F)
Brix	
Measuring range	0 ... 100 °Brix
Brix error	0.3 °Brix
Inside pipe diameter	
Stainless steel version	3.5 mm (0.14“)
Hastelloy version	3.0 mm (0.12“)
Pipe wall thickness	
Stainless steel version	0.25 mm (0.0098“)
Hastelloy version	0.5 mm (0.0196“)
Liquid pressure measuring pipe[1)]	
Stainless steel	130 bar (1885 psi) at 20 °C (68 °F)
Hastelloy C22/2.4602	410 bar (5945 psi) at 20 °C (68 °F)
Materials	Stainless steel AISI 316L/1.4435
Measuring pipe and connection	Hastelloy C22/2.4602
Enclosure[2)]	
Material	Stainless steel AISI 316L/1.4404
Enclosure grade	IP67/NEMA4
Connection thread	
ISO 228/1	G¼” male
ANSI/ASME B1.20.1	¼” NPT male
Ex approval	Ex ia IIC T3-T6 05ATEX138072X c-UL-us Class 1 Div. 1, Gr. A, B, C, D
Weight	3.5 kg (7.7 lb)
Dimensions	135 x 205 x 58 mm (5.31“ x 8.07“ x 2.28“)

1) According to DIN 2413, DIN 17457

2) Housing is not rated for pressure containment.

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Flow sensor SITRANS FC300

Selection and Ordering data	Article No.	Order code
SITRANS F C Flow sensors	7ME4400 -	
SITRANS FC300 DN 4 (1/6“) sensor	■■■■■ - ■■■■	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Pipe material and temperature		
Stainless steel AISI 316L/1.4435		
115 °C (239 °F)	1G	
180 °C (356 °F)	1H	
Hastelloy C22/2.4602		
115 °C (239 °F)	2G	
180 °C (356 °F)	2H	
Pressure		
PN 100	D	
PN 130 (316L/C22)	G	
PN 410 (C22)	Q	
Process connection		
Pipe thread		
G ¼“ male	10	
¼“ NPT male	11	
Configuration		
Standard	1	
Density	2	
Brix/Plato	3	
Fraction (specification required)	9	N0Y
Transmitter compact mounted on sensor		
No transmitter, sensor and adapter only	A	
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex de [ia/ib] T3 -T6 Ex-approval	B	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	C	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz	D	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	E	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz, ½" NPT	F	
Cable		
No cable	A	
5 m (16.4 ft) cable	B	
10 m (32.8 ft) cable	C	
25 m (82 ft) cable	D	
50 m (164 ft) cable	E	
75 m (246 ft) cable	F	
150 m (492 ft) cable	G	
Calibration		
Standard calibration 3 flow x 2 points	1	
Standard calibration matched pair 3 flow x 2 points	2	
Accredited calibration matched pair 5 flow x 2 points (DANAK)	3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8	

Selection and Ordering data	Order code
Additional information Please add “**-Z**“ to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**C11**
Material certificate EN 10204-3.1	**C12**
Welding certificate NDT-Penetrant: ISO 3452	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Tag name plate, stainless steel	**Y17**
Tag name plate, plastic	**Y18**
Customer-specific transmitter setup	**Y20**
Customer-specified, matched pair (5 x 2)	**Y60**
Customer-specified calibration (5 x 2)	**Y61**
Customer-specified, matched pair (10 x 1)	**Y62**
Customer-specified calibration (10 x 1)	**Y63**
Cleaned for oil and grease	**Y80**
Special version	**Y99**

Operating instructions for SITRANS F C FC300

Description	Article No.
• English	**A5E00698213**
• German	**A5E00728101**
• Spanish	**A5E00746629**
• French	**A5E00746625**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)		
• 5 m (16.4 ft)	**FDK:083H3015**	
• 10 m (32.8 ft)	**FDK:083H3016**	
• 25 m (82 ft)	**FDK:083H3017**	
• 50 m (164 ft)	**FDK:083H3018**	
• 75 m (246 ft)	**FDK:083H3054**	
• 150 m (492 ft)	**FDK:083H3055**	

Spare parts

Description	Article No.	
Multiple plug for cable mounting	**FDK:083H5056**	
2 kB SENSORPROM unit (Sensor Serial No. and Article No. must be specified by ordering)	**FDK:083H4410**	
Mounting bracket in AISI 304	**A5E02590439**	
Demo suitcase including MASS 6000, FC300 (DN 4), and HART module	**A5E00789737**	

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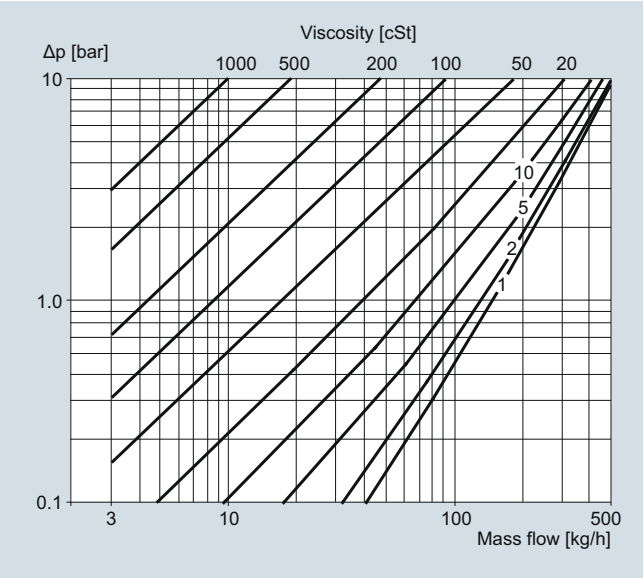
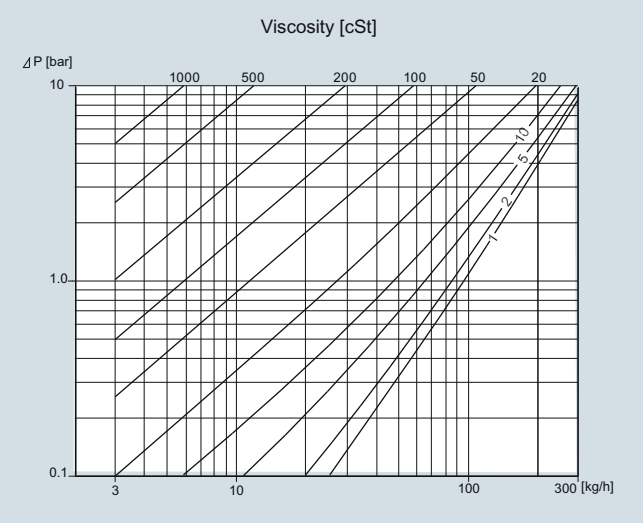
Characteristic curves

Pressure drop



Stainless steel 316L/1.4404



Hastelloy C22/2.4602

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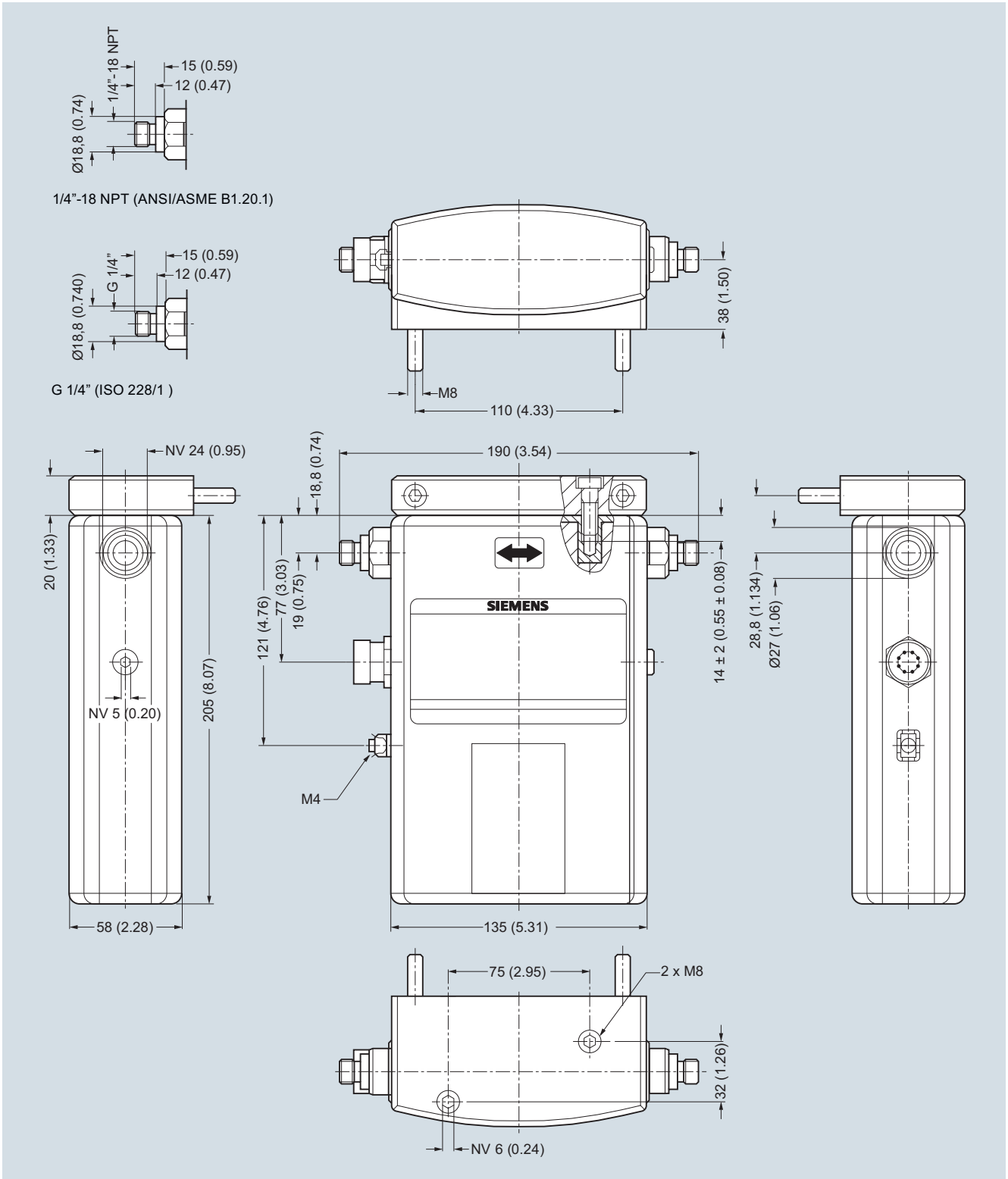
3

Dimensional drawings

SITRANS FC300 DN 4



SITRANS FC300, dimensions in mm (inch)

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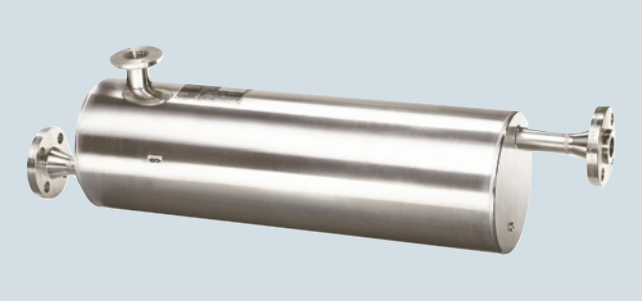
Overview



MASS 2100 DI 3 to DI 40 is suitable for accurate mass flow measurement of a variety of liquids and gases.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy. The ease of installation through a "plug & play" mechanical and electrical interface ensures optimum performance and operation.

The sensor delivers true multi-parameter measurements i.e.: Mass flow, volume flow, density, temperature and fraction.

Benefits

- High accuracy better than 0.1 % of mass flow rate
- Large dynamic turn-down ratio better than 500:1
- Densitometer performance available through density accuracy (depending upon sensor size) ranging from 0.0005 to 0.0015 g/cm^3 with a typical repeatability better than 0.0001 to 0.0002 g/cm^3
- Single continuous tube design, with no internal welds, reductions or flow splitters offers optimal hygiene, safety and CIP cleanability for food and beverage and pharmaceutical applications
- Markets' thickest sensor walls ensure optimal life-time and corrosion resistance and high-pressure durability
- Full bore design provides lower pressure loss due to same internal diameter throughout the entire sensor
- Balanced pipe design with little mechanical energy loss, ensures optimal performance and stability under non-ideal and unstable process conditions (pressure, temperature, density changes etc.)
- 4-wire Pt1000 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- Multi-plug electrical connector and SENSORPROM enables true "plug & play". Installation and commissioning in less than 10 minutes
- Intrinsically safe Ex design ia IIC as standard, making service in hazardous area possible without having to demount the sensor if a compact Ex d transmitter needs service
- Sensor pipe available in high-quality stainless steel AISI 316L/1.4435 or Hastelloy C22/2.4602 offering optimum corrosion resistance
- Centre-block design decouples process noise from the environment such as vibrations, pulsations, pressure shocks etc. making installation flexible and versatile
- Rugged and space-saving sensor design in stainless steel matching all environments
- High-pressure program as standard
- The sensor calibration factor is also valid for gas measurement
- Uniform sensor interface matching all transmitter versions at the same time whether it is compact IP67/NEMA 6, compact Ex d or remote installation, one sensor fits all

Application

Coriolis mass flowmeters are suitable for measuring all liquids and gases. The measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity and flow profile.

Due to this versatility the meter is easy to install and the Coriolis flowmeter is recognized for its high accuracy in a wide turn-down ratio which is a paramount in many applications.

The main applications of the Coriolis flowmeter can be found in all industries, such as:	
Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis
Food and beverage	Dairy products, beer, wine, soft-drinks, Brix/Plato, fruit juices and pulps, bottling, CO_2 dosing, CIP-liquids
Automotive	Fuel injection nozzle and pump testing, filling of AC units, engine consumption, paint robots
Oil and gas	Filling of gas bottles, furnace control, test separators, LPG
Water and waste water	Dosing of chemicals for water treatment

The wide varity of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task.

Design

The MASS 2100 sensor consists of a single bent tube in a double bent pipe configuration, welded directly to the process connectors at each end.
The centre-block is brazed onto the sensor pipes from the outside acting as a mechanical low pass filter.

The sensor is available in 2 material configurations, AISI 316L/1.4404 or Hastelloy C22/2.4602 with a wide variety of process connections.

The enclosure is made in stainless steel AISI 316L/1.4404 with a grade of encapsulation of IP67.

The sensor is as standard Ex ia approved, intrinsically safe.

The sensor can be installed in horizontal or vertical position. In horizontal position the sensor is self draining.

Heating: All the sensors MASS 2100, DI 3 to DI 40, can optionally be equipped with a heating coil to avoid solidification of sensitive fluids during down-time or period between discontinuing processes. This feature gives the user an alternative to the costly electrical heating normally used, as it gives the freedom to choose either hot water, superheated steam or hot oil, to maintain a constant temperature inside the sensor.

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Flow sensor MASS 2100 DI 3 to DI 40

Function

The measuring principle is based on the Coriolis effect. See "System information SITRANS F C Coriolis mass flowmeters".

Integration

The sensor can be connected to all MASS 6000 transmitters for compact and remote installation as well as SIFLOW FC070 standard and Ex type transmitters.

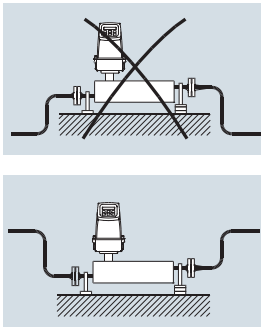
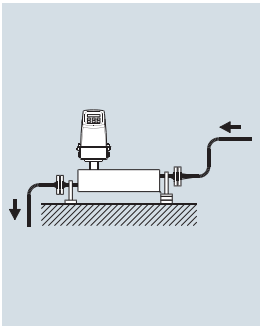
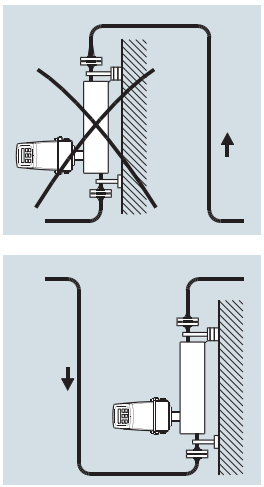
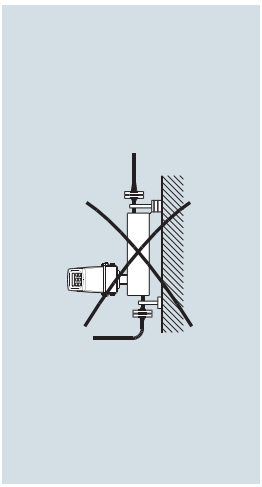
All sensors are delivered with a SENSORPROM containing all information about calibration data, identity and factory pre-programming of transmitter settings.

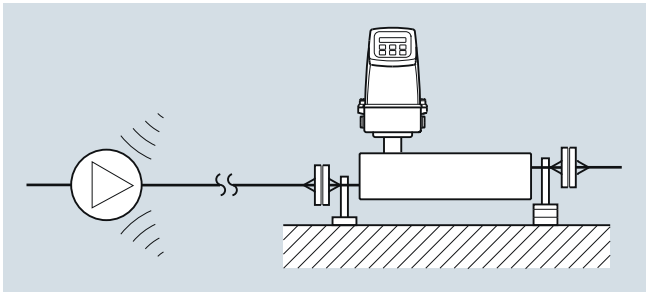
Installation guidelines MASS 2100 DI 3 ... DI 40 (1/8" ... 1½")

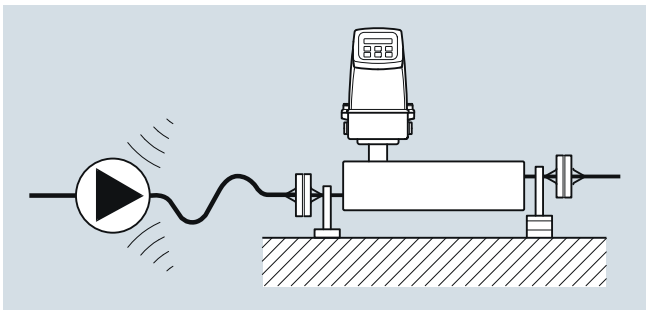
Installation of sensor

In order to perform according to given specifications for flow and density accuracy, the sensor must be installed using rigid mounting brackets as shown in the installation examples.

If the liquid is volatile or contains solid particles, vertical mounting is not recommended.

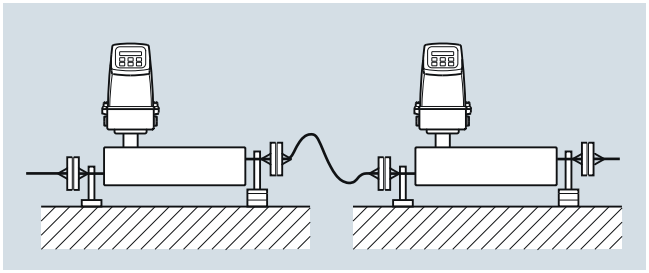
	Liquid	Gas
Horizontal		
Vertical		





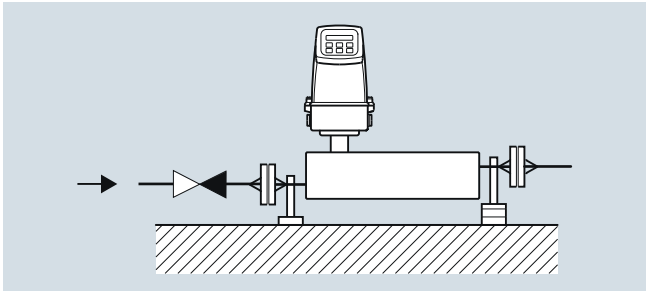
Vibration

Always locate the flowmeter as far away as possible from components that generate mechanical vibration in the piping.



Cross talk

Cross talk between sensors mounted close to each other may disturb the measurement. To avoid cross talk never mount more than one meter on each frame and mount flexible hose connections between the sensors as shown.



Zero point adjustment

To facilitiate zero point adjustment a shut-off valve should always be mounted in connection with the sensor as a proper zero point setting is essential for a good accuarcy.

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Technical specifications

Versions (mm (inch))		**DI 3 (1/8)**	**DI 6 (¼)**	**DI 15 (5/8)**	**DI 25 (1)**	**DI 40 (1½)**
Inside pipe diameter (sensor consists of one continuous pipe)	mm (inch)	3.0 (0.12)	6.0 (0.24)	14.0 (0.55)	29.7 (1.17)	43.1 (1.70)
Pipe wall thickness	mm (inch)	0.5 (0.02)	1.0 (0.04)	1.0 (0.04)	2.0 (0.08)	2.6 (0.10)
Mass flow measuring range	kg/h (lb/h)	0 ... 250 (0 ... 550)	0 ... 1000 (0 ... 2200)	0 ... 5600 (0 ... 12345)	0 ... 25000 (0 ... 55100)	0 ... 52000 (0 ... 114600)
Density	g/cm³ (lb/inch³)	0 ... 2.9 (0 ... 0.10)				
Fraction e.g.	°Brix	0 ... 70 (applicable temperature range: 10 ... 99 °C (50 ... 210.2 °F))				
Temperature						
Standard	°C (°F)	-50 ... +180 °C (-58 ... +356 °F)				
Liquid pressure measuring pipe[1]						
Stainless steel	bar (psi)	230 (3336)	265 (3844)	130 (1885)	110 (1595)	105 (1523)
Hastelloy C22/2.4602	bar (psi)	350 (5076)	410 (5946)	200 (2900)	185 (2683)	not available
Materials						
Measuring pipe, flange and thread connection		Stainless steel AISI 316L/1.4435				
		Hastelloy C22/2.4602		not available		
Enclosure and enclosure material		IP67 (NEMA 4) and stainless steel AISI 316L/1.4404, **The housing is not rated for pressure containment**				
Process connections[2]						
Flange						
EN 1092-1, PN 40			DN 10	DN 15	DN 25	DN 40
ANSI B16.5, Class 150			½"	½"	1"	1½"
ANSI B16.5, Class 600 (Class 300)			½"	½"	1"	1½"
Dairy screwed connection (PN 16/25/40)[3]						
DIN 11851			DN 10	DN 15	DN 32	DN 40
ISO 2853/BS 4825 part 4 (SS3351)			25 mm	25 mm	38 mm	51 mm
Dairy clamp connection (PN 16)[3]						
ISO 2852/BS 4825 part 3 (SMS3016)			25 mm	25 mm	38 mm	51 mm
Thread						
ISO 228/1, PN 100		G¼" female	G¼" male	G½" male	G1" male	G2" male
ANSI/ASME B1.20.1, PN 100		¼" NPT female	¼" NPT male	½" NPT male	1" NPT male	2" NPT male
Cable connection		Multiple plug connection to sensor 5 x 2 x 0.35 mm² twisted and screened in pairs, ext. Ø 12 mm				
Ex-version		Ex ia IIC T3-T6, DEMKO 03 ATEX 135252X				
Weight approx.	kg (lb)	4 (8.8)	8 (17.6)	12 (26.5)	48 (105.8)	70 (154.5)

1) Max. at 20 °C (68 °F), DIN 2413, DIN 17457

2) Other connections to order, see "Selection and Ordering data"

3) Material, AISI 316/1.4401 or corresponding

For accuracy specification see "System information SITRANS F C".

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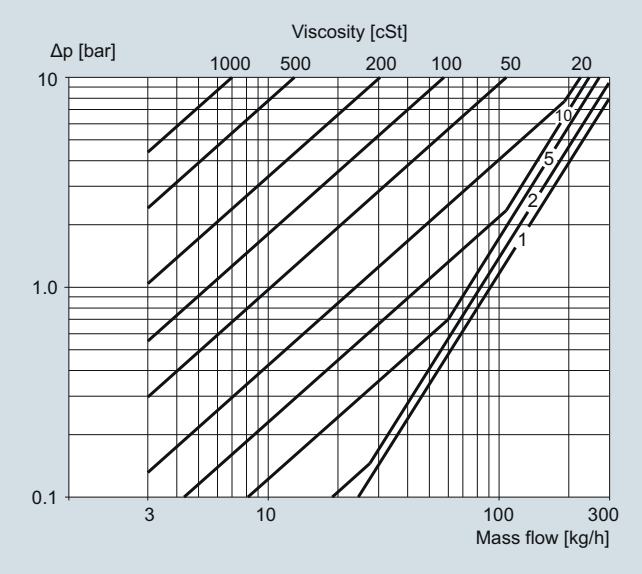
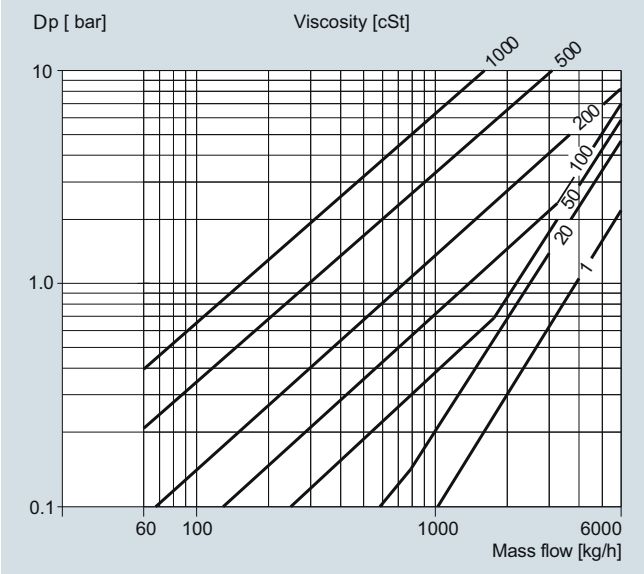
Flow sensor MASS 2100 DI 3 to DI 40

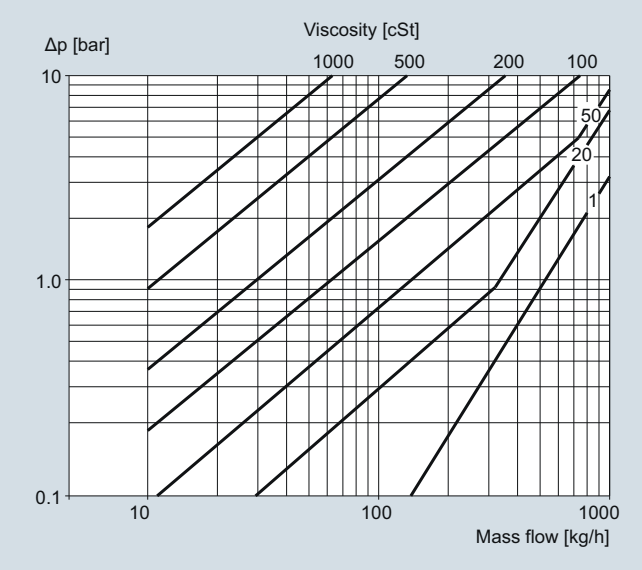
Pressure drop



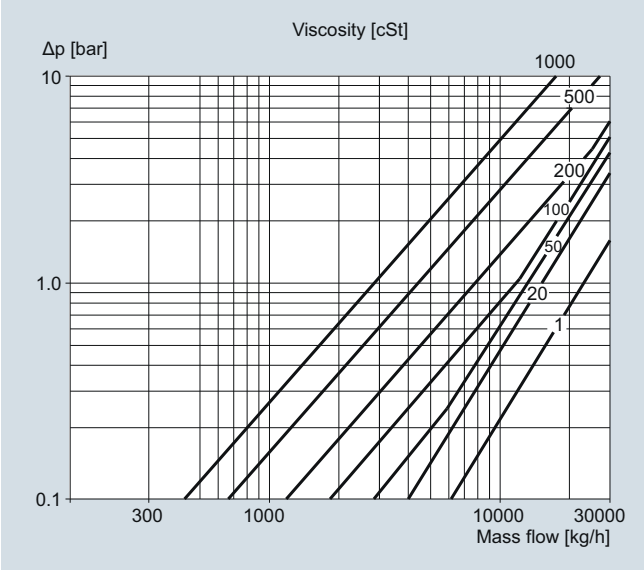
MASS 2100 DI 3 (1/8"), pressure drop for density = 1000 kg/m^3



MASS 2100 DI 15 (½"), pressure drop for density = 1000 kg/m^3



MASS 2100 DI 6 (¼"), pressure drop for density = 1000 kg/m^3



MASS 2100 DI 25 (1"), pressure drop for density = 1000 kg/m^3

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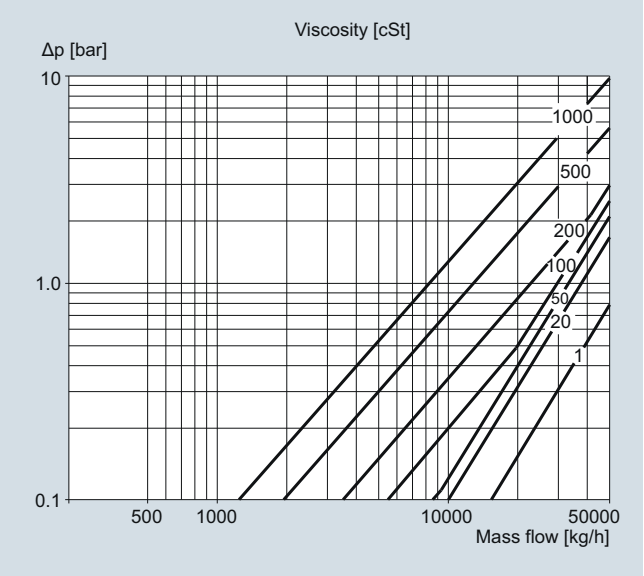
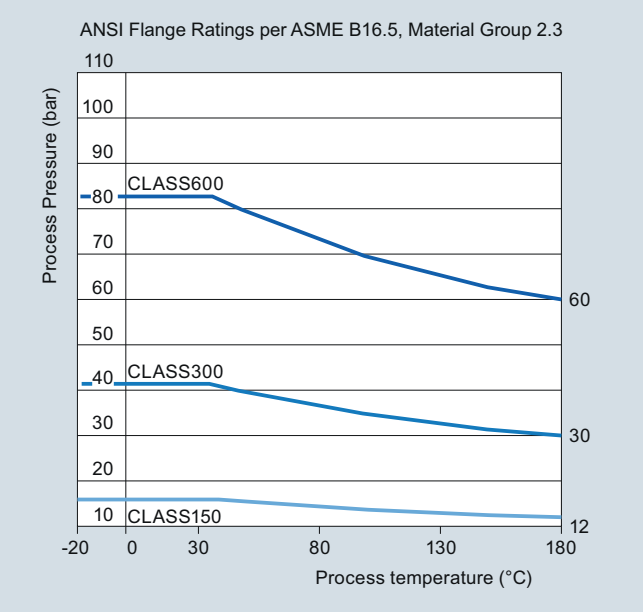
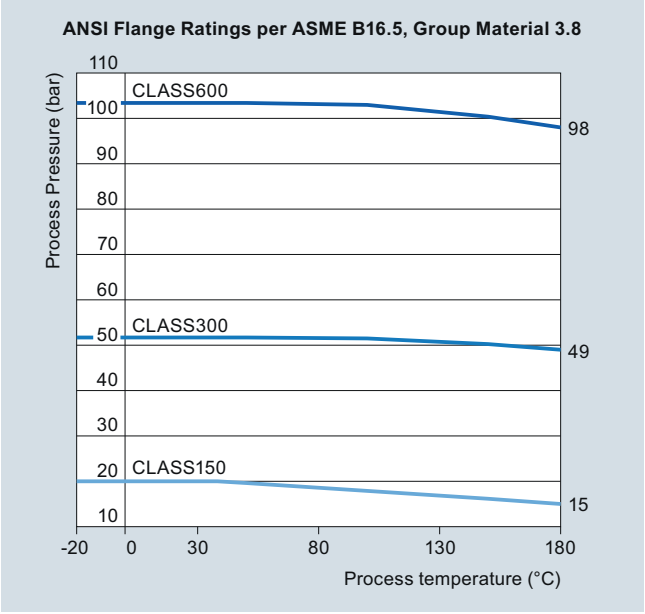


MASS 2100 DI 40 (1½"), pressure drop for density = 1000 kg/m^3

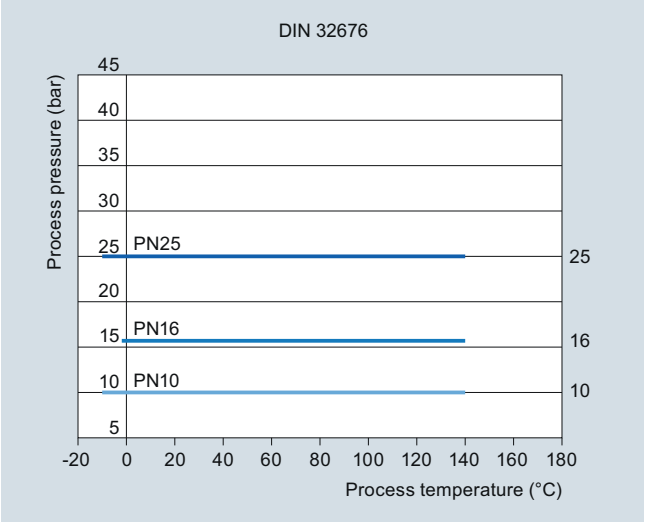
Pressure/temperature curves



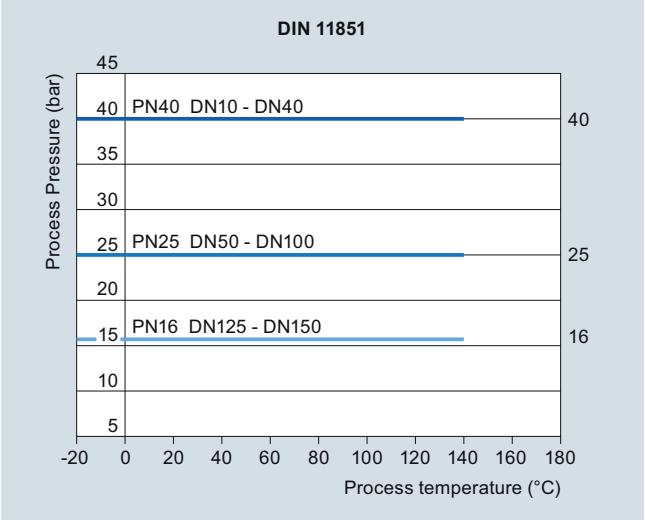
ASME flanges B16.5 stainless steel



ASME flanges B16.5 Hastelloy C22/2.4602



DIN 32676 flanges stainless steel (PN 10 ... PN 25)



DIN 11581 flanges stainless steel (PN 25 ... PN 40)

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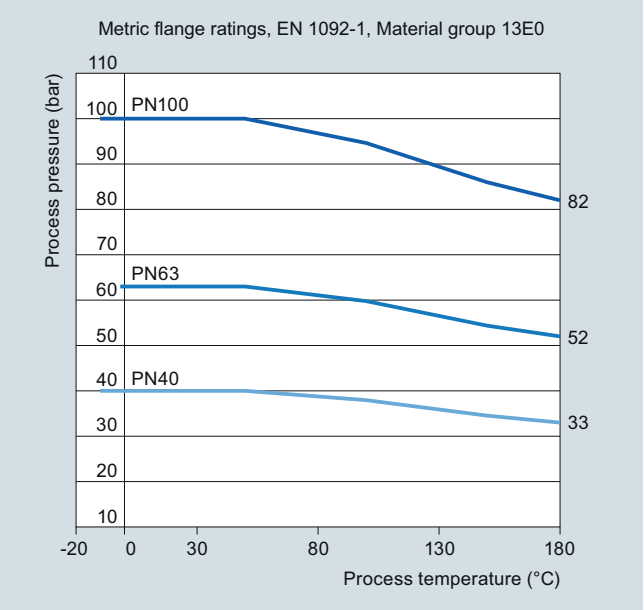
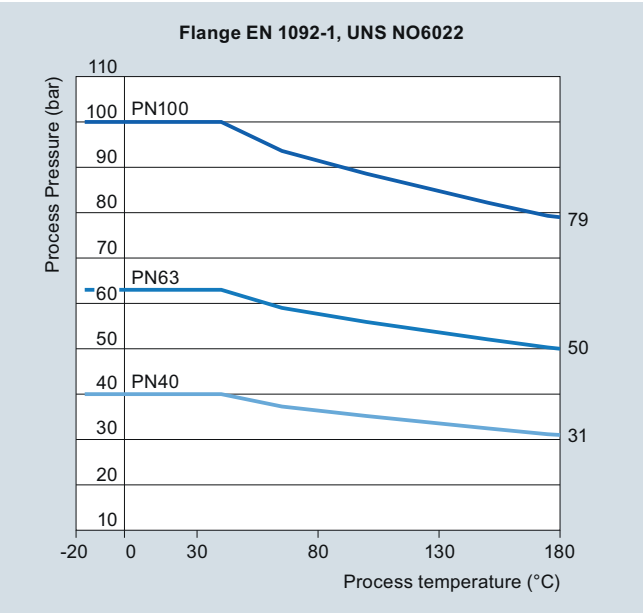
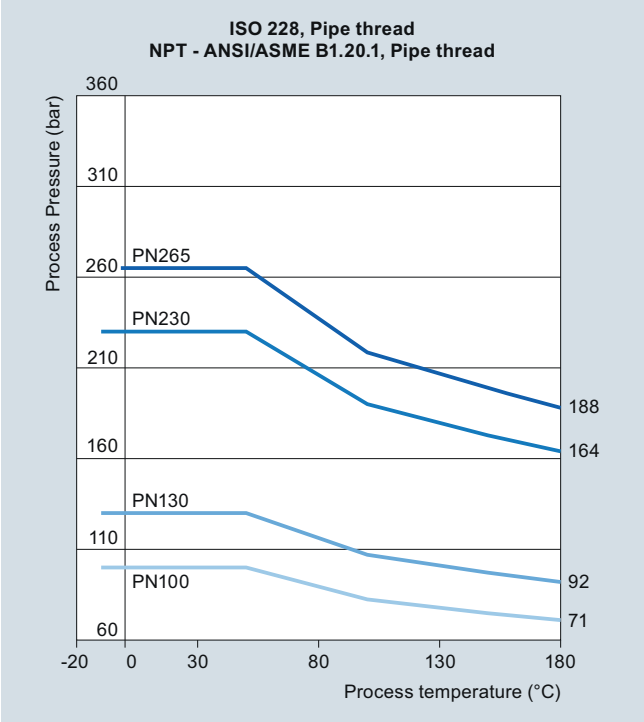
Flow sensor MASS 2100 DI 3 to DI 40



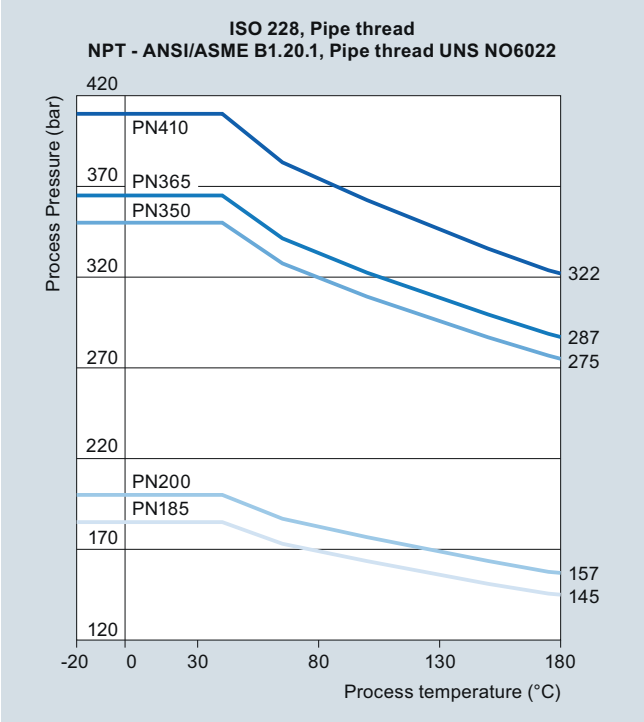
EN 1092 flanges stainless steel (PN 40 ... PN 100)



EN 1092 flanges Hastelloy C22/2.4602 (PN 40 ... PN 100)



ISO 228 and NPT pipe thread stainless steel (PN 100 ... PN 265)



ISO 218 and NPT pipe thread stainless steel (PN 185 ... PN 410)

For further information on the PED standard and requirements, see page 9/6.

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Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors		
MASS 2100 without heating jacket ↗	7ME4100-	
MASS 2100 heated, DN 15 connection ↗	7ME4200-	
MASS 2100 heated, ½ inch, ANSI B16.5 connection ↗	7ME4210-	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter		
Stainless steel AISI 316L/1.4435		
DI 3 (PN 100/PN 230)	1C	
DI 6	1D	
DI 15	1E	
DI 25	1F	
DI 40	1G	
Hastelloy C22/2.4602		
DI 3 (PN 100/PN 350)	2C	
DI 6	2D	
Pressure		
PN 16 (DI 6, DI 15, DI 25 and DI 40)	A	
PN 25 (DI 6, DI 15, DI 25 and DI 40)	B	
PN 40 (DI 6, DI 15, DI 25 and DI 40)	C	
PN 100 (DI 3, DI 6, DI 15, DI 25 and DI 40)	D	
PN 105 (DI 40, 2", AISI 316L/1.4404)	E	
PN 110 (DI 25, 1", AISI 316L/1.4404)	F	
PN 130 (DI 15, ½", AISI 316L/1.4404)	G	
PN 185 (DI 25, 1", Hastelloy C22/2.4602)	J	
PN 200 (DI 15, ½", Hastelloy C22/2.4602)	K	
PN 230 (DI 3, ¼", AISI 316L/1.4404)	L	
PN 265 (DI 6, ¼", AISI 316L/1.4404)	M	
PN 350 (DI 3, ¼", Hastelloy C22/2.4602)	N	
PN 410 (DI 6, ¼", Hastelloy C22/2.4602)	Q	
Class 150 (DI 6, DI 15, DI 25 and DI 40)	R	
Class 600 (DI 6, DI 15, DI 25 and DI 40)	S	
Process connection/flange		
Pipe thread		
G ¼"	10	
¼" NPT	11	
G ½"	12	
½" NPT	13	
G 1	14	
1" NPT	15	
G 2"	16	
2" NPT	17	
Flange EN1092-1 Form B		
DN 10 (PN 40/PN 100)	20	
DN 15 (PN 40/PN 100)	21	
DN 25 (PN 40/PN 100)	22	
DN 40 (PN 40/PN 100)	23	
DN 50 (PN 40/PN 100)	24	
Flange ASME/ANSI B 16.5		
½" (class 150/class 600)	30	
¾" (class 150/class 600)	31	
1" (class 150/class 600)	32	
1 ½" (class 150/class 600)	33	
2" (class 150/class 600)	34	

Selection and Ordering data	Article No.	Ord. code
SITRANS F C sensors		
MASS 2100 without heating jacket	7ME4100-	
MASS 2100 heated, DN 15 connection	7ME4200-	
MASS 2100 heated, ½ inch, ANSI B16.5 connection	7ME4210-	
Dairy screwed connection DIN 11851		
DN 10 (PN 40)	40	
DN 15 (PN 40)	41	
DN 25 (PN 40)	42	
DN 32 (PN 40)	43	
DN 40 (PN 25)	44	
DN 50 (PN 25)	45	
DN 65 (PN 25)	46	
Dairy clamp connection ISO 2852 (DIN 32676) Cone down the sensor in order to obtain self-drainage with connectors ISO 2852		
25 mm (PN 16)	50	
38 mm (PN 16)	51	
51 mm (PN 16)	52	
Dairy screwed connection ISO 2853		
25 mm (PN 16)	60	
38 mm (PN 16)	61	
51 mm (PN 16)	62	
Configuration/calibration type		
Standard	1	
Density	2	
Brix/Plato	3	
Fraction (specification required)	9	NOY
Transmitter compact mounted on sensor		
No transmitter, sensor and adapter only	A	
MASS 6000, Ex d, stainless steel enclosure, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC with Ex de [ia/ib] T3 -T6 Ex-approval	B	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	C	
MASS 6000, IP67, Polyamide enclosure, cable glands M20, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz	D	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 24 V AC/DC	E	
MASS 6000, IP67, Polyamide enclosure, cable glands ½" NPT, 1 current, 1 freq./pulse and 1 relay output, 115/230 V AC 50/60 Hz	F	
Cable		
No cable	A	
5 m (16.4 ft) cable	B	
10 m (32.8 ft) cable	C	
25 m (82 ft) cable	D	
50 m (164 ft) cable	E	
75 m (246 ft) cable	F	
150 m (492 ft) cable	G	
Calibration/verification		
Standard calibration 3 flow x 2 points	1	
Stand. calibration matched pair 3 flow x 2 points	2	
Accredited calibration matched pair 5 flow x 2 points (DANAK to ISO 17025)	3	
Extended calibration customer-specified select Y60, Y61, Y62 or Y63 (see additional information)	8	

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Flow sensor MASS 2100 DI 3 to DI 40

Dairy MLFB example

MASS 2100

7ME4100-1E C 41 1 D A 1

Sensor size DI 15, AISI 316L/1.4435

PN 40

DN 15 connector

Standard configuration/calibration

MASS 6000 IP67 compact mounted

No cable

Standard calibration, 3 flow x 2 points

Selection and Ordering data

Selection and Ordering data	Order code
Addtional information	
Please add "**-Z**" to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**C11**
Material certificate EN 10204-3.1	**C12**
NDT- X-ray inspection report: EN 1435 DI3 sensor only: NDT-Penetrant inspection report ISO 3452.	**C13**
Factory certificate according to EN 10204 2.2	**C14**
Factory certificate according to EN 10204 2.1	**C15**
Tag name plate, stainless steel	**Y17**
Tag name plate, plastic	**Y18**
Customer-specific transmitter setup	**Y20**
Customer-specified, matched pair (5 x 2)	**Y60**
Customer-specified calibration (5 x 2)	**Y61**
Customer-specified, matched pair (10 x 1)	**Y62**
Customer-specified calibration (10 x 1)	**Y63**
Cleaned for oil and grease	**Y80**
Special version	**Y99**

Operating instructions for SITRANS F C MASS 2100 DI 3 to DI 40

Description	Article No.
• English	**A5E02896535**
• German	**A5E03073519**
• Spanish	**A5E03073549**
• French	**A5E03073539**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

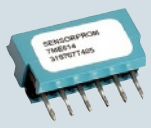
Selection and Ordering data

Accessories

Description	Dimension	Article No.
Mating parts for hygienic fittings DIN 11851 Includes: • 2 unions • 2 mating parts (for welding in) • 2 EPDM gaskets	DN 10	**FDK:085U1016**
	DN 15	**FDK:085U1017**
	DN 25	**FDK:085U1019**
	DN 32	**FDK:085U1020**
	DN 40	**FDK:085U1021**
	DN 50	**FDK:085U1022**
	DN 65	**FDK:085U1023**
Mating parts for hygienic clamp ISO 2852 Includes: • 2 clamps • 2 mating parts • 2 EPDM gaskets	25 mm	**FDK:085U1029**
	40 mm	**FDK:085U1031**
	50 mm	**FDK:085U1032**
2 EPDM gaskets with collar for mounting set DIN 11851	DN 10	**FDK:085U1006**
	DN 15	**FDK:085U1007**
	DN 25	**FDK:085U1009**
	DN 32	**FDK:085U1010**
	DN 40	**FDK:085U1011**
	DN 50	**FDK:085U1012**
	DN 65	**FDK:085U1013**

Description	Length	Article No.
Cable with multiple plug Standard blue cable between MASS 6000 and MASS 2100, 5 x 2 x 0.34 mm² twisted and screened in pairs. Temperature range -20 °C ... +110 °C (-4 °F ... +230 °F)		
	5 m (16.4 ft)	**FDK:083H3015**
	10 m (32.8 ft)	**FDK:083H3016**
	25 m (82 ft)	**FDK:083H3017**
	50 m (164 ft)	**FDK:083H3018**
	75 m (246 ft)	**FDK:083H3054**
	150 m (492 ft)	**FDK:083H3055**

Spare parts

Description	Article No.
Adapter for MASS 2100	**FDK:083L8889**
Multiple plug for cable mounting	**FDK:083H5056**
2 kB SENSORPROM unit, including programming (Sensor Serial No. and Article No. must be specified by ordering)	 **FDK:083H4410**

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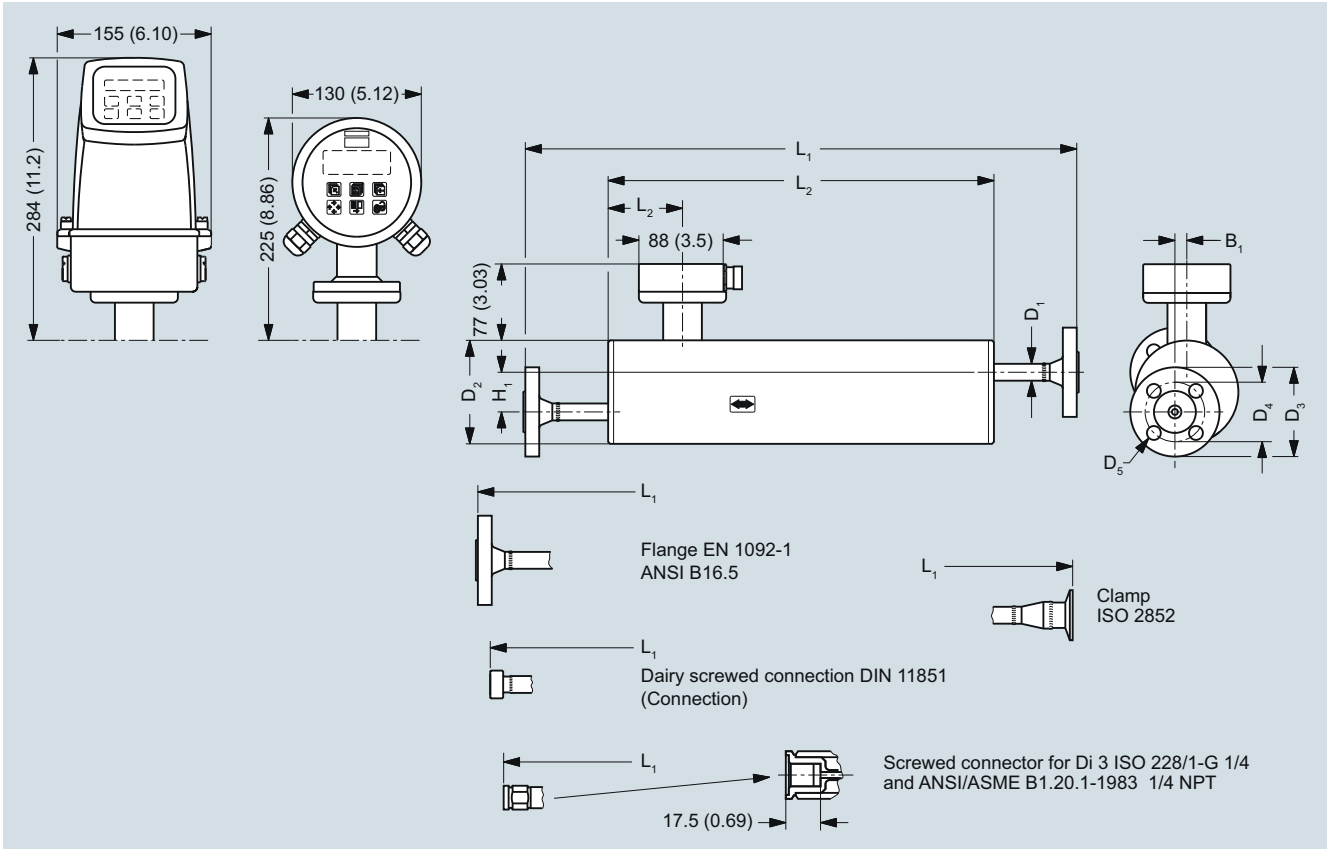
Dimensional drawings

MASS 2100 sensor



Dimension in mm (inch)

For not listed variants please contact product support

Sensor size	Connections			L1 mm	L2 mm	L3 mm	H1 mm	B1 mm	D1 mm	D2 mm	D3 mm	D4 mm	D5 mm
DI (inch)	Type	Pressure rating	Size										
DI 3	Pipe thread ISO 228/1 - G¼	PN 100	¼"	400	280	75.5	60	0	21.3	104	-	-	-
(1/8)	Pipe thread ANSI/ASME B 1.20.1 - ¼" NPT	PN 100	¼"	400	280	75.5	60	0	21.3	104	-	-	-
DI 6	Flange EN 1092-1	PN 100	DN 10	580	390	62.0	40	12	17.0	104	100	70.0	14.0
(¼)	Flange EN 1092-1	PN 40	DN 10	560	390	62.0	40	12	17.0	104	90.0	60.0	14.0
	Flange ANSI B16.5	Class 150	½"	624	390	62.0	40	12	17.0	104	88.9	60.5	15.7
	Flange ANSI B16.5	Class 600	½"	608	390	62.0	40	12	17.0	104	95.3	66.5	15.7
	Screwed connection DIN 11851	PN 40	DN 10	532	390	62.0	40	12	17.0	104	-	-	-
	Clamp ISO 2852	PN 16	25 mm	570	390	62.0	40	12	17.0	104	-	-	-
DI 15	Flange EN 1092-1	PN 100	DN 15	634	444	75.5	44	20	21.3	129	105	75.0	14.0
(½)	Flange EN 1092-1	PN 40	DN 15	620	444	75.5	44	20	21.3	129	95.0	65.0	14.0
	Flange ANSI B16.5	Class 150	½"	639	444	75.5	44	20	21.3	129	88.9	60.5	15.7
	Flange ANSI B16.5	Class 600	½"	660	444	75.5	44	20	21.3	129	95.3	66.5	15.7
	Screwed connection DIN 11851	PN 40	DN 15	586	444	75.5	44	20	21.3	129	-	-	-
	Clamp ISO 2852	PN 16	25 mm	624	444	75.5	44	20	21.3	129	-	-	-
DI 25	Flange EN 1092-1	PN 100	DN 25	970	700	75.5	126	25	33.7	219	140.0	100.0	18.0
(1)	Flange EN 1092-1	PN 40	DN 25	934	700	75.5	126	25	33.7	219	115.0	85.0	14.0
	Flange ANSI B16.5	Class 150	1"	967	700	75.5	126	25	33.7	219	108.0	79.2	15.7
	Flange ANSI B16.5	Class 600	1"	992	700	75.5	126	25	33.7	219	124.0	88.9	19.1
	Screwed connection DIN 11851	PN 40	DN 32	922	700	75.5	126	25	33.7	219	-	-	-
	Clamp ISO 2852	PN 16	38 mm	940	700	75.5	126	25	33.7	219	-	-	-
DI 40	Flange EN 1092-1	PN 100	DN 40	1100	850	75.5	180	0	48.3	273	170.0	125.0	22.0
(1½)	Flange EN 1092-1	PN 40	DN 40	1063	850	75.5	180	0	48.3	273	150.0	110.0	18.0
	Flange ANSI B16.5	Class 150	1½"	1100	850	75.5	180	0	48.3	273	127.0	98.6	15.7
	Flange ANSI B16.5	Class 600	1½"	1128	850	75.5	180	0	48.3	273	155.4	114.3	22.4
	Screwed connection DIN 11851	PN 25	DN 50	1090	850	75.5	180	0	48.3	273	-	-	-
	Clamp ISO 2852	PN 25	51 mm	1062	850	75.5	180	0	48.3	273	-	-	-

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Flow sensor MASS 2100 DI 3 to DI 40

For not listed variants please contact product support.

Sensor size	Connections			L1	L2	L3	H1	B1	D1	D2	D3	D4	D5
				inch	inch	inch	inch	inch	inch	inch	inch	inch	inch
DI (inch)	Type	Pressure rating	Size										
DI 3	Pipe thread ISO 228/1 - G¼	PN 100	¼"	15.75	11.02	2.97	2.36	0	0.84	4.09	-	-	-
(1/8)	Pipe thread ANSI/ASME B 1.20.1 - ¼" NPT	PN 100	¼"	15.75	11.02	2.97	2.36	0	0.84	4.09	-	-	-
DI 6	Flange EN 1092-1	PN 100	DN 10	22.83	15.35	2.44	1.57	0.47	0.67	4.09	3.94	2.76	0.55
(¼)	Flange EN 1092-1	PN 40	DN 10	22.05	15.35	2.44	1.57	0.47	0.67	4.09	3.54	2.36	0.55
	Flange ANSI B16.5	Class 150	½"	24.57	15.35	2.44	1.57	0.47	0.67	4.09	3.5	2.38	0.62
	Flange ANSI B16.5	Class 600	½"	23.94	15.35	2.44	1.57	0.47	0.67	4.09	3.75	2.62	0.62
	Screwed connection DIN 11851	PN 40	DN 10	20.94	15.35	2.44	1.57	0.47	0.67	4.09	-	-	-
	Clamp ISO 2852	PN 16	25 mm	22.44	15.35	2.44	1.57	0.47	0.67	4.09	-	-	-
DI 15	Flange EN 1092-1	PN 100	DN 15	24.96	17.48	2.97	1.73	0.79	0.84	5.08	2.95	4.13	0.55
(½)	Flange EN 1092-1	PN 40	DN 15	24.41	17.48	2.97	1.73	0.79	0.84	5.08	3.74	2.56	0.55
	Flange ANSI B16.5	Class 150	½"	25.16	17.48	2.97	1.73	0.79	0.84	5.08	3.5	2.38	0.62
	Flange ANSI B16.5	Class 600	½"	25.98	17.48	2.97	1.73	0.79	0.84	5.08	3.75	2.62	0.62
	Screwed connection DIN 11851	PN 40	DN 15	23.07	17.48	2.97	1.73	0.79	0.84	5.08	-	-	-
	Clamp ISO 2852	PN 16	25 mm	24.57	17.48	2.97	1.73	0.79	0.84	5.08	-	-	-
DI 25	Flange EN 1092-1	PN 100	DN 25	38.19	27.56	2.97	4.96	0.98	1.33	8.62	3.94	5.51	0.71
(1)	Flange EN 1092-1	PN 40	DN 25	36.77	27.56	2.97	4.96	0.98	1.33	8.62	4.53	3.35	0.55
	Flange ANSI B16.5	Class 150	1"	38.07	27.56	2.97	4.96	0.98	1.33	8.62	4.25	3.12	0.62
	Flange ANSI B16.5	Class 600	1"	39.06	27.56	2.97	4.96	0.98	1.33	8.62	4.88	3.50	0.75
	Screwed connection DIN 11851	PN 40	DN 32	36.30	27.56	2.97	4.96	0.98	1.33	8.62	-	-	-
	Clamp ISO 2852	PN 16	38 mm	37.01	27.56	2.97	4.96	0.98	1.33	8.62	-	-	-
DI 40	Flange EN 1092-1	PN 100	DN 40	43.31	33.46	2.97	7.09	0	1.9	10.75	4.92	6.69	0.87
(1½)	Flange EN 1092-1	PN 40	DN 40	41.85	33.46	2.97	7.09	0	1.9	10.75	5.91	4.33	0.71
	Flange ANSI B16.5	Class 150	1½"	43.31	33.46	2.97	7.09	0	1.9	10.75	5	3.88	0.62
	Flange ANSI B16.5	Class 600	1½"	44.41	33.46	2.97	7.09	0	1.9	10.75	6.12	4.50	0.88
	Screwed connection DIN 11851	PN 25	DN 50	42.91	33.46	2.97	7.09	0	1.9	10.75	-	-	-
	Clamp ISO 2852	PN 25	51 mm	41.81	33.46	2.97	7.09	0	1.9	10.75	-	-	-

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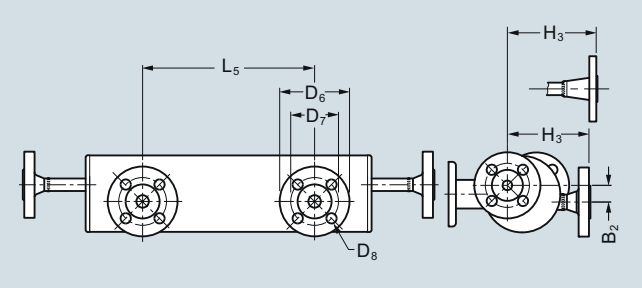
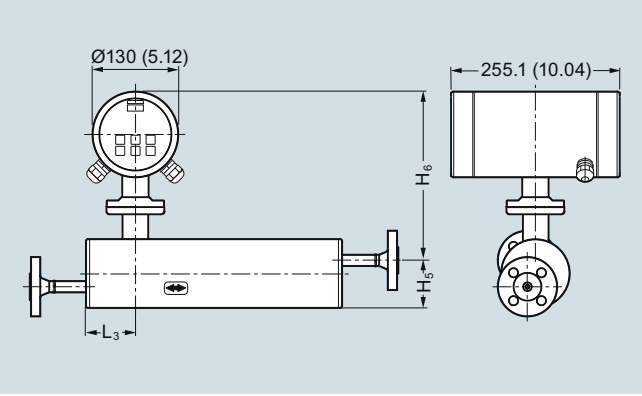
MASS 2100 sensor with “heating jacket”



Dimensions in mm (inch)

Sensor size	Connec-tions heated			L5	H3	B2	D6	D7	D8
DI (inch)	Type	Pressure rating	Size	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)	mm (inch)
DI 3 (1/8)	EN 1092-1	PN 40	DN 15	234 (9.21)	122 (4.8)	22 (0.87)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	131.6 (5.18)	22 (0.87)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 6 (¼)	EN 1092-1	PN 40	DN 15	234 (9.21)	112 (4.41)	22.7 (0.89)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	234 (9.21)	121.6 (4.79)	22.7 (0.89)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 15 (½)	EN 1092-1	PN 40	DN 15	234 (9.21)	126.5 (4.98)	31.5 (1.24)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class150	½"	234 (9.21)	136.1 (5.36)	31.5 (1.24)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 25 (1)	EN 1092-1	PN 40	DN 15	420 (16.54)	213.6 (8.41)	60 (2.36)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	420 (16.54)	223.2 (8.79)	60 (2.36)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)
DI 40 (1½)	EN 1092-1	PN 40	DN 15	500 (19.68)	267.5 (10.53)	43 (1.69)	95 (3.74)	65.0 (2.56)	14.0 (0.55)
	ANSI B16.5	Class 150	½"	500 (19.68)	277.1 (10.91)	43 (1.69)	88.9 (3.5)	60.5 (2.38)	15.7 (0.62)

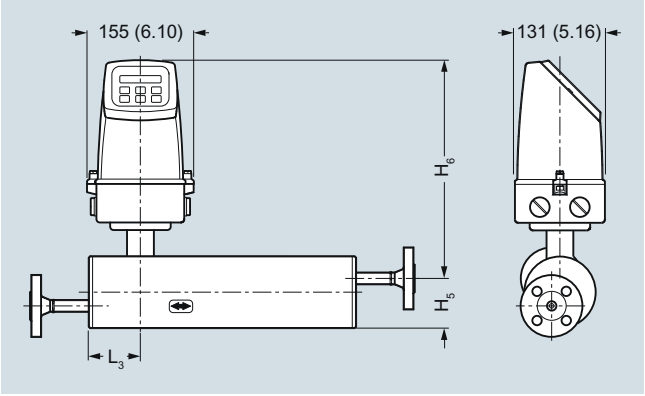
MASS 2100 and MASS 6000 Ex d compact version



Dimensions in mm (inch)

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	247 (9.72)	329 (12.95)
6 (¼)	62 (2.44)	72 (2.83)	257 (10.12)	329 (12.95)
15 (½)	75 (2.95)	87 (3.43)	267 (10.51)	354 (13.94)
25 (1)	75 (2.95)	173 (6.81)	271 (10.67)	444 (17.48)
40 (1½)	75 (2.95)	227 (8.94)	271 (10.67)	498 (19.61)

MASS 2100 and MASS 6000 IP67 compact version



Dimensions in mm (inch)

Sensor size [DI (inch)]	L_3 [mm (inch)]	H_5 [mm (inch)]	H_6 [mm (inch)]	$H_5 + H_6$ [mm (inch)]
3 (1/8)	75 (2.95)	82 (3.23)	306 (12.04)	388 (15.28)
6 (¼)	62 (2.44)	72 (2.83)	316 (12.44)	388 (15.28)
15 (½)	75 (2.95)	87 (3.43)	326 (12.83)	413 (16.26)
25 (1)	75 (2.95)	173 (6.81)	330 (13.00)	503 (19.80)
40 (1½)	75 (2.95)	227 (8.94)	330 (13.00)	557 (21.93)

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Flow sensor MC2

Overview

SITRANS F C MC2 is available in sizes DN 100 and DN 150 (4" and 6").

The MC2 sensor is suitable for accurate mass flow measurement of a variety of liquids.

The sensor offers superior performance in terms of flow accuracy, turn-down ratio and density accuracy and delivers true multi-parameter measurements i.e.: mass flow, volume flow, density, temperature and fraction flow.

The very compact sensor construction makes installation and commissioning of even the largest sizes very straight forward and easy.

Benefits

- High accuracy better than 0.15 % of mass flow rate
- Large dynamic turn-down ratio
- Densitometer performance available through density accuracy better than 0.001 g/cm^3
- Space-saving split-flow sensor design facilitating low pressure loss
- Parallel S-tube design and optimal oriented inductive sensors enhances accuracy and turn-down ratio.
- Self-draining in both horizontal and vertical position
- Rigid enclosure design reduces the influence from pipeline vibration and thermal stress
- 4-wire Pt100 temperature measurement ensures optimum accuracy on mass flow, density and fraction flow
- SENSORPROM enables true "plug & play" - installed and commissioned in less than 10 minutes.
- Safe Ex design Ex em [ib] IIC
- Sensor pipe available in high-quality stainless steel AISI 316Ti/1.4571 or Hastelloy C4/2.4610 offering optimum corrosion resistance.
- CIP cleanability for food and beverage and pharmaceutical applications

Application

Coriolis mass flowmeters are suitable for measuring all liquids. The measurement is independent of changes in process conditions/parameters such as temperature, density, pressure, viscosity, conductivity, and flow profile.

Due to this versatility the meter is easy to install and the Coriolis flowmeter is recognized for its high accuracy in a wide turndown ratio which is paramount in many applications.

MC2 sensors are not designed or approved for flow measurement of gaseous process media.

The product is manufactured by ABB Automation Products GmbH and distributed by Siemens.

The main applications of the Coriolis flowmeter can be found in all industries, such as:	
Chemical and pharma	Detergents, bulk chemicals, pharmaceuticals, acids, alkalis
Food and beverage	Dairy products, beer, wine, soft-drinks, Plato/Brix, fruit juices and pulps, bottling, CO_2 dosing, CIP-liquids
Oil and gas	Liquid measurement, furnace control, test separators, LPG, oil bunkering
Water and waste water	Dosing of chemicals for water treatment

The wide variety of combinations and versions from the modular system means that ideal adaptation is possible to each measuring task. MC2 ist **not** recommended for gas applications.

Design

The MC2 sensor consists of 2 parallel measuring pipes, welded directly onto a flow-splitter at each end to eliminate a direct coupling to the process connectors and significantly reduce effects from external vibrations.

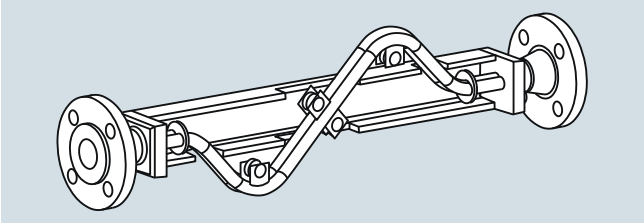
The flow-splitters are welded onto a rigid sensor housing which acts as a mechanical low-pass filter.

The sensor is available in 2 material configurations, AISI 316L/ 1.4436 or Hastelloy C4/2.4610 with a wide variety of process connections.

The enclosure is made of stainless steel AISI 304/1.4301 with an encapsulation grade of IP67/NEMA 4.

The sensor is Ex-approved Ex em [ib] IIC.

It can be installed in horizontal or vertical position, and is self-draining in both positions.



The MC2 Ex version sensor is based on a different Ex concept than MASS 6000. Therefore the MC2 Ex version sensor can only be connected to MASS 6000 IP67, MASS 6000 19" or SIFLOW FC070 standard versions, which have to be remote mounted in the safe area. MASS 6000 Ex d, MASS 6000 19" Ex and SIFLOW FC070 Ex can **not** be used with MC2 Ex sensors.

Hazardous area
Zone 1 + 2

Safe area

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Function

The measuring principle is based on the Coriolis effect. See "System information Coriolis mass flowmeters".

Integration

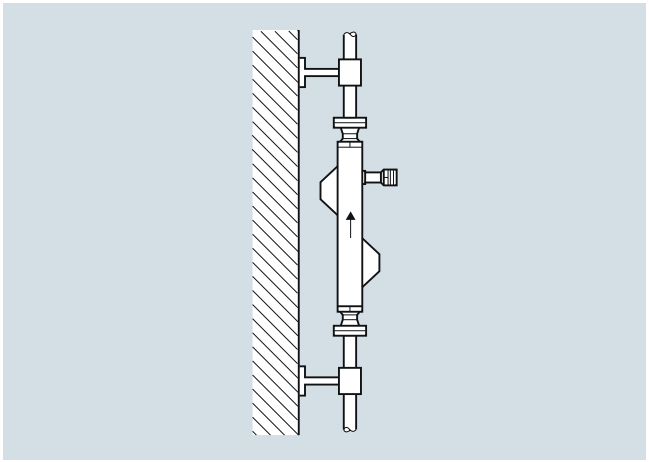
Installation guidelines MC2 DN 100 and DN 150

Installation of sensor

Rigid mounting brackets must be used when installing the sensor. The brackets must be installed as close to the sensor as possible, attached to the piping outside the process connections.

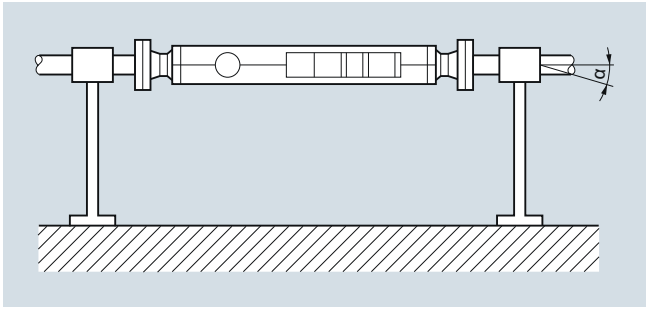
The optimal installation orientation is a vertical installation with an upward flow as shown in the following figure. This has the advantage that any solids contained in the fluid will settle downward and gas bubbles will move upward out of the meter tube when the flow rate is zero. Additionally, it is easy to drain the meter tube. Deposits can thereby be avoided.

Vertical orientation:

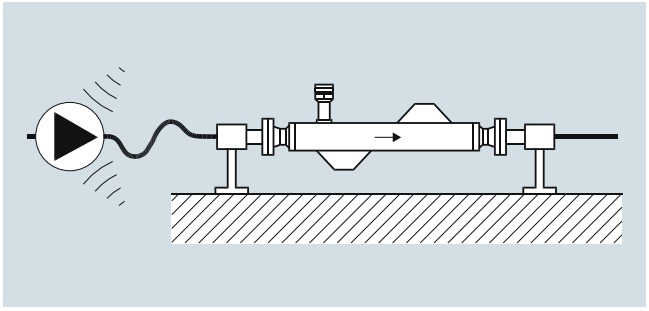


Vertical installation self-draining (upward flow)

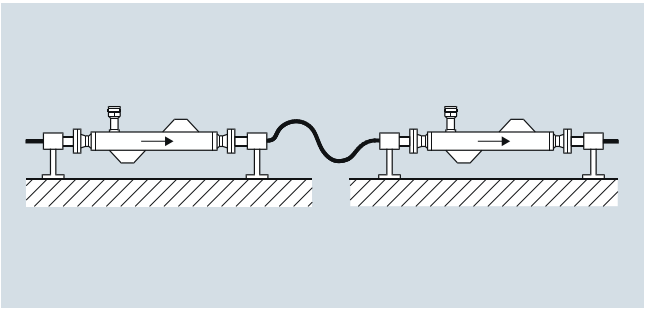
Horizontal orientation, self-draining



Avoid vibrations

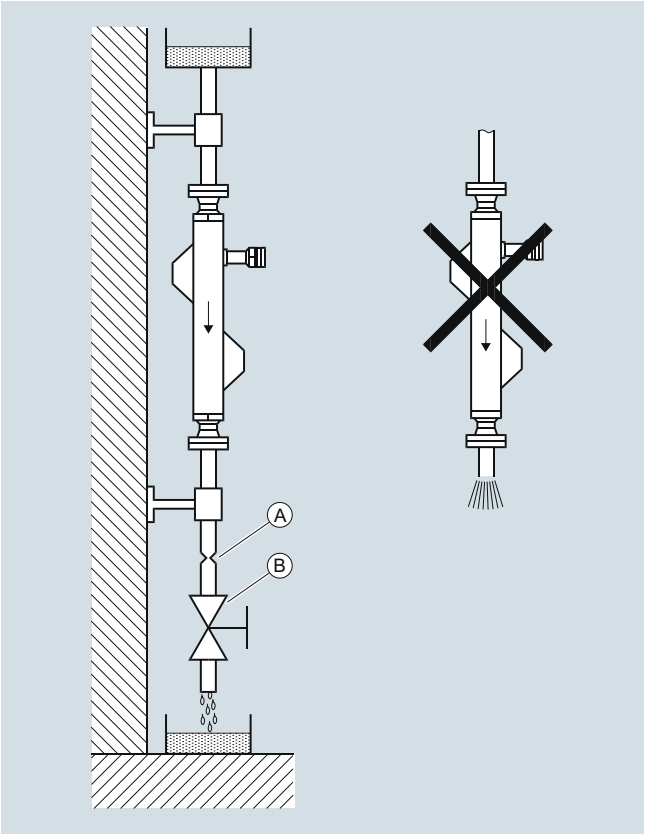


Avoid cross talk



Installation in a drop line

Mount with reduction (A) or orifice (B) to prevent partially draining (min. back pressure: 0.2 bar).



Installation in a drop line

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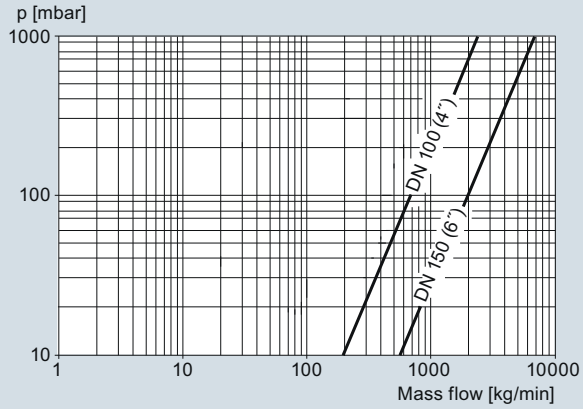
Technical specifications

Versions (mm (inch))		100 (4)	150 (6)
Inside pipe diameter	**mm (inch)**	43.1 (1.69)	76.1 (2.99)
Pipe wall thickness	**mm (inch)**	2.6 (0.10)	3.2 (0.13)
Mass flow measuring range at pressure drop of 2 bar (29 psi) at 1 g/cm³ (0.036 lb/inch³)	**kg/h (lb/h)**	203 500 (448 640)	602 000 (1 327 181)
Density	**g/cm³ (lb/inch³)**	0.5 ... 3.5 (0.18 ... 0.126)	
Fraction e.g. Brix	**°Brix**	0 ... 100 (on request)	Not possible
Temperature			
Standard-version		-50 ... +200 °C (-58 ... +392 °F)	
Ex-version		-50 ... +200 °C (-58 ... +392 °F)	
Liquid pressure measuring pipe			
Stainless steel (DIN 2413, 20 °C (68 °F))	**bar (psi)**	40 (580)	40 (580)
Materials			
Measuring pipe		Stainless steel AISI 316Ti/1.4571 or Hastelloy C4/2.4610	
Enclosure		IP67	
Enclosure material/ connection box		AISI 304 (1.4301)/aluminum, max. pressure 40 bar (580 psi)	
Process connections		See dimensional drawings	
Electrical connections		Screw terminals, M 20	
Cable		5 x 2 x 0.35 mm² twisted and screened in pairs, ext. Ø 12 mm	
Cable length		10, 25, 75 or 150 m (32.8, 82, 246 or 492 ft.)	
Ex-version			
ATEX 1443X		II 2G Ex em [ib] IIC T2-T6	
Weight approx.	**kg (lb)**	91 (201)	261 (573)

For accuracy specifications see „System information Coriolis mass flowmeters“.

Pressure drop



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Selection and Ordering data	Article No. Ord. code
SITRANS F C flow sensors MC2 ↗	7ME4300-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Nominal diameter	
Stainless steel AISI 316Ti/1.4571	
DN 100	1D
DN 150	1E
Hastelloy C4/2.4610	
DN 100	2D
DN 150	2E
Nominal pressure	
PN 40	A
Class 150	C
Class 300	D
Clamps/screwed-connections	F
Process connections	
Flange EN 1092-1	
DN 80 (PN 40, PN 100)	22
DN 100 (PN 40)	23
DN 150 (PN 40)	24
Flange ASME/ANSI B16.5	
3“ (class 150/300/600)	32
4“ (class 150/300)	33
6“ (class 150/300)	34
Dairy screwed connection to DIN 11851	
DN 80 (PN 25)	42
DN 100 (PN 25)	43
Dairy clamp connection DIN 32676 (ISO 2852) Tri-clamp	
81 mm clamp (PN 10)	52
100 mm clamp (PN 10)	53
Aseptic nut flange DIN 11864-2 form A for pipes dimensioned by DIN 11866	
DN 80 (3“)	63
DN 100 (4“)	64
Configuration	
Flow (0.15% of rate) and density (5 kg/m³ [0.31 lb/ft³])	1
Flow (0.15% of rate) and density (1 kg/m³ [0.06 lb/ft³])	5
Ex-approval and cable gland	
Non-Ex, M20 x 1.5	A
ATEX, M20 x 1.5	B
Cable	
No cable	A
Calibration (Density and fraction calibrations must be ordered as PVR)	
Standard	1

Dairy MLFB example	Article No.
MC2 sensor	7ME4300- -
Sensor size DN 100. AISI 316Ti/1.4571	1D
Nominal pressure: Clamps DIN 11851, DN 100, PN 25	F
	43
Configuration/calibration type: flow and density (5 kg/m³ [0.31 lb/ft³])	1
Without Ex appproval	A
No cable	A
Standard calibration	1

Selection and Ordering data	Order code
Additional information Please add “**-Z**“ to Article No. and specify Order code(s) and plain text.	
Pressure testing certificate PED: 97/23/EC	**C11**
Material certificate EN 10204-3.1	**C12**
Material certificate according to NACE	**C16**
Tag name plate, stainless steel	**Y17**
Tag name plate, plastic self-adhesive	**Y18**
Customer-specified, matched pair (5 x 2)	**On request**
Customer-specified calibration (5 x 2)	**On request**
Customer-specified, matched pair (10 x 1)	**On request**
Customer-specified calibration (10 x 1)	**On request**

Operating instructions for SITRANS F C MC2

This device is shipped with ABB documentation and an installation/connection instruction in four languages (Article No. A5E34730442).

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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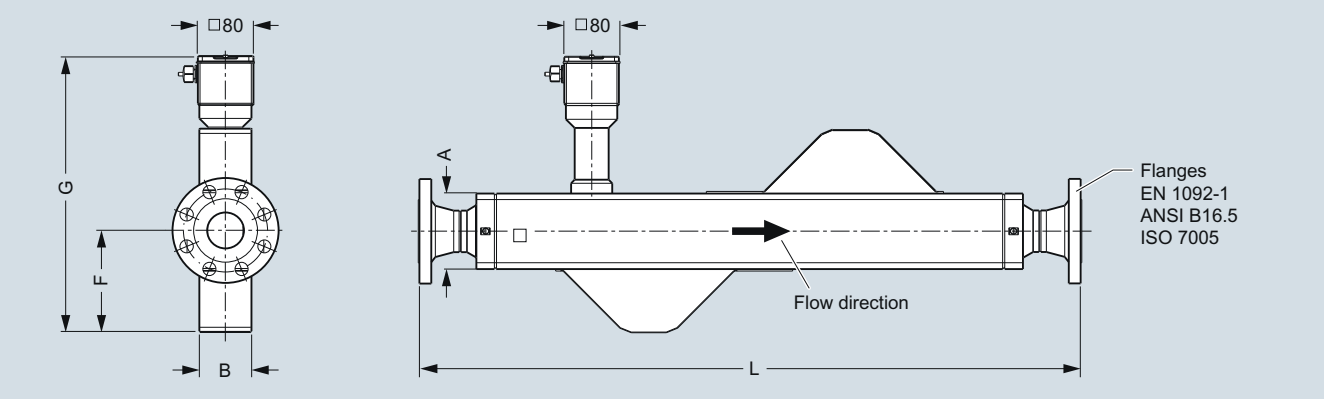
3

Dimensional drawings

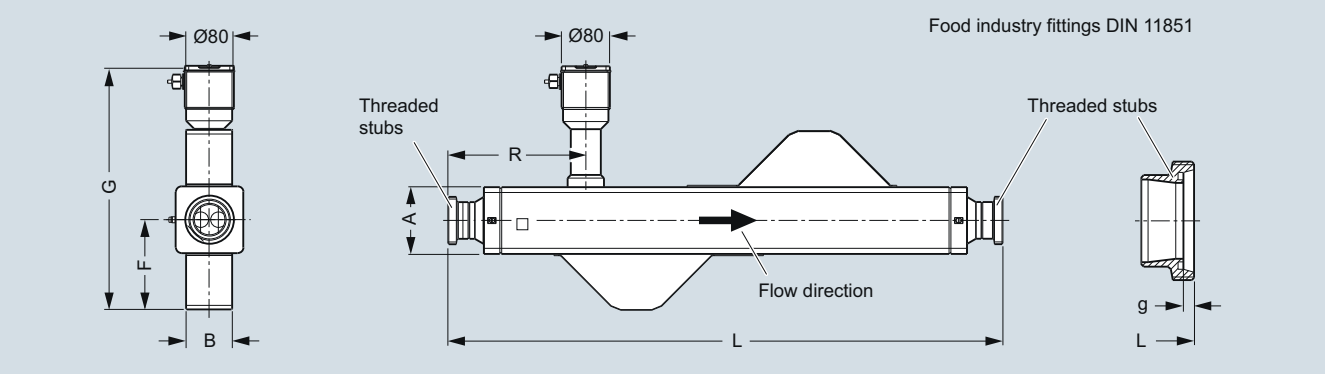
Remote design, flanged construction, DIN EN/ANSI



Meter size		Process connection size		L [mm (inch)]						G[1] [mm (inch)]	F [mm (inch)]	B [mm (inch)]	A [mm (inch)]	Weight [kg (lb)]
inch	DN	inch	DN	DIN 11864-2 form A	EN 1092-1 PN 40	EN 1092-1 PN 100	ANSI B16.5 CL 150	ANSI B16.5 CL 300	ANSI B16.5 CL 600					
4	100	3	80	1618 (63.70)	1640 (64.57)	1680 (66.14)	1660 (65.35)	1680 (66.14)	1702 (67.01)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	84 (185)
		4	100	1463 (57.60)	1480 (58.27)	1530 (60.24)	1500 (59.06)	1520 (59.84)	1568 (61.73)					91 (201)
		6	150	N/A	1778 (69.92)	N/A	1806 (71.10)	1826 (71.89)	N/A					120 (265)
6	150	6	150	N/A	2040 (80.31)	N/A	2070 (81.50)	2090 (82.28)	N/A	613 (24.13)	285 (11.22)	190 (7.84)	260 (9.84)	260 (573)

[1] For Ex add 54 mm

Remote design, food industry fittings, DIN 11851



Meter size		Process connection size			L [mm (inch)]	g [mm (inch)]	G[1] [mm (inch)]	F [mm (inch)]	B [mm (inch)]	A [mm (inch)]	R [mm (inch)]	Weight [kg (lb)]
inch	DN	inch	DN									
4	100	3	80	Rd 110 x 1/6	1618 (63.70)	8 (0.31)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	401 (15.79)	82 (180)
		4	100	Rd 130 x ¼	1463 (57.60)	10 (0.39)					314 (12.36)	86 (190)

[1] For Ex add 54 mm

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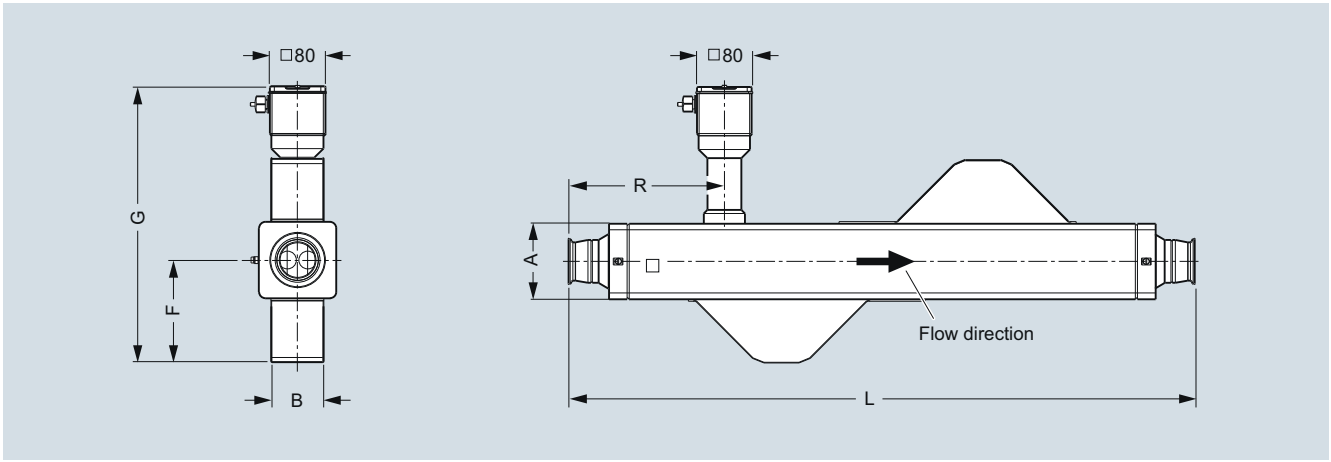
Remote design, Tri-clamp DIN 32676 (ISO 2852)



Dimensions in mm (inch)

Meter size		Process connection size		L [mm (inch)] ± 3	G[1)] [mm (inch)]	F [mm (inch)]	B [mm (inch)]	A [mm (inch)]	R [mm (inch)]	Weight [kg (lb)]
inch	DN	inch	DN							
4	100	3	80	1598 (62.91)	500 (19.69)	215 (8.46)	131 (5.16)	170 (6.69)	440 (17.32)	71 (157)
		4	100	1448 (57.01)					365 (14.37)	69 (152)

1) For Ex add 54 mm

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Flow sensor MC2

Process Connections

- Flanges EN 1092-1/ANSI B16.5
- Tri-Clamp DIN 32676 (ISO 2852)
  - DN 100: Series 1
- Food Industry fittings DIN 11851

The max. allowable operating pressure is a function of the process connection type, the fluid temperature, the bolts and the gaskets.

Pressure Rating

- PN 16, PN 40
  Class 150, Class 300

Housing as secondary containment

- Max. 40 bar

Pressure Equipment Directive 97/23/EG

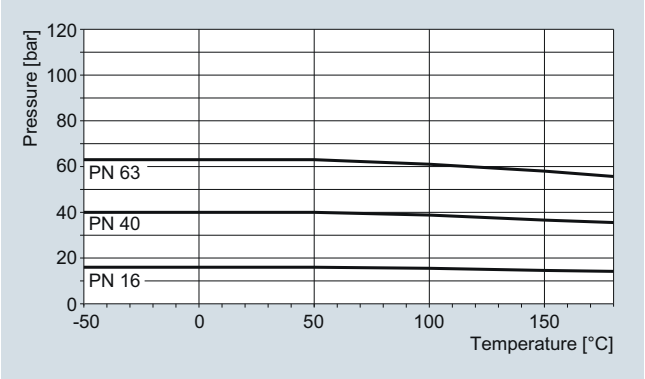
- Conformity evaluation category III, fluid group 1

Corrosion resistance of measuring pipe material to measuring medium has to be considered.

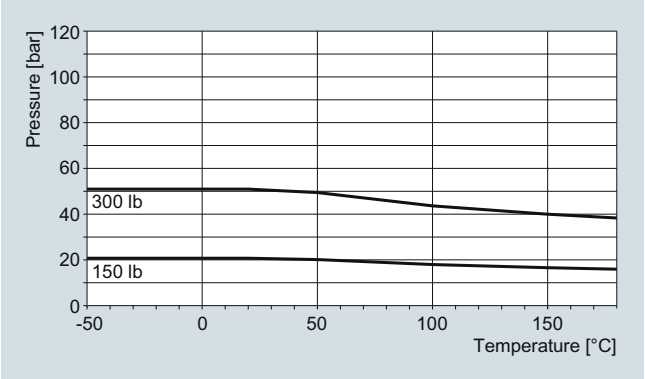
Material strength for process connections

Process connection	Size		$PS_{max.}$ at 20 °C (68 °F)	$TS_{max.}$	$TS_{min.}$
	DN	inch	bar (psi g)	°C (°F)	°C (°F)
Thread acc. DIN 11851	100	4	25 (363)	140 (284)	-40 (-40)
Tri-Clamp acc. DIN 32676	100	4	10 (145)	120 (248)	-40 (-40)

Pressure/temperature curves



DIN-Flanges stainless steel AISI 316Ti/1.4571 to DN 100 (4")



ASME-Flanges stainless steel AISI 326Ti/1.4571 to DN 100 (4")

For further information on the PED standard and requirements, see page 9/6.

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Overview

Siemens offers two types of ultrasonic flowmeters, inline flowmeters and clamp-on flowmeters. This offers the end user the maximum flexibility to choose the technology that best fits his needs. This chapter shows the inline versions.

SITRANS F US inline ultrasonic flowmeters measure flow of electrically conductive and non-conductive liquids.

Benefits

- Greater flexibility:
  - Sensor sizes from DN 50 to 1 200 mm (2" to 48")
  - Inline retrofit as 1-path and 2-path up to DN 4 000 (160")
  - Compact and remote transmitter installation
  - HART and PROFIBUS PA communication
  - Mains or battery powered solutions
  - Dedicated transmitter portfolio for HVAC, power generation, utility and general industry as well as more demanding applications
- Easier service:
  - Comprehensive self-diagnostic for error indication and logging
  - Exchange of the transducers without interrupting operation
  - Battery lifetime of up to 6 years
- Approvals/certificates:
  - Custody transfer approvals within district heating
  - ATEX
  - Standard with calibration certificate

Application

Inline ultrasonic flowmeters are suitable for measuring the flow of liquids with good acoustic permeability, independent of conductivity, viscosity, temperature, density and pressure.

- max. 3 % solids
- max. 3 % air and gas
- max. 350 cSt

The main applications can be found in the following sectors:

- Raw water intake for water treatment plants
- Treated waste water
- Power generation and utility
- Oil and gas industry and petrochemical industry
- Irrigation systems
- Cooling water plants within the industry and in power stations
- Plants transporting non-conductive liquids
- HART/4 to 20 mA output
- PROFIBUS PA
- ATEX

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System information SITRANS F US Inline ultrasonic flowmeters

Please see Product selector on the Internet, since some constrains might be related to some of the features:
www.pia-selector.automation.siemens.com

		SONO 3300/ FUS060	SONO 3100/ FUS060	SONOKIT/ FUS060 FUS080	FUE380	FUS380
		7ME3300...	7ME3100...	7ME3210.../ 7ME3220...	7ME3410...	7ME3400...
Industry						
Water, treated waste water		**XXX**	**XX**	**XXX**		**XXX**
Irrigation		**XX**	**XX**	**XXX**		**XXX**
Utility, district heating water, cooling		**XXX**	**XX**	**XXX**	**XXX**	**XXX**
Utillity, district heating, CT approvals required					**XXX**	
Oil		**XX**	**XXX**	**XX**		**X**
Cryogenic fluids (only on request)			**XXX**			
Onshore and Offshore applications		**XX**	**XXX**	**XX**		**X**
Chemical		**XXX**	**XXX**	**X**		
Design						
Transmitter compact mounted				●	●	●
Transmitter remote mounted		●	●	●	●	●
Transducers can be replaced under pressure			●	●		
Retrofit on existing steel pipes/non-weldable				●		
Transmitter enclosure						
Polyamid, IP67				●	●	●
Die-cast aluminum (painted), IP65		●	●	●		
Communication						
HART		●	●	●		
PROFIBUS PA		●	●	●		
Power supply						
3.6 V Battery				●	●	●
115 … 230 V AC		●	●	●	●	●
115 … 230 V AC and 3.6 V battery backup				●	●	●
24 V AC/DC		●	●	●		
Accuracy						
0.25 % (with 4-path system on request)			●			
0.50 %		●	●	●	●	●
Sensor design						
1-path ultrasonic measurement (special request)				●[1]		
2-path ultrasonic measurement		●	●	●	●	●
4-path ultrasonic measurement (special request)			●	●		
Dimension						
DN 50	2"	●	●[2]		●	●
DN 65	2½"	●	●[2]		●	●
DN 80	3"	●	●[2]		●	●
DN 100	4"	●	●	●[1]	●	●
DN 125	5"	●	●	●[1]	●	●
DN 150	6"	●	●	●[1]	●	●
DN 200	8"	●	●	●	●	●
DN 225	9"	●	●	●	●	●
DN 250	10"	●	●	●	●	●
DN 300	12"	●	●	●	●	●
DN 350	14"		●	●	●	●
DN 400	16"		●	●	●	●
DN 500	20"		●	●	●	●
DN 600	24"		●	●	●	●
DN 700	28"		●[2]	●	●	●

X = can be used, **XX** = often used, **XXX** = most often used, ● = available

[1] SONOKIT 1-path DN 100 to DN 2400 and 2-path DN 200 to DN 4000
[2] Only available as PVR (product variation request - special request)

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Please see Product selector on the Internet, since some constrains might be related to some of the features:
www.pia-selector.automation.siemens.com

		SONO 3300/ FUS060	SONO 3100/ FUS060	SONOKIT/ FUS060 FUS080	FUE380	FUS380
		7ME3300...	7ME3100...	7ME3210.../ 7ME3220...	7ME3410...	7ME3400...
Dimension (continued)						
DN 800	32"		●[2]	●	●	●
DN 900	36"		●[2]	●	●	●
DN 1000	40"		●[2]	●	●	●
DN 1200	48"		●[2]	●[5]	●	●
DN 1400 ... 4000	54" ... 160"			●[1] [5]		
Process connection						
Flanges		●	●		●	●
Flangeless (for weld-in)			●			
Flanges Norm						
EN 1092-1		●	●		●	●
EN 1759-1		●	●			
ANSI B16.5			●			
Pressure rating						
PN 6				●		
PN 10		●	●	●		
PN 16		●	●	●	●	●
PN 25			●	●	●	●
PN 40		●	●	●	●	●
Class 150		●	●			
Class 300		●	●			
Pipe, flange and transducer material						
Carbon steel		●	●	●	●	●
Stainless steel			on request	●		
Die cast bronze					●	●
Other materials			on request	on request		
Media temperature						
°C	°F					
-20	-4		●	●		
-10	+14	●	●	●		
+2	+35.6	●	●	●	●[6]	●
+60	+140	●	●	●	●	●
+120	+248	●	●	●	●[3]	●[3]
+150	+302	●	●	●	●[4]	●[4]
+160	+320	●	●	●	●	●
+190	+374		●	●	●	●
+200	+392		●	●	●	●
Measuring principle						
Transit time principle		●	●	●	●	●

● = available

1) SONOKIT 1-path DN 100 to DN 2400 and 2-path DN 200 to DN 4000
2) Only available as PVR (product variation request - special request).
3) Compact
4) Pipe material bronze brass
5) SONOKIT with FUS080 up to DN 1200
6) Min. 5 °C (41 °F)

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System information SITRANS F US Inline ultrasonic flowmeters

Please see Product selector on the Internet, since some constrains might be related to some of the features:
www.pia-selector.automation.siemens.com

	SONO 3300/ FUS060	SONO 3100/ FUS060	SONOKIT/ FUS060 FUS080	FUE380	FUS380
	7ME3300...	7ME3100...	7ME3210.../ 7ME3220...	7ME3410...	7ME3400...
Approvals					
Custody transfer approval					
MID, MI-004, EN 1434 (European energy meter standard)				●	
Other country-specific type approval available for:					
- Russia	●	●	●	●	●
- China				●	
Ex approval					
Ex d ATEX		●	●		
Ex i ATEX	●	●	●		

● = available

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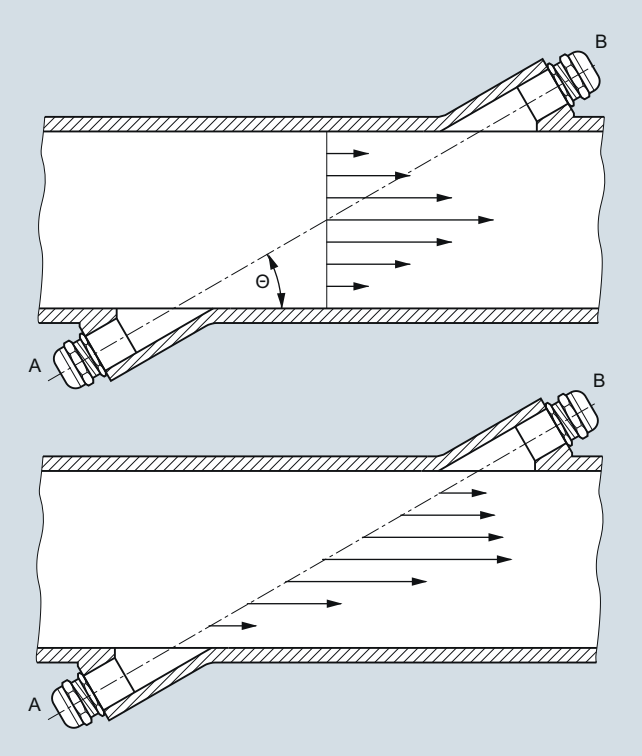
Function

Physical principle



Velocity distribution along sound path

A sound wave traveling in the same direction as the liquid flow arrives at point B from point A in a shorter time than the sound wave traveling against the direction of flow (from point B to A). The difference in sound transit time indicates the flow velocity in the pipe.

Since delay time is measured at short intervals both in and against flow direction, viscosity and temperature have no influence on measurement accuracy.

Measuring principle

In SITRANS F US flowmeters the two ultrasonic transducers are placed at an angle θ in relation to the pipe axis. The transducers function as transmitters and receivers of the ultrasonic signals. Measurement is performed by determining the time the ultrasonic signal takes to travel with and against the flow. The principle can be expressed as follows:

$v = K \cdot (t_{B,A} - t_{A,B}) / (t_{A,B} \cdot t_{B,A}) = K \cdot \Delta t/t^2$

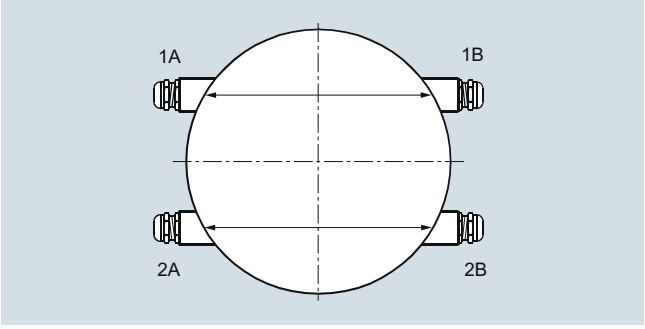
v = Average flow velocity
t = Transit time
K = Proportional pipe geometry factor

This measuring principle offers the advantage that it is independent of variations in the actual sound velocity of the liquid, i.e. independent of the temperature.
Proportional factor K is determined by wet calibration.

Direct signal processing

The ultrasonic signal is sent directly between the transducers. The advantage gained sending signals from point to point is an extremely good signal strength.

2-path solution



Ultrasonic 2-path flowmeter with 4 transducers. In the upper path transducers 1A / 1B and in the lower path 2A / 2B are displayed.

The accuracy of ultrasonic flowmeters depends on the pipe geometry before and after the flowmeter and the number of ultrasonic measuring paths.

When water flows through a pipe, it has a tendency to swirl and/or flow with different velocities inside the pipe, depending on the pipe design.

A 2-path ultrasonic flowmeter offers:

- less sensitivity to upstream obstruction like bends, pumps or valves.
- high security in the measurements as the meter continues to measure even if, for some reason, one path stops working.

Typical straight inlet requirements are upstream 10 x D_i (D_i = diameter of the flowmeter) and downstream 3 x D_i.

Typical accuracy that can be reached with 2-path ultrasonic flowmetering is ± 0.5 % with installations according to above demands.

4-path ultrasonic flowmeters

Some applications require accuracy under extreme short inlet conditions and swirl that cannot be obtained with 2-path solutions.

For these applications we can offer a 4-path solution – customer-specified – according to actual inlet conditions.

Please contact Siemens Flow Instruments for specific applications.

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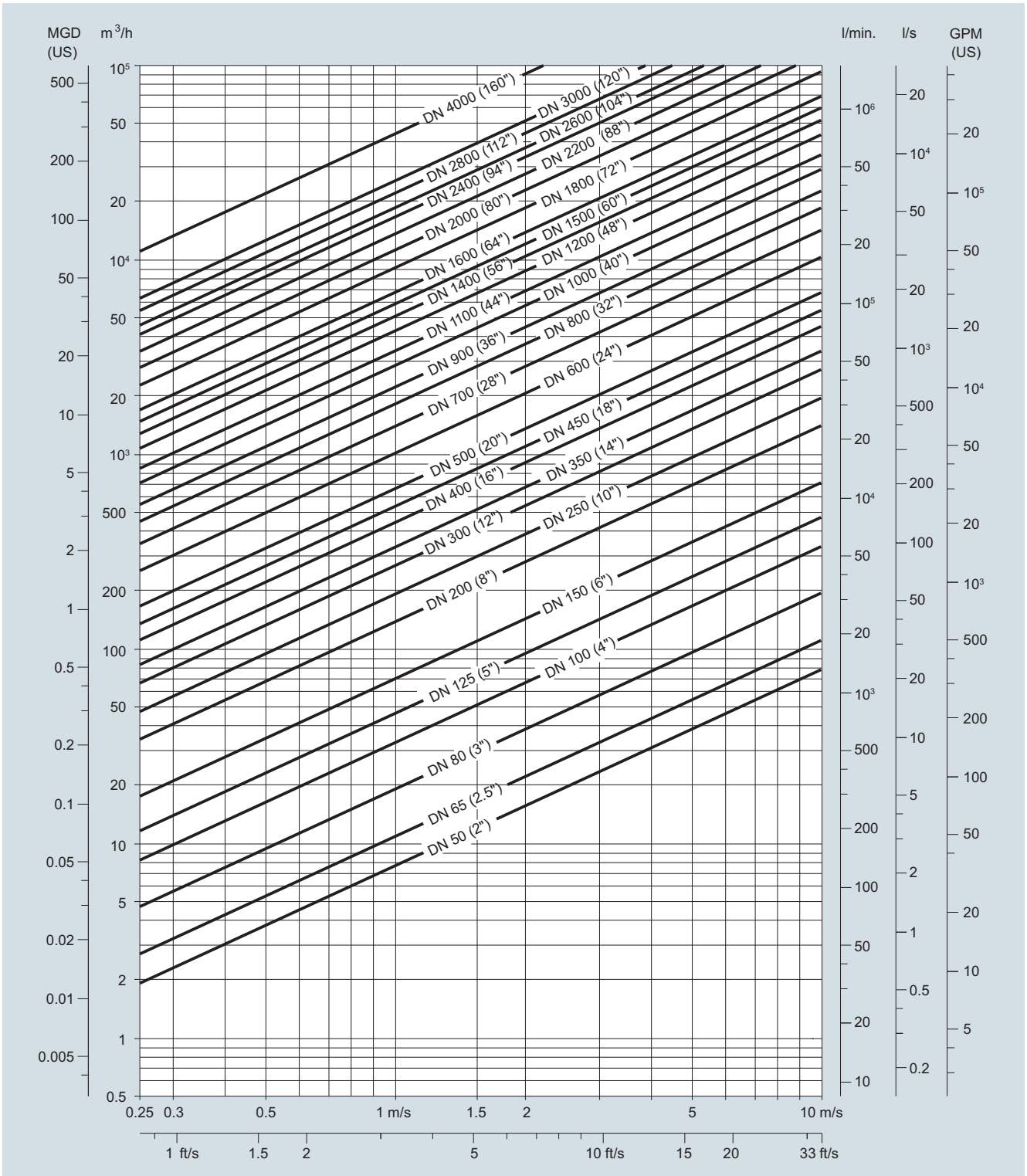
3

Technical specifications



Nominal size and flow

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Guidelines for selection of sensor

- Min. measuring range: 0 … 1 m/s
- Max. measuring range: 0 … 10 m/s

Nominal flow velocity:

- Normal: 1 … 3 m/s
- Minimum: not permanently below 0.5 m/s
- Maximum: up to 8 m/s

Flow velocity calculation formula:

- $v = (4 \times Q_{max}) / (\pi \times D_i^2 \times 3600)$
- v in m/s, Q_{max} in m^3/h, D_i in m

Additional to the flow velocity check it is recommended to observe the Reynolds number (Re):

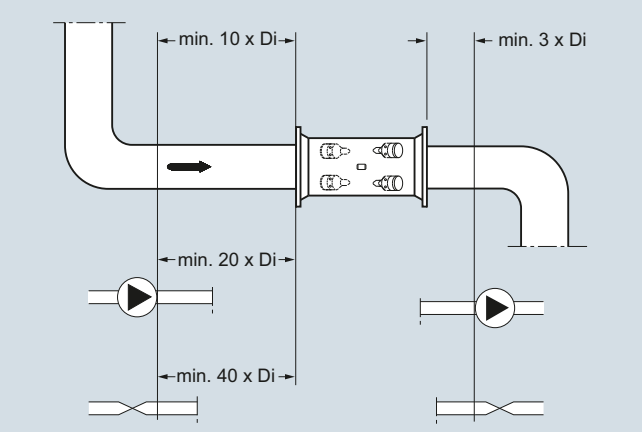
The optimal performance of the flowmeter is with a Re above 10 000, which is typical for flow velocities (water) above 0.5 m/s. Avoid an Re value between 2000 and 5000. In order to observe this and to be above the recommended 0.5 m/s flow velocity limit the sensor size must be reduced.

Re formula: Re = V x Di / Viscosity

V in m/s, Di in m, Viscosity in cSt (X x E^{-6} m^2/s)

Example: Viscosity for water at 20 °C = 1 x E^{-6} m^2/s

Inlet and outlet conditions



Recommended inlets and outlets

To maximize performance inlet and outlet must be straight. There must be a certain distance between flowmeter and bends, pumps and valves. It is also important to centre the flowmeter in relation to pipe flanges and gaskets.

Valves must always be installed after the flowmeter. The only exception is installation of the sensor in a vertical pipe. In this case a valve below the sensor is necessary to allow zero point adjustment. It is important to select a valve which does not alter the flow when fully open.

Recommended inlet/outlet	**SONO 3300, SONO 3100, SONOKIT 2-path**	**FUS380/FUE380[1)]**	**SONOKIT 1-path**
90° bend	10 x D_i	10 x D_i	20 x D_i
Fully opened valve	10 x D_i	10 x D_i	20 x D_i
Partially opened valve	40 x D_i	40 x D_i	40 x D_i
2 x 90° bends in same plane	15 x D_i	15 x D_i	25 x D_i
2 x 90° bends in two planes	20 x D_i	20 x D_i	40 x D_i
Reductions (Outlet 0 x D_i)	10 x D_i	10 x D_i	20 x D_i
Pumps	20 x D_i	20 x D_i	40 x D_i
Outlet	3 x D_i	3 x D_i	3 x D_i

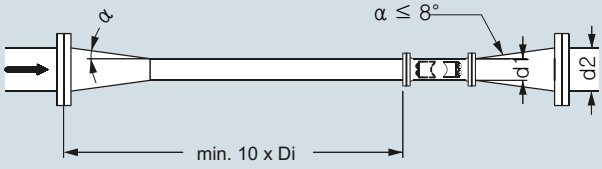
[1)] Inlet for FUE380 with MID approval should be for sizes ≥ DN 80: 1.5 m

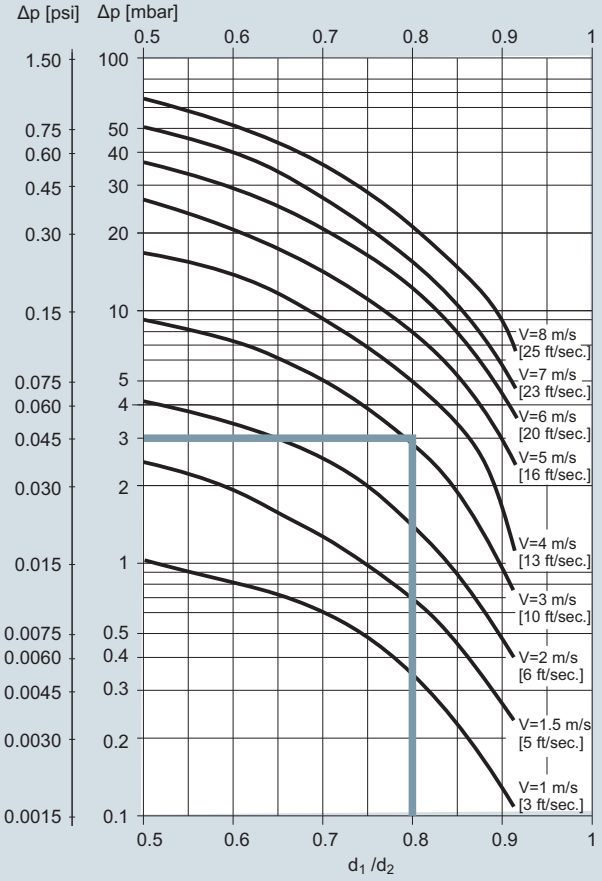
Reductions

The flowmeter can be installed between two reducers (e.g. DIN 28545). At 8° the pressure drop curve below applies.

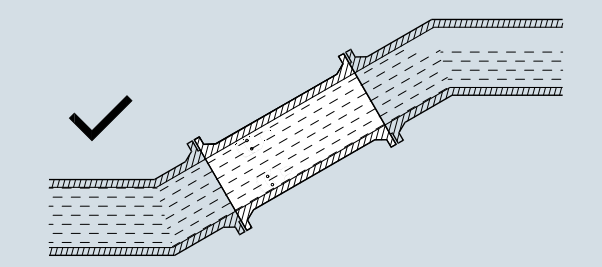
Example:

A flow velocity of 3 m/s (V) in a sensor with a diameter reduction from DN 250 to DN 200 (d_1/d_2 = 0.8) gives a pressure drop of 3 mbar.





The sensor must always be completely filled with liquid:



The following installations must be avoided:

- Installation at the highest point of the pipe system
- Installation in vertical pipes with free outlet

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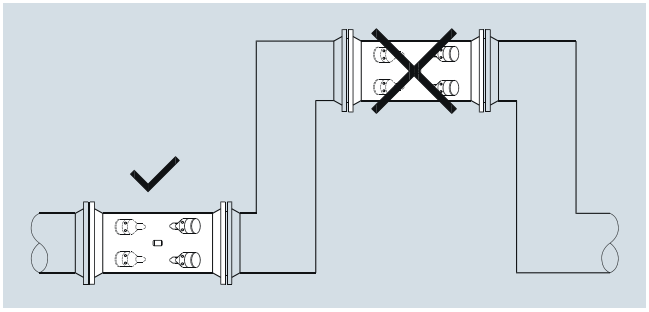
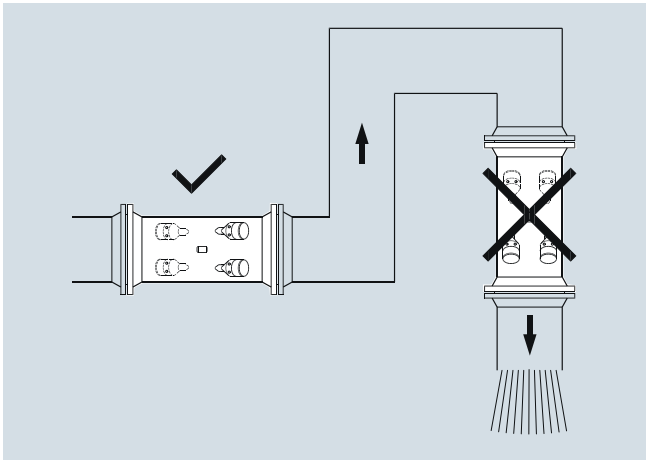
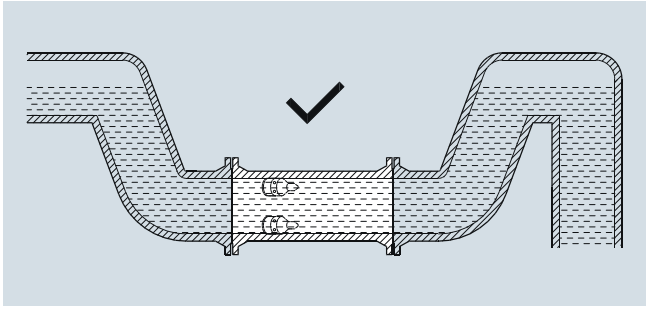
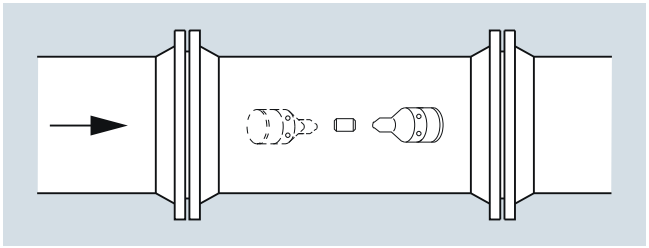




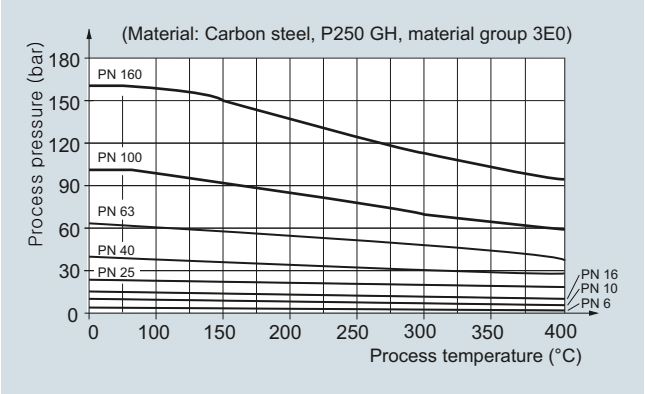
With partially full pipes or pipes with free outlet the flowmeter should be located in a U-shaped tube:

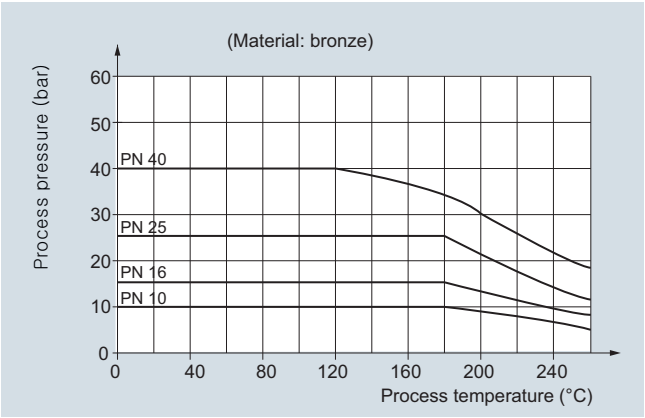


Installing the transducers in horizontal position is recommended:

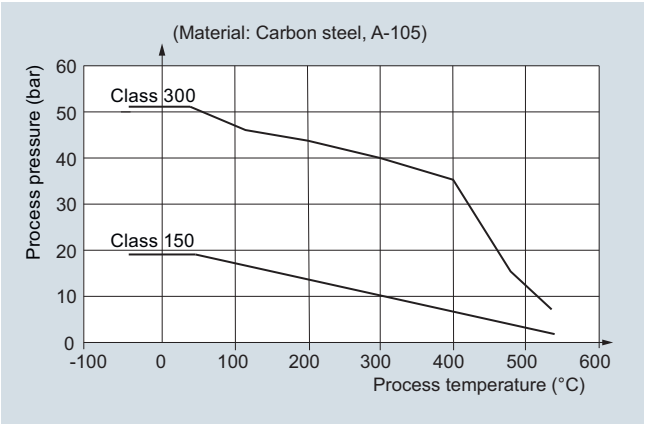


Pressure/temperature curve to EN (DIN) flanges





Pressure/temperature curve to ANSI B16.5 flanges



Note: The pressure/temperature curves only assist in the selection of a system. No responsibility is taken for the correctness of the information. For further information on the PED standard and requirements, see page 9/6.

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Reference conditions

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

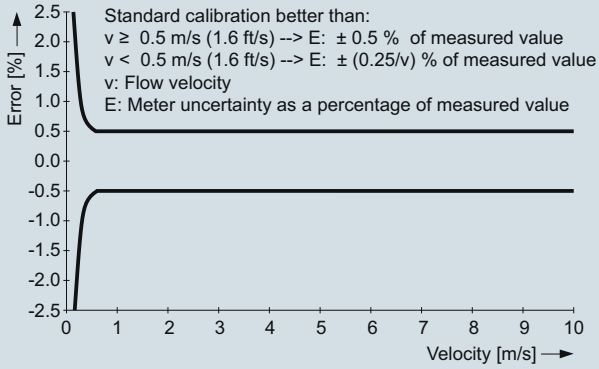
Therefore the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability).

Siemens offer accredited calibrations assured to ISO 17025. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

Flowmeter calibration data are stored in the internal EEPROM of the transmitters FUS060 or FUS080.

The system accuracy refers to the following systems:

SONO 3300/FUS060, SONO 3100/FUS060[1)] which are typically calibrated on the frequency output.



Typical calibration reference conditions:	
Fluid	Water
Fluid temperature	22 ± 5 °C
Ambient temperature	22 ± 5 °C
Supply voltage	115/230 V AC +10 … -15 % 24 V DC +25 … -15 %, 24 V AC ±15 %
Straight inlet length	20 x D_i
Outlet	3 x D_i
Rangeability	0 … 1 m/s to 0 … 10 m/s
Repeatabilty	Better than 0.25 % in the range 0.5 … 10 m/s
Linearity (for water)	
• Reynolds number 1000 < Re < 5000	Better than 1 %
• Reynolds number > 5000	Better than 0.5 %

1) Only systems with transmitter FUS060. For systems with transmitter FUS080 see chapter on FUS380 and FUE380.

Additional effects of deviations from reference conditions

- Current output: As frequency output (± 0.1 % of actual flow +0.05 % FSO)
- Effect of ambient temperature: Frequency/pulse output: < 0.005 % SPAN/K; Current output: < ± 0.0075 % SPAN/K
- Effect of supply voltage: 0.005 % of measuring value at 1 % change

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Overview

SITRANS FUS060 is a transit time based transmitter designed for ultrasonic flowmetering with dedicated sensors in the FUS in-line series up to DN 4000. SITRANS FUS060 is engineered for high performance and is suitable for 1-path, 2-path and 4-path flowmeters.

Benefits

- Superior signal resolution for optimum turn down ratio
- Simple menu-based local operation with two-line display and four optical input elements, for unlimited use in potentially explosive atmospheres
- Self-monitoring and diagnostic
- Operate up to 4 paths
- ATEX II 2G Ex dem [ia/ib] IIC T6/T4/T3
- Remote installation up to 120 m from sensor
- 1 analog output (4 to 20 mA) standard with HART-protocol, 1 digital frequency or pulse output, 1 relay output for limit, alarms, flow direction
- PROFIBUS PA Profile 2, 1 digital frequency or pulse output

Design

The transmitter type FUS060 is designed for remote installation in non-hazardous or hazardous areas.

The transmitter is designed for use in a flowmeter system together with sensors type SONOKIT, SONO 3300 and SONO 3100.

The FUS060 is ordered as part of a complete flowmeter system. It can be ordered separately as spare part and manually programmed with the sensor data.

Application

The main application for flowmeters with the transmitter SITRANS FUS060 is measurement volume of flow within the general, petrochemical and chemical industries, power engineering and water and waste water, as well as various types of oils and liquid gases.

Integration

The transmitter output is often used as input for an automation system or as input for systems of remote reading.

The SITRANS FUS060 transmitter offers current, pulse and relay outputs as standard output functions and supports HART or Profibus PA communication.

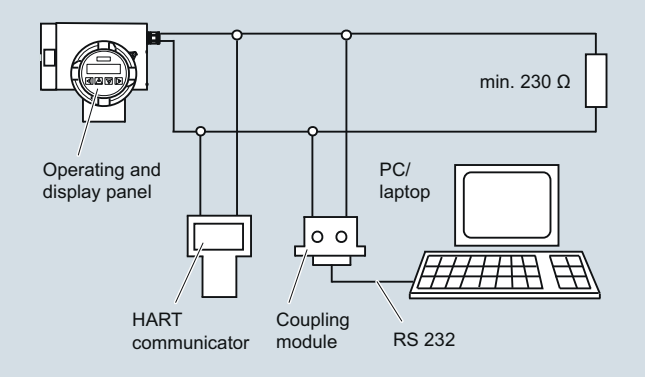
The settings of the transmitter output functions are individually programmed via keypad and display menu.

Function

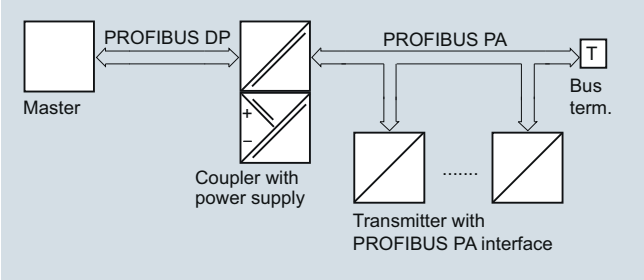
Displays and keypad

Operation of the SITRANS FUS060 transmitter can be carried out using:

- Keypad and display unit
- HART communicator
- PC/laptop and SIMATIC PDM software via HART communication
- PC/laptop and SIMATIC PDM software using PROFIBUS PA communication

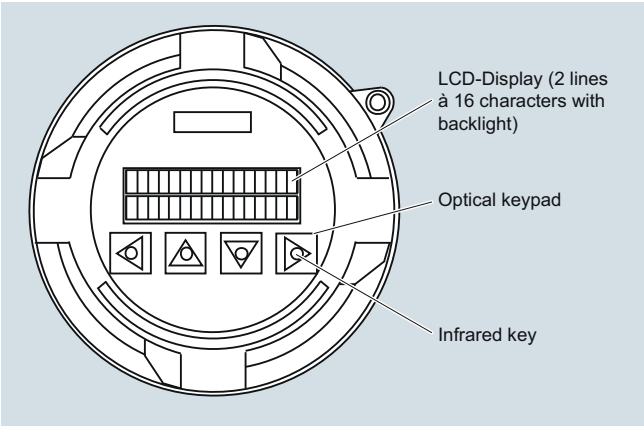


HART communication



PROFIBUS PA communication

The operating and display panel permits simple operation without supplementary equipment. It is not necessary to open the housing. All changes to a setting can therefore also be carried out in the potentially explosive atmosphere.



Operating and display panel

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The individual functions and parameters are selected using a hierarchical, multi-language input menu and four infrared keys. The parameters can be specifically selected and modified using codes, e.g.:

- Operating parameters such as measuring range, physical dimensions, device information
- Limits for flow, totalizer, ultrasonic velocity or ultrasonic amplitude
- Noise suppression using damping, error stages and hysteresis
- Display parameters (freely-configurable display)
- Display in volume or mass dimensions
- Density as constant input value for conversion of volume into mass dimensions
- Forward/backward measurement
- Flow direction
- Diagnostics functions and control values
- Functions of the PROFIBUS PA output:
  flow, net quantity (volume or mass), ultrasonic velocity, ultrasonic amplitude, forward quantity (volume or mass), backward quantity (volume or mass)
- Functions of the analog output:
  flow, ultrasonic velocity or ultrasonic amplitude
- Functions of digital output 1:
  pulse output, frequency output, limit, flow direction or device status
- Functions of digital output 2:
  limit, flow direction or device status
- Simulation of output signal via analog output, digital output 1 and digital output 2

The HART protocol is implemented via the analog output (current output). Using this communication facility, the device can be parameterized with a PC/laptop and SIMATIC PDM software in addition to local operation.

In the version with PROFIBUS PA, the analog output is replaced by the digital PROFIBUS PA output. The device can then be parameterized via PROFIBUS communication and with SIMATIC PDM in addition to local operation.

Technical specifications

Input	
Measurement	Flow by measuring the transit time difference of ultrasonic signals through ultrasonic transducers in DN 100 ... 4000 2-path sensor pipes (optional, depending on selected size, 1-path or 4-path special solutions are possible).
Nominal diameters and number of paths	2-path DN 100 ... DN 4000 (optionally also 1-path and 4-path, depending on size
Max. cable length	120 m (395 ft) (shielded coaxial cable). For Ex version the transducer cable length is restricted to 3 m (9.84 ft) in order to meet requirements for electrical immunity. For 2-path and 4-path systems with sizes ≥ DN 3000 cable length is restricted to 30 m (98.4 ft).
Output	
Function	Current output programmable for flow, sound velocity or amplitude level.
Analog output	Active current output (13.2 V < open loop voltage < 15.8 V)
• Signal range	4 ... 20 mA
• Upper limit	20 ... 22.5 mA, adjustable
• Signal on alarm	3.6 mA, 22 mA, or 24 mA
• Load	Max. 600 Ω; for non Ex version ≥ 230 Ω for HART communication ≤ 330 Ω for Ex-version
• Only PROFIBUS PA version:	Analog output omitted, is replaced by digital PROFIBUS PA interface
Digital output 1	
Function	Pulse, frequency or status output - programmable for pulses, frequency, alarm, limit or status.
• Active or passive signal, can be configured with positive or negative logic	Active: 24 V DC, ≤ 24 mA, R_i = 300 Ω Passive: open collector, 30 V DC, ≤ 200 mA
• For explosion protection (ATEX version) and PROFIBUS PA version	Only passive: open collector 30 V DC, ≤ 100 mA
• Output function, configurable	Pulse output • Adjustable pulse significance ≤ 5000 pulses/s • Adjustable pulse width ≥ 0.1 ms Frequency response • f_{END} selectable up to 10 kHz Limit for flow, totaliziers,ultrasonic velocity or ultrasonic amplitude device status, flow direction

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Digital output 2	
Function	Relay output - programmable for alarm, limit or status indication.
• Relay, NC or NO contact	Switching capacity max. 5 W Max. 50 V DC, max. 200 mA DC Self-resetting fuse, R_i = 9 Ω
• For explosion protection (ATEX version)	Max. 30 V DC, max. 100 mA DC, 50 mA AC (cf. EC-Type Examination certificate)
• Output function, configurable	Limit for flow, ultrasonic velocity or ultrasonic amplitude flow direction device status
• Only PROFIBUS PA version:	Digital output 2 omitted
Communication via analog output 4 ... 20 mA	
• PC/laptop or HART communicator with SITRANS F flowmeter	
- Load with connection of coupling module	min. 230 Ω (max. 330 Ω for Ex-version)
- Load with connection of HART communicator	min. 230 Ω
- Cable	2-wire shielded ≤ 3 km (≤ 1.86 miles) Multi-core shielded ≤ 1.5 km (≤ 0.93 miles)
- Protocol	HART, version 5.1
Communication via PROFIBUS PA interface	Layers 1 + 2 according to PROFIBUS PA Communication system according to IEC 61158/EN 50170
• Power supply	Separate supply, four-wire device Permissible bus voltage 9 ... 32 V See certificates and approvals
• Current consumption from bus	10 mA; ≤ 15 mA in event of error with electronic current limiting
Electrical isolation	Outputs electrically isolated from power supply and from one another
Accuracy	
Error in measurement (at reference conditions)	
• Pulse output	≤ ± 0.5 % of measured value at 0.5 ... 10 m/s or ≤ ± 0.25/V[m/s] % of measured value at flow < 0.5 m/s
• Analog output	As pulse output plus ± 0.1 % of measured value, ± 20 µA
• Repeatability	≤ ± 0.25 % of measured value at 0.5 ... 10 m/s
Reference conditions (water)	
• Process temperature in the connected sensor	25 °C ± 5 °C (77 °F ± 9 °F)
• Ambient temperature at the transmitter	25 °C ± 5 °C (77 °F ± 9 °F)
• Transmitter warming-up time	30 min.
Installation conditions of connected sensor	Upstream section > 10 x DN and downstream section > 5 x DN

Rated operation conditions	
Ambient conditions	
Ambient temperature	
• Operation	-20 ... +50 °C (-4 ... +122 °F)
• In potentially explosive atmospheres	Observe temperature classes
• Storage	-25 ... +80 °C (-13 ... +176 °F)
Enclosure rating	IP65 (NEMA 4)
Electromagnetic compatibility	For use in industrial environments
• Emitted interference	To EN 55011/CISPR-11
• Noise immunity	To EN/IEC 61326-1 (Industry)
Medium conditions	The measuring media must be ultrasonic signal compatible. It must be homogeneous and not two-phased to transfer the acoustic ultrasonic signals.
• Process temperature	-200 ... +250 °C (-328 ... +482 °F) (not directly influenced by medium temperature)
• Gases/solids	Influence accuracy of measurement (approx. max. 3 % gases or solids)
Design	
Separate version	Transmitter is connected to the transducers via 3 ... 120 m (9.8 ... 395 ft) long specially shielded cables (coaxial cable) For ATEX versions mounted in the Ex area only with 3 m (9.8 ft) long cables.
Enclosure material	Die-cast aluminum, painted
Wall mounting bracket (standard and special)	Stainless steel (standard: always incl.)
Weight of transmitter	4.4 kg (9.7 lb)
Electrical connection	Cable glands (always incl.) • Power supply and outputs - 2 x M20 (HART)/ M25 (PROFIBUS) or - 2 x ½"-NPT (HART) • Transducers/sensor - 2/4 x M16 or - 2/4 x ½" NPT
Displays and controls	
Display	LCD, two lines with 16 characters each
• Multi-display: 2 freely-selectable values are displayed simultaneously in two lines	Flow, volume, mass flow, mass, flow velocity, speed of sound, ultrasonic signal information, current, frequency, alarm information
Operation	4 infrared keys, hierarchical menu shown with codes
Power supply	
Supply voltage	
• Standard version	120 ... 230 V AC ± 15 % (50/60 Hz) or 19 ... 30 V DC/ 21 ... 26 V AC
• Ex version	19 ... 30 V DC/21 ... 26 V AC
Power failure	No effect for at least 1 period (> 20 ms)
Power consumption	Approx. 10 VA/10 W
Certificates and approvals	
Explosion protection	ATEX II 2G Ex dem [ia/ib] IIC T6/T4/T3 T6 for media < 85 °C (185 °F) T5 for media < 100 °C (212 °F) T4 for media < 135 °C (275 °F) T3 for media < 200 °C (392 °F)

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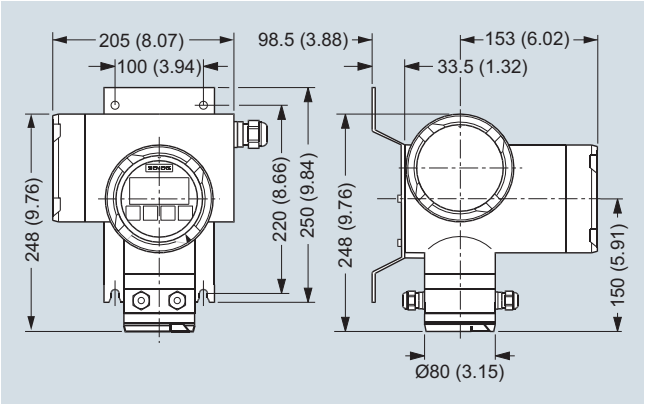
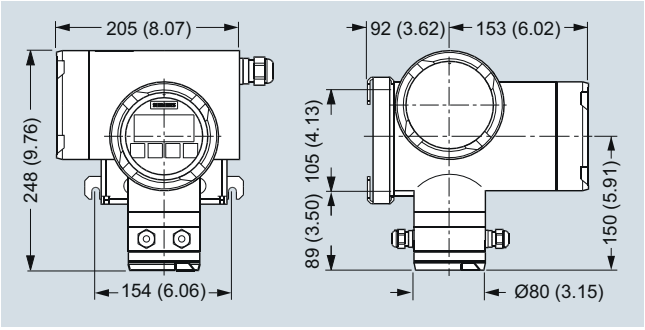
Coaxial cable		
Standard Coaxial cable (75 Ω)	Coaxial cable with SMB straight plug on one end for connection to the FUS060	
Outside diameter	Ø 5.8 mm	
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter	
Material (outside jacket)	black PE	
Ambient temperature	-10 ... +70 °C (14 ... 158 °F)	
High temperature Coaxial cable (75 Ω)	Coaxial cable with SMB straight plug on one end for the connection to FUS060	
Outside diameter	Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter - with SMB plug at the end) and between these is a black hot melt junction Ø 16 mm (length 70 mm)	
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter (max 3 m 9.84 ft) transducer cable length for Ex area mounted transmitters)	
Material (outside jacket)	Brown PTFE (0.3 m (0.98 ft) part) and black PE (for remaining cable)	
Ambient temperature	-200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and -10 ... +70 °C (14 ... 158 °F) (black PE for remaining transmitter cable part)	

Dimensional drawings

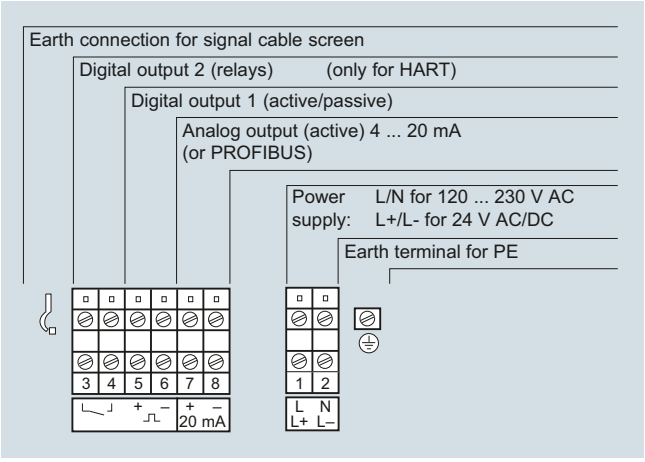


SITRANS FUS060 with standard mounting bracket, dimensions in mm (inch)



SITRANS FUS060 with optional special mounting bracket, dimensions in mm (inch)

Schematics



Electrical connection SITRANS FUS060

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Transmitter FUS060 operating instructions, accessories and spare parts

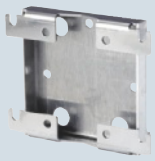
Operating instructions

Description	Article No.
• English	**A5E01204521**
• German	**A5E02123845**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Standard wall mounting bracket	**7ME5933-0AC04**	
Special wall-/pipe mounting bracket kit	**7ME5933-0AC05**	
Safety clamp for electronic cover with glass plate (7ME5933-0AC01)	**7ME5933-0AC06**	

Process Device Manager SIMATIC PDM		
SIMATIC PDM Details about the SIMATIC PDM tool can be found on page 8/11, chapter "Communication and Software"	**See page 8/18, chapter "Communication and Software"**	
HART modem for communication with FUS060 HART, PC and SIMATIC PDM		
HART modem With USB connection	**7MF4997-1DB**	

Spare parts

SITRANS FUS060 transmitter, available standard and Ex versions

The transmitter configuration is made in the flowmeter Order codes (together with the sensors).
The information below is for spare part ordering only and with fixed standardized pre-settings for a DN 2000 2-path system.

Description	Version	Enclosure	Supply	Article No.	
FUS060, 230 V, HART, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 … 230 V AC 50/60 Hz	**7ME3050-2BA10-1BA1**	
FUS060, 230 V, HART, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 … 230 V AC 50/60 Hz	**7ME3050-2BA10-1BA2**	
FUS060, 230 V, PROFIBUS, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 … 230 V AC 50/60 Hz	**7ME3050-2BA10-1DA1**	
FUS060, 230 V, PROFIBUS, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	115 … 230 V AC 50/60 Hz	**7ME3050-2BA10-1DA2**	
FUS060, 24 V, HART, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/ 21 ... 26 V AC	**7ME3050-2BA20-1BA1**	
FUS060, 24 V, HART, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/ 21 ... 26 V AC	**7ME3050-2BA20-1BA2**	
FUS060, 24 V, PROFIBUS, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/ 21 ... 26 V AC	**7ME3050-2BA20-1DA1**	
FUS060, 24 V, PROFIBUS, Imperial cable glands	Transmitter for remote connection	IP65 (NEMA 4)	19 ... 30 V DC/ 21 ... 26 V AC	**7ME3050-2BA20-1DA2**	
FUS060, ATEX, 24 V, HART, Metric cable glands	Transmitter for remote connection	IP65 (NEMA 4) ATEX approval	19 ... 30 V DC/ 21 ... 26 V AC	**7ME3050-2BA21-1CA1**	

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Description	Article No.	
Operating/Display module	**7ME5933-0AC00**	
Electronics cover with glass plate (non Ex) . Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	**7ME5933-0AC01**	
Cover for sensor cable and gasket. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	**7ME5933-0AC02**	
Cover for mains supply/communication. Die cast aluminum, with corrosion-resistant Basic Polyester powder coating (min. 60 µm)	**7ME5933-0AC03**	
FUS060 Sensor connection PCBA, Standard versions only, 1 pc.	**A5E02551331**	
FUS060 Sensor connection PCBA, ATEX version only, 1 pc.	**A5E02551334**	
M20 cable gland set for FUS060 (M20) power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	**A5E02246350**	

Description	Article No.	
M20 cable gland set for FUS060 ATEX version power and output connection, PA plastic, 1 x in blue (ATEX Ex i) and 1 x gray (ATEX Ex-e) • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +95 °C (-4 ... +203 °F)	**A5E02246356**	
1/2" NPT cable gland set for FUS060 (NPT) power and output connection, gray PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	**A5E02246396**	
M25 cable gland set for the FUS060 PA (M25) power and output connection, gray PA plastic, 2 pcs. • cables Ø 9 ... 16 mm (0.35" ... 0.63") • -40 ... +100 °C (-40 ... +212 °F)	**A5E02246378**	
M16x1.5 cable gland set for FUS060 (M16) sensor connection, gray PA plastic, 2 pcs. and 2 pcs. blind. • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -40 ... +100°C (-40 ... +212 °F)	**A5E02593526**	
M16 x 1.5 cable gland set for FUS060 (M16) sensor connection, brass chrome, 2 pcs. and 2 pcs. blind • cables Ø 5 ... 9 mm (0.20" ... 0.35") • -20 ... +105°C (-4 ... +221 °F)	**A5E02246369**	
½" NPT cable gland set for FUS060 (NPT) sensor connection, 4 pcs. M16 bush to ½" NPT and 4 pcs. ½" NPT gray PA plastic glands • cables Ø 5 ... 9 mm (0.20 ... 0.35") • -20 ... +100 °C (-4 ... +212°F)	**A5E02247877**	

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Transmitter SITRANS FUS060

Cables for FUS060

Description	Length m (ft)	Article No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	**A5E00875101**	
	15 (49.21)	**A5E00861432**	
	30 (98.43)	**A5E01278662**	
	60 (196.85)	**A5E01278682**	
	90 (295.28)	**A5E01278687**	
	120 (393.70)	**A5E01278698**	
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 Ω)	3 (9.84)	**A5E00875105**	
	15 (49.21)	**A5E00861435**	
	30 (98.43)	**A5E01196952**	
Special coaxial cable sets for low temperature cryogenic systems; with SMB plug for transmitter SITRANS FUS060, PTFE material, temp. -200 ... +200 °C (-328 ... .+392 °F), impedance 75 Ω (2 pcs.)	10 (32.84)	**A5E02085593**	
	15 (49.21)	**A5E03262088**	
	30 (98.43)	**A5E02085644**	
	40 (131.23)	**A5E02085649**	

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Overview

SITRANS FUS080 is a transit time based transmitter designed for ultrasonic flowmetering with any sensor in the FUS inline series SONOKIT, FUS380 and FUE380 up to DN 1200.

The ultrasonic flowmeter transmitter SITRANS FUS080 comes as battery or mains powered version.The SITRANS FUS080 is designed to measure flow water applications.

The SONOKIT retrofit flowmeter series are shown from page 3/273. The standard flowmeter series SITRANS FUS380 is described from page 3/284. The type approved flowmeter series for flowmetering in energy meter custody transfer systems are named SITRANS FUE380 - see page 3/289.

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one button straight forward display
- IrDA optical interface for local communication
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on all district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanic isolated digital outputs for easy connection to a calculator (potential free)
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q_i (min) : Q_s (max) up to 1:400

Application

The main application for flowmeters with the transmitter SITRANS FUS080 is measurement of water flow in district heating plants, local networks, boiler stations, substations, chiller plants, irrigations plants and other general water applications.

Design

The transmitter type SITRANS FUS080 is designed with fiberglass reinforced polyamide enclosure for remote or compact installation in normal areas. The remote versions are available with up to 30 meter distance from flowmeter to transmitter. When ordering as a compact version in the series FUS380 and FUE380 the transducer cables are pre-mounted at the sensor.

The transmitter is available in an IP67/NEMA 4X/6 enclosure and is designed for use in the flowmeters series:

- SONOKIT (1-path or 2-path)
- FUS380 (2-path)
- FUE380 (2-path)

The transmitter FUS080 is always ordered as part of a complete flowmeter system.

It can be manually ordered separately as spare part preprogrammed with the given sensor data.

Integration

The flowmeter pulse output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUS380 has two pulse outputs, with functions that can be individually selected.

The settings of the transmitter, eg. flow and pulse output rate, are defined when ordering the complete flowmeter.

If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except eventually local approvals on the flowmeter.

Technical specifications

Input	
Measurement	Flow by measuring the transit time difference of ultrasonic signals through ultrasonic transducers in the sensor pipes. Supporting of 1-path or 2-path sensors in sizes DN 50 ... 1200 measuring on water.
Measuring rate	
• Battery mode	0.5 Hz
• Mains supply	Up to 15 Hz
• Back-up mode	0.5 Hz (at mains supply drop)
Flow rate	0.02 ... 9 m/s (0.065 ... 29.5 ft/s), bidirectional flow metering
Output	2 pulse or status outputs (A and B), individual galvanically isolated MOS relay outputs, passive mode, max. ±35 V AC/DC, max. 50 mA
Max. pulse frequency	100 Hz at Q_s (Q_{max})
Pulse value and length	Selectable with the ordering of the flowmeter
Output A function	Pulse: forward, reverse, forward net, reverse net (preset: forward)
Output B function	Pulse: forward, reverse, forward net, reverse net (preset: forward) or alarm indication or call-up indication (preset: alarm)
Pulse value A and B	0.1 l/p, 0.25 l/p, 0.5 l/p, 1 l/p, 2.5 l/p, 10 l/p, 25 l/p, 50 l/p, 100 l/p, 250 l/p, 500 l/p, 1 m^3/p, 2.5 m^3/p, 5 m^3/p, 10 m^3/p, 25 m^3/p, 50 m^3/p, 100 m^3/p, 250 m^3/p, 500 m^3/p, 1 000 m^3/p
Pulse length (depending on Q_{max} by DN selection)	5, 10, 20, 50, 100, 200, 500 ms (standard 5 ms)
Alarm indication	Path 1 (F1), path 2 (F2) internal, failure (F3, F4), powers supply warning or low battery indication (F5), Q_{max} overflow (F6), pulse overflow (F7, F8), internal data logger warning (F9)

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Rated operation conditions	
Ambient conditions	
Ambient temperature	
• Operation	-10 ... +60 °C (14 ... 140 °F) (MID version: max. +55 °C (131 °F))
• Storage	-40 ... +85 °C (-40 ... +185 °F) (battery included)
Enclosure rating	IP67/NEMA 4X/6 to EN 60529 and DIN 40050
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CISPR-11
• Immunity	To EN/IEC 61326-1 (Industry)
• MID approved (FUE380 series)	Environment class E2 and M1
Mechanical vibration	2 g, 1 ... 800 Hz sinusoidal in all directions according to IEC 68-2-6
Weight of transmitter	Approx. 1.5 kg (3.3 lb)
Design	
Enclosure material	Fibre-glass reinforced polyamide, light gray color
Wall mounting kit	IP67/NEMA 4X/6 terminal box for the wall mounting of the transmitter, fiber-glass reinforced polyamide with stainless steel bracket, cable glands entries: 2 x 2 M20 or PG 13.5 for power supply and outputs and 2 x M20 or PG 13.5 for the sensor cables, glands (supply and outputs and double cable entries for sensor cables) are included.
Sensor cable	Coaxial cable sets for remote transmitter up to 30 m (98.4 ft) long transducer cable, 75 Ω impedance, cables sets are prepared for the connection to the sensors
Display and controls	
Display	LCD, 8 digits, additional 2 digits and symbols for status information
Resolution	Totalized information can be displayed with 1, 2 or 3 decimals or automatic adjustment (default)
Display setting	Flow unit: Preset: m^3/h Volume unit: Preset: m^3
Push button	One push button for menu selection and display information
Communication (IrDA optical eye)	IrDA – optical communication and control interface with Modbus RTU protocol for read or write transmitter settings and data via PC and PDM tool
Power supply	
Battery	D-cell battery pack, 3.6 V LiSOCl (Lithium Thionyl Chloride, 32 Ah), replaceable, life- and working-time up to 6 years
Mains	87 ... 265 V AC (50 ... 60 Hz) or 87 ... 265 V AC (50 ... 60 Hz) with D-cell single battery backup, 2.6 V LiSOCl (Lithium Thionyl Chloride, 12.5 Ah), replaceable, life time up to 8 years
Power consumption	
Mains version	Approx. 2.5 VA

SONOKIT, FUS380, FUE380

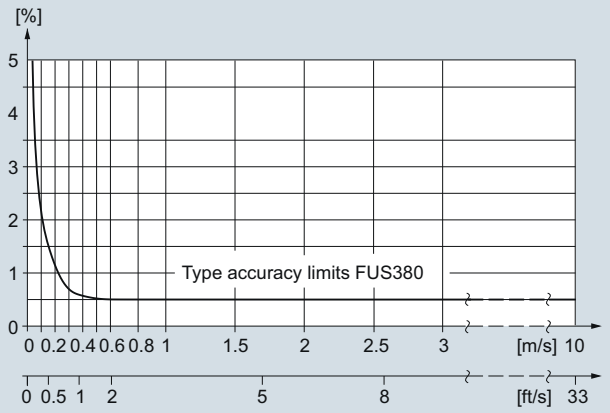
The flow values and settings are predefined according to dimension selection.

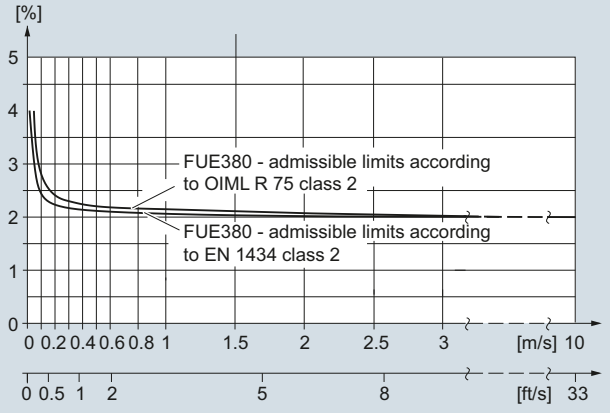
The transmitter settings are changeable by using the SW tool PDM (for FUE380 series some of the setting are only readable, restriction of the approval requirements).

Accuracy/Error in measurement:

(at reference conditions for FUS380 and FUE380 series, SONOKIT series will differ in the accuracy)

- Pulse output
  - ≤ ±0.5 % of measured value at 0.5 ... 10 m/s or
  - ≤ ±0.25/V [m/s] % of measured value at flow < 0.5 m/s
- Repeatability ≤ 0.25 % of measured value at 0.5 ... 10 m/s
- Reference conditions
  - Process temperature and ambient temperature: 25 °C ± 5 °C (77 °F ± 9 °F)
  - Transmitter warming-up time 30 min.
  - Installation conditions of the sensor: Upstream section > 10 x DN and downstream section > 5 DN





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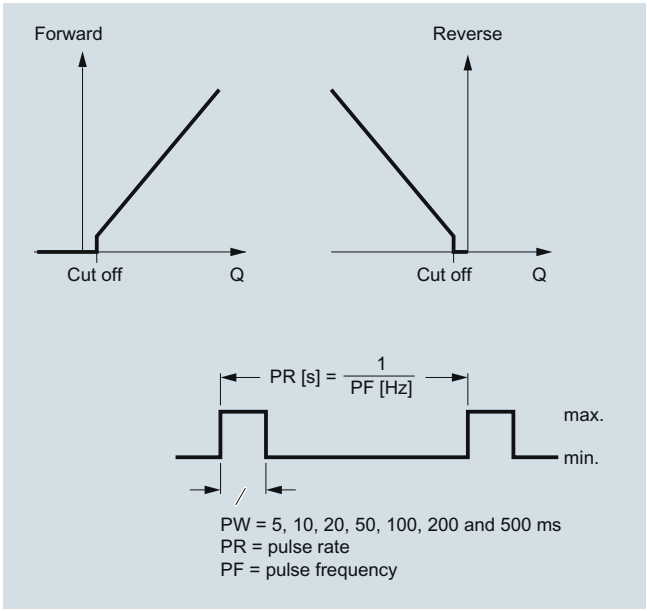
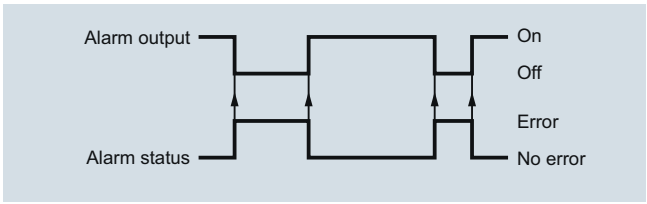
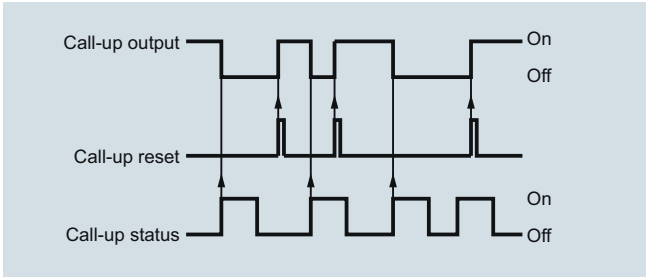
Output configuration



Pulse volume: output A/B configured as volume per pulse, calculated on forward/reverse or net forward/reverse flow. The volume per pulse is free scaleable (via PDM software).



Pulse output B can be used as stated above or as alarm or call-up function.



Call-up: the call-up output is active until manually reset by use of PDM tool. The call-up function is activated when an alarm is activated.

Sensor coaxial cable for SONOKIT series with FUS080

Coaxial cable		
Standard coaxial cable (75 Ω)		
Outside diameter	Ø 5.8 mm	
Length	15, 30 m (49.2, 98.4 ft) between sensor and transmitter	
Material (outside jacket)	Black PE	
Ambient temperature	-10 ... +70 °C (14 ... 158 °F)	

Sensor coaxial cable for FUS380/FUE 380 series

Coaxial cable		
High temperature coaxial cable (75 Ω)	With special designed glands for connection in the sensor/transducer	
Outside diameter	Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter – black holt melt junction part between (Ø 16 mm, length 70 mm)	
Length	Up to 30 m (98.4 ft) between sensor and transmitter	
Material (outside jacket)	Brown PTFE (0.3 m (9.84 ft) part) and black PE (for remaining cable)	
Ambient temperature	-200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and -10 ... +70 °C (14 ... 158 °F) (black PE for remaining transmitter cable part)	

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Transmitter FUS080 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
for use with SONOKIT	
• English	**A5E03059912**
integrated in FUS/FUE380	
• English	**A5E00730100**
• German	**A5E00740611**
• Spanish	**A5E00754188**
• French	**A5E00754173**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature. All literature is also available for free at: http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Sun lid for FUS080 transmitter (frame and lid)	**A5E02328485**	
Brace (holder) for optical IrDA eye	**A5E00695277**	
IrDA infrared interface adapter with USB for data acquisition with 1.2 m (3.9 ft) cable	**FDK:087L4163**	
Process Device Manager SIMATIC PDM		
SIMATIC PDM Details about the SIMATIC PDM tool can be found on page 8/11, chapter "Communication and Software"	**See page 8/18, chapter "Communication and Software"**	

Spare parts

A spare part transmitter can be ordered for a specific system. In the description of the following spare part transmitters the related transmitter Article No. found on the device silver front label is noted.

Spare part transmitter for FUS380 systems (7ME3400)

Description	Article No.	
FUS080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AA0	**A5E02729700**	
FUS080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUS380 flowmeter series[1]. Transmitter Article No. 7ME3450-0AA20-2AA0	**A5E02729035**	
FUS080 transmitter 230 V mains as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AA0	**A5E02699309**	
FUS080 transmitter 230 V mains with backup-battery as spare part transmitter for FUS380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AA0	**A5E02729610**	

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3400-xxxxx-xxxx-Z, XX.... and xxxxxxHxxx)

Spare part transmitter for FUE380 approved systems (7ME3410)

(only with MID approval marks, no MID verification – only a complete flowmeter can be MID-verified, i.e. sensor together with the transmitter)

Description	Article No.	
FUE080 transmitter 3.6 V battery (no battery included, to be ordered separate) as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA10-2AB0	**A5E02734600**	
FUE080 transmitter 3.6 V battery (battery included) as spare part transmitter for FUE380 flowmeter serie.s[1]. Transmitter Article No. 7ME3450-0AA20-2AB0	**A5E02734568**	
FUE080 transmitter 230 V mains as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA30-2AB0	**A5E02734539**	
FUE080 transmitter 230 V mains with backup-battery as spare part transmitter for FUE380 flowmeter series. Transmitter Article No. 7ME3450-0AA40-2AB0	**A5E02734585**	

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3410-xxxxx-xxxx-Z, XX.... and xxxxxxHxxx)

Spare part transmitter for SONOKIT systems (7ME3210/7ME3220)

Description	Article No.	
FUS080 transmitter 3.6V battery (no battery included, to be ordered separate) as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA10-2AA0	**A5E03048726**	
FUS080 transmitter 3.6V battery (battery included) as spare part transmitter for SONOKIT flowmeters[1]. Transmitter Article No. 7ME3450-0AA20-2AA0	**A5E03048714**	
FUS080 transmitter 230V mains as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA30-2AA0	**A5E03048701**	
FUS080 transmitter 230V mains with backup-battery as spare part transmitter for SONOKIT flowmeters. Transmitter Article No. 7ME3450-0AA40-2AA0	**A5E03048719**	

When ordering: Inform on flowmeter Article No. and flowmeter serial no. (e.g. 7ME3220-xxxxx-xxxx-Z, XX.... and xxxxxxHxxx)

[1] Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

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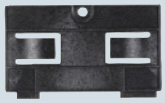
Spare part transmitter for FUS880 retrofitting systems (7ME3440)

Description	Article No.	
Sparepart FUS080 transmitter 3.6 V, incl. 3.6V dual batterie pack, USA version Transmitter Article No.: 7ME3450-0AA20-1CA0: Label, 0: Siemens FUS080 transmitter; Version, 0: Without connection box; Enclosure, A: IP67/NEMA 4X/6; Code A: Standard; Supply Voltage, 2: 3.6V DC battery; Ex. Approval, 0: no Ex approval; Display, 1: With display and unit label; Region version, C: USA: AcFt,CFS; Application, A: Standard FUS080 (for SITRANS Retrofit - 7ME344); Code, 0: Standard	**A5E03412669**	
FUS080 transmitter for FUS880 retrofit systems, USA version, incl. wall-mounting kit, 2 transducers and 2 pcs. 60 ft (20 m) of cables. Label, 0: Siemens FUS080 transmitter; Diameter, 0A: None; Wall Thickness, A: None; Pipe Material, 0: No Pipe; Track configuration, 1: 1-Track; Region version, 2: USA: AcFt,CFS; Transmitter, D: FUS080,IP67, Battery, Remote, unit label; Template, A: None; Transducer coax cable, 4: 20 m with gland	**7ME3440-0AA01-2DA4**	
FUS080 transmitter for FUS880 retrofit systems, USA version, incl. wall-mounting kit, 4 transducers and 4 pcs. 60 ft (20 m) of cables: Label, 0: Siemens FUS080 transmitter; Diameter, 0A: None; Wall Thickness, A: None; Pipe Material, 0: No Pipe; Track configuration, 3: 2-Track (X-Configuration); Region version, 2: USA: AcFt,CFS; Transmitter, D: FUS080 ,IP67, Battery, Remote,unit label; Template, A: None; Transducer coax cable, 4: 20 m with gland	**7ME3440-0AA03-2DA4**	

Description	Article No.	
Internal battery pack, one set of 2 D-cell (3.6 V 33 Ah)[1] • 1 pc. pack • 24 pcs. pack	 **A5E02679676** **A5E02896941**	
Single battery back-up to main supply (13.5 Ah)[1]	**A5E02679923**	
Battery cover for transmitter FUS080	**A5E00694468**	
PG 13.5 cable gland set for FUS080 power and output connection, black PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	**FDK:083G0228**	
PG 13.5 cable gland set (two cable entries) for FUS080 sensor connection, black PA plastic, 2 pcs. • cables Ø 6 ... 12 mm (0.24" ... 0.47") • -40 ... +100 °C (-40 ... +212 °F)	**A5E00694500**	
SITRANS FUS/FUE380 wall mounting kit for remote transmitter mounting, including connection plate (DN 50 ... DN 1200/2" ... 48")	**A5E00694509**	
SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (bronze sensors only, DN 50 ... DN 80/2" ... 3")	**A5E01208138**	
SITRANS FUS/FUE380 terminal box for compact transmitter mounting, including connection plate, (steel sensors only, DN 100 ... DN 1200/4" ... 48")	**A5E00694660**	
FUS080 display and keypad	**A5E00873496**	

[1] Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

Downloads for DEVICE description FUE380
http://support.automation.siemens.com/WW/view/en/23036121/133100

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Transmitter SITRANS FUS080/FUE080

Sensor cables for FUS380/FUE380 flowmeters

Description	Article No.	
DN 50 to 80 flowmeters		
Coaxial cable for FUS080; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part, max. 70 °C (158 °F); impedance 75 Ω		
5 m (16.4 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	**A5E01208092**	
10 m (32.8 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	**A5E01208114**	
20 m (65.6 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	**A5E01208117**	
30 m (98.4 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") remote mounting	**A5E01208121**	
0.5 m (1.64 ft) cable set (4 pcs.) for DN 50 ... DN 80 (2" ... 3") for compact version of FUS380/FUE380	**A5E01208126**	
DN 100 to 1200 flowmeters		
Coaxial cable for FUS080; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part, max. 70 °C (158 °F); impedance 75 Ω		
5 m (16.4 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	**A5E00695476**	
10 m (32.8 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	**A5E00695479**	
20 m (65.6 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	**A5E00695480**	
30 m (98.4 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") remote mounting	**A5E00695483**	
1 m (3.28 ft) cable set (4 pcs.) for DN 100 ... DN 1200 (4" ... 48") for compact version of FUS380/FUE380	**A5E00695486**	

Sensor cables for SONOKIT flowmeter with FUS080

Description	Article No.	
15 m (49.2 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	**A5E02478541**	
30 m (98.4 ft) cable set (2 pcs.) remote mounting with SONOKIT flowmeters	**A5E02478751**	

Sensor cables for FUS880 retrofitting systems (7ME3440)

Description	Article No.	
Coaxial cable with transducer connection		
for use in FUS880 and SONO 3300 sensors; with 0.3 m brown PTFE high temperature transducer part, max. 200 °C (392 °F) and black PVC for the remaining transmitter part, max. 70 °C (158 °F); cable impedance 75 Ω.		
• 1 x 10 m (32.8 ft)	**FDK:085L2400**	
• 1 x 20 m (65.6 ft)	**FDK:085L2401**	
• 1 x 30 m (98.4 ft)	**FDK:085L2402**	
Transducer spare part set of two transducers with gaskets for STRANS FUS880 retrofitting systems	**FDK:087H3007**	

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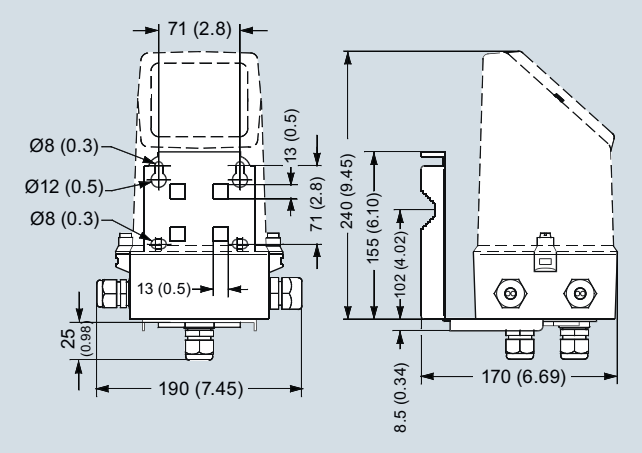
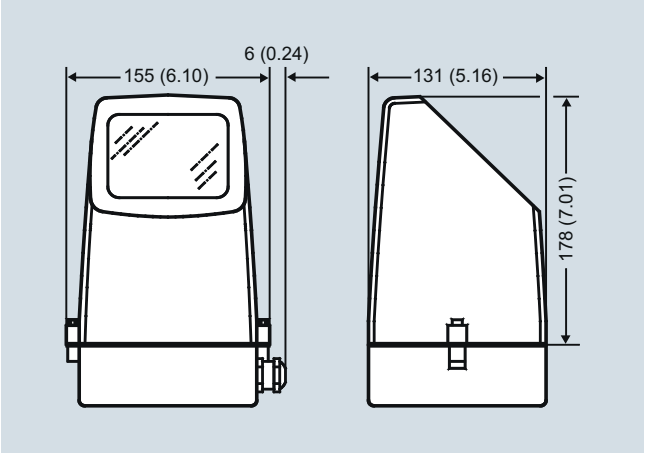
Dimensional drawings

FUS080 transmitter IP67/NEMA 4X/6, wall mounting and compact mounting

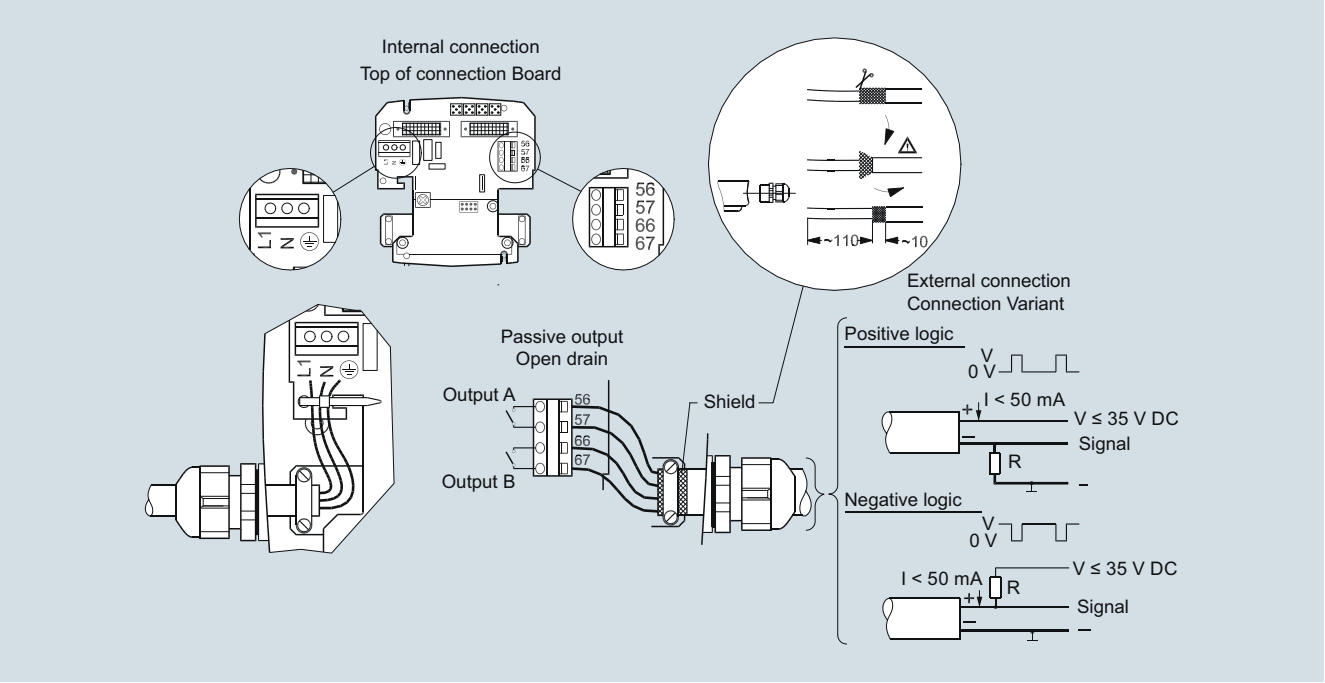


Transmitter wall mounted, dimensions in mm (inch)



Transmitter compact mounted, dimensions in mm (inch)

Schematics



Electrical connection of SITRANS FUS080

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Overview

The combination of SONO 3300 sensor and FUS060 transmitter is ideal for applications within the general industry. Measurements are independent of liquid temperature, density, pressure and conductivity. Transducers cannot be replaced.

Benefits

- Robust remote transmitter FUS060
- Robust design for industrial applications
- Measures all liquids less than 350 cSt, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- Long-time stability
- ATEX approval

Application

The main application for SONO 3300/FUS060 ultrasonic flowmeter is measurement of volume.

SONO 3300/FUS060 can be used for water and treated waste water, oil, hot water/cooling systems.

Design

The SONO 3300/FUS060 consists of a casted sensor (DN 50 to 80 (2" to 3")), welded pipes (DN 100 to 300 (4" to 12")) and a transmitter FUS060.

The transmitter can only be mounted separately.

The internal signal cables from transducers to sensor connection box are protected from an aggressive environment by stainless steel pipes.

Sensor installation

See system information.

Technical specifications

The transmitter related to this system is the SITRANS FUS060.
Technical specifications to the FUS060 see page 3/245.

2-path sensor with flanges and inline transducers	
Error in measurement	
Error in measurement at reference conditions	v > 0.5...10 m/s, < ± 0.5 % of rate (v=flow speed)
Max. flow velocity	10 m/s (32 ft/s)
Nominal size	DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250, DN 300 (2" … 12")
Media temperature	Separate version: -10 … +160 °C (14 … 320 °F)
Ambient temperature (sensor)	Separate version: -20 ... +60 °C (-4 ... +140 °F) Storage: -40 … +85 °C (-40 … +185 °F)
Enclosure	Standard version: IP67 (NEMA 4X/NEMA 6) ATEX version: As standard, but with ATEX approval (see below)
Process connections	
PN designated EN 1092-1, type 11 (B)	• DN 50 ... 300 (2" … 12"), PN 40 • DN 100 ... 300 (4" … 12"), PN 16 • DN 200 ... 300 (8" … 12"), PN 10
Class designated EN 1759-1	• DN 50 ... 300 (2" ... 12"), class 150 • DN 50 ... 300 (2" ... 12"), class 300
Transducer	Inline version welded into pipe
Materials	
Pipe	• DN 50 ... 80 (2" … 3"): Cast steel EN 1.1131-GS-15Mn5 • DN 100 ... 300 (4" … 12"): Carbon steel EN 1.0345-P235GH
Flange	• DN 50 ... 300 (2" … 12"): EN 1.0025-S235JRG2
Class	ASTM A105
Transducer	Stainless steel AISI 316 or similar

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Certificates and approvals	
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on CD
Material certificate	Material certificate according to EN 10204-3.1 is optionally available
NDT examination report	Extended material certificate is available on request
Calibration report	A standard calibration report is shipped with each flowmeter.
Extended accredited ISO/IEC 17025 calibration certificates	Optionally available
Approvals	No custody transfer approvals
Ex approval	System ATEX approval for SONO 3300 with remote transmitter FUS060-Ex (ATEX II 2G Ex dem [ia/ib] IIC T6/T4/T3) For Ex version the transducer cable length is restricted to 3 m (9.84 ft), in order to meet requirements.

The sensors are approved according to EU directive 97/23/EC dated 29 May 1997 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

Coaxial cable between sensor SONO 3300 and transmitter FUS060

Standard Coaxial cable (75 Ω)	Coaxial cable with SMB straight plug on one end for the FUS060 connector
Outside diameter	Ø 5.8 mm
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter
Material (outside jacket)	black PE
Ambient temperature	-10 ... +70 °C (14 ... 158 °F)
High temperature Coaxial cable (75 Ω)	Coaxial cable with SMB straight plug on one end for the FUS060 connector
Outside diameter	Ø 5.13 mm (first 0.3 m (0.98 ft) part to the transducer), Ø 5.8 mm (for remaining cable to the transmitter - with SMB plug at the end) and between these is a black hot melt junction Ø 16 mm (length 70 mm)
Length	3, 15, 30, 60, 90, 120 m (9.84, 49.21, 98.43, 196.85, 295.28, 393.70 ft) between sensor and transmitter (max. 3 m (9.84 ft)) transducer cable length for Ex area mounted transmitters)
Material (outside jacket)	Brown PTFE (0.3 m (0.98 ft) part) and black PE (for remaining cable)
Ambient temperature	-200 ... +200 °C (-328 ... +392 °F) (brown PTFE transducer part) and -10 ... +70 °C (14 ... 158 °F) (black PE for remaining transmitter cable part)

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Flowmeter SONO 3300/FUS060

Selection and Ordering data		Article No. / Order code
Sensor SONO 3300 with transmitter FUS060		7ME3300-
		0-
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Diameter	**Qn setting [m^3/h]**	
DN 50 (2")	10	1A
DN 50 (2")	26	1B
DN 50 (2")	60	1D
DN 65 (2½")	15	1E
DN 65 (2½")	42	1F
DN 65 (2½")	100	1H
DN 80 (3")	20	1J
DN 80 (3")	60	1K
DN 80 (3")	150	1M
DN 100 (4")	36	1N
DN 100 (4")	100	1P
DN 100 (4")	230	1R
DN 125 (5")	50	1S
DN 125 (5")	150	1T
DN 125 (5")	360	1V
DN 150 (6")	80	2A
DN 150 (6")	220	2B
DN 150 (6")	500	2D
DN 200 (8")	120	2E
DN 200 (8")	380	2F
DN 200 (8")	900	2H
DN 250 (10")	200	2J
DN 250 (10")	600	2K
DN 250 (10")	1400	2M
DN 300 (12")	300	2N
DN 300 (12")	850	2P
DN 300 (12")	2200	2R
Flange norm and pressure rating (All sizes are not available in all pressure ratings)		
EN 1092-1		
PN 10 (DN 200 ... 300 (8" ... 12"))		B
PN 16 (DN 80 ... 300 (3" ... 12"))		C
PN 40 (DN 50 ... 300 (2" ... 12"))		E
ANSI B16.5		
class 150 (DN 50 ... 300 (2" ... 12"))		H
class 300 (DN 50 ... 300 (2" ... 12"))		J
Sensor type (approval) and transmitter mounting		
IP67 standard, remote transmitter		1
IP67 Ex-version (ATEX), remote transmitter (Ex-version)		3
Cable gland entries in FUS060 and SONO 3300		
Cable glands M20 in sensor and in transmitter M25/20/16 x 1.5		1
Transmitter version of SITRANS FUS060		
IP65 (NEMA 4), 120/230 V AC		N
IP65 (NEMA 4), 24 V AC/DC		P
IP65 (NEMA 4), 24 V AC/DC, Ex-version (ATEX)		Q

Selection and Ordering data	Article No. / Order code
Sensor SONO 3300 with transmitter FUS060	7ME3300-
	0-
FUS060 output module	
HART, 4 ... 20 mA, 1 pulse output, 1 relay	B
HART, Ex version, 4 ... 20 mA, 1 pulse output, 1 relay	C
PROFIBUS PA, 1 pulse/frequency	D
Transducer coaxial cable	
4 x 3 m, max. 70 °C (158 °F), the only option for Ex i	0
4 x 15 m, max. 70 °C (158 °F)	1
4 x 30 m, high temp. max.200 °C (392 °F)	2
4 x 30 m, max. 70 °C (158 °F)	3
4 x 60 m, max. 70 °C (158 °F)	4
4 x 90 m, max. 70 °C (158 °F)	5
4 x 120 m, max. 70 °C (158 °F)	6
4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i	7
4 x 15 m, high temp. max. 200 °C (392 °F)	8

Selection and Ordering data	Order code
Additional information	
Please add „**-Z**" to Article No. and specify Order code(s) and plain text.	
Calibration	
Production calibration DN 50 ... DN 300 (with certificate, 2 x 3 points in 10 %, 25 % and 100 % Qn)	**Included**
Accredited Siemens ISO/IEC 17025 calibration for DN 50 to DN 200 with Qn as selected in Diameter. Calibration certificate: 2 x 5 points in 5%, 10 %, 25 %, 50% and 100 % Qn (max. flow 630 m^3/h).	**D20**
Accredited Siemens ISO/IEC 17025 calibration for DN 200 to DN 300 with Qn as selected in Diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2000 m^3/h).	**D21**
Material certificate	
EN 10204-3.1	**F10**
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	**Y17**

Please use online Product selector to get latest updates. Product selector link:
www.pia-selector.automation.siemens.com

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Flowmeter SONO 3300 with FUS060 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
SITRANS FUS060	
• English	**A5E01204521**
• German	**A5E02123845**
SITRANS F US SONO 3300	
• English	**A5E01365400**
• German	**A5E02690975**
• Spanish	**A5E02690992**
• French	**A5E02690987**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Potting kit

Description	Article No.	
Potting kit for terminal box of SONO 3200 transducers for IP68/NEMA 6P (not for Ex sensors)	**FDK:085L2403**	

Cable connection boxes
(Optional for the connection of individually transducer cables with the FUS060 transducer cables)

Description	Article No.	
Junction box for coaxial cable • IP68 metal box for 4 coaxial cables	**FDK:085B1361**	

Spare parts

Cables for SONO 3300 with FUS060 (only as spare parts)

Description	Length m (ft)	Article No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	**A5E00875101**	
	15 (49.21)	**A5E00861432**	
	30 (98.43)	**A5E01278662**	
	60 (196.85)	**A5E01278682**	
	90 (295.28)	**A5E01278687**	
	120 (393.70)	**A5E01278698**	
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part (max. 200 °C (392 °F)) and black PVC transmitter part with SMB plug (max. 70 °C (158 °F)); impedance 75 Ω (2 pcs.)	3 (9.84)	**A5E00875105**	
	15 (49.21)	**A5E00861435**	
	30 (98.43)	**A5E01196952**	

Cable glands (for the SONO 3300 terminal box) (only as spare parts)

Type	Material	Temperature range [°C (°F)]	Article No.	
M20	Nickel-plated brass, 2x cables Ø 5 ... 6 mm (2 pcs.)	-25 ... +200 (-13 ... +392)	**A5E02246329**	

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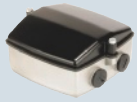
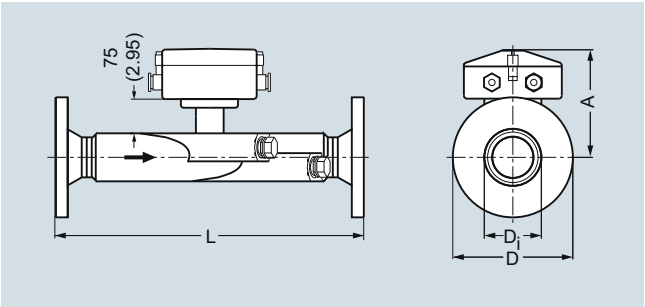
Flowmeter SONO 3300/FUS060

Description	Article No.	
SONO 3300 terminal box lid, in stainless steel painted black (1 pc.)	**FDK:085U1505**	
Gasket for SONO 3300 terminal lid in EPDM (1 pc.)	**FDK-085U1820**	

Description	Article No.	
SONO 3300 stainless steel terminal box (1 pc.), M20 cable gland version, incl. lid in stainless steel (painted black) and gasket in EPDM	**A5E00836867**	
Coax cable connecting plate (1 pc.) for SONO 3300 terminal box and use with transmitter type FUS060	**A5E02593568**	

3

Dimensional drawings



Sensor SONO 3300, dimensions in mm (inch)

DN	EN 1092-1																	
	PN 10						PN 16						PN 40					
	$L^{1)}$		D		D_i		$L^{1)}$		D		D_i		$L^{1)}$		D		D_i	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
50													475	18.70	165	6.50	52.60	2.07
65													475	18.70	185	7.28	62.70	2.47
80							380	14.96	200	7.87	78.00	3.07	400	15.75	200	7.87	78.00	3.07
100							375	14.76	220	8.66	102.40	4.00	400	15.75	235	9.25	102.40	4.00
125							375	14.76	250	9.84	128.30	5.05	400	15.75	270	10.63	128.30	5.05
150							360	14.17	285	11.22	154.20	6.07	400	15.75	300	11.81	154.20	6.07
200	400	15.75	340	13.39	207.30	8.16	400	15.75	340	13.39	207.30	8.16	450	17.72	375	14.76	206.50	8.13
250	400	15.75	395	15.55	260.40	10.25	400	15.75	405	15.94	260.40	10.25	500	19.69	450	17.72	258.80	10.19
300	400	15.75	445	17.52	309.70	12.19	420	16.54	460	18.11	309.70	12.19	500	19.69	515	20.28	307.90	12.12

DN	ANSI														Weight[2]			
	150 lb						300 lb						EN and ANSI		EN		ANSI	
	$L^{1)}$		D		D_i		$L^{1)}$		D		D_i		A					
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	kg	lb	kg	lb
50 mm/2"	510	20.08	152	5.98	52.6	2.07	520	20.47	165	6.50	52.6	2.07	180	7.09	14	30.9	17	37.5
65 mm/2½"	510	20.08	178	7.01	62.7	2.47	520	20.47	190	7.48	62.7	2.47	186	7.32	16	35.3	20	44
80 mm/3"	420	16.54	191	7.52	78.0	3.07	440	17.32	210	8.27	78.0	3.07	193	7.60	19	42	23	51
100 mm/4"	420	16.54	229	9.01	102.4	4.03	440	17.32	254	10	102.4	4.03	205	8.07	25	55	35	78
125 mm/5"	440	17.32	254	10.00	128.3	5.05	460	18.11	279	10.98	128.3	5.05	218	8.58	29	64	40	89
150 mm/6"	430	16.93	279	10.98	154.2	6.07	450	17.71	318	12.52	154.2	6.07	232	9.13	35	78	50	111
200 mm/8"	480	18.90	343	13.50	202.7	7.98	500	19.69	381	15	202.7	7.98	256	10.08	54	119	72	160
250 mm/10"	490	19.29	406	15.98	254.5	10.02	520	20.47	444	17.48	254.5	10.03	283	11.14	85	189	98	217
300 mm/12"	550	21.65	483	19.02	306.3	12.06	580	22.83	521	20.51	306.3	12.06	309	12.17	115	256	142	322

[1] Length tolerance (mm): DN 50 ... 100 +2/-3, DN 125 ... 200 +3/-4, DN 250 ... 300 +4/-5

[2] Approximate weights without transmitter FUS060 - weight of FUS060 is 4.4 kg (9.7 lb)

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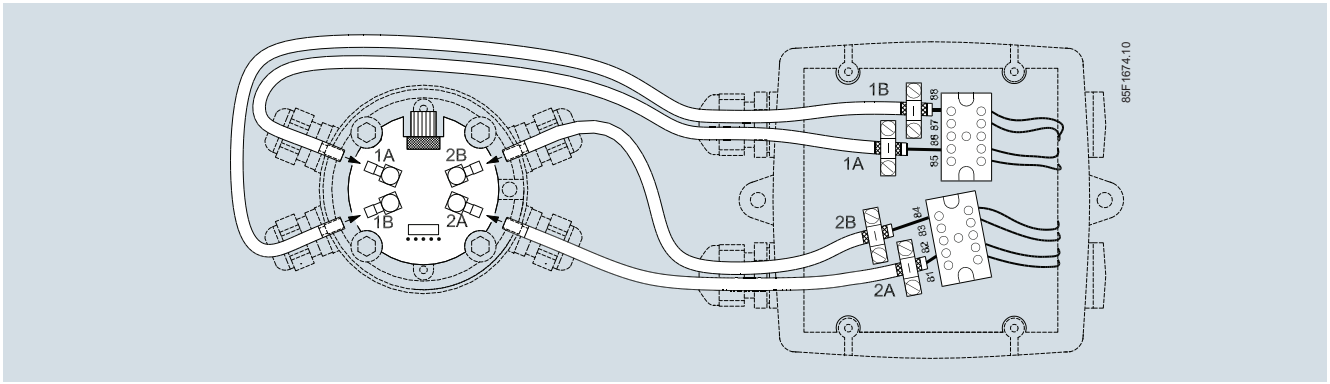
Schematics



Electrical connection of SITRANS FUS060 and SONO 3300

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3

Overview

The combination of the SONO 3100 sensor and the FUS060 transmitter is ideal for applications where process shut-down is impossible during service and where there is a need for extreme high/low temperatures and pressures.

Transducers can be changed without interrupting operation. SONO 3100 can optionally be delivered as a 4-path solution for absolute best performance and accuracy.

Benefits

- Transducers can be replaced under pressure
- Measurement of all liquids less than 350 Cst, conductive or non-conductive
- No pressure drop
- Reliable and accurate flow measurements
- Long-time stability
- On request as special versions:
  - Special sensor material, e.g. Duplex, stainless steel
  - High/low temperature sensor version: +250 °C (+482 °F)/ -200 °C (-328 °F) sensors
  - Pressure rating 430 bar (6235 psi)
  - Special sensor sizes down to DN 25
  - 1-path or 4-path sensor technology

Application

The main application for SONO 3100 in combination with transmitter type FUS060 is to measure volume flow within:

- Petrochemical industry
- Power engineering
- Water and waste water
- Oil and liquefied gases

SITRANS FUS060 holds ATEX for hazardous areas, HART and PROFIBUS PA. SONO 3100 holds ATEX Ex approval.

Design

The SONO 3100 in combination with FUS060 consists of a SONO 3100 sensor, SONO 3200 transducers with O-rings or flanges depending on selection - and a FUS060 transmitter.

SONO 3100 is basically supplied in a 2-path solution with flanges in sizes from DN 100 to DN 600 and without flanges in sizes from DN 100 to DN 300.

1-path or 4-path special versions are avaible on request, depending on size (DN 25 to DN 4000).

SONO 3100 is as standard available in carbon steel from DN 100 to DN 600.

FUS060 is designed for remote wall mounting only.

Technical specifications

The transmitter related to this system is the SITRANS FUS060. Technical specifications to the FUS060 see page 3/245.

2-path sensor fitted with four SONO 3200 transducers	
Error in measurement	
Error in measurement at reference conditions	v > 0.5 ... 10 m/s, < ± 0.5 % of rate (v=flow velocity)
Max flow velocity	10 m/s (32 ft/s)
Nominal size	DN 100 ... 600 (4" ... 24")
Media temperature	
• Standard	-10 ... +200 °C (14 ... 392 °F)
• ATEX Ex d version	-20 ... +200 °C (-4 … +392 °F)
• ATEX Ex i version	-10 ... +200 °C (14 ... +392 °F)
• Specials	-200 °C (-328 °F) or up to 250 °C (482 °F)
Ambient temperature	
• Standard and Ex-i version	-20 ... +60 °C (-4 ... +140 °F)
• Ex d version	-20 ... +180 °C (-4 ... +356 °F)
Enclosure	IP67 (NEMA 4X/6)/IP68 (NEMA 6P) and ATEX (see below)
Process connections	
PN designated, EN 1092-1, type 11 (B)	
Pipe material carbon steel	• DN 200 ... 600 (8" ... 24"), PN 10 • DN 100 ... 600 (4" ... 24"), PN 16 • DN 200 ... 600 (8" ... 24"), PN 25 • DN 100 ... 500 (4" ... 20"), PN 40
Class designated, EN 1759-1	
Pipe material carbon steel	• DN 100 … 600 (4" … 24") Class 150 • DN 100 … 300 (4" … 12") Class 300
Without flanges (EN 10217), (weld-in version) only in carbon steel	• DN 350 … 600 (14" … 24"), PN 10 • DN 100 … 600 (4" … 24"), PN 16 • DN 200 … 600 (8" … 24"), PN 25 • DN 100 … 500 (4" … 20"), PN 40
Transducer SONO 3200	O-ring or flange versions
Materials	
Pipe	Steel EN 1.0345-P235GH
Flange	
PN	EN 10025-S235JRG2, 1E1
Class	ASTM A105,1,1
Transducer body	Stainless steel AISI 316 or similar
Transducer terminal house	Stainless steel AISI 316 or plastic PA 6.6

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Certificates and approvals	
System ATEX approval for SONO 3100 together with transmitter FUS060-Ex	ATEX II 2G Ex dem [ia/ib] IIC T6/T4/T3 or ATEX II 2G Ex d IIC T3-T6 Gb with SONO 3200 Exd transducers (for standard FUS060 transmitter, installed outside of Ex zone) For FUS060 Ex version the transducer cable length is restricted to 3 m (9.84 ft), in order to meet requirements for electrical immunity.
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on CD
Material certificate	Material certificate according to EN 10204-3.1 is optionally available
NDT examination report	Extended material certificate is optionally available
Pressure certificate	Pressure test according EN 1024-2.3 optionally available
Calibration report	A standard calibration report is shipped with each flowmeter. Optionally available: Extended accredited ISO/IEC 17025 calibration certificates
Approvals	No custody transfer approvals

The sensor SONO 3100 with transmitter FUS060 conforms to Product Family Standard EN 61326/A3 appendix A (Title: Electrical Equipment for Measurement control and laboratory use – EMC requirements).

The sensors are approved according to EU directive 97/23/EC dated 29 May 1997 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

The SONO 3100 as weld-in version does not include the flanges. Thus, it can neither be tested nor approved according to PED. After the installation, all installation-related activities (welding, pressure test etc.) are the responsibility of the customer.

Selection and Ordering data — Article No. Order code

SITRANS F US SONO 3100 sensor 2-path ↗ **7ME3100 -** ■■■■■ - ■■■■ ■■■

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Diameter	**Qn setting [m^3/h]**	
DN 100 (4")	28	**1 N**
DN 100 (4")	100	**1 P**
DN 100 (4")	220	**1 R**
DN 125 (5")	44	**1 S**
DN 125 (5")	150	**1 T**
DN 125 (5")	350	**1 V**
DN 150 (6")	64	**2 A**
DN 150 (6")	220	**2 B**
DN 150 (6")	500	**2 D**
DN 200 (8")	110	**2 E**
DN 200 (8")	380	**2 F**
DN 200 (8")	900	**2 H**
DN 250 (10")	180	**2 J**
DN 250 (10")	600	**2 K**
DN 250 (10")	1300	**2 M**
DN 300 (12")	250	**2 N**
DN 300 (12")	850	**2 P**
DN 300 (12")	2000	**2 R**
DN 350 (14")	350	**2 S**
DN 350 (14")	1000	**2 T**
DN 350 (14")	2800[1)]	**2 V**
DN 400 (16")	450	**3 A**
DN 400 (16")	1300	**3 B**
DN 400 (16")	3600	**3 D**
DN 500 (20")	1300	**3 J**
DN 500 (20")	2200	**3 K**
DN 500 (20")	4200[1)]	**3 M**
DN 600 (24")	1300	**3 S**
DN 600 (24")	3200	**3 T**
DN 600 (24")	4200[1)]	**3 V**

Flange norm and pressure rating
(All sizes are not available in all pressure ratings)

EN 1092-1	
PN 10 (DN 200 ... DN 600)	**B**
PN 16 (DN 100 ... DN 600)	**C**
PN 25 (DN 200 ... DN 600)	**D**
PN 40 (DN 100 ... DN 500)	**E**
ANSI B16.5	
class 150 (DN 100 ... DN 600)	**H**
class 300 (DN 100 ... DN 300)	**J**
Pipe without flanges (EN 10217) (weld-in version)[2)]	
PN 10 (DN 200 ... DN 600)	**P**
PN 16 (DN 100 ... DN 600)	**Q**
PN 25 (DN 200 ... DN 600)	**R**
PN 40 (DN 100 ... DN 500)	**S**

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Flowmeter SONO 3100/FUS060

Selection and Ordering data	Article No. Order code
SITRANS F US SONO 3100 sensor 2-path	**7ME3100 -**
Pipe and flange material	
Carbon steel (DN 100 ... 1200)	**1**
Transducer type and approval	
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 50 mm, 100 °C (212 °F) (DN 100 ... 600)	**1**
IP68 SS housing, PN 40, O-ring, 50 mm, 200 °C (392 °F) (DN 100 ... 600)	**2**
IP68 SS housing, PN 40, O-ring, 50 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) (DN 100 ... 600)	**3**
IP67 (NEMA 4X/6) PA housing, PN 40, flange, 88 mm, 100 °C (212 °F) (DN 100 ... 300)	**4**
IP68 SS housing, PN 40, flange, 88 mm, 200 °C (392 °F) (DN 100 ... 300)	**5**
IP68 SS housing, PN 40, flange, 88 mm, 180 °C (356 °F), Ex d ATEX approval (only with standard FUS060) (DN 100 ... 300)	**6**
IP67 SS housing, PN 40, O-ring, 50 mm, 190 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) (DN 100 ... 600)	**7**
IP67 SS housing, PN 40, flange, 88 mm, 190 °C (374 °F), Ex i ATEX approval (only with FUS060 Ex-version) (DN 100 ... 300)	**8**
Cable gland entries	
Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5	**1**
Cable glands ½" NPT in transducers and in transmitter	**2**
Transmitter version of SITRANS FUS060	
IP65 (NEMA 4), 120/230 V AC	**N**
IP65 (NEMA 4), 24 V AC/DC	**P**
IP65 (NEMA 4), 24 V AC/DC ATEX Ex version	**Q**
FUS060 output module	
HART, 1 pulse output, 1 relay	**B**
HART Ex, 1 pulse output, 1 relay	**C**
PROFIBUS PA, 1 pulse/frequency	**D**
Transducer coaxial cable	
4 x 3 m, max. 70 °C (158 °F), the only option for Ex i	**0**
4 x 15 m, max. 70 °C (158 °F)	**1**
4 x 30 m, high temp. max. 200 °C (392 °F)	**2**
4 x 30 m, max. 70 °C (158 °F)	**3**
4 x 60 m, max. 70 °C (158 °F)	**4**
4 x 90 m, max. 70 °C (158 °F)	**5**
4 x 120 m, max. 70 °C (158 °F)	**6**
4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i	**7**
4 x 15 m, high temp. max. 200 °C (392 °F)	**8**

This device is shipped with a Quick Start guide and the SITRANS F manual CD containing the complete manual library. Printed Operating Instructions are available for purchase via PMD.

1) Reduced Q value during calibration (Qn setting unchanged).
2) For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed by ordering (only if the factor of Du / Wxx > 100).

Selection and Ordering data	Order code
Additional information	
Please add „**-Z**" to Article No. and specify Order code(s) and plain text.	
Calibration	
Production calibration DN 100 ... DN 600 (with certificate)	**Included**
Accredited Siemens ISO/IEC 17025 calibration for DN 100 to DN 200 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 630 m^3/h).	**D20**
Accredited Siemens ISO/IEC 17025 calibration for DN 200 to DN 600 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 2800 m^3/h).	**D21**
Accredited Siemens ISO/IEC 17025 calibration for DN 400 to DN 600 with Qn as selected in diameter. Calibration certificate: 2 x 5 points in 5 %, 10 %, 25 %, 50 % and 100 % Qn (max. flow 8000 m^3/h).	**D22**
Material certificate	
EN 10204-3.1	**F10**
EN 10204-3.1 and 100 % NDT on weldings, DN 100 ... DN 400	**F11**
EN 10204-3.1 and 100 % NDT on weldings, DN 500 ... DN 600	**F12**
Pressure certificate	
EN 10204-2.3	**F21**
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	**Y17**

Please use online Product selector to get latest updates. Product selector link:
www.pia-selector.automation.siemens.com

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Flowmeter SONO 3100 with FUS060 operating instructions, accessories and spare parts

Operating instructions

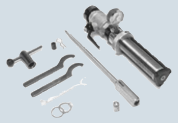
Description	Article No.
SITRANS FUS060	
• English	**A5E01204521**
• German	**A5E02123845**
SITRANS F US SONO 3100	
• English	**A5E00814513**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

Description	Article No.	
Potting kit for terminal box of SONO 3200 transducer for IP68/NEMA 6P (not for Ex sensors)	**FDK:085L2403**	

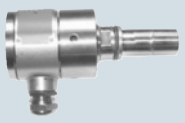
Description	Transducer length	Article No.	
Extraction tool for replacement of SONO 3200 O-ring transducers under pressure and for hot-tapping (working conditions: typically water, max. 40 bar and max. 60 °C (max. 580 psi and max. 140 °F))	50 mm (1.97") transducers	**FDK:085B5331**	

Cable connection boxes
(For the connection of individually transducer cables with the FUS060 transducer cables)

Description	Article No.	
Junction box for coaxial cable		
• IP68 metal box for 4 coaxial cables	**FDK:085B1361**	
• IP68 EEx e plastic box for 4 coaxial cables, no ATEX approval	**FDK:085B1363**	

Spare parts

Transducer SONO 3200 spare parts, complete units

Type	Material	Gasket	Press. rating	Terminal housing	Approv.	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 M20		-20 ... +100 (-4 ... +212)	50 (1.97)	**FDK:085B5453**	
O-ring	316 SS	O-ring	PN 40	316 SS M20		-20 ... +200 (-4 ... +392)	50 (1.97)	**FDK:085B5450**	
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex d[1)]	-20 ... +200 (-4 ... +392)	50 (1.97)	**FDK:085B5451**	
O-ring	316 SS	O-ring	PN 40	316 SS M20	Ex i[2)]	-10 ... +200 (14 ... 392)	50 (1.97)	**A5E00836448**	
O-ring	316 SS	O-ring	PN 40	Plastic, PA 6.6 ½" NPT		-20 ... +100 (-4 ... +212)	50 (1.97)	**A5E00839472**	
O-ring	316 SS	O-ring	PN 40	316 SS ½" NPT		-20 ... +200 (-4 ... +392)	50 (1.97)	**A5E00839431**	
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 M20		-20 ... +100 (-4 ... +212)	88 (3.47)	**FDK:085B5461**	
Flange	316 SS	Graphite	PN 40	316 SS M20		-20 ... +200 (-4 ... +392)	88 (3.47)	**FDK:085B5462**	
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex d[1)]	-20 ... +200 (-4 ... +392)	88 (3.47)	**FDK:085B5463**	
Flange	316 SS	Graphite	PN 40	316 SS M20	Ex i[2)]	-10 ... +200 (14 ... +392)	88 (3.47)	**A5E00836465**	
Flange	316 SS	Graphite	PN 40	Plastic, PA 6.6 ½" NPT		-20 ... +100 (-4 ... +212)	88 (3.47)	**A5E00839479**	
Flange	316 SS	Graphite	PN 40	316 SS ½" NPT		-20 ... +200 (-4 ... +392)	88 (3.47)	**A5E00839440**	
Flange	316 SS	Copper ring	PN 40	316 SS PG13.5 (cryogenic version)		-200 ... +100 (-328 ... +212)	88 (3.47)	**FDK:085B5416**	
Flat flange	316 SS	Flat gasket	PN 40	316 SS M20 (cryogenic version)		-200 ... +100 (-328 ... +212)	88 (3.47)	**A5E02593524**	
Flange	316 SS	Graphite	PN 160	316 SS M20		-20 ... +180 (-4 ... +356)	88 (3.47)	**FDK:085B5464**	
Flange	316 SS	Graphite	PN 160	316 SS M20	Ex d[1)]	-20 ... +200 (-4 ... +392)	88 (3.47)	**FDK:085B5465**	

[1)] ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb

[2)] For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

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Terminal housing for SONO 3200 sensor

Type	Pressure rating	Material	Temp. range [°C (°F)]	Article No.	
Terminal housing (M20 cable gland)	N/A	PA 6.6	-20 ... +100 (-4 ... +212)	**FDK:085B5501**	
Terminal housing (M20 cable gland)	N/A	ASTM 316	-20 ... +200 (-4 ... +392)	**FDK:085B5504**	
Terminal housing (½" NPT cable gland)	N/A	PA 6.6	-20 ... +100 (-4 ... +212)	**A5E00839460**	
Terminal housing (½" NPT cable gland)	N/A	ASTM 316	-20 ... +200 (-4 ... +392)	**A5E00839427**	
Ex d[1] terminal housing (M20 cable gland)	N/A	ASTM 316	-20 ... +200 (-4 ... +392)	**FDK:085B5505**	
Ex i[2] terminal housing (M20 cable gland)	N/A	ASTM 316	-10 ... +200 (14 ... 392)	**A5E00835255**	

1) ATEX (Ex) IIC 2G EEx d IIC T3 ... T6

2) For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

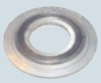
SONO 3200 spare parts, transducer body without terminal housing, including insert

Type	Material	Gasket	Pressure rating	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
O-ring	316 SS	O-ring	PN 40	-20 ... +200 (-4 ... +392)	50 (1.97)	**FDK:085B1405**	
Flange	316 SS	Graphite	PN 40	-20 ... +200 (-4 ... +392)	88 (3.47)	**FDK:085B1464**	

SONO 3200 spare parts, transducer insert

Type	Temp. range [°C (°F)]	Length mm (inch)	Article No.	
Insert	-20 ... +200 (-4 ... +392)	50 (1.97)	**FDK:085B1411**	
Insert	-20 ... +200 (-4 ... +392)	88 (3.47)	**FDK:085B1459**	

Transducer SONO 3200 gaskets

Type	Pressure rating	Material	Temperature range [°C (°F)]	Article No.	
Gasket O-ring (3 pcs. for o-ring transducers)	PN 40	FKM	-20 … +200 (-4 ... +392)	**FDK:085B1089**	
Gasket flange	PN 40/160	Graphite	-20 … +200 (-4 ... +392)	**FDK:085B1080**	
Gasket and 12 mm (0.47") bolts and nuts for flange transducers	PN 40	Flat ring type	-20 … +200 (-4 ... +392)	**FDK:085B1083**	
Gasket and 16 mm (0.63") bolts and nuts for flange transducers	PN 160	Graphite, 316 SS	-20 … +200 (-4 ... +392)	**FDK:085B1084**	
Gasket for cryogenics transducer with flat flange (2 pcs.)	PN 40	Graphite/metal	-200 … +100 (-328 ... +212)	**A5E02593522**	

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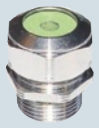
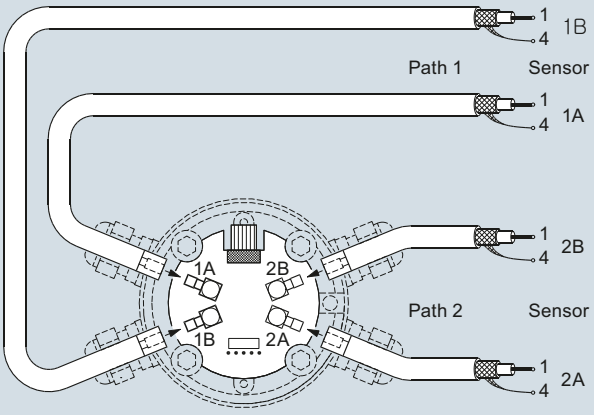
SONO 3200 cable glands

Type/description	Temperature range [°C (°F)]	Appr.	Article No.	
black PA plastic, cable Ø 5 ... 13 mm	-20 ... 100 (-4 ... +212)		**A5E02246304**	
½" NPT gray PA plastic, cable Ø 5 ... 9 mm	-20 ... 100 (-4 ... +212)		**A5E02246309**	
½" NPT crome-plated brass, cable Ø 5 ... 9 mm	-40 ... 100 (-40 ... +212)		**A5E02246258**	
M20 stainless steel, cable Ø 4 ... 6 mm	-25 ... 200 (-13 ... +392)	Ex i	**A5E02246194**	
M20 Stainless steel, cable Ø 5 ... 8 mm	-60 ... 180 (-76 ... +356)	Ex d	**A5E02246311**	

Cables for SONO 3100 with FUS060

Description	Length m (ft)	Article No.	
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	**A5E00875101**	
	15 (49.21)	**A5E00861432**	
	30 (98.43)	**A5E01278662**	
	60 (196.85)	**A5E01278682**	
	90 (295.28)	**A5E01278687**	
	120 (393.7)	**A5E01278698**	
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC for remaining transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 Ω) (2 pcs.)	3 (9.84)	**A5E00875105**	
	15 (49.21)	**A5E00861435**	
	30 (98.43)	**A5E01196952**	
SITRANS F US special coaxial cable sets for low temperature cryogenic systems, with SMB-plug for transmitter SITRANS FUS060, PTFE material, temp. -200 ... +200 °C (-328 ... .+392 °F), impedance 75 Ω (2 pcs.)	10 (32.84)	**A5E02085593**	
	15 (49.21)	**A5E03262088**	
	30 (98.43)	**A5E02085644**	
	40 (131.23)	**A5E02085649**	

Schematics



Electrical connection of SITRANS FUS060 and SONO 3100

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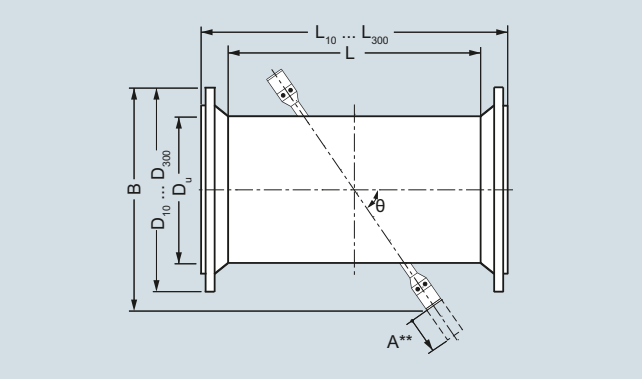
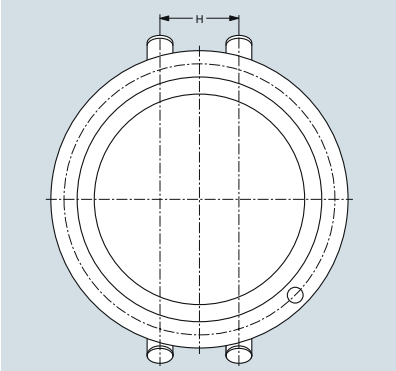
Dimensional drawings of sensor SONO 3100





Sensor SONO 3100 with EN norm

DN	D_U	$L^{1) 4)}$	$B^{5)}$	θ	H	PN 10			PN 16			PN 25			PN 40		
						$W_{10}^{2)}$	D_{10}	$L_{10}^{1)}$	$W_{16}^{2)}$	D_{16}	$L_{16}^{1)}$	$W_{25}^{2)}$	D_{25}	$L_{25}^{1)}$	$W_{40}^{2)}$	D_{40}	$L_{40}^{1)}$
	[mm]	[mm]	[mm]	[°]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
100	114.3	860	305	45[3)]	42.8	-	-	-	3.6	220	960	-	-	-	3.6	235	990
125	139.7	862	325	45[3)]	64.5	-	-	-	4.0	250	970	-	-	-	4.0	270	990
150	168.3	862	350	45[3)]	78.1	-	-	-	4.5	285	970	-	-	-	4.5	300	1010
200	219.1	668	430	45[3)]	102.1	6.3	340	790	6.3	340	790	6.3	360	820	6.3	375	840
250	273.0	714	480	45[3)]	127.6	6.3	395	850	6.3	405	850	7.1	425	890	7.1	450	920
300	323.9	607	525	45[3)]	151.8	7.1	445	740	7.1	460	760	8.0	485	790	8.0	515	830
350	355.6	639	550	45[3)]	166.4	8.0	505	770	8.0	520	800	8.0	555	840	8.8	580	880
400	406.4	703	600	45[3)]	191.3	8.0	565	850	8.0	580	875	8.8	620	925	11.1	660	975
500	508.0	797	690	45[3)]	241.1	7.1	670	950	8.0	715	980	10.0	730	1050	14.2	755	1080
600	610.0	912	705	60	294.8	7.1	780	1075	8.8	840	1105	11.0	845	1165	-	-	-

1) Length tolerance (mm): DN 100 +2/-3, DN 125 ... 200 +3/-4, DN 250 ... 400 +4/-5, DN 500 ...600 +5/-6

2) Wall thickness for pressure rates PN 6 ... 40. For weld-in sensor versions according EN10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y=P, Q, R, S) the tube roundness shall be agreed by ordering (only if the factor of Du/Wxx > 100).

3) For all sensors with flange transducers path angle are 60°

4) L is the length of sensor versions without flanges (weld-in version)

5) B dimension value is an approximate information and may differ a little by flange pressure rate.

A**) Space required for replacement of transducer min. 230 mm (9.1 inch). For replacement with special tool (extraction tool) see more information on page 3/267.

SONO 3100, 2-path				
Nominal diam.	**Flange type - Weight [kg (lb)]**			
DN	**PN 10**	**PN 16**	**PN 25**	**PN 40**
100 (4")	-	32 (70.5)	-	35 (77.2)
125 (5")	-	38 (83.8)	-	44 (97.0)
150 (6")	-	45 (99.2)	-	52 (114.6)
200 (8")	59 (130.0)	58 (127.9)	70 (154.3)	79 (174.2)
250 (10")	73 (161.0)	75 (163.3)	96 (211.6)	117 (257.9)
300 (12")	83 (183.0)	92 (202.8)	114 (251.3)	151 (332.9)
350 (14")	98 (216.0)	113 (249.1)	145 (332.9)	191 (421.1)
400 (16")	119 (262.4)	141 (310.9)	191 (421.1)	275 (606.3)
500 (20")	153 (337.3)	207 (456.4)	284 (626.0)	379 (836.0)
600 (24")	193 (425.5)	276 (608.5)	363 (800.3)	-

Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lb).
For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lb).

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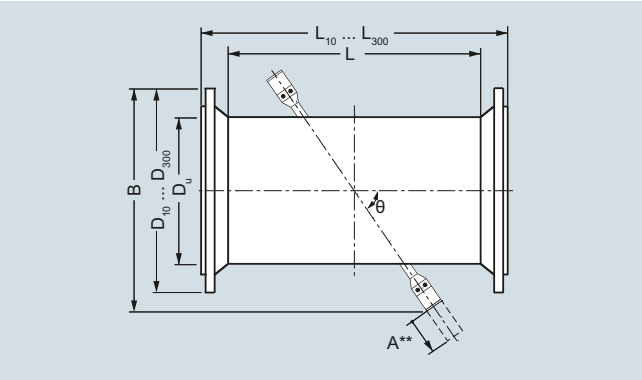

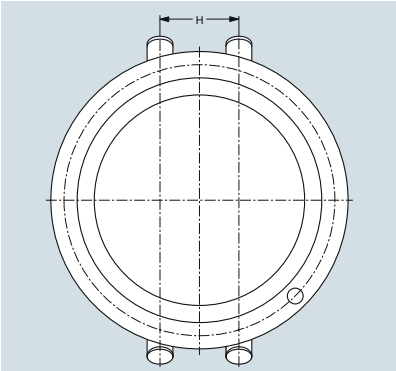

Sensor SONO 3100 with ANSI norm

						Class 150			Class 300		
Size (DN) inch (mm)	**D_U [inch]**	**L[1) 4)] [inch]**	**B[5)] [inch]**	**θ [°]**	**H [inch]**	**W_{150}[2)] [inch]**	**D_{150} [inch]**	**L_{150}[1)] [inch]**	**W_{300}[2)] [inch]**	**D_{300} [inch]**	**L_{300}[1)] [inch]**
4 (100)	4.50	33.86	12.01	45[3)]	1.69	0.14	9.00	39.86	0.25	10.00	40.62
5 (125)	5.50	33.94	12.80	45[3)]	2.54	0.15	10.00	40.94	0.27	11.00	41.70
6 (150)	6.63	33.94	13.78	45[3)]	3.07	0.16	11.00	40.94	0.30	12.50	41.70
8 (200)	8.63	26.30	16.93	45[3)]	4.02	0.16	13.50	34.30	0.29	15.00	35.06
10 (250)	10.75	28.11	18.90	45[3)]	5.02	0.18	16.00	36.11	0.34	17.50	37.35
12 (300)	12.75	23.90	20.67	45[3)]	5.98	0.20	19.00	32.90	0.39	20.50	34.14
14 (350)	14.00	25.16	21.65	45[3)]	6.55	0.21	21.00	35.16	-	-	-
16 (400)	16.00	27.68	23.62	45[3)]	7.53	0.22	23.50	33.74	-	-	-
20 (500)	20.00	31.38	27.17	45[3)]	9.49	0.26	27.50	42.76	-	-	-
24 (600)	24.00	35.91	27.76	60	11.61	0.30	32.00	47.91	-	-	-

1) Length tolerance (mm): 4" +0.08"/-0.12" (+2/-3mm), 5" ... 8" +0.12"/ -0.16" (+3/-4mm), 10" to 16" +0.16"/-0.20" (+4/-5mm), 20" ... 24" +0.20"/ -0.24" (+5/-6mm)

2) Minimum wall thickness for pressure rates Class 150 or Class 300. For weld-in sensor versions according to EN 10217 (flangeless sensors 7ME3100-xxYxx-xxxx, Y = P, Q, R, S) the tube roundness shall be agreed by ordering (only if the factor of Du/Wxx > 100).

3) For all sensors with flange transducers path angle are 60°

4) L is the length of sensor versions without flanges (weld-in version)

5) B dimension value is an approximate information and may differ a little by flange pressure rate.

A**) Space required for replacement of transducer min. 230 mm (9.1 inch). For replacement with special tool (extraction tool) see more information in „Sensor SONO 3100 accessories and spare parts" on page 3/267.

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Flowmeter SONO 3100/FUS060

Approximate weights for SONO 3100 sensor with ANSI B16.5 flanges

Nominal diameter		Weight [kg (lb)][1]			
DN	DN	CL150		CL300	
[inch]	[mm]	[kg]	[lb]	[kg]	[lb]
4	100	32	70.5	35	77.2
5	125	38	83.8	44	97.0
6	150	45	99.2	52	114.6
8	200	58	127.9	79	174.2
10	250	75	165.3	117	257.9
12	300	92	202.8	151	332.9
14	350	113	249.1	-	-
16	400	141	310.9	-	-
20	500	207	456.4	-	-
24	600	276	608.5	-	-

1) Weight of system incl. process flanges and standard O-ring transducers. For sensors with flange transducer please add approx. 10 kg (22.05 lb). For SS terminal housings instead of the standard PA housing add approx. 5 kg (11.03 lb).

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Overview

SONOKIT is a transit time based ultrasonic flowmeter for retrofitting on existing pipelines.

The kit offers all necessary parts and special tools to make the installation as 1-path or 2-path flowmeter.

The set is made for installation on empty pipes or pipes under pressure without process shut-down (hot-tap).

Please contact Siemens for further information on hot-tap tools and instructions.

SONOKIT has inline transducers (in contact with media) which assure superior accuracy and performance.

Benefits

- Cost-effective solution – contains all the necessary components for retrofitting
- SONOKIT is easy to install in pipeline sizes DN 200 to DN 4000 (8" to 160") 1-path DN 100 to DN 2400 (4" to 96").
- No bypass installation necessary – withstands pressures up to 40 bar (580 psi) and media temperatures between -20 °C and +200 °C (-4 °F and +392 °F)
- High accuracy – the bigger the pipe, the more accurate the result
- Solid construction and no moving parts for a 100 % maintenance and obstruction-free flowmeter
- The SONOKIT comes with transducers in IP68 enclosure
- Available in a robust version that can be buried and withstands constant flooding
- Inline transducers assure superior accuracy and performance
- Automatic calculation of the calibration factor when pipe geometry data are entered in the transmitter
- FUS060 transmitter versions with HART or PROFIBUS PA
- FUS080 transmitter, battery or mains-powered

Application

- Raw water intake for water treatment plants
- Water distribution systems
- Irrigation systems
- Power generation (energy and water)
- District heating plants
- Cooling water plants within the industry and in power stations
- Systems within the oil and refinery business
- Sewage treatment plants
- Plants transporting non-conductive liquids

Design

The SONOKIT package box contains all necessary parts to build an ultrasonic flowmeter on existing pipes depending on choices at ordering:

- Papers to wrap around pipes for alignment of sensors
- Transducer alignment tools
- Mounting plates, transducer holders and SONO 3200 transducers
- Transducer cables
- SITRANS FUS060 or FUS080 transmitter for wall mounting
- 4-path version is available on request

Technical specifications

The transmitter related to this system is the SITRANS FUS080 or FUS060.

Technical specifications to the FUS060 see page 3/245 and to FUS080 see page 3/251.

Accuracy	
Typical, depending on accuracy of measurements of installation	• 2-path: ≤ ± (0.5 … 1.5 %) • 1-path: ≤ ± (1 … 3 %)

Note:
Accuracy depends on the accuracy of the measurements taken at location. This means that inaccurate measurements of angles, distance between transducers, wall thickness and pipe diameter have a direct effect on the accuracy. Values measured are entered into the memory of the FUS060 or FUS080 transmitter.

Requirements for pipes

Size	FUS060: DN 100 … DN 4000 (4" … 160") FUS080: DN 100 … DN 1200 (4" … 48")
Line pressure	max. 40 bar (580 psi)
Media temperature	
• Standard	-10 ... +200 °C (14 ... 392 °F)
• ATEX Ex d version	-20 .... +200 °C (-4 … +392 °F)
• ATEX Ex i version	-10 ... +200 °C (+14 ... +392 °F)
• Specials	-200 °C (-328 °F) or up to 250 °C (482 °F)
Ambient temperature sensor	
• Standard and Ex-i version	-20 ... +60 °C (-4 ... +140 °F)
• Ex d version	-20 ... +180 °C (-4 ... +356 °F)
Transducer enclosure/ approvals/certificates	
Standard version	IP67 (NEMA 6)/IP68 (NEMA 6P)
Ex approval	System ATEX approval for SONO 3200 Ex i transducers together with transmitter FUS060-Ex: ATEX II 2G Ex dem [ia/Ib] IIC T6/T4/T3 or ATEX II 2G Ex d IIC T3-T6 Gb with SONO 3200 Ex d transducers (for standard FUS060 transmitter, installed outside of Ex zone)
Material certificates	EN 10204-3.1 material certificate on transducer mounting parts
Transducer materials	
Terminal housing	Standard version: PA 6.6, 100 °C (212 °F) or stainless steel AISI 316, 200 °C (392 °F)
Transducer body	Standard version: Stainless steel AISI 316, 200 °C (392 °F)

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Flowmeter SONOKIT (with FUS060 or FUS080)

Materials of existing pipeline	
Steel	Transducer holder: EN 10273 or EN 10216 (P235GH)
	Mounting plates[1]: EN 10273 or EN 10216 (P235GH)
Concrete	Transducer holder: Stainless steel AISI 316 or similar
	Mounting plates[1]: (not included)
Stainless steel	Transducer holder: Stainless steel AISI 316 or similar
	Mounting plates[1]: Stainless steel AISI 316 or similar
Pipe wall thickness	
Steel pipe (AISI 316 and St. 37.2 or corresponding material)	Transducer and holder available in length L = 160, allowing a pipe wall thickness up to 20 mm (0.79")
Concrete pipe	Transducer and holder available in length L = 230, allowing a pipe wall thickness up to 200 mm (7.9") and pipe sizes ≥ DN 600

Dimension of the package box (L x W x H, approx.)	856 x 390 x 344 mm (33.7" x 15.4" x 13.5")
Weight example of a package (standard 2-path with FUS060)	approx. 53 kg (116.8 lb)
Certificates and approvals	
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on a CD
Material certificate	Material certificate for the transducer parts according to EN 10204-3.1 is optionally available
Approvals	No custody transfer approvals

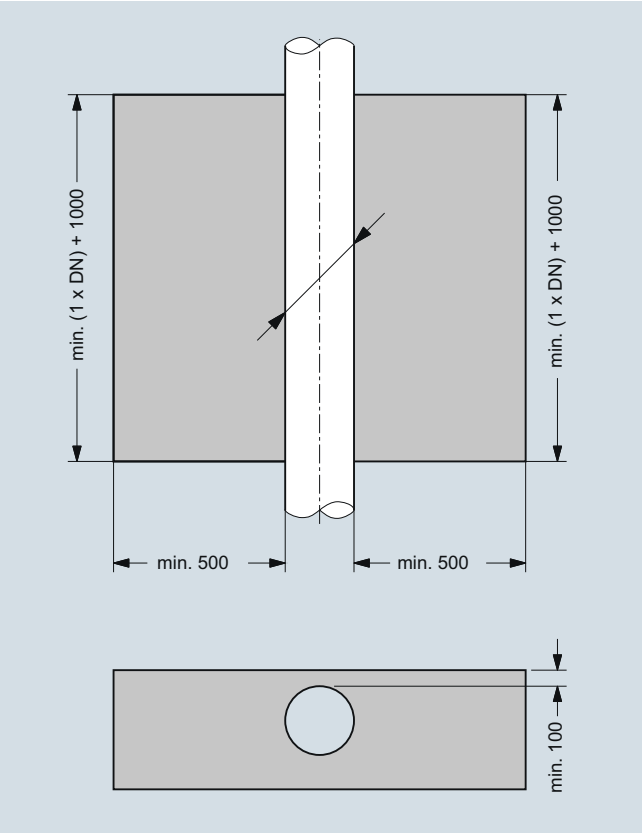
Information on PED approval:

The SONOKIT includes the pipe mounting parts only and therefore it cannot be PED-approved. After the installation, all installation-related activities (welding, pressure test etc.) are the responsibility of the customer.

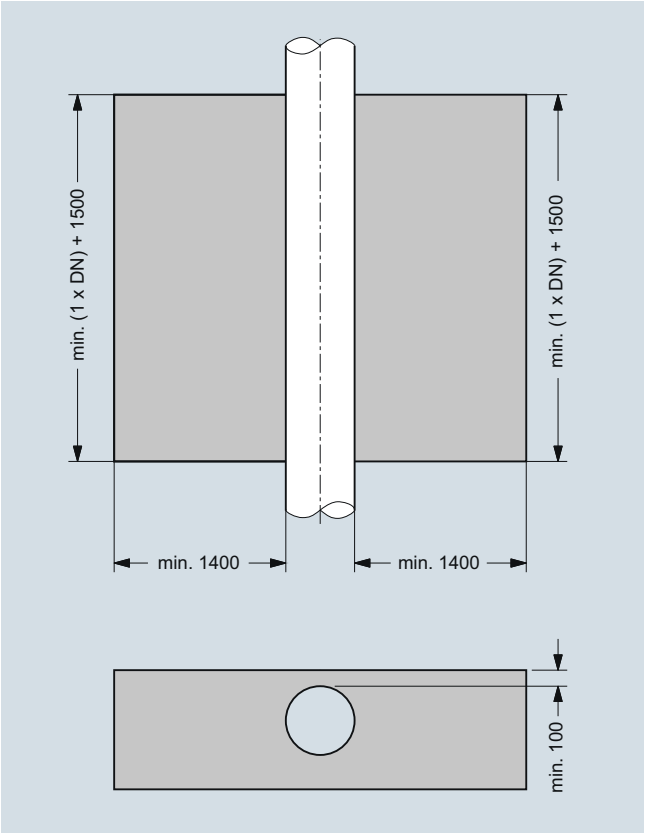
[1] Mounting plates are only included for empty pipe installation types (refer to selection "A"). For tapping-band types holder and mounting plates are not included (refer to selection "C").

Installation requirements

The space requirements (in mm) around the pipe for retrofitting a SITRANS F US ultrasonic flowmeter type SONOKIT are given below:



Empty pipe installation



Hot-tap installation

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Selection and Ordering data		Article No.	Ord. code
SITRANS F US SONOKIT 1-path sensor		7ME3210 -	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Diameter	**Qn setting [m^3/h]**		
DN 100 (4")	100	1 P	
DN 125 (5")	150	1 T	
DN 150 (6")	220	2 B	
DN 200 (8")	380	2 F	
DN 250 (10")	600	2 K	
DN 300 (12")	850	2 P	
DN 350 (14")	1000	2 T	
DN 400 (16")	1300	3 B	
DN 450 (18")	1700	3 F	
DN 500 (20")	2200	3 K	
DN 550 (22")	2600	3 P	
DN 600 (24")	3200	3 T	
DN 650 (26")	3600	4 B	
DN 700 (28")	4200	4 F	
DN 750 (30")	4800	4 K	
DN 800 (32")	5500	4 P	
DN 900 (36")	7500	5 B	
DN 1000 (40")	9000	5 K	
DN 1100 (44")	10000	5 P	
DN 1200 (48")	13200	5 T	
Only for FUS060			
DN 1300 (52")	14000	6 A	
DN 1400 (56")	16800	6 C	
DN 1500 (60")	19000	6 E	
DN 1600 (64")	22800	6 G	
DN 1700 (68")	25000	6 J	
DN 1800 (72")	27600	6 L	
DN 1900 (76")	31000	6 N	
DN 2000 (80")	36000	6 Q	
DN 2100 (84")	37000	6 S	
DN 2200 (88")	42000	6 U	
DN 2300 (92")	45000	6 W	
DN 2400 (96")	51000	7 A	
Installation method[3]			
Empty pipe (incl. transducer holder and mounting plates). Alignment rods and tools must be ordered as accessories.		A	
Hot tap, mounting under pressure (mounting plates **not** incl.). Special mounting tools to be ordered separately.		B	
SONOKIT for tapping band (DN 200 ... DN 1800) (trandsducer holder and mounting plates **not** incl., tapping band to be ordered separately)[1]		C	
Transducer holder			
None (for tapping band)		0	
Carbon steel, length = 160 mm, mounting plates in carbon steel		1	
Stainless steel, length = 160 mm, mounting plates in stainless steel		2	
Stainless steel, length = 230 mm, for concrete pipe (DN 600 ... DN 2400)		3	
Transducer type and approval			
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 100 °C (212 °F), no approval		1	
IP68 SS housing, PN 40, O-ring, 180 °C (356 °F), Ex d, ATEX approval (only with standard FUS060)		2	
IP68 PA housing, Sylgard potting kit, PN 40, O-ring, 100 °C (212 °F), no approval		3	
IP68 SS housing, Sylgard potting kit, PN 40, O-ring, 200 °C (392 °F), no approval		4	
IP67 SS housing, PN 40, O-ring, 190 °C (374 °F), Ex i type, ATEX approval (only with FUS060 Ex)		5	
Cable gland entries			
Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5 (FUS080 only M20)		1	
Cable glands ½" NPT in transducers and in transmitter (only with FUS060)		2	
Transmitter version of SITRANS FUS060 (only DN 100 ... 2400 (4" ... 96")			
IP65 (NEMA 4), 120/230 V AC		N	
IP65 (NEMA 4), 24 V AC/DC		P	
IP65 (NEMA 4), 24 V AC/DC Ex version		Q	
Transmitter version of SITRANS FUS080 (only DN 100 ... 1200 (4" ... 48"))			
PDM software tool and IrDA-adapter, which are needed for settings update, to be ordered separately, see FUS080 accessories			
IP67/NEMA 4X/6 115 ... 230 V AC		U	
IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack		V	
IP67/NEMA 4X/6 115 ... 230 V AC, incl. 3.6 V single battery backup		W	
IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)[2]		X	
Transmitter output module			
Transmitter SITRANS FUS080:			
Pulse and/or alarm output (standard for FUS080).		A	
Transmitter SITRANS FUS060:			
HART, 1 pulse output, 1 relay		B	
HART Ex version, 1 pulse output, 1 relay		C	
PROFIBUS PA, 1 pulse/frequency		D	
Transducer coaxial cables (with FUS080 only, 15 and 30 m, 70°C (158 °F) cable types)			
2 x 3 m, max. 70 °C (158 °F), the only option for Ex i		0	
2 x 15 m, max. 70 °C (158 °F)		1	
2 x 30 m, high temp. max. 200 °C (392 °F)		2	
2 x 30 m, max. 70 °C (158 °F)		3	
2 x 60 m, max. 70 °C (158 °F)		4	
2 x 90 m, max. 70 °C (158 °F)		5	
2 x 120 m, max. 70 °C (158 °F)		6	
2 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i		7	
2 x 15 m, high temp. max. 200 °C (392 °F)		8	
Special version (add Order code):			
No transducer cable, cable length 2 x 3 m, the only option for Ex i		9	R0A
No transducer cable, cable length 2 x 15 m		9	R0B
No transducer cable, cable length 2 x 30 m		9	R0C
No transducer cable, cable length 2 x 60 m		9	R0D
No transducer cable, cable length 2 x 90 m		9	R0E
No transducer cable, cable length 2 x 120 m		9	R0F

[1] Tapping band via special request

[2] Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs."

[3] Mounting tools must be ordered separately as "-Z"-options.

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Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data	Order code
Additional information	
Please add „**-Z**" to Article No. and specify Order code(s) and plain text.	
Material certificate	
EN 10204-3.1, transducer body material	**F30**
EN 10204-3.1, transducer holder material	**F31**
EN 10204-3.1, mounting plate material	**F32**
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	**Y17**
Accessories	
Alignment rods-set for DN 100 ... 650 (4" ... 26") ∅ = 25 mm, L = 500 mm, 3 pcs.	**S10**
Alignment rods-set for DN 700 ... 1900 (28" ... 76") ∅ = 25 mm, L = 500 mm, 6 pcs.	**S11**
Alignment rods-set for DN 2000 ... 2400 (80" ... 96") ∅ = 25 mm, L = 500 mm, 8 pcs.	**S12**
Spanner key for tranducer mounting type SONO 3200 O-ring type	**T11**
Tool set with various mounting/spare parts for SONOKIT installation	**T12**

Operating instructions

Description	Article No.
SITRANS FUS060	
• English	**A5E01204521**
• German	**A5E02123845**
SITRANS FUS080	
• English	**A5E03059912**
• German	**A5E31628428**
• Spanish	**A5E31628493**
• French	**A5E31628438**
SITRANS F US SONOKIT 1-path	
• English	**A5E00814557**
• German	**A5E02610428**
• Spanish	**A5E02608231**
• French	**A5E02610419**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Please use online Product selector to get latest updates. Product selector link:
www.pia-selector.automation.siemens.com

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Selection and Ordering data		Article No.	Ord. code
SITRANS F US SONOKIT 2-path sensor		7ME3220-	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Diameter	**Qn setting [m^3/h]**		
DN 200 (8")	380	2F	
DN 250 (10")	600	2K	
DN 300 (12")	850	2P	
DN 350 (14")	1000	2T	
DN 400 (16")	1300	3B	
DN 450 (18")	1700	3F	
DN 500 (20")	2200	3K	
DN 550 (22")	2600	3P	
DN 600 (24")	3200	3T	
DN 650 (26")	3600	4B	
DN 700 (28")	4200	4F	
DN 750 (30")	4800	4K	
DN 800 (32")	5500	4P	
DN 900 (36")	7500	5B	
DN 1000 (40")	9000	5K	
DN 1100 (44")	10 000	5P	
DN 1200 (48")	13 200	5T	
Only for FUS060			
DN 1300 (52")	14 000	6A	
DN 1400 (56")	16 800	6C	
DN 1500 (60")	19 000	6E	
DN 1600 (64")	22 800	6G	
DN 1700 (68")	25 000	6J	
DN 1800 (72")	27 600	6L	
DN 1900 (76")	31 000	6N	
DN 2000 (80")	36 000	6Q	
DN 2100 (84")	37 000	6S	
DN 2200 (88")	42 000	6U	
DN 2300 (92")	45 000	6W	
DN 2400 (96")	51 000	7A	
DN 2500 (100")	53 000	7C	
DN 2600 (104")	60 000	7E	
DN 2700 (108")	62 000	7G	
DN 2800 (112")	72 000	7J	
DN 2900 (116")	71 000	7L	
DN 3000 (120")	78 000	7N	
DN 3100 (124")	82 000	7Q	
DN 3200 (128")	85 000	7S	
DN 3300 (132")	92 000	7U	
DN 3400 (136")	100 000	7W	
DN 3500 (140")	100 000	8A	
DN 3600 (144")	110 000	8C	
DN 3700 (148")	120 000	8E	
DN 3800 (152")	130 000	8G	
DN 3900 (156")	130 000	8J	
DN 4000 (160")	144 000	8L	
Installation method[2]			
Empty pipe (incl. transducer holder and mounting plates). Alignment rods and tools must be ordered as accessories.		A	
Hot tap, mounting under pressure (mounting plates **not** incl.). Special mounting tools to be ordered separately.		B	
SONOKIT for tapping band (DN 200 ... DN 1800) (trandsducer holder and mounting plates **not** incl., tapping band to be ordered separately)[1]		C	

[1] Tapping band via special request

[2] Mounting tools must be orderd separately as "-Z" options

Selection and Ordering data	Article No.	Ord. code
SITRANS F US SONOKIT 2-path sensor	7ME3220-	
Transducer holder		
None (for tapping band)	0	
Carbon steel, length = 160 mm, mounting plates in carbon steel	1	
Stainless steel, length = 160 mm, mounting plates in stainless steel	2	
Stainless steel, length = 230 mm, for concrete pipe (DN 600 ... DN 4000)	3	
Transducer type and approval		
IP67 (NEMA 4X/6) PA housing, PN 40, O-ring, 100 °C (212 °F), no approval	1	
IP68 SS housing, PN 40, O-ring, 180 °C (356 °F), EEx d, ATEX approval (only with standard FUS060)	2	
IP68 PA housing, Sylgard potting kit, PN 40, SS, O-ring, 100 °C (212 °F), no approval	3	
IP68 SS housing, Sylgard potting kit, PN 40, SS, O-ring, 200 °C (392 °F), no approval	4	
IP67 SS housing, PN 40, O-ring, 190 °C (374 °F), Ex i, ATEX approval (only with FUS060 Ex)	5	
Cable gland entires		
Cable glands M20 in transducers and in transmitter M25/20/16 x 1.5 (FUS080 only M20)	1	
Cable glands ½" NPT in transducers and in transmitter (only with FUS060)	2	
Transmitter version of SITRANS FUS060 (only DN 200 ... 4000 (8" ... 160"))		
IP65 (NEMA 4), 120/230 V AC	N	
IP65 (NEMA 4), 24 V AC/DC	P	
IP65 (NEMA 4), 24 V AC/DC Ex version	Q	
Transmitter version of SITRANS FUS080 (only DN 200 ... 1200 (8" ... 48"))		
PDM software tool and IrDA-adapter, which are needed for settings update, to be ordered separately, see FUS080 accessories		
IP67/NEMA 4X/6 115 ... 230 V AC	U	
IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack	V	
IP67/NEMA 4X/6 115 ... 230 V AC, incl. 3.6 V single battery backup	W	
IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)[4]	X	
Transmitter output module		
Transmitter SITRANS FUS080:		
Pulse and/or alarm output (standard for FUS080).	A	
Transmitter SITRANS FUS060:		
HART, 1 pulse output, 1 relay	B	
HART Ex version, 1 pulse output, 1 relay	C	
PROFIBUS PA, 1 pulse/frequency	D	

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Flowmeter SONOKIT (with FUS060 or FUS080)

Selection and Ordering data	Article No.	Ord. code	
SITRANS F US SONOKIT 2-path sensor	**7ME3220 -** ■■■■■ - ■■■■		■■■
Transducer coaxial cables (with FUS080 only, 15 and 30 m, 70°C (158 °F) cable types)			
4 x 3 m, max. 70 °C (158 °F), the only option for Ex i		**0**	
4 x 15 m, max. 70 °C (158 °F)		**1**	
4 x 30 m, high temp. max. 200 °C (392 °F)		**2**	
4 x 30 m, max. 70 °C (158 °F)		**3**	
4 x 60 m, max. 70 °C (158 °F) (up to DN 3000)		**4**	
4 x 90 m, max. 70 °C (158 °F) (up to DN 3000)		**5**	
4 x 120 m, max. 70 °C (158 °F) (up to DN 3000)		**6**	
4 x 3 m, high temp. max. 200 °C (392 °F), the only option for Ex i		**7**	
4 x 15 m, high temp. max. 200 °C (392 °F)		**8**	
Special version (add Order code):			
No transducer cable, cable length 4 x 3 m, the only option for Ex i		**9**	**R0A**
No transducer cable, cable length 4 x 15 m		**9**	**R0B**
No transducer cable, cable length 4 x 30 m		**9**	**R0C**
No transducer cable, cable length 4 x 60 m (up to DN 3000)		**9**	**R0D**
No transducer cable, cable length 4 x 90 m (up to DN 3000)		**9**	**R0E**
No transducer cable, cable length 4 x 120 m (up to DN 3000)		**9**	**R0F**

Selection and Ordering data	Order code
Additional information	
Please add „**-Z**" to Article No. and specify Order code(s) and plain text.	
Material certificate	
EN 10204-3.1, transducer body material	**F30**
EN 10204-3.1, transducer holder material	**F31**
EN 10204-3.1, mounting plate material	**F32**
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	**Y17**
Accessories	
Alignment rods-set for DN 100 ... 750 (4" ... 30") ∅ = 25 mm, L = 500 mm, 3 pcs.	**S10**
Alignment rods-set for DN 800 ... 2100 (32" ... 84") ∅ = 25 mm, L = 500 mm, 6 pcs.	**S11**
Alignment rods-set for DN 2200 ... 4000 (88" ... 160") ∅ = 25 mm, L = 500 mm, 8 or 10 pcs.	**S12**
Spanner key for tranducer mounting type SONO 3200 O-ring type	**T11**
Tool set with various mounting/spare parts for SONOKIT installation	**T12**

Operating instructions

Description	Article No.
SITRANS FUS060	
• English	**A5E01204521**
• German	**A5E02123845**
SITRANS FUS080	
• English	**A5E03059912**
• German	**A5E31628428**
• Spanish	**A5E31628493**
• French	**A5E31628438**
SITRANS F US SONOKIT 2-path	
• English	**A5E02445496**
• German	**A5E02554972**
• Spanish	**A5E02555037**
• French	**A5E02555044**
• Czech	**A5E02814192**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:
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www.pia-selector.automation.siemens.com

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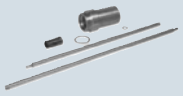
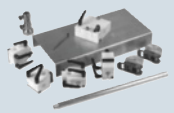
Flowmeter SONOKIT accessories and spare parts

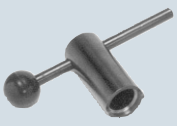
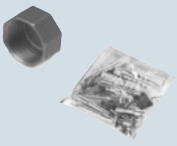
Accessories

Potting kit for SONO 3200 terminal housing

Description	Article No.	
Potting kit for terminal box of SONO 3200 transducers for IP68/NEMA 6P (not for Ex sensors)	**FDK:085L2403**	

Tools for SONO 3200 transducers and SONOKIT

Description	Article No.	
Extraction tool for replacement of SONO 3200 O-ring transducers under pressure and for hot-tapping (working conditions: typically water, max. 40 bar and max. 60 °C (max. 580 psi and max. 140 °F)) For transducer length:		
• Up to 160 mm (6.3")	**FDK:085B5333**	
• Up to 230 mm (9.1")	**FDK:085B5335**	
Angle measurement tool for SONOKIT	**FDK:085B5330**	
Hot-tap drilling tool for SONOKIT, the extraction tool is required, max. pressure 40 bar (580 psi)	**FDK:085B5392**	
Alignment tool for SONOKIT (typically for hot-tapping) For use on pipe sizes in the range DN 300 to DN 1200.	**FDK:085B5393**	

Description	Article No.	
Alignment rods-set for DN 100 ... 650 (4" ... 26"), ∅ = 25 mm, L = 500 mm, 3 pcs.	**A5E02609214**	
Alignment rods-set for DN 700 ... 1900 (28" ... 76"), ∅ = 25 mm, L = 500 mm, 6 pcs.	**A5E02609215**	
Alignment rods-set for DN 2000 ... 4000 (80" ... 160"), ∅ = 25 mm, L = 500 mm, 10 pcs.	**A5E02609216**	
Spanner key for tranducer mounting type SONO 3200 O-ring type	**A5E02609218**	
Tool set with various mounting/spare parts for SONOKIT installation	**A5E02609219**	

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Flowmeter SONOKIT (with FUS060 or FUS080)

Cable connection boxes
(For the connection of individual transducer cables with the FUS060 transducer cables)

Description	Article No.	
Junction box for coaxial cable		
• IP68 metal box for 2 coaxial cables	**FDK:085B1360**	
• IP68 metal box for 4 coaxial cables	**FDK:085B1361**	
• IP68 EEx e plastic box for 2 coaxial cables, no ATEX approval	**FDK:085B1362**	
• IP68 EEx e plastic box for 4 coaxial cables, no ATEX approval	**FDK:085B1363**	

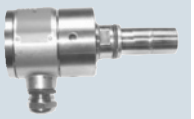
Spare parts

Transducer SONO 3200 spare parts, complete transducer with ½"-NPT cable glands

Trans-ducer type	Material	Gasket	Pressure rating	Terminal housing	Approval	Temperature range [°C (°F)]	Length [mm (inch)]	Article No.	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 … +100 (-4 ... +212)	160 (6.3)	**A5E00839476**	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 … +200[1] (-4 ... +392)	160 (6.3)	**A5E00839435**	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 … +100 (-4 ... +212)	230 (9.41)	**A5E00839477**	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 … +200[1] (-4 ... +392)	230 (9.41)	**A5E00839437**	

1) 316 SS housing for -20 ... +200 °C (-4 ... +392 °F) media temp. but cable glands only for -20 ... +100 °C (-4 ... +212 °F) ambient temp.

Transducer SONO 3200 spare parts, complete transducer with M20 cable glands

Trans-ducer type	Material	Gasket	Pressure rating	Terminal housing	Approval	Temperature range [°C (°F)]	Length [mm (inch)]	Article No.	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 … +100 (-4 ... +212)	160 (6.3)	**FDK:085B5454**	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 … +200[1] (-4 ... +392)	160 (6.3)	**FDK:085B5455**	
O-ring	316 SS	O-ring	PN 40	Plastic PA 6.6		-20 … +100 (-4 ... +212)	230 (9.41)	**FDK:085B5458**	
O-ring	316 SS	O-ring	PN 40	316 SS	Ex d[2]	-20 … +200 (-4 ... +392)	160 (6.3)	**FDK:085B5452**	
O-ring	316 SS	O-ring	PN 40	316 SS	Ex i[3]	-10 … +200 (14 ... 392)	160 (6.3)	**A5E00836462**	
O-ring	316 SS	O-ring	PN 40	316 SS		-20 … +200[2] (-4 ... +392)	230 (9.41)	**FDK:085B5459**	

1) 316 SS housing for -20 ... +200 °C (-4 ... +392 °F) media temp. but cable glands only for -20 ... +100 °C (-4 ... +212 °F) ambient temp.
2) ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb
3) For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

Transducer SONO 3200 spare parts, transducer terminal housing with M20 cable glands

Type	Article No.	
Material: PA 6.6, Temperature range: -20 … +100 °C (-4 ... +212 °F)	**FDK:085B5501**	
Material: AISI 316, Temperature range: -20 … +200 °C (-4 ... +392 °F)	**FDK:085B5504**	
Material: AISI 316, Ex d[1], Temperature range: -20 … +200 °C (-4 ... +392 °F)	**FDK:085B5505**	
Material: AISI 316, Ex i[2], Temperature range: -10 … +200 °C (14 ... 392 °F)	**A5E00835255**	

1) ATEX (Ex) IIC 2G Ex d IIC T3-T6 Gb
2) For systems with FUS060 ATEX IIC 2G Ex dem [ia/ib] T6/T4/T3

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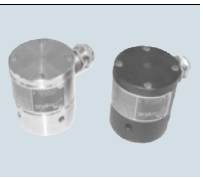
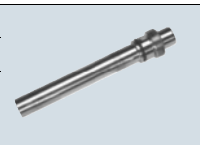
Transducer SONO 3200 spare parts, transducer terminal housing with ½"-NPT cable glands

Type	Article No.
Material: PA 6.6, Temperature range: -20 … +100 °C (-4 ... +212 °F)	**A5E00839460**
Material: AISI 316, Temperature range: -20 … +200 °C (-4 ... +392 °F)	**A5E00839427**



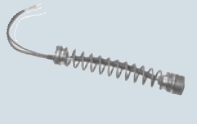
Transducer SONO 3200 spare parts transducer body with insert as well as insert only

Temperature range [°C (°F)]	Gasket	Length [mm (inch)]	Article No.
-20 … +200 (-4 ... +392)	O-ring (FFKM O-ring material)[1]	160 (6.3)	**FDK:085B1406**
-20 … +200 (-4 ... +392)	O-ring (FKM 602 O-ring material)[2]	160 (6.3)	**FDK:085B5510**
-20 … +200 (-4 ... +392)	O-ring	230 (9.41)	**FDK:085B5511**



[1] Chemical resistant O-ring material. Body specially for Ex-approved transducers.
[2] Body specially for standard transducers.

Temperature range [°C (°F)]	Length [mm (inch)]	Article No.
-20 … +200 (-4 ... +392)	160 (6.3)	**FDK:085B1419**
-20 … +200 (-4 ... +392)	230 (9.41)	**FDK:085B1420**



Transducer SONO 3200 gasket

Type	Pressure rating	Material	Temperature range [°C (°F)]	Article No.
Gasket O-ring (3 pcs. for O-ring transducers)	PN 40	FKM	-20 … +200 (-4 ... +392)	**FDK:085B1089**

Cables for SONOKIT SONO 3200 transducers with FUS060

Description	Length [m (ft)]	Article No.
Coaxial cable for FUS060, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	3 (9.84)	**A5E00875101**
	15 (49.21)	**A5E00861432**
	30 (98.43)	**A5E01278662**
	60 (196.85)	**A5E01278682**
	90 (295.28)	**A5E01278687**
	120 (393.70)	**A5E01278698**
High temp. coaxial cable for FUS060; with 0.3 m brown PTFE high temp. transducer part, max. 200 °C (392 °F) and black PVC transmitter part with SMB plug, max. 70 °C (158 °F); (impedance 75 Ω) (2 pcs.)	3 (9.84)	**A5E00875105**
	15 (49.21)	**A5E00861435**
	30 (98.43)	**A5E01196952**

Cables for SONOKIT SONO 3200 transducers with FUS080

Description	Length [m (ft)]	Article No.
Coaxial cable for FUS080, (75 Ω, max. 70 °C (158 °F), black PVC) (2 pcs.)	15 (49.21)	**A5E02478541**
	30 (98.43)	**A5E02478751**

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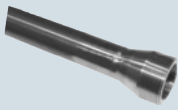
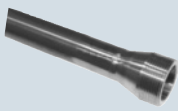
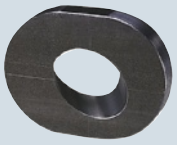
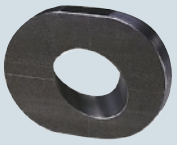
Flowmeter SONOKIT (with FUS060 or FUS080)

Transducer holder for SONOKIT SONO 3200 transducers

Description	Article No.	
1-path (each incl. 1 pc.)		
• 160 mm (6.3") stainless steel 45°, DN 100 … DN 150 (4" ... 6")	**FDK:085L1103**	
• 160 mm (6.3") carbon steel 45°, DN 100 … DN 150 (4" ... 6")	**FDK:085L1102**	
• 230 mm (9.1") for concrete pipe 60°, DN 600 … DN 2400 (24" ... 96")	**FDK:085L1107**	
• 160 mm (6.3") stainless steel 60°, DN 200 … DN 2400 (8" ... 96")	**FDK:085L1105**	
• 160 mm (6.3") carbon steel 60°, DN 200 … DN 2400 (8" ... 96")	**FDK:085L1104**	
2-path (each incl. 1 pc.)		
• 230 mm (9.1") for concrete pipe 60°, DN 600 … DN 4000 (24" ... 160")	**FDK:085L1111**	
• 160 mm (6.3") stainless steel 60°, DN 200 … DN 4000 (8" ... 160")	**FDK:085L1109**	
• 160 mm (6.3") carbon steel 60°, DN 200 … DN 4000 (8" ... 160")	**FDK:085L1108**	

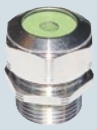
The other transducer holder parts are either completely in stainless steel for the concrete and stainless steel pipes (AISI 316L/1.4404 or similar). For carbon pipes the part welded onto the pipe is in carbon steel (St.37 or similar). Thread part is stainless steel (AISI 316L/1.4404 or similar).

Mounting plate for SONOKIT SONO 3200 transducers

Description	Article No.	
1-path (each incl. 1 pc.)		
• Stainless steel plate, 45°, DN 100 … DN 150 (4" ... 6")	**FDK:085L1113**	
• Carbon steel plate, 45°, DN 100 … DN 150 (4" ... 6")	**FDK:085L1112**	
• Stainless steel plate, 60°, DN 200 … DN 2400 (8" ... 96")	**FDK:085L1115**	
• Carbon steel plate, 60°, DN 200 … DN 2400 (8" ... 96")	**FDK:085L1114**	
2-path (each incl. 1 pc.)		
• Stainless steel plate, 60°, DN 200 … DN 4000 (8" ... 160")	**FDK:085L1119**	
• Carbon steel plate, 60°, DN 200 … DN 4000 (8" ... 160")	**FDK:085L1118**	

The mounting plates are either in stainless steel (AISI 316L/1.4404 or similar) or carbon steel (St.37 or similar).

SONO 3200 cable glands

Type/ description	Temperature range [°C (°F)]	Appr	Article No.	
black PA plastic, cable Ø 5 ... 13 mm	-20 ... 100 (-4 ... +212)		**A5E02246304**	
½" NPT gray PA plastic, cable Ø 5 ... 9 mm	-20 ... 100 (-4 ... +212)		**A5E02246309**	
½" NPT crome-plated brass, cable Ø 5 ... 9 mm	-40 ... 100 (-40 ... +212)		**A5E02246258**	
M20 stainless steel, cable Ø 4 ... 6 mm	-25 ... 200 (-13 ... +392)	Ex i	**A5E02246194**	
M20 stainless s teel, cable Ø 5 ... 8 mm	-60 ... 180 (-76 ... +356)	Ex d	**A5E02246311**	

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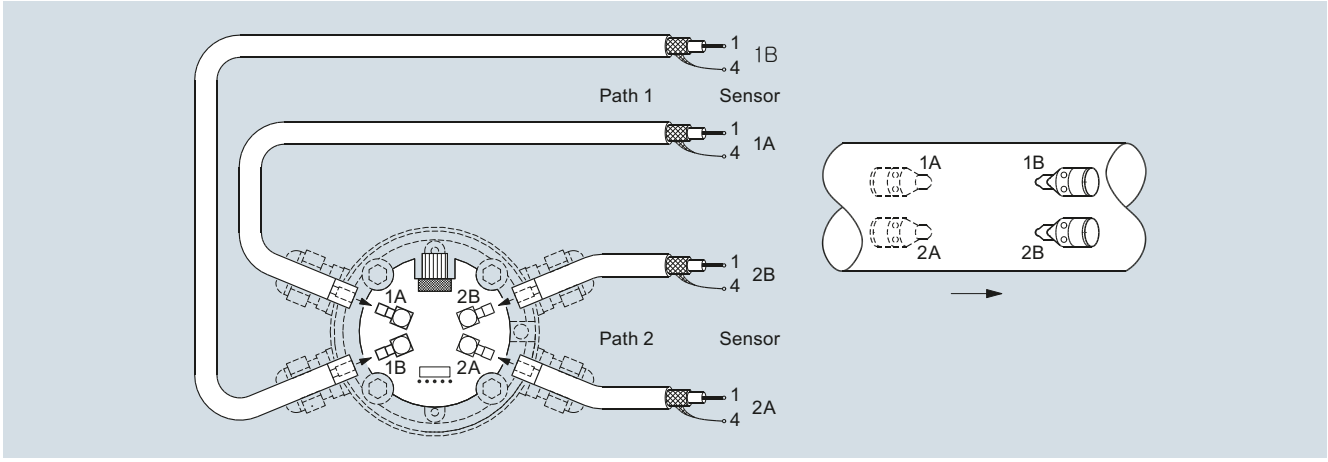
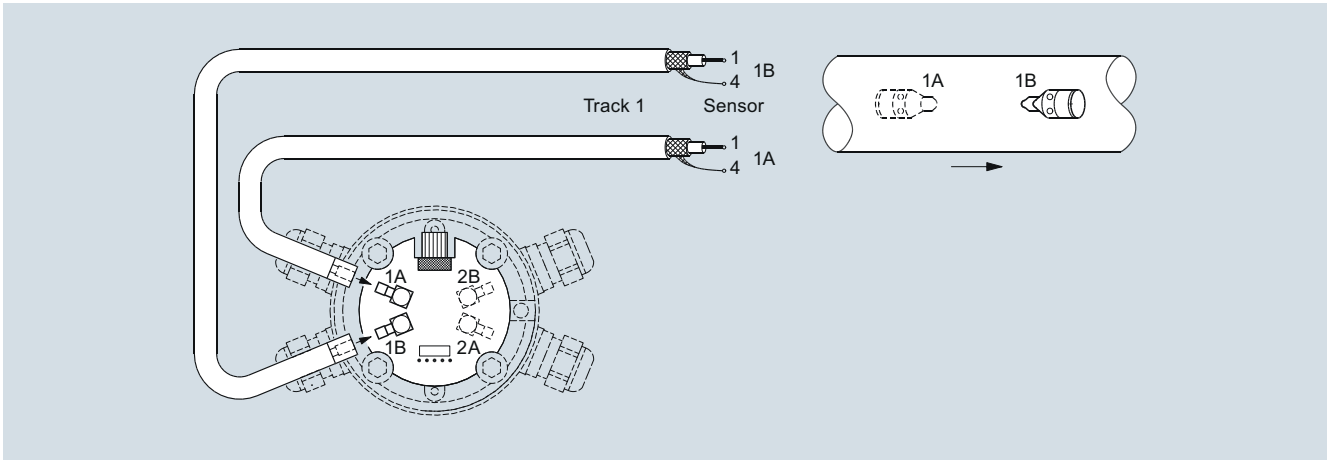
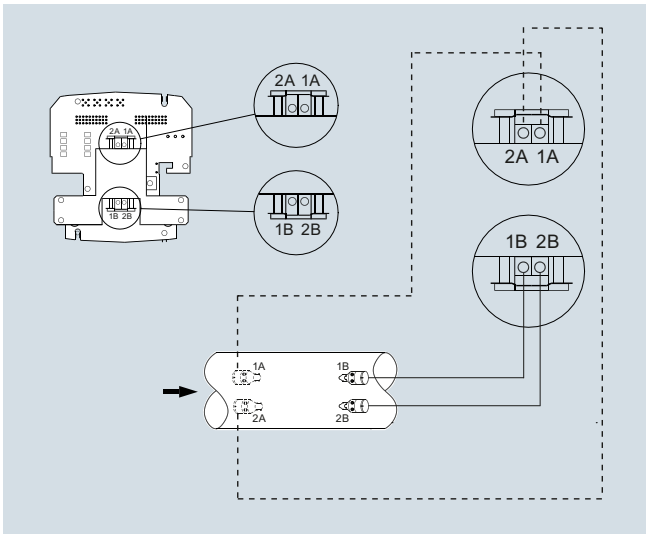
Schematics



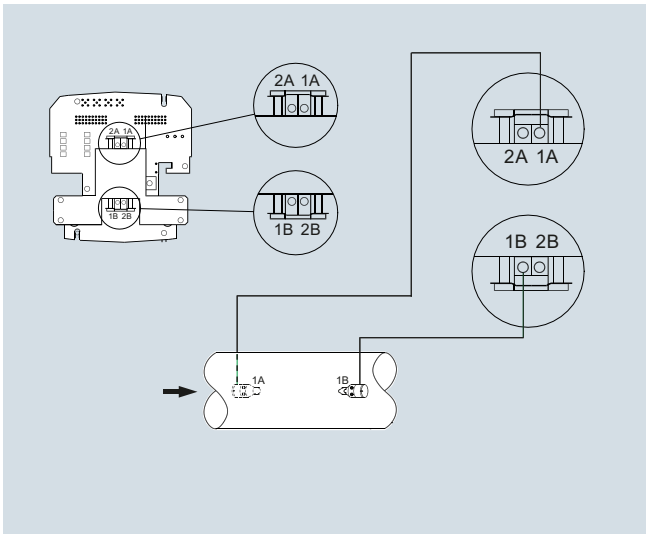
Electrical connection of SITRANS FUS060 and SONOKIT 2-path. Max. 30 m transducer cable length for sizes ≥ DN 3000.



Electrical connection of SITRANS FUS060 and SONOKIT 1-path



Electrical connection of SITRANS FUS080 and SONOKIT 2-path



Electrical connection of SITRANS FUS080 and SONOKIT 1-path

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Flowmeter SITRANS FUS380 standard

Overview

The 2-path flowmeter SITRANS FUS380 comes as battery or mains-powered and is designed to measure water flow in district heating plants, local networks, boiler stations, substations, chiller plants and other general water applications.
The type-approved flowmeter version is named SITRANS FUE380 - see page 3/289.
Technically, the meter types SITRANS FUS380 and SITRANS FUE380 are completely identical, only difference is the calibration limit and the type approval for custody transfer.

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on most district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q_i (min) : Q_s (max) up to 1:400

Application

The main application for SITRANS FUS380 is measurement of water flow or water flow in energy meter systems in district heating networks or chilled water.

Design

The 2-path design of SITRANS FUS380 ensures maximum accuracy under short inlet conditions. The flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUS080.

The unit is available in a compact or a remote version with up to 30 meter distance from flowmeter to transmitter. When ordering a compact version the transducer cables are pre-mounted and ready for installation.

Compact mounting is only possible up to 120 °C (248 °F). The sensor must be isolated to protect transmitter from heat. The transmitter is available in an IP67/NEMA 4X/6 enclosure.

Integration

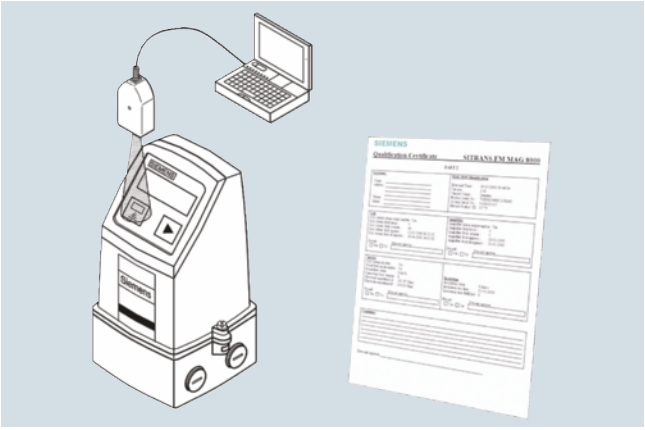
The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading.
SITRANS FUS380 has two digital output functions that can be individually selected.
Pulse output rate is defined when ordering. To get optimal benefit the pulse value must be selected as low as possible.
If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except possible local approvals on the flowmeter.

Function

Together with the SIMATIC PDM tool the FUS380 offers the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with specific data that defines the quality status of the measurement.

The Qualification Certificate shows information about the actual status of the flowmeter:

- General settings, flowmeter and battery information, totalizer values, and pulse output settings
- Detailed information about the transmitter and the sensor functionality, and a main parameter list for evaluating the functionality of the flowmeter



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Configuration SITRANS FUS380

Selection guide SITRANS FUS380, standard version

DN	Q_s (m^3/h)	Q_{max} (m^3/h) (105 % of Q_s)	Q_p (m^3/h)	Q_i (m^3/h) (1:100 of Q_p)	Cut-off (m^3/h)	Cut-off (% of Q_{max})	Typical pulse value[1] (l/pulse)
50	15	15.75	15	0.15	0.075	0.48	1
50	45	47.25	15	0.15	0.075	0.16	1
50	45	47.25	30	0.3	0.150	0.32	1
65	25	26.25	25	0.25	0.125	0.48	1
65	72	75.6	25	0.25	0.125	0.17	1
65	72	75.6	50	0.5	0.250	0.33	1
80	40	42	40	0.4	0.200	0.48	2.5
80	120	126	40	0.4	0.200	0.16	2.5
80	120	126	80	0.8	0.400	0.32	2.5
100	60	63	60	0.6	0.300	0.48	2.5
100	180	189	60	0.6	0.300	0.16	2.5
100	240	252	120	1.2	0.600	0.24	2.5
125	10	10.5	100	1	0.500	4.76	2.5
125	280	294	100	1	0.500	0.17	2.5
125	400	420	200	2	1.000	0.24	2.5
150	150	157.5	150	1.5	0.750	0.48	10
150	420	441	150	1.5	0.750	0.17	10
150	560	588	300	3	1.500	0.26	10
200	250	262.5	250	2.5	1.250	0.48	10
200	700	735	250	2.5	1.250	0.17	10
200	900	945	500	5	2.500	0.26	10
250	400	420	400	4	2.000	0.48	10
250	1 120	1 176	400	4	2.000	0.17	10
250	1 400	1 470	800	8	4.000	0.27	10
300	560	588	560	5.6	2.800	0.48	50
300	1 560	1 638	560	5.6	2.800	0.17	50
300	2 100	2 205	1 120	11.2	5.600	0.25	50
350	750	787.5	750	7.5	3.750	0.48	50
350	2 100	2 205	750	7.5	3.750	0.17	50
350	2 800	2940	1 500	15	7.500	0.26	50
400	950	9 97.5	950	9.5	4.750	0.48	50
400	2 660	2 793	950	9.5	4.750	0.17	50
400	3 600	3 780	1 900	19	9.500	0.25	50
500	1 475	1 548.75	1 475	14.75	7.375	0.48	100
500	4 130	4 336.5	1 475	14.75	7.375	0.17	100
500	5 500	5 775	2 950	29.5	14.750	0.26	100
600	2 150	2 257.5	2 150	21.5	10.750	0.48	100
600	6 020	6 321	2 150	21.5	10.750	0.17	100
600	8 000	8 400	4 300	43	21.500	0.26	100
700	2 900	3 045	2 900	29	14.500	0.48	100
700	8 120	8 526	2 900	29	14.500	0.17	100
700	10 800	11 340	5 800	58	29.000	0.26	100
800	3 800	3 990	3 800	38	19.000	0.48	100
800	10 640	11 172	3 800	38	19.000	0.17	100
800	14 200	14 910	7 600	76	38.000	0.25	100
900	5 000	5 250	3 800	38	19.000	0.36	100
900	14 000	14 700	5 000	50	25.000	0.17	100
900	20 000	21 000	5 000	50	25.000	0.12	100
1 000	6 000	6 300	3 800	38	19.000	0.30	100
1 000	16 800	17 640	6 000	60	30.000	0.17	100
1 000	24 000	25 200	12 000	120	60.000	0.24	100
1 200	9 000	9 450	3 800	38	19.000	0.20	100
1 200	25 200	26 460	9 000	90	45.000	0.17	100
1 200	36 000	37 800	18 000	180	90.000	0.24	100

The values Q_i, Q_p and Q_s are shown on the system label of the FUS380. Q_i (Q_{min}) means the minimal and Q_p (Q_{nom}) the nominal flow rate. Q_s is the highest operatable flow rate. The maxium flow rate (Q_{max}) is 105 % of Q_s. The low flow cut-off is 50 % of Q_i.

In order to obtain best pulse output resolution in the range Q_{min} to Q_s of approx. 100 Hz at Q_s, two or three flow values for every dimension can be selected at ordering. Therefore the ordering data table also shows Q_p (Q_n). This flow rate is between Q_i (Q_{min}) and Q_s and indicates the normal or typical flow.

To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: L/pulse > Q_s (m^3/h) /360.
For example Q_s = 300 m^3/h; L/pulse > 300/360; L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

[1] Typical pulse values for SITRANS FUS380 with pulse length 5 ms. Other values are possible - please see the selections at the 7ME340 Order codes.

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3

Technical specifications

Sensor design	2-path sensor with flanges and inline transducers wet-calibrated from factory
Nominal size (DN 50 ... DN 80 in bronze)	DN 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000, 1200
Pressure rate	PN 16, PN 25, PN 40 EN 1092-1 flanges: • type 01 (B): DN 100 to DN 125 • type 11 (B): DN 150 to DN 1200 • type 11 (B) 'design': DN 50 to DN 80
Pipe material	• DN 100 ... DN 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray. • DN 50 ... 80: Die-cast bronze G-CuSn10/W2.1050.01 (EN 1982)
Transducer design	• DN 100 ... DN 1200: Inline version and welded onto the pipe • DN 50 ... DN 80: Screwed into the pipe
Transducer material	Stainless steel (AISI 316/1.4404)/ brass ($CuZn_{36}Pb_2As$)
Sensor operating conditions	
Ambient temperature	
• Operation	-10 … +60 °C (14 ... 140 °F) (MID version: -10 … +55 °C (14 ... 131 °F))
• Storage	-40 … +85 °C (-40 ... +185 °F)
Measured media	Heating water, according to VDI-2035 (pH 8.2 - 10.5), industrial VdTÜV information sheet 1466 and AGFW information sheet FW 510.
Media/surface temperature	
• DN 100 ... DN 1200	Remote: 2 … 200 °C (35.6 … 392 °F)
• DN 50 ... DN 80	Remote: 2 … 150 °C (35.6 … 302 °F)
• DN 50 ... DN 1200	Compact: 2 … 120 °C (35.6 … 248 °F)
Degree of protection	Sensor connection IP67/NEMA 4X/6
Max. flow velocity	DN 50 … DN 1200: 9 m/s (29.5 ft/s)
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CSPRI-11
• Noise immunity	To EN/IEC 61236-1 (Industry)
Transmitter	
The transmitter related to this system is the SITRANS FUS080. Technical specifications to the FUS080 see page 3/251 ff.	
Sensor cable	
Cable length	Max. 30 m (98.4 ft) between transmitter and sensor
Certificates and approvals	
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on CD
Material certificate	Material certificate according EN 3.1 is optionally available
Calibration report	A standard calibration report is shipped with every flowmeter. Extended accredited ISO/IEC 17025 calibration certificates optionally available
Approvals	No custody transfer approvals

The sensors are approved according to EU directive 97/23/EC dated 29 May 1997 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

SITRANS FUS380 uncertainty

	FUS380
Flow value setting	Predefined settings according to dimension
Approval	No approval
Flow rate v_f	0.02 … 9 m/s (0.065 … 29.5 ft/s)
Output A	Pulse: forward, reverse, forward net, reverse net (Preset: forward)
Output B	Pulse (forward, reverse, forward net, reverse net, alarm, call-up (Preset: alarm)
Pulse value A & B (depending on DN value)	0.1 l/p, 0.25 l/p, 0.5 l/p, 1 l/p, 2.5 l/p, 10 l/p, 25 l/p, 50 l/p, 100 l/p, 250 l/p, 500 l/p, 1 m^3/p, 2.5 m^3/p, 5 m^3/p, 10 m^3/p, 25 m^3/p, 50 m^3/p, 100 m^3/p, 250 m^3/p, 500 m^3/p, 1000 m^3/p
Pulse width	5/10/20/50/100/200/500 ms
Flow unit setup	Preset: m^3/h
Volume unit setup	Preset: m^3

Flowmeter Calibration and traceability

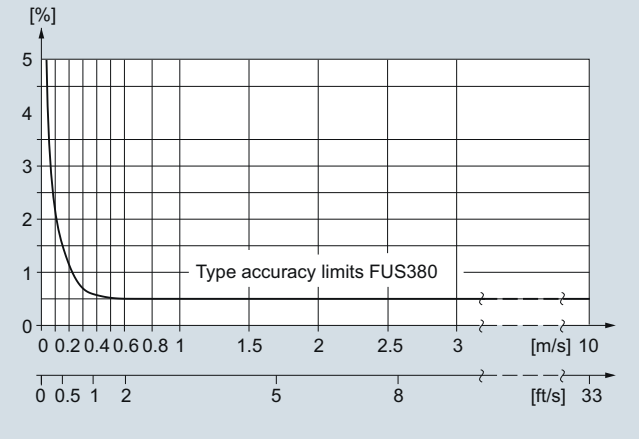
To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability). Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m^3/h to 10 000 m^3/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A standard calibration certificate with Q_n as selected flow is shipped with each SITRANS FUS380. This production calibration protocol consists of 2 x 3 points at Q_i, 10 % Q_p and Q_p (max. 4 200 m^3/h).

Accuracy SITRANS FUS380:

± 0.5 % for 0.5 m/s < v < 10 m/s and ± 0.25/$V_{act.}$ [%] below 0.5 m/s



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Selection and Ordering data			Article-No. Order code
Flowmeter SITRANS FUS380 (standard) ↗			**7ME3400-**
			0-A
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Diameter	**Flow setting [m^3/h] Qp (Qn)[1]**	**Qs**	
DN 50 (2")[2]	15	15	**1A**
DN 50 (2")[2]	15	45	**1C**
DN 50 (2")[2]	30	45	**1D**
DN 65 (2½")[2]	25	25	**1E**
DN 65 (2½")[2]	25	72	**1G**
DN 65 (2½")[2]	50	72	**1H**
DN 80 (3")[2]	40	40	**1J**
DN 80 (3")[2]	40	120	**1L**
DN 80 (3")[2]	80	120	**1M**
DN 100 (4")	60	60	**1N**
DN 100 (4")	60	180	**1Q**
DN 100 (4")	120	240	**1R**
DN 125 (5")	100	100	**1S**
DN 125 (5")	100	280	**1U**
DN 125 (5")	200	400	**1V**
DN 150 (6")	150	150	**2A**
DN 150 (6")	150	420	**2C**
DN 150 (6")	300	560	**2D**
DN 200 (8")	250	250	**2E**
DN 200 (8")	250	700	**2G**
DN 200 (8")	500	900	**2H**
DN 250 (10")	400	400	**2J**
DN 250 (10")	400	1 120	**2L**
DN 250 (10")	800	1 400	**2M**
DN 300 (12")	560	560	**2N**
DN 300 (12")	560	1 560	**2Q**
DN 300 (12")	1 120	2 100	**2R**
DN 350 (14")	750	750	**2S**
DN 350 (14")	750	2 100	**2U**
DN 350 (14")	1 500	2 800	**2V**
DN 400 (16")	950	950	**3A**
DN 400 (16")	950	2 660	**3C**
DN 400 (16")	1 900	3 600	**3D**
DN 500 (20")	1 475	1 475	**3J**
DN 500 (20")	1 475	4 130	**3L**
DN 500 (20")	2 950	5 500	**3M**
DN 600 (24")	2 150	2 150	**3S**
DN 600 (24")	2 150	6 020	**3U**
DN 600 (24")	4 300	8 000	**3V**
DN 700 (28")	2 900	2 900	**4E**
DN 700 (28")	2 900	8 120	**4G**
DN 700 (28")	5 800	10 800	**4H**
DN 800 (32")	3 800	3 800	**4N**
DN 800 (32")	3 800	10 640	**4Q**
DN 800 (32")	7 600	14 200	**4R**
DN 900 (36")	5 000	5 000	**5A**
DN 900 (36")	5 000	14 000	**5C**
DN 900 (36")	10 000	20 000	**5D**
DN 1 000 (40")	6 000	6 000	**5J**
DN 1 000 (40")	6 000	16 800	**5L**
DN 1 000 (40")	12 000	24 000	**5M**
DN 1 200 (48")	9 000	9 000	**5S**
DN 1 200 (48")	9 000	25 200	**5U**
DN 1 200 (48")	18 000	36 000	**5V**

This device is shipped with a Quick Start guide and the SITRANS F manual CD containing the complete manual library. Printed Operating Instructions are available for purchase via PMD.

Selection and Ordering data	Article-No. Order code
Flowmeter SITRANS FUS380 (standard)	**7ME3400-**
	0-A
Flange norm and pressure rating	
System without sensor - only a transmitter FUS080 as spare part - settings as defined with this Article No.	**A**
EN 1092-1 Flanges	
• PN 16 (DN 100 ... DN 1 200)	**C**
• PN 25 (DN 200 ... DN 1 000)	**D**
• PN 40 (DN 50 ... DN 250)[3]	**E**
Compact/remote connection	
Compact version, max. 120 °C (248 °F)	**0**
Remote version, max. 150/200 °C (302/392 °F)	
• 5 m (16.4 ft)	**2**
• 10 m (32.8 ft)	**3**
• 20 m (65.6 ft)	**4**
• 30 m (98.4 ft)	**5**
Pulse output value setup[5]	
0.1 l/p	**1**
1 l/p	**2**
2.5 l/p	**3**
10 l/p	**4**
50 l/p	**5**
100 l/p	**6**
250 l/pulse	**7**
1 m^3/pulse	**8**
0.25 l/pulse	**9** **N0A**
0.5 l/pulse	**9** **N0B**
5 l/pulse	**9** **N0C**
25 l/pulse	**9** **N0D**
500 l/pulse	**9** **N0E**
2.5 m^3/pulse	**9** **N0F**
5 m^3/pulse	**9** **N0G**
10 m^3/pulse	**9** **N0H**
25 m^3/pulse	**9** **N0J**
50 m^3/pulse	**9** **N0K**
100 m^3/pulse	**9** **N0L**
250 m^3/pulse	**9** **N0M**
500 m^3/pulse	**9** **N0N**
1000 m^3/pulse	**9** **N0P**
Transmitter version of SITRANS FUS080	
IP67/NEMA 4X/6 115 ... 230 V AC	**B**
IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack[4]	**D**
IP67/NEMA 4X/6 115 ... 230 V AC, including 3.6 V single battery backup[4]	**E**
IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)	**G**
Pulse width setup	
5 ms (standard)	**2**
10 ms	**3**
20 ms	**4**
50 ms	**5**
100 ms	**6**
200 ms	**7**
500 ms	**8**

1) Q_p (Q_n) is the normal or typical flow. Q_p and Q_s is shown on the system label.
2) Pipe material bronze brass.
3) PN 40 standard for DN 50 ... DN 80 die-cast bronze pipes.
4) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.
5) To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms:
L/pulse > Q_s (m^3/h) /360.
For example Q_s = 300 m^3/h; L/pulse > 300/360;
L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

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Selection and Ordering data	Order code
Additional information	
Please add „**-Z**" to Article No. and following add-on code(s) with plain text.	
Calibration/certificate FUS380	
Production calibration for DN 50 ... DN 1200 with Q_n as selected in diameter. Incl. Calibration protocol: 2 x 3 points, Q_i, 10 % Q_p and Q_p (max. 8000 m^3/h).	**Included**
Accredited Siemens ISO/IEC 17025 calibration for DN 50 ... DN 200 with Q_n as selected in diameter. Certificate: 2 x 5 points, Q_i, 5 %, 10 %, 50 % and 100 % of Q_p (max. 630 m^3/h).	**D20**
Accredited Siemens ISO/IEC 17025 calibration for DN 250 ... DN 600 with Q_n as selected in diameter. Certificate: 2 x 5 points, 5 %, 10 %, 50 % and 100 % of Q_p (max. 2800 m^3/h).	**D21**
Accredited Siemens ISO/IEC 17025 calibration, DN 500 ... DN 1200 with Q_n as selected in diameter. Certificate: 2 x 5 points, Q_i, 5 %, 10 %, 50 % and 100 % of Q_p (max. 8000 m^3/h).	**D22**
Output B as reverse flow pulses. No calibration/verification of this function.	**E21**
Material certificate	
EN 10204-3.1 (pipe material)	**F10**
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	**Y17**

Please use online Product selector to get latest updates. Product selector link:
www.pia-selector.automation.siemens.com

Flowmeter SITRANS FUS380 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
• English	**A5E00730100**
• German	**A5E00740611**
• Spanish	**A5E00754188**
• French	**A5E00754173**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

For accessories and spare parts see chapter of transmitter SITRANS FUS080/FUE080 on page 3/254.

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Overview

The 2-path flowmeter SITRANS FUE380 comes as battery or mains-powered and is designed to measure water flow in district heating plants, local networks, boiler stations, substations, chiller plants and other general water applications.
The flowmeter FUE380 is approved according to energy meter standards EN 1434 class 2, OIML R 75 class 2 and MID class 2. Metrological parameters are protected against manipulation.
The type-approved flowmeter version is named SITRANS FUE380. For a standard flowmeter type FUS380 without a type approval, see separate FUS380 chapter.
Technically, the meter types SITRANS FUS380 and SITRANS FUE380 are completely identical, only difference is the calibration limit and the type approval for custody transfer.

Benefits

- Battery-powered up to 6 years
- 115/230 V mains-powered with back-up battery option in case of mains power failure
- Fast measuring frequency 15 Hz/0.5 Hz (230 V AC/Battery)
- Easy one-button straight forward display
- 2-path measuring principle for optimum accuracy
- Compact or remote mounting
- Measures on most district water qualities and water conductivities
- No pressure drop
- Long-term stability
- 2 galvanically isolated digital outputs for easy connection to a calculator (potential-free)
- Bidirectional measurement, with 2 totalizers and outputs
- Dynamic range Q_i:Q_p up to 1:50/100 or max. range Qi:Qs up to 1:400

Application

The main application for SITRANS FUE380 is measurement of water flow or water flow in energy meter systems for custody transfer in district heating networks or chilled water.
Combined with an energy calculator and a pair of temperature sensors, SITRANS FUE380 can be used as part of an energy meter system. For this purpose Siemens offers energy calculator SITRANS FUE950.

Design

The 2-path design of SITRANS FUE380 ensures maximum accuracy under short inlet conditions. The approved flowmeter consists of a flow sensor pipe, 4 transducers/transducer cables and a transmitter SITRANS FUE080.

The unit is available in a compact or a remote version with up to 30 meter distance from flowmeter to transmitter. When ordering a compact version the transducer cables are pre-mounted and ready for installation.

Compact mounting is only possible up to 120 °C (248 °F). The sensor must be isolated to protect transmitter from heat. The transmitter is available in an IP67/NEMA 4X/6 enclosure.

FUE380 MI-004 approval

The SITRANS FUE380 program is type-approved according to international energy meter standard EN 1434. On 1 November 2006 the MI-004 energy meter directive became effective providing that all energy meters with a MI-004 verification label can be sold across the EU borders.

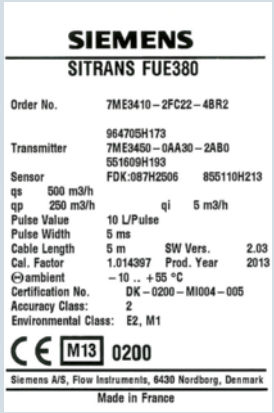
The FUE380 are MI-004 verified and labeled products according to Directive 2004/22/EC of the European Parliament and Council of March 31, 2004 on measuring instruments (MID), Annex MI-004, in sizes from DN 50 to DN 1200.

The MID certification is obtained as module B + module D approvals according to the above-mentioned directive.

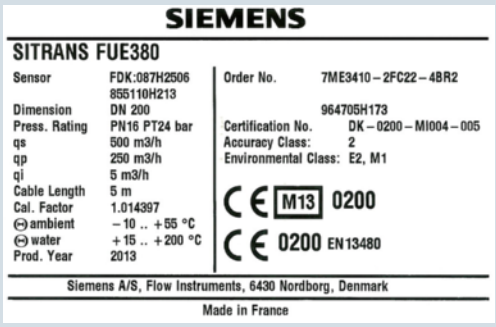
Module B: MI-004 Type MID approval according to EN 1434: 2007

Module D: Quality insurance MID approval of production

The MID system label with the approval information is placed on the side of the transmitter and on the sensor. An example of the product label is shown below:



FUE380 transmitter label (with MID first verification)



FUE380 sensor label (with MID first verification)

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Integration

The flowmeter digital output is often used as input for an energy meter or as input for digital systems for remote reading.

SITRANS FUE380 has two digital output functions that can be individually selected.

Pulse output rate is defined when ordering. To get optimal benefit the pulse value must be selected as low as possible.

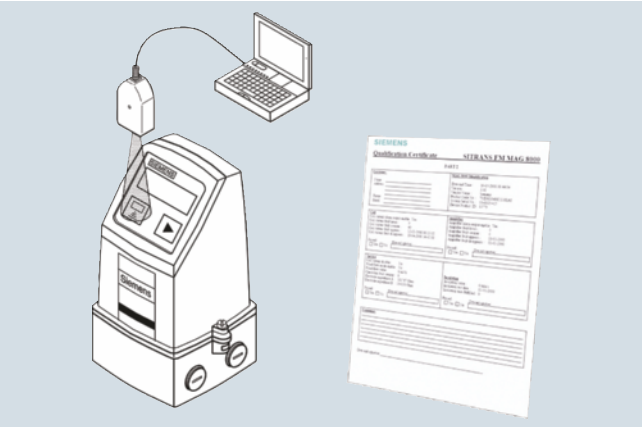
If the flowmeter forms part of an energy meter system for custody transfer, no further approvals are needed, except possible local approvals on the flowmeter.

Function

Together with the SIMATIC PDM tool the FUE380 offers the possibility of testing and verifying the flowmeter on site and creating a printed "Qualification Certificate" with specific data that defines the quality status of the measurement.

The Qualification Certificate shows information about the actual status of the flowmeter:

- general settings, flowmeter and battery information, totalizer values, and pulse output settings
- detailed information about the transmitter and the sensor functionality, and a main parameter list for evaluating the functionality of the flowmeter



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Configuration SITRANS FUE380 type-approved

Selection guide SITRANS FUE380, type-approved flowmeter

DN	Q_s (m^3/h)	Q_{max} (m^3/h (105 % of Q_s)	Q_p (m^3/h)	Q_i (m^3/h) (1:50 of Q_p)[4]	Q_i (m^3/h) (1:100 of Q_p)[4]	Cut-off (m^3/h)	Cut-off (% of Q_{max})	Typical pulse value[5] (l/pulse)
50	30	31.5	15[2]	0.3	-	0.075	0.24	1
50	45	47.25	15[2]	0.3	-	0.075	0.16	1
50	45	47.25	30[3]	-	0.30	0.150	0.32	1
65	50	52.5	25[2]	0.5	-	0.125	0.24	1
65	72	75.6	25[2]	0.5	-	0.125	0.17	1
65	72	75.6	50[3]	-	0.50	0.250	0.33	1
80	80	84	40[2]	0.8	-	0.200	0.24	2.5
80	120	126	40[2]	0.8	-	0.200	0.16	2.5
80	120	126	80[3]	-	0.80	0.400	0.32	2.5
100	120	126	60[2]	1.2	-	0.300	0.24	2.5
100	180	189	60[2]	1.2	-	0.300	0.16	2.5
100	180	189	120[3]	-	1.20	0.600	0.32	2.5
125	200	210	100[2]	2.0	-	0.500	0.24	2.5
125	280	294	100[2]	2.0	-	0.500	0.17	2.5
125	280	294	200[3]	-	2.00	1.000	0.34	2.5
150	300	315	150[2]	3.0	-	0.750	0.24	10
150	420	441	150[2]	3.0	-	0.750	0.17	10
150	420	441	300[3]	-	3.00	1.500	0.34	10
200	500	525	250[2]	5.0	-	1.250	0.24	10
200	700	735	250[2]	5.0	-	1.250	0.17	10
200	700	735	500[3]	-	5.00	2.500	0.34	10
250	800	840	400[2]	8.0	-	2.000	0.24	10
250	1 120	1 176	400[2]	8.0	-	2.000	0.17	10
250	1 120	1 176	800[3]	-	8.00	4.000	0.34	10
300	1 120	1 176	560[2]	11.2	-	2.800	0.24	50
300	1 560	1 638	560[2]	11.2	-	2.800	0.17	50
300	1 560	1 638	1120[3]	-	11.20	5.600	0.34	50
350	1 500	1 575	750[2]	15.0	-	3.750	0.24	50
350	2 100	2 205	750[2]	15.0	-	3.750	0.17	50
350	2 100	2 205	1 500[3]	-	15.00	7.500	0.34	50
400	1 900	1 995	950[2]	19.0	-	4.750	0.24	50
400	2 660	2 793	950[2]	19.0	-	4.750	0.17	50
400	2 660	2 793	1 900[3]	-	19.00	9.500	0.34	50
500	2 950	3 097.5	1 475[2]	29.5	-	7.375	0.24	100
500	4 130	4 336.5	1 475[2]	29.5	-	7.375	0.17	100
500	4 130	4 336.5	2 950[3]	-	29.50	14.750	0.34	100
600	4 300	4 515	2 150[2]	43.0	-	10.750	0.24	100
600	6 020	6 321	2 150[2]	43.0	-	10.750	0.17	100
600	6 020	6 321	4 300[3]	-	43.00	21.500	0.34	100
700	5 800	6 090	2 900[2]	58.0	-	14.500	0.24	100
700	8 120	8 526	2 900[2]	58.0	-	14.500	0.17	100
700	8 120	8 526	5 800[3]	-	58.00	29.000	0.34	100
800	7 600	7 980	3 800[2]	76.0	-	19.000	0.24	100
800	10 640	11 172	3 800[2]	76.0	-	19.000	0.17	100
800	10 640	11 172	7 600[3]	-	76.00	38.000	0.34	100
900	10 000	10 500	5 000[2]	100.0	-	25.000	0.24	100
900	14 000	14 700	5 000[2]	100.0	-	25.000	0.17	100
900	14 000	14 700	10 000[3]	-	100.00	50.000	0.34	100

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Flowmeter SITRANS FUE380 with CT approval

DN	Q_s (m^3/h)	Q_{max} (m^3/h (105 % of Q_s)	Q_p (m^3/h)	Q_i (m^3/h) (1:50 of Q_p)[4]	Q_i (m^3/h) (1:100 of Q_p)[4]	Cut-off (m^3/h)	Cut-off (% of Q_{max})	Typical pulse value[5] (l/pulse)
1 000	12 000	12 600	6 000[2]	120.0	-	30.000	0.24	100
1 000	16 800	17 640	6 000[2]	120.0	-	30.000	0.17	100
1 000	16 800	17 640	12 000[3]	-	120.00	60.000	0.34	100
1 200	18 000	18 900	9 000[2]	180.0	-	45.000	0.24	100
1 200	25 200	26 460	9 000[2]	180.0	-	45.000	0.17	100
1 200	25 200	26 460	18 000[3]	-	180.00	90.000	0.34	100

Dynamic range Q_i:Q_p: better than 1:100 or 1:50 according to OIML R 75 class 2 and MID EN 1434 class 2.

Qi (Q_{min}) means the minimal and Q_p (Q_{nom}) the nominal flow rate according to the approval requirements.
Q_s is the highest operatable flow rate. The maximum flow rate (Q_{max}) is 105 % of Q_s. The low flow cut-off is 50 % of Q_i.
Q_i, Q_p and Q_s are shown on the system nameplate of the FUE380.

In order to obtain best pulse output resolution in the range Q_{min} to Q_s of approx. 100 Hz at Q_s, two or three flow values for every dimension can be selected at ordering. Therefore the ordering data table also shows Q_p (Q_n). This flow rate is between Q_i (Q_{min}) and Q_s and indicates the normal or typical flow according to the approval requirements.

1) Typical pulse values with a pulse length of 5 ms in connection with SITRANS FUE950. Other values are possible, please see the selections at the 7ME341 Order code.

2) EN 1434 and MID flow values

3) OIML R 75 and MID flow values

4) The minimum flow (Q_i) should be checked in the PIA-selector or product master data base (PMD)

5) To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: L/pulse > Q_s (m^3/h) /360.
For example Q_s = 300 m^3/h; L/pulse > 300/360; L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

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Technical specifications

Pipe design	2-path sensor with flanges and inline transducers wet-calibrated from factory
Nominal size welded version (DN 50 ... DN 80 in bronze)	DN 50, 65, 80, 100, 125, 150, 200, 250, 300, 350, 400, 500, 600, 700, 800, 900, 1000, 1200
Pressure rate	PN 16, PN 25, PN 40 EN 1092-1 flanges: • type 01 (B): DN 100 to DN 125 • type 11 (B): DN 150 to DN 1200 • type 11 (B) 'design': DN 50 to DN 80
Pipe material	• DN 100 ... DN 1200: Carbon Steel EN 1.0345/P235 GH, painted in light-gray. • DN 50 ... DN 80: Die-cast bronze G-CuSn10/W2.1050.01 (EN 1982)
Transducer design	• DN 100 ... DN 1200: Inline version and welded onto the pipe • DN 50 ... DN 80: Screwed into the pipe
Transducer material	Stainless steel (AISI 316/1.4404)/ brass ($CuZn_{36}Pb_2As$)
Sensor operating conditions	
Ambient temperature	
• Operation	-10 … +60 °C (14 ... 140 °F) (MID version: -10 … +55 °C (14 ... 131 °F))
• Storage	-40 … +85 °C (-40 ... +185 °F)
Measured media	Heating water, according to VDI-2035 (pH 8.2 - 10.5), industrial VdTÜV information sheet 1466 and AGFW information sheet FW 510.
Media/surface temperature	
• DN 100 ... DN 1200	Remote: 2 … 200 °C (35.6 … 392 °F) MID: min. +15 °C/+59 °F
• DN 50 ... DN 80	Remote: 2 … 150 °C (35.6 … 302 °F) MID: min. +15 °C/+59 °F
• DN 50 ... DN 1200	Compact: 2 … 120 °C (35.6 … 248 °F) MID: min. +15 °C/+59 °F
Degree of protection	Sensor connection IP67/NEMA 4X/6
Electromagnetic compatibility	
• Emitted interference	To EN 55011/CISPR-11
• Noise immunity	To EN/IEC 61326-1 (Industry)
• MID	Environment class E2 and M1
Max. flow velocity at Q_s	DN 50 … DN 1200: 9 m/s (29.5 ft/s)

Transmitter

The transmitter related to this system is the SITRANS FUE080.
Technical specifications to the FUE080 see page 3/251 ff.

Sensor cable	
Cable length	Max. 30 m (98.4 ft) between transmitter and sensor
Certificates and approvals	
Conformity certificate	The devices are supplied as standard with a Siemens Certificate of Conformity on CD
Material certificate	Material certificate according EN 10204-3.1 is optionally available
Calibration report	A standard calibration report is shipped with every flowmeter. Extended accredited ISO/IEC 17025 calibration certificates optionally available
Approvals	• Approval standards: EN 1434 and OIML R 75 Class 2 • Type approval: MID, MI-004, class 2 approval and certification (according to EN 1434)

The sensors are approved according to EU directive 97/23/EC dated 29 May 1997 regarding fluid group 1, classified in category III. Design according to EN 13480 (PED Directive).

Type-dependent settings

Flow value	Predefined according to EN 1434/ OIML R 75/MID
Approval	Country specific
Flow rate v_f	0.02 … 9 m/s (0.065 … 29.5 ft/s)
Output A	Preset: Forward pulses
Output B	Preset: Alarm
Pulse value A & B (depending on DN value)	Preset: See scheme - previous page Preset for SITRANS FUE950 or free selectable depending on flow rate (Q_s)
Pulse width	Preset: 5 ms
Flow unit setup	Preset: m^3/h
Volume unit setup	Preset: m^3

Flowmeter Calibration and traceability

To ensure continuous accurate measurement, flowmeters must be calibrated. The calibration is conducted at Siemens flow facilities with traceable instruments referring directly to the physical unit of measurement according to the International System of Units (SI).

Therefore, the calibration certificate ensures recognition of the test results worldwide, including the US (NIST traceability). Siemens offers accredited calibrations assured to ISO 17025 in the flow range from 0.0001 m^3/h to 10 000 m^3/h. Siemens Flow Instruments accredited laboratories are recognized by ILAC MRA (International Laboratory Accreditation Corporation - Mutual Recognition Arrangement) ensuring international traceability and recognition of the test results worldwide.

A standard calibration certificate with Q_n as selected flow is shipped with each SITRANS FUE380. This production calibration protocol consists of 2 x 3 points at Q_i, 10 % Q_p and Q_p (max. 4 200 m^3/h).

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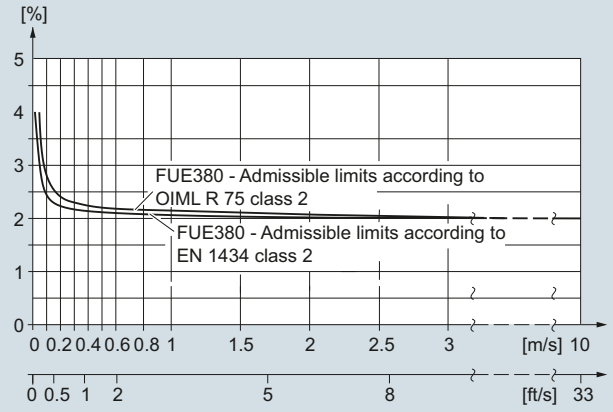
Flowmeter SITRANS FUE380 with CT approval

Typical accuracy SITRANS FUE380:

$\pm(0.5 + 0.02\ Q_p/Q)$ [%]
Q_p according to EN 1434/OIML requirements.

Example: DN 100, Q_p = 60 m^3/h at Q = 1.2 m^3/h:
Accuracy at 1.2 m^3/h = typical 1.5 %



SITRANS FUE380 fulfils the requirements
$E_f = \pm (2 + 0.02\ Q_p/Q_i)$ max. ± 5 %, according to EN 1434 and OIML R 75, class 2 or MID class 2 requirements.

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Selection and Ordering data			Article No. Order code
Flowmeter SITRANS FUE380 (type-approved)			7ME3410 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Diameter	**Flow setting [m³/h] Qp[m³/h][1)]**	**Qs [m³/h]**	
DN 50 (2")[2)]	15[3)]	30	1B
DN 50 (2")[2)]	15[3)]	45	1C
DN 50 (2")[2)]	30[4)]	45	1D
DN 65 (2½")[2)]	25[3)]	50	1F
DN 65 (2½")[2)]	25[3)]	72	1G
DN 65 (2½")[2)]	50[4)]	72	1H
DN 80 (3")[2)]	40[3)]	80	1K
DN 80 (3")[2)]	40[3)]	120	1L
DN 80 (3")[2)]	80[4)]	120	1M
DN 100 (4")	60[3)]	120	1P
DN 100 (4")	60[3)]	180	1Q
DN 100 (4")	120[4)]	180	1R
DN 125 (5")	100[3)]	200	1T
DN 125 (5")	100[3)]	280	1U
DN 125 (5")	200[4)]	280	1V
DN 150 (6")	150[3)]	300	2B
DN 150 (6")	150[3)]	420	2C
DN 150 (6")	300[4)]	420	2D
DN 200 (8")	250[3)]	500	2F
DN 200 (8")	250[3)]	700	2G
DN 200 (8")	500[4)]	700	2H
DN 250 (10")	400[3)]	800	2K
DN 250 (10")	400[3)]	1 120	2L
DN 250 (10")	800[4)]	1 120	2M
DN 300 (12")	560[3)]	1 120	2P
DN 300 (12")	560[3)]	1 560	2Q
DN 300 (12")	1 120[4)]	1 560	2R
DN 350 (14")	750[3)]	1 500	2T
DN 350 (14")	750[3)]	2 100	2U
DN 350 (14")	1 500[4)]	2 100	2V
DN 400 (16")	950[3)]	1 900	3B
DN 400 (16")	950[3)]	2 660	3C
DN 400 (16")	1 900[4)]	2 660	3D
DN 500 (20")	1 475[3)]	2 950	3K
DN 500 (20")	1 475[3)]	4 130	3L
DN 500 (20")	2 950[4)]	41 30	3M
DN 600 (24")	2 150[3)]	4 300	3T
DN 600 (24")	2 150[3)]	6 020	3U
DN 600 (24")	4 300[4)]	6 020	3V
DN 700 (28")	2 900[3)]	5 800	4F
DN 700 (28")	2 900[3)]	8 120	4G
DN 700 (28")	5 800[4)]	8120	4H
DN 800 (32")	3 800[3)]	7 600	4P
DN 800 (32")	3 800[3)]	10 640	4Q
DN 800 (32")	7 600[4)]	10 640	4R
DN 900 (36")	5 000[3)]	10 000	5B
DN 900 (36")	5 000[3)]	14 000	5C
DN 900 (36")	10 000[4)]	14 000	5D
DN 1000 (40")	6 000[3)]	12 000	5K
DN 1000 (40")	6 000[3)]	16 800	5L
DN 1000 (40")	12 000[4)]	16 800	5M
DN 1200 (48")	9 000[3)]	18 000	5T
DN 1200 (48")	9 000[3)]	25 200	5U
DN 1200 (48")	18 000[4)]	25 200	5V

Selection and Ordering data	Article No. Order code
Flowmeter SITRANS FUE380 (type-approved)	7ME3410 -
Flange norm and pressure rating	
System without sensor - only a transmitter	
EN 1092-1	
PN 16 (DN 100 ... DN 1 200)	C
PN 25 (DN 200 ... DN 1 000)	D
PN 40 (DN 50 ... DN 250)[5)]	E
Compact/remote connection	
Compact version, max. 120 °C (248 °F)	0
Remote version, max. 150/200 °C (302/392 °F)	
5 m (16.4 ft)	2
10 m (32.8 ft)	3
20 m (65.6 ft)	4
30 m (98.4 ft)	5
Approvals/pulse output	
Without approval (neutral) Selectable pulse output	0
With approval marks Selectable pulse output	1
With approval marks and seal Selectable pulse output	2
Pulse output value setup[8)]	
0.1 l/p	1
1 l/p	2
2.5 l/p	3
10 l/p	4
50 l/p	5
100 l/p	6
250 l/pulse	7
1 m³/pulse	8
0.25 l/pulse	9 N0A
0.5 l/pulse	9 N0B
5 l/pulse	9 N0C
25 l/pulse	9 N0D
500 l/pulse	9 N0E
2.5 m³/pulse	9 N0F
5 m³/pulse	9 N0G
10 m³/pulse	9 N0H
25 m³/pulse	9 N0J
50 m³/pulse	9 N0K
100 m³/pulse	9 N0L
250 m³/pulse	9 N0M
500 m³/pulse	9 N0N
1 000 m³/pulse	9 N0P

This device is shipped with a Quick Start guide and the SITRANS F manual CD containing the complete manual library. Printed Operating Instructions are available for purchase via PMD.

For notes 1) to 8) see next page

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Flowmeter SITRANS FUE380 with CT approval

Selection and Ordering data	Article No. / Order code
Flowmeter SITRANS FUE380 (type-approved)	**7ME3410 -** ■■■■ - ■■■■ ■■■
Transmitter SITRANS FUE080	
IP67/NEMA 4X/6 115 ... 230 V AC	**B**
IP67/NEMA 4X/6 3.6 V battery version, incl. dual battery pack[6]	**D**
IP67/NEMA 4X/6 115 ... 230 V AC, including 3.6 V single battery backup[6]	**E**
IP67/NEMA 4X/6 3.6 V battery version (no battery pack included)	**G**
Country/approval type[7]	
Neutral, no approval mark	**A**
China	**C**
Russia, EN 1434/OIML R 75	**M**
MID-Approval, (EN 1434/OIML R 75), English	**R**
MID-Approval, (EN 1434/OIML R 75), German	**S**
MID-Approval, (EN 1434/OIML R 75), Polish	**T**
MID-Approval, (EN 1434/OIML R 75), French	**U**
Pulse width setup	
5 ms (standard)	**2**
10 ms	**3**
20 ms	**4**
50 ms	**5**
100 ms	**6**
200 ms	**7**
500 ms	**8**

1) Q_p (Q_n) is the normal flow according to the approval requirements. Q_p and Q_s is shown on the system label.

2) Pipe material bronze brass

3) EN 1434 flow values. The minimum flow (Q_i) should be checked in the PIA-selector or product master data base (PMD).

4) OIML R 75/EN1434 flow values without PTB approval

5) PN 40 standard for DN 50 ... DN 80 die-cast bronze pipes

6) Lithium batteries are subject to special transportation regulations according to United Nations "Regulation of Dangerous Goods, UN 3090 and UN 3091". Special transport documentation is required to observe these regulations. This may influence both transport time and costs.

7) Other countries in progress

8) To get optimal benefit of the pulses the pulse value and pulse length shall be selected as low as possible. The following calculation formula can be used for determining the shortest pulse value at a pulse length of 5 ms: L/pulse > Q_s (m^3/h) /360.
For example Q_s = 300 m^3/h; L/pulse > 300/360; L/pulse > 0.83; therefore the pulse value must be 1 l/pulse

Selection and Ordering data	Order code
Additional information	
Please add „**-Z**" to Article No. and following add-on code(s) with plain text.	
Calibration/certificate FUE380	
Approval, verification and approval sealing as defined with the article number. See Order code.	
Production calibration for DN 50 ... DN 1200 with Q_n as selected in diameter Incl. Calibration protocol: 2 x 3 points, Q_i, 10 % Q_p and Q_p (max. 8000 m^3/h).	**Included**
Accredited Siemens ISO/IEC 17025 calibration for DN 50 ... DN 200 with Q_n as selected in diameter. Certificate: 2 x 5 points, Q_i, 5 %, 10 %, 50 % and 100 % of Qp (max. 630 m^3/h).	**D20**
Accredited Siemens ISO/IEC 17025 calibration for DN 250 ... DN 600 with Q_n as selected in diameter. Certificate: 2 x 5 points, Q_i, 5 %, 10 %, 50 % and 100 % of Q_p (max. 2800 m^3/h).	**D21**
Accredited Siemens ISO/IEC 17025 calibration, DN 500 ... DN 1200 with Q_n as selected in diameter. Certificate: 2 x 5 points, Q_i, 5 %, 10 %, 50 % and 100 % of Qp (max. 8000 m^3/h).	**D22**
Output B as reverse flow pulses. No calibration/verification of this function.	**E21**
Material certificate	
EN 10204-3.1 (pipe material)	**F10**
Tag name plate	
Stainless steel TAG plate (1 x 24 x 80 mm), wire fixed. Font size depends on text length: 8 mm for 1 ... 10 characters, 4 mm for 11 ... 20 characters (specify in plain text).	**Y17**

Flowmeter SITRANS FUE380 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
• English	**A5E00730100**
• German	**A5E00740611**
• Spanish	**A5E00754188**
• French	**A5E00754173**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

For accessories and spare parts on page 3/254 see chapter of transmitter FUS080/FUE080.

Please use online Product selector to get latest updates.
Product selector link:
www.pia-selector.automation.siemens.com

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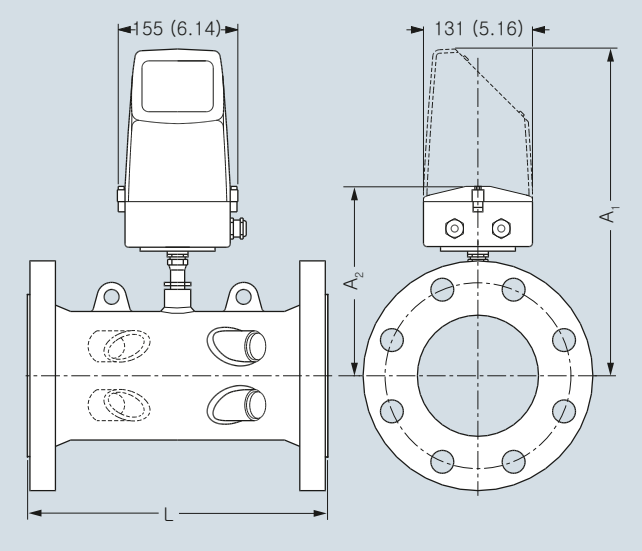
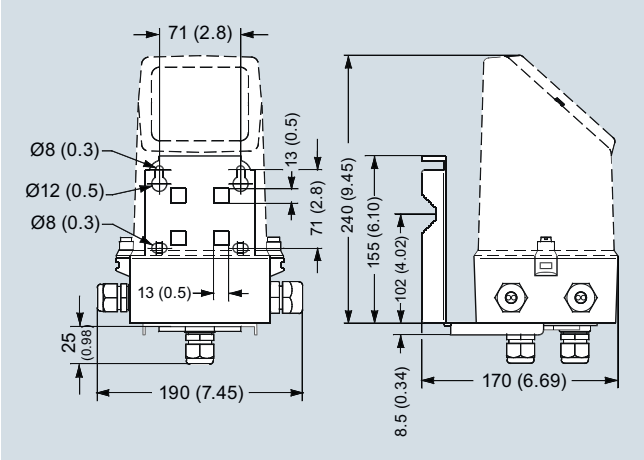
Dimensional drawings



Transmitter IP67/NEMA 4X/6, wall mounting



Dimensions in mm (inch)

Sensor dimensions for FUS380 and FUE380

Size	PN 16		PN 25		PN 40				
	L	Weight	L	Weight	L	Weight	A_1	A_2	Lift hug
DN	mm	kg	mm	kg	mm	kg	mm	mm	
50	-	-	-	-	300 +0/-2	10	350	196	No
65	-	-	-	-	300 +0/-2	15	360	206	No
80	-	-	-	-	350 +0/-3	18	370	216	No
100	350 +0/-2	15	-	-	350 +0/-3	18	375	221	No
125	350 +0/-2	18	-	-	350 +0/-3	24	380	226	No
150	500 +0/-3	28	-	-	500 +0/-3	34	390	236	No
200	500 +0/-3	38	500 +0/-3	47	500 +0/-3	55	414	260	No
250	600 +0/-3	60	600 +0/-3	76	600 +0/-3	91	440	286	No
300	500 +0/-3	66	500 +0/-3	81	-	-	466	312	Yes
350	550 +0/-3	94	550 +0/-3	121	-	-	495	341	Yes
400	600 +0/-3	124	600 +0/-3	153	-	-	507	353	Yes
500	625 +0/-3	194	625 +0/-3	231	-	-	558	404	Yes
600	750 +0/-3	303	750 +0/-3	365	-	-	609	455	Yes
700	875 +0/-3	361	875 +0/-3	553	-	-	660	506	Yes
800	1000 +0/-3	494	1000 +0/-3	770	-	-	710	556	Yes
900	1230 +6/-6	475	1300 +6/-6	835	-	-	760	606	Yes
1000	1300 +6/-6	594	1370 +6/-6	1000	-	-	810	656	Yes
1200	1360 +6/-6	732	-	-	-	-	910	756	Yes

Notes:
- Weight for transmitter/electronics 1.5 kg (compact version) or approximately 5 kg (remote version including 10 m cable set)
- - Means not available
- All weigths are **approximate**
- For flange values - see norm EN 1092-1

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Flowmeter SITRANS FUS380 and FUE380

Size	PN 16		PN 25		PN 40				
	L	Weight	L	Weight	L	Weight	A_1	A_2	Lift hug
inch	inch	lb	inch	lb	inch	lb	inch	inch	
2	-	-	-	-	11.81 +0/-0.08	22	13.78	7.72	No
2½	-	-	-	-	11.81 +0/-0.08	33	14.17	8.11	No
3	-	-	-	-	13.78 +0/-0.08	40	14.57	8.51	No
4	13.78 +0/-0.08	33	-	-	13.78 +0/-0.12	40	14.76	8.70	No
5	13.78 +0/-0.08	40	-	-	13.78 +0/-0.12	53	14.96	8.90	No
6	19.68 +0/-0.12	62	-	-	19.68 +0/-0.12	75	15.35	9.29	No
8	19.68 +0/-0.12	84	19.68 +0/-0.12	104	19.68 +0/-0.12	121	16.30	10.24	No
10	23.62 +0/-0.12	132	23.62 +0/-0.12	168	23.62 +0/-0.12	201	17.32	11.26	No
12	19.68 +0/-0.12	146	19.68 +0/-0.12	179	-	-	18.35	12.29	Yes
14	21.65 +0/-0.12	207	21.65 +0/-0.12	267	-	-	19.49	13.43	Yes
16	23.62 +0/-0.12	273	23.62 +0/-0.12	337	-	-	19.96	13.90	Yes
20	24.61 +0/-0.12	428	24.61 +0/-0.12	509	-	-	21.97	15.91	Yes
24	29.53 +0/-0.12	668	29.53 +0/-0.12	805	-	-	23.98	17.92	Yes
28	34.45 +0/-0.12	796	34.45 +0/-0.12	1246	-	-	25.98	19.92	Yes
32	39.37 +0/-0.12	1089	39.37 +0/-0.12	1698	-	-	27.95	21.89	Yes
36	48.43 +0/-0.24	1047	51.18 +0/-0.24	1841	-	-	29.92	23.86	Yes
40	51.18 +0/-0.24	1310	53.94 +0/-0.24	2205	-	-	31.89	25.83	Yes
48	53.54 +0/-0.24	1614	-	-	-	-	35.83	29.77	Yes

Notes:
- Weight for transmitter/electronics 3.3 lb (compact version) or approximately 11 lb (remote version including 32.8 ft cable set)
- - Means not available
- All weigths are **approximate**
- For flange values - see norm EN 1092-1

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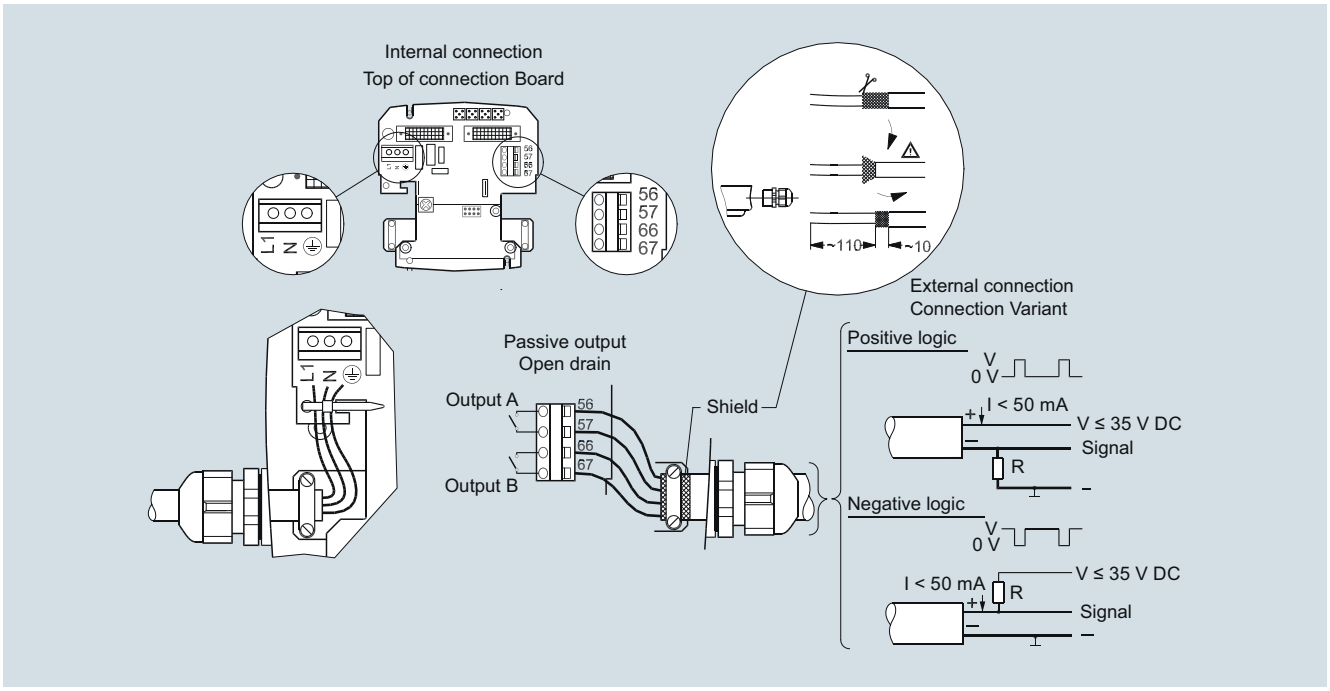
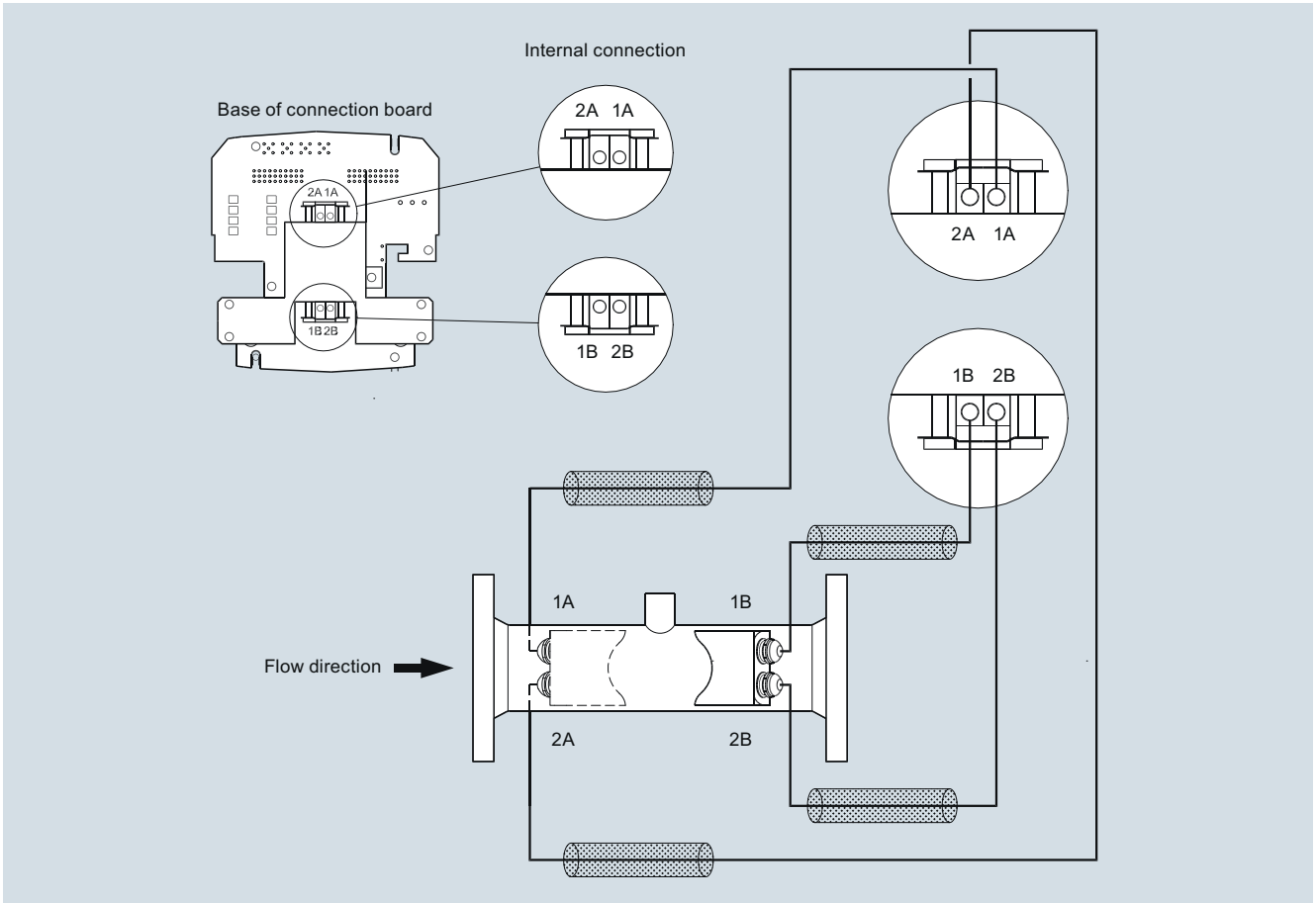
Schematics



Electrical connection of transmitter SITRANS FUS/FUE380



Electrical connection of sensor SITRANS FUS/FUE380

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SITRANS FUE950 energy calculator

Overview

SITRANS FUE950 is a universal thermal energy calculator, which meets the requirements EN 1434 and has the MID and PTB K7.2 approval for energy metering with the media water.

SITRANS FUE950 has been developed for the SITRANS FUS380/ FUE380 and alternatively MAG 5000/6000 or FST020. SITRANS FUE950 is modular in construction and can by order be fitted with optional modules depending on the application. The FUE950 supports none of the SITRANS FX, FC products and only some of the FUS clamp-on products.

Benefits

Basic functions

- Prepared for heating, cooling measurement
- Approval for MID for heat metering and PTB K7.2 for cooling
- High-accuracy thermal energy metering, meets EN1434 requirements
- Measured temperature range -20 … +190 °C (-4 … +374 °F)
- Instantaneous values for energy/volume flow
- Battery or mains powered
- Battery version with battery lifetime of typically up to 10 years
- Optical data interface
- Real date and time
- Auto-detection of 2-wire or 4-wire temperature sensors

Additional functions

- Individual tariff functions
- Advanced functions for cooling/heating applications or the combination
- Memory for 24 periods (months, weeks, days)
- Data logger function
- Expandable functionality with 2 optional plug and play add-on modules
- Communication over M-Bus, RS 485 or RS 232

Add-on modules

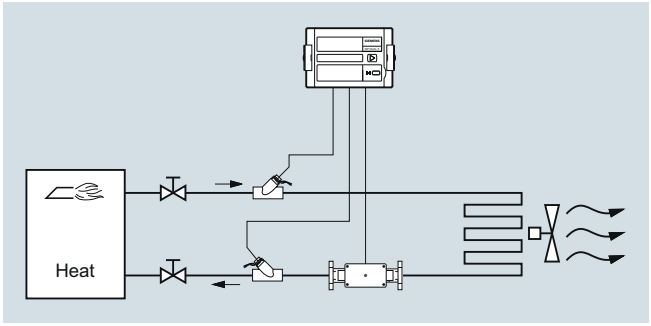
- Plug-in module with 2 extra pulse inputs
- Plug-in module with 2 pulse outputs
- Plug-in module with combination of input and output pulses
- Plug-in module for M-Bus communication
- Plug-in module for RS 232 or RS 485 communication
- Plug-in module with 2 passive current outputs (4 ... 20 mA)

Application

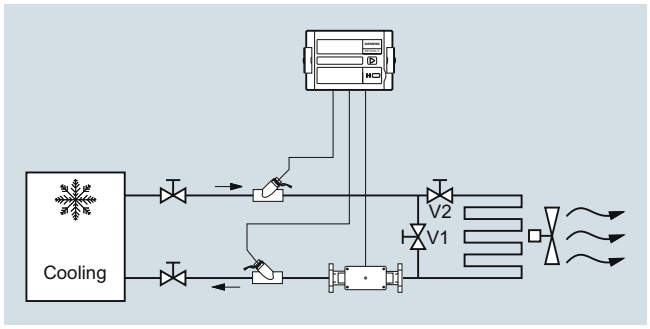
The SITRANS FUE950 is able to handle 3 kinds of applications, means energy calculation in:

- District heating applications
- Chilled water applications
- Combined cooling/heating applications

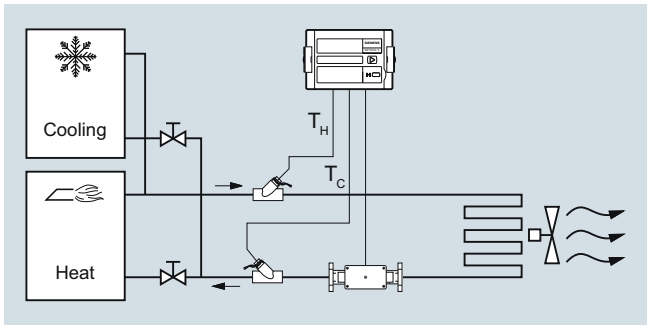
Energy metering in heating, hot water applications (code "A" and "B")



Energy metering in cooling, chilled water applications (code "C" and "D")



Energy metering in combined cooling/heating applications (code "E" and "F")



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Design

SITRANS FUE950 has an easy-read 8-digit LCD display with associated pictograms for the various functions. As the display has been made for several applications, some figures/symbols not used for normal district heating applications will be shown.

SITRANS FUE950 has a push button for simple operation and provides user-friendly control via the various display menu loops. The display will always be configured for the application chosen, and for the selected display settings.

The integrator has an IP54 plastic housing and is designed for wall or panel mounting. The housing comes with prepared rubber gaskets cable entries for fast and easy installation.

Operation menu loop structure

The FUE950 display has six menu loops and the menus are numbered in the display from 1 to 6. Some display menus consist of two values (to maximum seven) that are shown alternately at 4-second intervals.

The main menu loop no. 1 with the current data, e.g. for energy, volume, flow rate and temperature, is preprogrammed as default setting.

In the combined heating/cooling configuration the menu loop no. 5 (tariff menu loop) will be activated additionally.

Display and output pulses

Units: MWh, GJ, Gcal, MBtu, m^3, gal, m^3/h, GPM, °C, °F and kW; all decimal points are statically (the unit "gal" is shown with factor x 100).

The display unit and the last fractional digit are typical used for the pulse outputs.

Function

Technical principle

Calculation of energy is based on the following formula:

Energy = Volume x (T_{Hot} - T_{Cold}) x K_{factor} (T_i)

Volume: Volume [m^3] of a given amount of volume pulses

T_{Hot}: Measured temperature in the hot line

T_{Cold}: Measured temperature in the cold line

K_{factor} (T_i): Thermal coefficient of media enthalpy and heat content

The energy calculation is made by a counter and depends on temperature difference, pulse input frequency and legal requirements.

The calculator always carries out at least one energy calculation every 2 seconds. If the connected flowmeter has not sent enough pulses the energy calculation and flow indication is also based on the 8 seconds value.

Data memory

The FUE950 has a history memory of 24 periods (months, weeks, days). The following values are stored monthly, weekly or daily in the EEPROM on the programmed day of 1…31 (via software tool).

- Date/Time
- Energy
- Tariff energy 1
- Tariff energy 2
- Tariff definition 1
- Tariff definition 2
- Pulse counter input 1
- Operation hours
- Volume
- Error day counter
- Maximum monthly flow rate
- Maximum monthly power
- Date of maximum monthly flow rate
- Date of maximum monthly power
- Pulse counter input 2

Data logger memory (LOG)

The LOG of the calculator is stored every 24 hours with all cumulative values in the EEPROM. The storage frequency can be selected from various storage intervals (5, 6, 10, 12, 15, 20, 30, 60 minutes or the default setting of 24 hours). The data which are stored in the LOG could be read out using a software tool and can be used for evaluations.

Extract of possible LOG settings

Storage interval	Values	Number of data records	Recording period
5 minutes	• Error status • Overload time temperature • Overload time flow rate • Forward temperature • Return temperature • Date and time • Energy • Tariff energy 1 • Tariff energy 2 • Tariff definition 1 • Tariff definition 2 • Volume • Error day counter	440	36.6 hours
15 minutes		440	110 hours
1 hour		440	18.3 days
24 hours (default setting)		440	440 days

Maximal Values

The integrator creates max. values for power and flow rate based on consumption time, which are stored in the EEPROM. The integration intervals are adjustable to 6, 15, 30 or 60 minutes and 24h. Default setting is 60 minutes.

Tariff/Accounting date function

The calculator includes two independent memories in which the accumulated energy at two programmable tariff dates are stored.

- Last accounting date
- Last but one accounting date

Values stored

- Energy
- Volume
- Tariff counter 1
- Tariff counter 2
- Pulse counter 1
- Pulse counter 2
- Date

The integrator offers two optional tariff memories for monitoring plant load states. Here it concerns threshold value tariffs. Extensive tariff conditions make it possible to adapt the calculator individually to the required customer-specific applications.

Both tariffs are separately configurable and independent from each other. Energy or time can be measured alternatively per tariff register dependent on the tariff mode adjusted in each case.

With the "time triggered tariff function" the switch-on time and the switch-off time are adjustable independent from each other for each day of the week in steps of 15 minutes.

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SITRANS FUE950 energy calculator

The following tariff limit types of the tariff function are possible: (This example applies to the display at 1 fractional digits after comma)

Type	Description	Limit	Limit resolution
dT	Temperature difference	1 ... 190 °C	1 °C
-dT	Negative temperature difference	1 ... 190 °C	1 °C
TR	Return temperature (low)	1 ... 190 °C	1 °C
TV	Forward temperature (high)	1 ... 190 °C	1 °C
P	Power	10 ... 2 500 kW	10 kW
Q	Flow	1 ... 255 m^3/h	1 m^3/h
FE	"Theoretically forward energy" with return temperature of 0 °C		
Z	"Time triggered" counting energy		
E	"External" counting energy		

Error handling and memory

Events such as changes and faults are stored in a non-volatile memory with a capacity of up to 127 entries. The following events are recorded:

- Checksum error
- Temperature measurement error
- Error hours
- Start and end of test mode

If SITRANS FUE950 records an error, this will be automatically indicated by a "alarm symbol" on the display.

To protect the reading data, all the relevant data are saved in a non-volatile memory (EEPROM). This memory saves the measured values, device parameters and types of error at regular intervals.

The following events are recorded:

- Temperature sensor error
- Swapped hot and cold temperature sensors
- Battery low warning
- Power supply failure
- Optical communication warning
- RAM checksum error

Outputs/Inputs/Communication

Communication interfaces:

SITRANS FUE950 is fitted with an optical infra-red send/receive port in accordance with EN1434/IEC 61107, protocol standard, EN 1434/EN 60870-3 (M-Bus protocol).

A specific optical head with a permanent magnet (IrDA-adapter) in accordance with EN 1434 can be used for readout data or communication with the parameterization software.

2 ports for optionally plug-in modules

The calculator features 2 ports for the plug-in modules.

One slot is for the function modules and the other for the communication modules.

Communication modules

The following communication modules are available as options: RS 232 module, RS 485 module and M-Bus module. The RS 232 and RS 485 communication modules are serial interfaces and permit data exchange with the calculator. For this purpose a special data cable is necessary.

The M-Bus module is a serial interface for communication with external devices (M-Bus Master/Centre). According to the M-Bus structure a number of calculators can be connected to a control centre.

Pulse input module

Two pulse inputs are available. The pulse value and the unit is configurable for energy, water, gas or electrical meter by parameterization software. Data are separate cumulated in different registers and are also stored on the two accounting day's (Tariff registers).

Combined Pulse Input/Output module

Two pulse inputs combined with one pulse output are available on one module. The pulse inputs are configurable with value and the unit by parameterization software.

The pulse output is also programmable using the parameterization software.

Pulse output

The calculator provides levels for two optional external pulse outputs, which can be freely programmed using the parameterization software tool.

Default setting is one pulse which occurs per change in the least significant digit in the display with the unit and resolution selected by the device ordering.

Possible pulse output values

- Energy (default setting)
- Volume (default setting)
- Tariff energy 1
- Tariff energy 2
- Tariff condition 1, limit switch
- Tariff condition 2, limit switch
- Energy error
- Volume error
- Volume with specific resolution (0.1, 1.0, 10 or 100)
- Energy with specific resolution (0.1, 1.0, 10 or 100)

Combined current output module

Optional module with 2 passive 4 ... 20 mA outputs.

Possible output values:

- Power (default setting for output #1)
- Flow (default setting for output #2)
- Hot, cold or difference temperature

The settings can be configured by parameterization software. The current output module occupies both ports, means no other plug-in module will possible to plug in.

Module combinations

The calculator has a group of extension modules for communication and another group of extension modules for additional functionality. These modules are available first selected within the calculator, or for retrofitting in the field.

One single function module as well as one single communication module out of following modules is selectable.

Function modules:

- Pulse input module, 2 inputs
- Pulse output module, 2 outputs
- Combined pulse module 2 inputs, 1 output
- Combined current output module, 2 x passive 4 ... 20 mA (occupies both ports)

Communication modules:

- M-Bus (M-Bus protocol according EN 1434-3)
- RS 232 (M-Bus protocol according EN 1434-3)
- RS 485 (M-Bus protocol according EN 1434-3)

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Integration

SITRANS FUE950 is a multi-purpose energy calculator for media water which meets the requirements of EN 1434. Further, the energy calculator has been specially developed to process volume pulses from SITRANS FUS380/FUE380 or alternatively MAG 5000/6000 or FST020 transmitter.

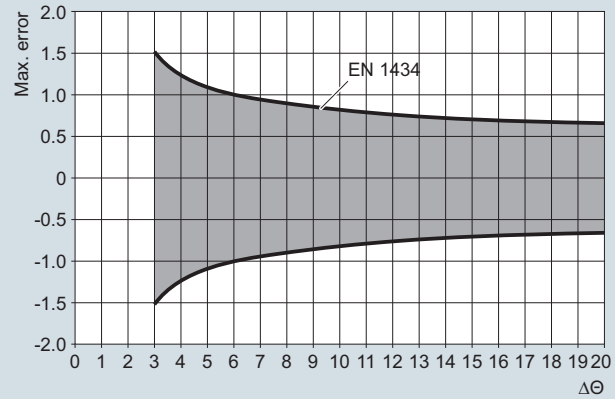
Technical specifications

Approval	MID approved in accordance with energy meter EN 1434 and PTB K7.2 (German national cooling approval)
Approved temperature range	
• Heating	0 ... 180 °C (32 ... 356 °F)
• Cooling	0 ... 105 °C (32 ... 221 °F)
Absolute temperature range	-20 ... +190 °C (-4 ... -374 °F)
Differential temperature	
• Heating	3 ... 177 K (starting at 0.1 K)
• Cooling	3 ... 102 K
Measuring accuracy	Meets requirements of EN 1434 Typically max. ± (0.5 + 3K/ΔΘ) [%] of measured value
Measuring rates	
• Battery type D-cell	Volume: 1 s, temperature: 4 s
• Mains versions	Volume: 1/8 s, temperature: 2 s
Flow range	Depends on pulse input value (IN0), see "Selection and Ordering data".
Power range value	Depends on pulse input value as follows:

Pulse input value (l/P or gal/P)	Max power [kW]
1	15 000
2.5	15 000
5	15 000
10	150 000
25	150 000
50	150 000
100	1 500 000
250 *)	1 500 000
500 *)	1 500 000
1 000 *)	15 000 000

*) not available for gal/pulse

Typical accuracy of FUE950



User interface (always included)	
Display	8-digit LCD display with associated pictograms/symbols
Units	MWh, GJ, Gcal, MBtu, m^3, m^3/h, GPM, gal, °C, °F, kW, MBtu/h (gal is shown with factor x 100)
Totalizer value range	99 999 999 or 9 999 999.9 (0 and 1 digit after comma). Display digits: Flow in 6 digits; Volume, power and energy in 8 digits
Values	Power, energy, volume, flow rate, temperatures
Push button	Single push button for the menu controlling
Optical interface IrDA interface	ZVEI optical interface with M-Bus protocol as per EN 1434, connection via separate IrDA-adapter baud rate: 300 or 2400
Rated operation conditions	
Enclosure	IP54 in accordance with IEC 529
Material	
• Housing	C Lexan 141R (or similar); colors: light gray (top part) and black (bottom part)
• Pipe/wall fitting	PA 6.6 GF25 (or similar)
• Other plastic parts	ABS Cycolac GPM500 (or similar)
• Gaskets	Neoprene and rubber cable bushings: EPDM 50
• Rubber cable bushings	EPDM 50
Temperature	
• Ambient	5 ... 55 °C (41 … 131 °F)
• Storage	-25 ... +70 °C (-13 … +158 °F) Relative ambient humidity < 93 %
Environment class	
• Mechanic class	M1/M2
• Electromagnetic class	E1/E2 (MID) or C (DIN EN 1434)
Temperature input (always included)	
Function	The temperature sensors must be connected to terminals 1-5 and 6-2 (TH) and 3-7 and 8-4 (TC) depending on cable type (2-wire or 4-wire).
Temperature range Absolute measuring range	-20 ... 190 °C (-4 … 374 °F) for T_H and T_C
Temperature difference	Start 0.1 K, min. 3 K, max. 177 K
Measurement cut-off	0.125 K 16-bit digital resolution AD converter
Display resolution	T_H and T_C: 0.1 K , ΔT: 0.1 K
Sensor types	Pt100 or Pt500 as 2-wire or 4-wire; Standard is Pt500. Sensor cable length: up to 10 m (according EN 1434 and MID-type approval).
Sensor connection	4-wire or 2-wire; auto detection of connection version
Flow input (IN0) (always included)	
Function	Used as standard for flow input of the external flowmeter. The input is marked as 10 (+ Flow Pulse), 11 (- Gnd) on the terminal strip. Note: The pulse input value selection must be the same as the pulse output setting of the flowmeter.

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SITRANS FUE950 energy calculator

Pulse value	1 ... 1 000 l/pulse or 1 ... 100 gal/pulse, selection by corresponding Order code. Will be shown at the device label
Pulse frequency	≤ 100 Hz (200 Hz)
Pulse ON-time	≥ 3 ms
Pulse OFF-time	≥ 2 ms
Type	Active pulse input
Terminal voltage	3.6 V DC (supplied internally by FUE950)
Flowmeter installation place	The flowmeter installation place can be in the hot line or cold line ("forward or return pipe") selected by corresponding Order code. The "installation place" will be shown at the device display and nameplate
Connected cable	Max. 10 m (shielded cables are highly recommended)
Ports for option modules	
Type	The calculator features 2 ports for optional plug-in modules.
Function modules (Port 1 or 2)	• Pulse input module, 2 inputs (In1, In2) • Pulse output module, 2 outputs (Out1, Out2) • Combination module of 2 inputs (In1, In2) and 1 output (Out1)
Current output module (Port 1)	2 passive 4 ... 20 mA (#1, #2) (occupies both port 1 and 2)
Communication modules (Port 1 or 2)	M-Bus, RS 232 or RS 485 (M-Bus protocol, according EN 1434-3)
Pulse output	
Function	The module contains connections for 2 pulse outputs, which can be programmed as desired using a software tool. The pulse outputs are marked as standard as O1, 'gnd' and O2, 'gnd' on the terminal strip and Out1 respectively Out2 in the display.
Type	Passive "open collector" pulse output, outputs potential isolated to each other
Pulse value	Last significant digits of the display (unit/pulse), selection by corresponding Order code and setting can be read via display menu, settings changeable via software tool
Pulse output 1	
• Pulse frequency	≤ 4 Hz
• Pulse width	125 ms ± 10 %
• Pulse duration	125 ms ± 10 %
• Pulse break	≥125 ms -10 %
Pulse output 2	
• Pulse frequency	≤ 100 Hz, depending on the selected pulse length
• Ratio	Pulse duration/pulse break ~1:1
Pulse length	5, 10, 50, 100 ms (default: 5 ms)
External voltage supply	3 … 30 V DC
Current	≤ 20 mA with a residual voltage of ≤ 0.5 V

Possible pulse output selection	• Energy (default setting for 'Out1') • Volume (default setting for 'Out2') • Tariff energy 1 • Tariff energy 2 • Tariff condition 1 (limit switch) • Tariff condition 2 (limit switch) • Energy error • Volume error • Volume with specific display resolution (or with factor 0, 1, 10 or 100 thereof) • Energy with specific display resolution (or factor 0.1 thereof)
Pulse input	
Function	Add-on module for two additional counters. The pulse input 1 is marked as I1, 'gnd' and the input 2 as I2, 'gnd' on the terminal strip and indicated in the display as separate registers IN1 and IN2 and can also be transferred via the communication modules.
Type	Passive "open collector" pulse inputs, outputs not potential isolated to each other, data are separate cumulated in different registers and are also stored on the two accounting day's.
Pulse value	Pulse value and the unit are configurable for energy, water, gas or electrical meter by a software tool Default: Pulse input 0.1 m^3 or 1 gal (if unit 'gal' is ordered with the Z-option "L05")
Pulse frequency	≤ 8 Hz
Pulse length	≥ 10 ms
External voltage supply	3 V DC (supplied internally by FUE950)
Current	based on R_i = 2.2 MΩ
Cable length	< 10 m connection limit
Current output module	
Function	The module contains connections for 2 passive current outputs, which can be programmed individually using the software tool. The outputs are marked „#1" and „#2" with corresponding polarity „+" and „-" on the terminal strip. The module will be connected on port 1 only, but both ports are occupied by the module.
Terminal voltage	External supply: 10 … 30 V DC (passive output)
Signal range	4 … 20 mA; 4 mA = 0 value and 20 mA = default maximum values (for #1: Power in kW and for #2: Flow with the max. values and selected unit). Defaults: For power it is the max. selectable value x 100 000 the last digit of display (e. g. 20 mA = 10 000 kW (1 digit res.) or 100 000 kW (0 digit res). For flow it is the max. selectable value x 10 000 the last digit of display (e. g. 20 mA = 1 000.0 m^3/h (1 digit res.) or 10 000 m^3/h (0 digit res.).

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Load	Max. 800 Ω
Upper limit	Up to 20.5 mA (exceed causes the error current value)
Signal on alarm	Errors are indicated with 3.5 mA or 22.6 mA (programmable, default: 3.5 mA)
Output values	Power, flow, temperature (configuring via software tool; default: for #1: Power and for #2: Flow)
M-Bus output	
Type	The optional M-Bus plug-in module is a serial interface for communication with external devices (M-Bus Repeater)
Protocol	M-Bus according EN 1434-3
Connection	The connection is not polarity-conscious and is electrically isolated, connection of 2 x max. 2.5 mm^2 wires, 300 or 2400 baud (auto baud detection), current drawn: one M-Bus load. M-Bus address: Each port has its own primary M-Bus address (Prim1 = the last two digits of the serial number; Prim2 = 0). The secondary address is unique for each calculator and is factory-set to equal the serial number.
RS 232 output	
Type	The optional module RS 232 is a serial interface for data transmission with external devices, e.g. PC; baud rate: 300 or 2400. The module contains a 3-pole terminal strip with terminals marked 62 (TX), 63 (RX) and 64 (GND). For this purpose a special data cable is necessary.
Protocol	M-Bus according EN 1434-3
Connection	The module contains a 3-pole terminal strip with terminals marked 62, 63, 64 (max. 2.5 mm^2); Connected cable length: max 10 m; For communication with a PC a special adapter cable is required (Article No. A5E02611774).
RS 485 output	
Function	The optional RS 485 module is a serial interface for data transmission with external devices, e.g. PC; baud rate: 2400. The module contains a 4-pole terminal strip with terminals marked D+, D-, Vcc and GND.
Protocol	M-Bus protocol according EN 1434-3
Connection	Terminals D+ and D-; electrically isolated; 2400 baud only. An external supply of 12 V DC ± 5 V (<5 W) is needed for the module (terminals Vcc and GND). The module terminals are max. for 2.5 mm^2 wires. Connected cable length: max. 10 m

Power consumption	
230 V and 24 V versions	Typical current appr. 0.15 VA
3.6 V D-cell battery	Typical battery lifetime 10 years under normal conditions (no add-on modules, max. 40 °C ambient temperature)
Supply data	Internal voltage 3.6 V by the battery or plug-in power supply module
Battery, 3.6 V type (option)	3.6 V lithium D-cell, battery lifetime typically 16 years with independently powered flowmeter
230 V AC module (option)	Plug-in module for 230 V AC (195 ... 253 V AC), 50/60 Hz (incl. battery backup)
24 V AC module (option)	Plug-in module for 24 V AC (12 ... 30 V AC) (incl. battery backup)
Battery backup (option)	Only with mains supply modules by internal 3.0 V lithium battery (type CR 2032) Displayed values, date and time are still updated, but the measuring functions have stopped, including the flow rate measurement. Communication via optional modules M-Bus, RS 485, RS 232 or optical interface is maintained, affecting the backup battery lifetime.

Accessories/Software

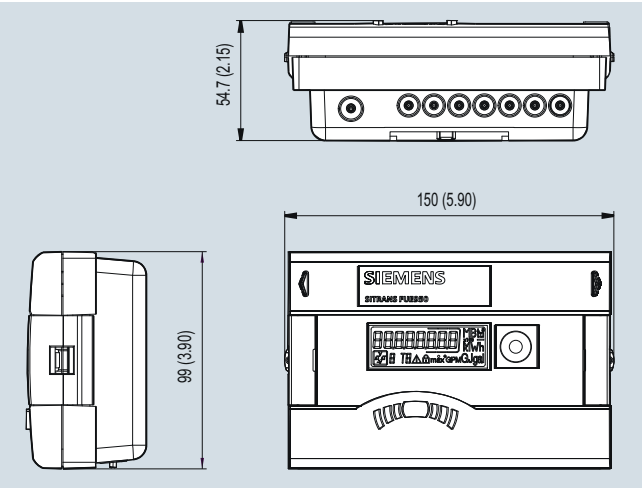
The parameterization software based on the M-Bus is a convenient tool for handling the calculator. It runs on Windows and is used for:

- Configuration of the calculator functionality, reading out different memories, printing out calculator logs (standard).
- Expert programming of the device (advanced setup).
- Test Lab programming of the device (full setup)

Configuration of the calculator functionality, reading out different memories, printing out calculator logs. For further details please contact your local Siemens representative.

A specific optical head with a permanent magnet in (IrDA adapter with bluetooth) accordance with EN 1434 can be used for programming/altering programming of readout data, configuration data, etc. The reader head can also be used to change measuring data.

Dimensional drawings



SITRANS FUE950, dimensions in mm (inch)

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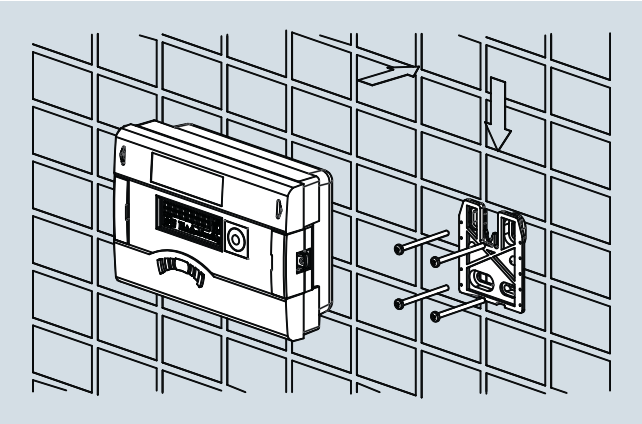
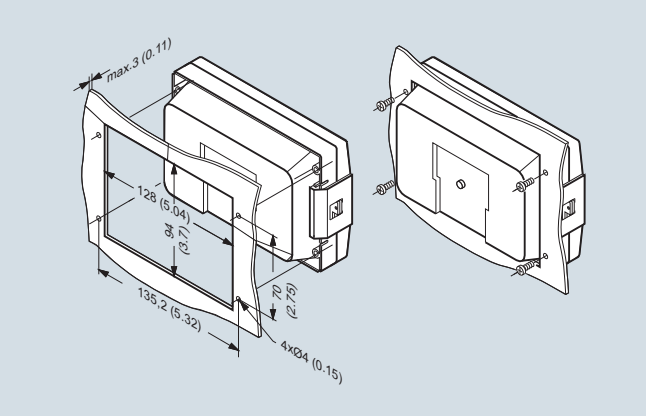


Wall mounting



Panel mounting, dimensions in mm (inch)

Pt500 temperature sensor pairs

Application

The temperature sensor set is designed for use with the Siemens energy calculator type SITRANS FUE950 for measurement of the energy consumption in a district heating or cooling net.

Temperature sensors are one of the integral components of every thermal energy meter in heating or cooling applications. They are used for determining temperature changes in fluids due to energy taken from or supplied to the loop. The temperature is thus measured by mounting temperature sensors upstream and downstream from the point where the exchange in the thermal energy of the system is.

To ensure an accurate measurement of the temperature difference according to MID (EN 1434) or PTB K7.2 the sensors are delivered as matched pairs.

By selection with the corresponding Order code the Pt500 sensor pair sets can be delivered with heating approval or with approvals for combined heating/cooling applications.

Technical specifications

Temperature sensor pairs:

2-wire Pt500

Pt500 2-wire temperature sensor pair (EN 1434)	
Measuring insert	Pt500 temperature sensor, EN 60751, tolerance class B, 2-wire
Pairing	Paired to EN 1434 (10 ... 130 °C/14 ... 266 °F)
Media temperature	0...150 °C (32 ... 302 °F)
Response time $T_{0.5}$	See sensor pocket specifications
Medium	Typically heating water
Pressure rating	See sensor pocket specifications
Protection	IP65
Pipe material	AISI 304Ti/1.4303
Dimension	∅ 6 mm
Sensor tube length	50 mm
Cable length	Up to 10 m (32.8 ft), fixed connected silicon cable, 2 connection wire terminals, terminal sleeves to DIN 46228

4-wire Pt500

Pt500 4-wire temperature sensor pair (with MID and PTB K7.2 approval)	
Measuring insert	Pt500 temperature sensor, EN 60751, tolerance class to ISO 751 Class B; 4-wire
Pairing	Matched paired according to EN 1434 at 10, 75 and 140 °C (50, 167 and 284 °F)
Type approval	MID (DE-06-MI004-PTB011) and PTB K7.2 (PTB 22.77/09.01). Only to be mounted with related sensor pockets according to the type approvals.
Media temperature	0...150 °C (32 ... 302 °F)
Permissible temp. pair range for ΔT	
• Heating	3 ... 150 K
• Cooling	3 ... 85 K
Medium	Approved for heating/cooling water
Protection	IP65
Environment	
• Mechanic class	M3
• Electromagnetic class	E1 (MID)
Pressure rating	See sensor pocket specifications
Material	
• Protective tube	Stainless steel AISI 304Ti/1.4571 (or similar), diameter of protective tube: 6 mm
• Connector cable	Silicon cable, 4 connection wire terminals, terminal sleeves to DIN 46228
Sensor tube length	140 or 230 mm (5.51 or 9.06 inch)
Cable length	5 m (16.4 ft), fixed connected

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Sensor pockets

Stainless steel sensor pocket (for 4-wire Pt500 types only - standard)	
Media temperature	0 ... 150 °C (32 ... 302 °F)
Approval	Approved only together with 4-wire sensors
Medium	Approved for heating/cooling water; up to max. 5 m/s flow velocity
Pressure rating	PN 40
Length	Face-to-face length 120/135 and 210/225 mm (4.72"/5.23" and 8.27"/8.86")
External diameter	Protective tube 8/11 mm (0.32"/0.43")
Internal diameter	Protective tube 6 mm (0.24")
Pipe connection	Thread G 1/2" (with sealing screw for sensor)
Material	Protective tube AISI 316Ti/1.4571 (or similar)
Use	• Use with related 4-wire Pt500 sensors only (according type approval) • For flow velocities up to 5 m/s • Recommended to install with welded sleeve (according to EU standard)

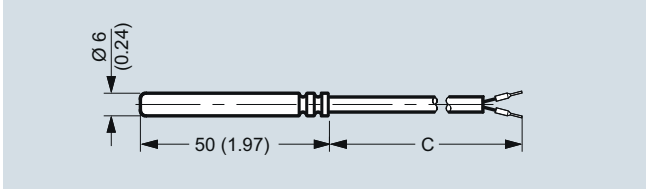
Stainless steel sensor pocket (for 2-wire Pt500 types only - some only available as spare part)					
Media temperature	0 ... 180 °C (32 ... 356 °F)				
Medium	Approved for heating water				
Response time $T_{0.5}$	Typically 13 s at 0.4 m/s without pasta				
	Typically 5 s at 0.4 m/s with pasta				
Pressure rating	PN 25				
Length	L1 (mm)	92	127	168	223
	L (mm)	82	117	155	210
Material	Stainless steel: AISI 316Ti/1.4571				
Use	For 2-wire Pt500 types only				

Brass sensor pocket (for 2-wire Pt500 types only - some only available as spare part)				
Media temperature	0 ... 150 °C (32 ... 302 °F)			
Medium	Approved for heating water			
Response time $T_{0.5}$	Typically 9 s at 0.4 m/s without pasta			
	Typically 5 s at 0.4 m/s with pasta			
Pressure rating	PN 16			
Length	L1 (mm)	47	92	127
	L (mm)	40	82	117
Material	Brass: $CuZn_{40}Pb_2$ (Ms58)			
Use	For 2-wire Pt500 types only			

Dimensional drawings

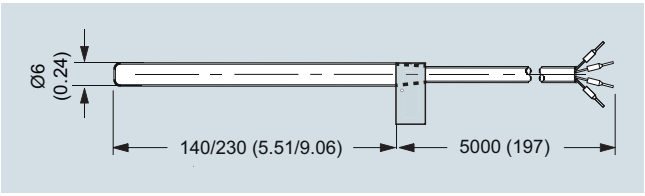
Pt500 2-wire temperature sensor pair (EN 1434)

Cable length 2, 3, 5 or 10 m ('C' at the dimensional drawing)



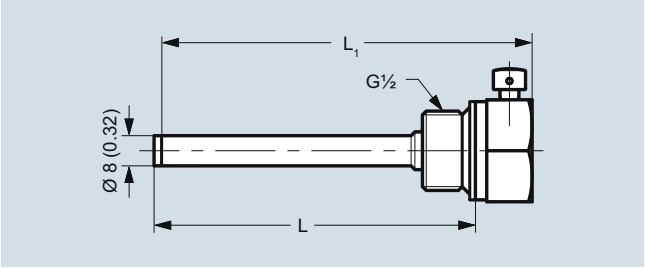
Pt500 2-wire temperature sensor, dimensions in mm (inch)

Pt500 4-wire temperature sensor pair (with MID and PTB K7.2 approval)



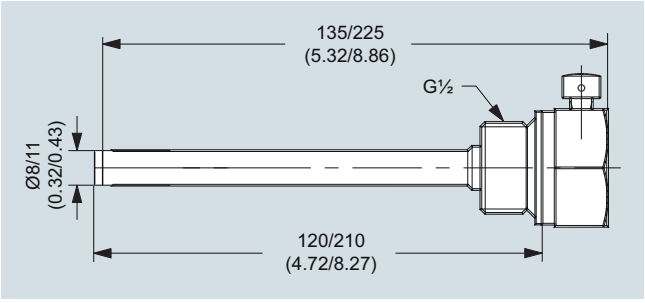
Pt500 4-wire temperature sensor, dimensions in mm (inch)

Stainless steel sensor pocket (for 2-wire Pt500 types only)					
Length	L1 (mm)	92	127	168	223
	L (mm)	82	117	155	210



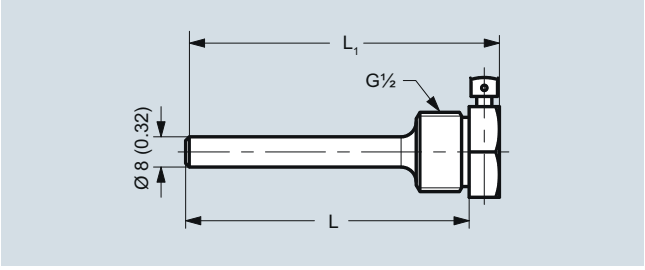
Sensor pocket (for 2-wire Pt500 types only), stainless steel, dimensions in mm (inch)

Stainless steel sensor pocket (for 4-wire Pt500 types only)



Stainless steel sensor pocket, dimensions in mm (inch)

Brass sensor pocket (for 2-wire Pt500 types only)				
Length	L1 (mm)	47	92	127
	L (mm)	40	82	117



Sensor pocket, brass (for 2-wire Pt500 types only), dimensions in mm (inch)

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SITRANS FUE950 energy calculator

Selection and Ordering data

Article No. 7ME3480-□□□□□-□□□□ Order code

Energy calculator SITRANS FUE950, MID or PTB K7.2 custody transfer approved ↗

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Flow input setting (IN0)

The pulse input value selection must be the same as the pulse output setting of the selected flowmeter. To get optimal function and performance the pulse value must be selected as low as possible according to the maximum flow rate.
The following calculation formula can be used for determining the lowest pulse value at a pulse length of 5 ms: L/pulse > Q_{max} (m^3/h)/360.
For example Q_{max} = 300 m^3/h; L/pulse > 300/360; L/pulse > 0.83; therefore the pulse value must be 1 l/pulse.

Pulse input in l/pulse or in gal/pulse (with option L05)	Flow limit Q_{max} in m^3/h	Flow limit Q_{max} in GPM *) (with option L05)	
1	360	6 000	2 A
2.5	900	15 000	2 B
5	1 800	30 000	2 C
10	3 600	60 000	3 A
25	9 000	150 000	3 B
50	18 000	300 000	3 C
100	36 000	600 000	4 A
250	90 000	-	4 B
500	180 000	-	4 C
1 000	360 000	-	5 A

*) GPM = Gallons per minute

Calculator application/Flowmeter installation place

For heating, flowmeter in return pipe (cold pipe), typical standard	A
For heating, flowmeter in forward pipe (hot pipe)	B
For cooling, media water, flowmeter in forward pipe (cold pipe)	C
For cooling, media water, flowmeter in return pipe (hot pipe)	D
For combined cooling/heating, flowmeter in forward pipe (hot pipe as heating) (MID conformity declaration for heating)	E
For combined cooling/heating, flowmeter in return pipe (cold pipe as heating) (MID conformity declaration for heating)	F

Temperature sensor type

Pt500 setup, no sensor pair included (standard)	0
Pt500 setup and Pt500 sensor pair (6/140 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 140 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01, incl. factory test report (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	3
Pt500 setup and Pt500 sensor pair (6/230 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 230 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01, incl. factory test report (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	4
Pt100 setup, no sensor pair included	5
Pt 500 setup and PT500 sensor pair (6/50 mm), 2-wire type incl. 5 m cable, 6 mm sensor diameter and 50 mm length, with MID approval (only for use with the applicable temperature sensor pockets)	6
Pt 500 setup and PT500 sensor pair (6/50 mm), 2-wire type incl. 10 m cable, 6 mm sensor diameter and 50 mm length, with MID approval (only for use with the applicable temperature sensor pockets)	7

Temperature sensor pocket sets: (for 6 mm sensor diameter)

No pockets (standard)	0
Brass pockets for 6 mm 2-wire sensors, length 82/92 mm, G½ inch, max. PN 16 (2 pcs.)	2
Stainless steel pocket, 120/135 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (2 pcs. for 140 mm 4-wire sensors above)	5
Stainless steel pockets for 6 mm 2-wire sensors, length 117/127 mm, G½ inch, max. PN 25 (2 pcs.)	6
Stainless steel pocket, 210/225 mm length for 6 mm sensor diameter, max. PN 40 and max 5 m/s (2 pcs. for 230 mm 4-wire sensors above)	7
Stainless steel pockets for 6 mm 2-wire sensors, length 155/168 mm, G½ inch, max. PN 25 (2 pcs.)	8

Voltage supply

Battery 3.6 V DC (Litium D-cell type) (standard)	1
Mains power module for 230 V AC supply (incl. back-up battery)	2
Mains power module for 24 V AC supply (incl. back-up battery)	3
No power supply module (power supply ordering separate)	4

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Selection and Ordering data	Article No.	Order code
Energy calculator SITRANS FUE950, MID or PTB K7.2 custody transfer approved	**7ME3480 -** ■■■■■ - ■■■■	■■■
Option modules		
No module (standard)	**A**	
1 module (communication module)		
M-Bus module	**B**	
RS 232 module (M-Bus protocol)	**C**	
RS 485 module (M-Bus protocol)	**D**	
1 module (function module)		
Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")	**E**	
Pulse input, 2x input (In1 and In2)	**F**	
Pulse out-/input combination, 2x input and 1x output	**G**	
Combination of 2 modules (communication and function module)		
M-Bus module and Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")	**H**	
M-Bus module and Pulse input, 2x input (In1 and In2)	**J**	
M-Bus module and Pulse out/-input combination, 2x input and 1x output	**K**	
RS 232 module (M-Bus) and Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")	**L**	
RS 232 module (M-Bus) and Pulse input, 2x input (In1 and In2)	**M**	
RS 232 module (M-Bus) and Pulse out/-input combination, 2x input and 1x output	**N**	
RS 485 module (M-Bus) and Pulse output, 2x output (Out1 "Energy" and Out2 "Volume")	**P**	
RS 485 module (M-Bus) and Pulse input, 2x input (In1 and In2)	**Q**	
RS 485 module (M-Bus) and Pulse out/-input combination, 2x input and 1x output	**R**	
Combination current output module, 2x passive 4 ... 20 mA (Out 1 "Power", Out 2 "Flow") (occupies both module Ports 1 and 2)	**S**	
Display units and resolutions		
MWh & kW, m^3, m^3/h in 2 digit resolution; Temperature: no decimal figures	**C**	
MWh & kW, m^3, m^3/h in 1 digit resolution; Temperature: no decimal figures	**D**	
MWh & kW, m^3, m^3/h in 0 digit resolution; Temperature: no decimal figures	**E**	
GJ & kW, m^3, m^3/h in 2digit resolution; Temperature: no decimal figures	**H**	
GJ & kW, m^3, m^3/h in 1 digit resolution; Temperature: no decimal figures	**J**	
GJ & kW, m^3, m^3/h in 0 digit resolution; Temperature: no decimal figures	**K**	
Gcal & kW, m^3, m^3/h in 2 digit resolution; Temperature: no decimal figures	**M**	
Gcal & kW, m^3, m^3/h in 1 digit resolution; Temperature: no decimal figures	**N**	
Gcal & kW, m^3, m^3/h - in 0 digit resolution; Temperature: no decimal figures	**P**	
MBTU & MBTU/h, m^3, m^3/h in 2 digit resolution; Temperature: no decimal figures	**Q**	
MBTU & MBTU/h, m^3, m^3/h in 1 digit resolution; Temperature: no decimal figures	**R**	
MBTU & MBTU/h, m^3, m^3/h - in 0 digit resolution; Temperature: no decimal figures	**S**	
Verification/Approval		
Without type approval mark, neutral label (standard))	**0**	
With MID type approval mark (only for heating combinations, selection "A, B, E and F")	**1**	
With MID approval mark and first MID verfication (only for heating, selection A, B, E and F")	**2**	
Cooling approval mark, German national cooling approval according PTB-TR-K7.2 (only for cooling and media water, selection "C and D")	**7**	
Cooling approval mark, German national cooling approval according PTB-TR-K7.2 and first verification (only for cooling and media water, selection "C and D")	**8**	
Further designs		
Please add "**-Z**" to Article No. and specify Order code		
Certificate		
Including factory test report (certificate) of FUE950	**ALWAYS INCLUDED**	
Cooling, setup for non water		
Water/glycol setting for media type "Tyfocor LS (R)" (only with neutral label, no verification and approval)		**C02**
Optional settings/programming		
Tariff function settings (specify in clear text, up to max. 20 characters)		**D02**
Pulse output setting of option module (specify in clear text, up to max. 20 characters)		**D06**
Pulse input setting of option module (specify in clear text, up to max. 20 characters)		**D08**
Pulse input setting of 4 ... 20 mA option module (please specify 20 mA related type and value in clear text, up to max. 20 characters)		**D10**
Special display units		
Flow in 'GPM' and Volume in 'gal' (x100) (digits/resolution as selected above, only with 0 digit resolution)		**L05**
Temperature in deg. F (digit resolution as selected above)		**L31**

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3

Flowmeter SITRANS FUE950 operating instructions, accessories and spare parts

Operating instructions

Description	Article No.
• English	**A5E03424739**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F US literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Accessories

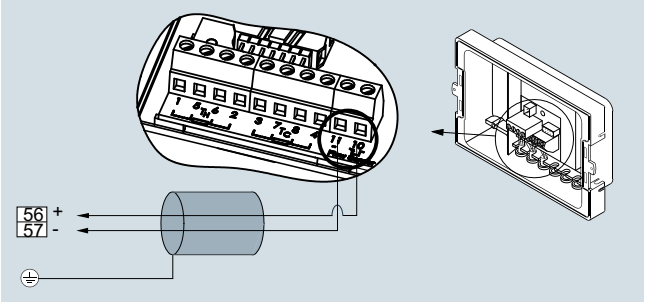
Description	Article No.
Infrared optical head (Bluetooth type) for data acquisition & programming of FUE950	**A5E02611768**
Bracket for SITRANS FUE950 wall mounting (20 pcs.)	**A5E02611769**
Cable for data acquisition via RS 232 PC/D-sub 9F/3 wire	**A5E02611774**
Basic version of programming software tool for FUE950	**free download from internet**
Expert version of programming software tool for FUE950	**A5E03478951**
Test Lab. version of re-programming software tool for FUE950 (Note: Before using this Test-Lab version an online training must be completed)	**A5E03461778**

Spare parts

Description	Article No.
Add-on modules for FUE950 (only for 7ME348 versions)	
Pulse input module (2 inputs)	**A5E03461432**
Pulse output module (2 outputs)	**A5E03461436**
Combined pulse in-/output module (2 inputs and 1 output)	**A5E03461437**
RS 232 module (M-Bus protocol)	**A5E03461459**
RS 485 module (M-Bus protocol)	**A5E03461512**
M-Bus module	**A5E03461516**
Combined current output module, 2 x passive 4 ... 20 mA	**A5E03461583**
Connection cable for option modules (types: Pulse, RS 232/RS 485, M-Bus, mA) (special connection cable with 2 plugs)	**A5E03461585**
Power supply for FUE950 (only for 7ME348 versions)	
3.6 V D-cell battery for SITRANS FUE950	**A5E03461708**
230 V AC supply module (incl. internal fuse T50 mA L 250 V and back-up battery) for SITRANS FUE950	**A5E03461717**
24 V AC supply module for SITRANS FUE950, incl. back-up battery	**A5E03461719**
Pocket for temperature sensors Pt500 (for related 4-wire Pt500 type only, 1 pc.)	
Stainless steel pocket (1 pc.), 135 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 140 mm sensor length).	**A5E03462868**
Stainless steel pocket (1 pc.), 225 mm length for 6 mm sensor diameter, max. PN 40 and max. 5 m/s (recommended for 230 mm sensor length).	**A5E03462870**
Pt500 4-wire temperature sensor pair, with MID MI004 and PTB K7.2 approvals and verification (for related 4-wire sensor pocket types only)	
Pt500 sensor pair (6/140 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 140 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	**A5E03462872**
PT500 sensor pair (6/230 mm), 4-wire with 5 m connection cable, 6 mm sensor diameter and 230 mm sensor length. MID approved DE-06-MI004-PTB011, PTB approved 22.77/09.01 (mentioned approvals are only valid if temp. sensors are used with the applicable temperature sensor pockets).	**A5E03462878**
FUE950 enclosure (only for 7ME348 versions)	
Bottom part of FUE950 enclosure (1 pc.)	**A5E03461508**
Snap fit for FUE950 enclosure (1 pc.)	**A5E30461731**
Pocket for Pt500 temperature sensors (for corresponding 2-wire Pt500 types only, 1pc.)	
Brass pocket 6 mm, G½B x 40 mm (PN 16), 1 pc.	**A5E02611778**
Brass pocket 6 mm, G½B x 85 mm (PN 16), 1 pc.	**A5E02611779**
Brass pocket 6 mm, G½B x 120 mm (PN 16), 1 pc.	**A5E02611780**
Stainless steel 6 mm, G½B x 85 mm (PN 25), 1 pc.	**A5E02611781**
Stainless steel 6 mm, G½B x 120 mm (PN 25), 1 pc.	**A5E02611783**
Stainless steel 6 mm, G½B x 155 mm (PN 25), 1 pc.	**A5E02611792**
Stainless steel 6 mm, G½B x 210 mm (PN 25), 1 pc.	**A5E02611793**
Pt500 temperature sensor pair, 2-wire cable, 6 mm sensor diameter, with MID/EN-approval (for corresponding 2-wire sensor pocket types only)	
Cable length:	
2 m	**A5E02611794**
3 m	**A5E02611795**
5 m	**A5E02611796**
10 m	**A5E02611798**

Schematics

Electrical connection for SITRANS FUS380/FUE380/FUE950 and MAG 5000/6000/FUE950



The diagram shows the connection between SITRANS FUE950 (terminals 10 and 11) and FUS380/FUE380 and MAG 5000/6000 (terminals 56 and 57). Temperature sensors must be connected to terminals 5 (1) and 6 (2) (T_H) and 7 (3) and 8 (4) (T_C).

Note:
The right flowmeter pulse output value must be equal to the FUE950 pulse input value and must be checked via the user menu of the transmitter MAG 5000/6000 or nameplate of FUE380 or FUS380.

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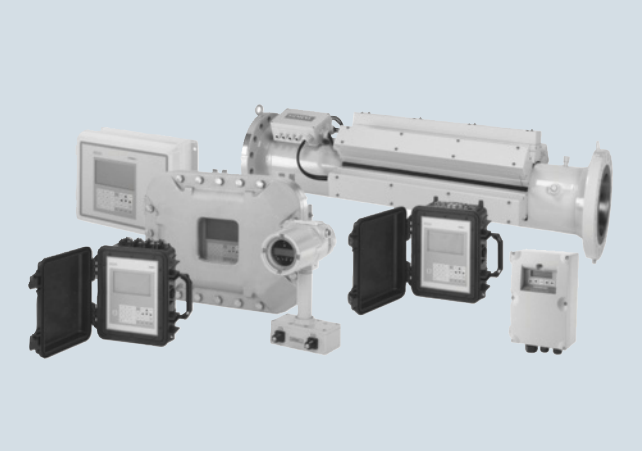
Overview



SITRANS F US clamp-on ultrasonic flowmeters provide highly accurate measurement while minimizing installation time and maintenance expense.

Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single, dual or multiple channel versions and a variety of enclosures - to suit your operating conditions and requirements

Application

SITRANS F US clamp-on ultrasonic flowmeters have seven product families, each targeting specific applications:

SITRANS FUS1010 Standard and SITRANS FUP1010 Portable flowmeters are suitable for a wide variety of liquid applications, including the following:

- Water industry
  - Raw water
  - Potable water
  - Chemicals
- Wastewater industry
  - Raw sewage
  - Effluent
  - Sludges
  - Mixed liquor
  - Chemicals
- HVAC industry
  - Chillers
  - Condensers
  - Hot & cold water systems
- Power industry
  - Nuclear
  - Fossil
  - Hydroelectric
- Processing industry
  - Process control
  - Batching
  - Rate indication
  - Volumetric and mass measurement

SITRANS FUE1010 Energy flowmeters are ideally suited to thermal energy/power industry applications, including:

- Chilled water sub-metering
- Hot water sub-metering
- Condenser water
- Glycol
- Thermal storage
- Lake source cooling

SITRANS FUH1010 Oil flowmeters are ideal for applications carrying crude oil, refined petroleum or liquefied gas. There are three application areas: Interface detection, precision volume and standard volume.

Interface detection

- Precise identification of interfaces on multi-liquid pipelines
- Product identification
- Density indication

Precision volume

- Applications with multiple liquids having a wide viscosity range
- Automatic gross volume compensation due to viscosity changes

Standard volume

- Standard (net) volume flow measurement
- Suitable for use in leak detection systems
- Mass flow output measurement
- Interface detection
- Scraper ("pig") detection
- Chemical and petrochemical processing

SITRANS FUG1010 Gas flowmeters are ideal for most natural and process gas industry applications, including:

- Checkmetering
- Allocation
- Flow survey verification
- Lost and unaccounted for (LAUF) analysis
- Production
- Storage

SITRANS FST020 Basic flowmeters are suitable for most clean liquid applications, including the following:

- Water & wastewater industry
  - Potable water
  - Wastewater, influent & effluent
  - Processed sewage, sludge
- Chemical feed industry
  - Sodium hypochlorite
  - Sodium hydroxide
- HVAC & power industries
  - Coolant flow
  - Fuel flow
- Process control
  - Chemicals
  - Pharmaceuticals

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Clamp-on ultrasonic flowmeters

SITRANS FUT1010 Liquid and gas flowmeters are suitable for liquid and gas applications, including the following:

- Liquid
  Pipeline balancing
  - Terminal transmix metering
  - Refinery blending
  - Airport facility management
  - Petrochemical processing
  - Plant optimization
- Gas
  Production wells
  - Underground storage
  - Transmission
  - Electric power generation
  - Gas processing plants

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System information and selection guide

SITRANS F US Clamp-on flowmeters	FUS1010 (Standard)	FST020 (Basic)	FUP1010 (Portable)	FUE1010 (Energy)	FUH1010 (Oil)	FUG1010 (Gas)	FUT1010 (Liquid/Gas)
Industry/Applications							
Water and aqueous solutions	X	X	X	X			
Utility district heating, cooling	X	X	X	X			
Chemical	X	X	X				
Hydrocarbons/Petrochemical, multiple products or varying viscosity, liquefied gases, net and gross volume					X		X
Hydrocarbons (Single product with limited viscosity range) gross volume	X		X		X		X
Very low flow (< 0.1 m/s) in small pipes	X	X	X				
Natural gas						X	X
Process gas						X	X
Slurries or liquids with high percentage of undissolved gases	X[4)]		X	X			
High temperature liquids > 120 °C (248 °F)	X[1)]	X[1)]	X[1)]	X[1)]	X[1)]		
Aerospace or hydraulic test	X[2)]		X[2)]				
Refrigeration liquids	X	X	X	X			
Food products	X	X	X				
Design							
Field clamp-on (non-intrusive)	X	X	X	X	X	X	X
Doppler (Reflexor) hybrid capability	X[4)]		X	X			
Standard volume or mass flow; per API 2540					X		X
Interface detection					X		X
Density output					X		X
Standard volume or mass flow; per AGA 8						X	X
Differential temperature with energy calculation				X			
Temperature measurement	X		X	X	X	X	X
Analog input	X		X	X	X	X	X
Large graphics display	X[4)]		X	X	X[4)]	X[4)]	X
Diagnostic PC software (Si-Ware)	X	X	X	X	X	X	X
Number of acoustic paths and channels							
1-channel	X	X	X	X	X	X	X
2-path	X		X	X	X	X	X
2-channel w/arithmetic function	X		X	X			
4-path/(special order)	X				X	X	X
4-channel w/sum of active channels	X						
Transmitter enclosure							
IP65 (NEMA 4X) wall mount	X	X		X	X	X	X
IP67 weatherproof			X				
IP40 (NEMA 1) portable				X[3)]			
IP65 (NEMA 7) compact explosionproof	X				X	X	
IP66 (NEMA 7) wall mount explosion-proof	X				X	X	X

1) Special order high temperature clamp-on sensor
2) Special order Aerospace clip-on sensor recommended
3) Available with portable energy systems
4) Not for NEMA 7 compact explosionproof

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System information SITRANS F US Clamp-on ultrasonic flowmeters

SITRANS F US Clamp-on flowmeters	FUS1010 (Standard)	FST020 (Basic)	FUP1010 (Portable)	FUE1010 (Energy)	FUH1010 (Oil)	FUG1010 (Gas)	FUT1010 (Liquid/Gas)
Power Supply							
Internal battery operation			X	X[1)]			
Battery charger (100 ... 240 V AC 50 ... 60 Hz) with country specific line cord			X	X[1)]			
90 ... 240 V AC, 50 ... 60 Hz	X	X		X	X	X	X
9 ... 36 V DC[4)]	X	X		X	X	X	X
Size (For larger pipes, see spares list for appropriate sensors and mountings.)							
6.5 ... 9150 mm (0.25“ ... 360.24“)	X	X	X				
38 ... 9150 mm (1.5“ ... 360.24“)				X	X	X	
Approvals							
FM/CSA[2)5)]	X			X[3)]	X	X	X
ATEX[5)]	X				X	X	X
UL/ULc[5)]		X	X	X			
C-TICK[5)]	X	X		X	X	X	

1) Available with portable energy systems

2) NEMA 4X associated equipment in DIV 2 connected to DIV 1 sensors, NEMA 7 explosionproof equipment in DIV 1 connected to DIV 1 sensors.

3) Not for portable enclosure

4) -Neg and +pos ground available for compact NEMA 7

5) Products are marked with CE as required by european directive.

Sensor type selection guide

	Standard sensor supported in MLFB			
Application condition. Note all that apply before making selection	High precision	Universal	(Reflexor)	Notes
Media				
General survey (clean liquids) on non-steel pipes		X	O	
General survey (clean liquids) on a limited range of steel pipes	X		O	
Moderately aerated liquid or slurry, up to 121 °C (250 °F)	X			
Highly aerated liquid or slurry	O	O	X	
Permanent installation on steel pipe (clean liquids)	X		O	
Installation in offshore or corrosive environment	O	X[1)]	O	Sensors available with corrosion resistance as special order
Liquid temperature greater than 120 °C (248 °F)	O	X[1)]		High temp metal block sensors available as special order (to 230 °C (446 °F))
Operation on single pipeline flowing multiple products	X	O		
Natural gas or process gas	X	O	O	Consult sales specialist for all gas applications
Pipe material				
Steel	X		O	
Steel pipe with diameter/wall thickness ratio <10	O	X		
Non-steel pipe material (copper, ductile iron, cast iron, etc.)	O	X		High precision sensors can also be used on plastic and aluminum pipes
Wall thickness > 31.75 (1.25")	O	X		

O = not suitable X = preferred choice

1) Available for special order

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Definitions

Sensor Chart	Description
Standard	Standard system sensor, plastic body with alu housing, FM, CE
Spare	Available for special application and special pipes. Contact factory for application use. Not available as part of a configured product
Gas	Usable for gas application. Available also as corrosion resistant, frame, track or weldseal mounting, T1, T2. FM, ATEX, CE
CE	All flowmeter and sensors are CE - certified
Ex-FM	Standard, corrosion resistant, frames, weldseal, T1, T2, T3
Ex-ATEX	Option for all corrosion resistant, frames, weldseal, T1, T2, T3
Corrosion resistant	SS Housing instead Alu
Trackless	Fixed only by straps, no other mounting (spacer bar as an option)
Tracks	Portable and dedicated for universal size A/B and for HP size A/B. For all size HT only dedicated
Frames	Portable and dedicated for universal size C,D,E, and for HP size C/D. For universal and HP size B available for pipes >125 OD
Portable	BNC instead F-connector. Mounting universal sensor by portable tracks, frames and spacerbar
Transportable	Dedicated sensor including adapter for portable BNC cables.
WeldSeal	Special SS Frames for FUH1010,FUG1010, but also special FUS1010. Corrosion resistant, Liquid and Gas, T1, T2
T1	Usable -40 to 120°C, but best for Ø Temperature <40°C; Standard
T2	Usable -40 to 120°C, but best for Ø Temperature >40°C - <80°C; Named as high temperature high precision
T3	Usable -40 to 120°C, but best for Ø Temperature >80°C; special request
Submersible	Transducers can be used submersible by denso.

Sensor availability guide

	Availability																
Sensor models	**Standard**	**Spare only**	**Gas**	**Ex-ATEX**	**Ex-FM**	**Corrosion restistant**	**Trackless**	**Tracks**	**Frames**	**Portable**	**Transportable**	**WeldSeal**	**T1 (best use -40 ... 65 °C)**	**T2 (best use1 ... 104 °C)**	**T3 (best use 32 ... 120 °C)**	**Submersible**	**Cataloge**
Universal Sensor -40 … 120 °C Alu housing CE IP68																	
A1 Universal for pipe OD – 5.8 … 50.8 mm (0.23" … 2")		X		X[1]	X[1]	X[1]	X[3]	X		X						X[1]	
A2 Universal for pipe OD – 12.7 … 50.8 mm (0.5" … 2")	X			X[1]	X[1]	X[1]	X[3]	X		X						X[1] [2]	X
B1 Universal for pipe OD – 12.7 … 76 mm (0.5" … 3")		X		X[1]	X[1]	X[1]	X[3]	X	X	X						X[1]	
B2 Universal for pipe OD – 12.7 … 76 mm (0.5" … 3")		X		X[1]	X[1]	X[1]	X[3]	X	X	X						X[1]	
B3 Universal for pipe OD – 19 … 127 mm (0.75" … 5")	X			X[1]	X[1]	X[1]	X[3]	X	X	X						X[1] [2]	X
C1 Universal for pipe OD – 51 … 254 mm (2" … 10")		X		X[1]	X[1]	X[1]	X		X	X						X[1]	
C2 Universal for pipe OD – 51 … 254 mm (2" … 10")		X		X[1]	X[1]	X[1]	X		X	X						X[1]	
C3 Universal for pipe OD – 51 … 305 mm (2" … 12")	X			X[1]	X[1]	X[1]	X		X	X						X[1] [2]	X
D1 Universal for pipe OD – 102 … 508 mm (4" … 20")		X		X[1]	X[1]	X[1]	X		X	X						X[1]	
D2 Universal for pipe OD – 152 … 610 mm (6" … 24")		X		X[1]	X[1]	X[1]	X		X	X						X[1]	
D3 Universal for pipe OD – 203 … 610 mm (8" … 24")	X			X[1]	X[1]	X[1]	X		X	X						X[1] [2]	X
*E1 Universal for pipe OD – 254 … 3048 mm (10" … 120")		X		X[1]	X[1]	X[1]	X		X	X						X[1]	
*E2 Universal for pipe OD – 254 … 6096 mm (10" … 240")	X			X[1]	X[1]	X[1]	X		X	X						X[1] [2]	X
*E3 Universal for pipe OD – 304 … 9144 mm (12" … 360")		X	X[1]	X[1]	X[1]	X[1]	X		X	X		X[1]				X[1]	

[1] Excluding portable
[2] Spare only
[3] Usable but not recommended

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System information SITRANS F US Clamp-on ultrasonic flowmeters

Sensor models	Availability																
	Standard	Spare only	Gas	Ex-ATEX	Ex-FM	Corrosion restistant	Trackless	Tracks	Frames	Portable	Transportable	WeldSeal	T1 (best use -40 ... 65 °C)	T2 (best use1 ... 104 °C)	T3 (best use 32 ... 120 °C)	Submersible	Cataloge
High Precision Sensor -40 ... +120 °C Alu T1 (T2, T3) CE IP68																	
A1H (High Precision) for pipe WT - 0.64 ... 1.0 mm (0.025" ... 0.04")		X	X[1]	X[1]	X[1]	X[1]	X[3]	X			X		X	X	X	X[1]	X
A2H (High Precision) for pipe WT - 1.0 ... 1.5 mm (0.04" ... 0.06")	X		X[1]	X[1]	X[1]	X[1]	X[3]	X			X		X	X	X	X[1] [2]	X
A3H (High Precision) for pipe WT - 1.5 ... 2.0 mm (0.06" ... 0.08")	X		X[1]	X[1]	X[1]	X[1]	X[3]	X			X		X	X	X	X[1] [2]	X
B1H (High Precision) for pipe WT - 2.0 ... 3.0 mm (0.08" ... 0.12")	X		X[1]	X[1]	X[1]	X[1]	X[3]	X	X		X		X	X	X	X[1] [2]	X
B2H (High Precision) for pipe WT - 3.0 ... 4.1 mm (0.12" ... 0.16")	X		X[1]	X[1]	X[1]	X[1]	X[3]	X	X		X		X	X	X	X[1] [2]	X
B3H (High Precision) for pipe WT - 2.7 ... 3.3 mm (0.106" ... 0.128")		X	X[1]	X[1]	X[1]	X[1]	X[3]	X	X		X		X	X	X	X[1]	X
C1H (High Precision) for pipe WT (stainless steel construction) - 4.1 ... 5.8 mm (0.16" ... 0.23")	X		X[1]	X[1]	X[1]	X[1]	X		X		X	X[1]	X	X	X	X[1] [2]	X
C2H (High Precision) for pipe WT (stainless steel construction) - 5.8 ... 8.1 mm (0..23" ... 0.32")	X		X[1]	X[1]	X[1]	X[1]	X		X		X	X[1]	X	X	X	X[1] [2]	X
* D1H (High Precision) for pipe WT (stainless steel construction) - 8.1 ... 11.2 mm (0..32" ... 0.44")	X		X[1]	X[1]	X[1]	X[1]	X		X		X	X[1]	X	X	X	X[1] [2]	X
* D2H (High Precision) for pipe WT (stainless steel construction) - 11.2 ... 15.7 mm (0.44" ... 0.62")	X		X[1]	X[1]	X[1]	X[1]	X		X		X	X[1]	X	X	X	X[1] [2]	X
* D3H (High Precision) for pipe WT (stainless steel construction) - 7.4 ... 9.0 mm (0..293" ... 0.354")		X	X[1]	X[1]	X[1]	X[1]	X		X		X	X[1]	X	X	X	X[1]	X
* D4H (High Precision) for pipe WT (stainless steel construction) - 15.7 ... 31.8 mm (0..62" ... 1.25")	X		X[1]	X[1]	X[1]	X[1]	X		X		X	X[1]	X	X	X	X[1] [2]	X
High Temperature Universal Sensor -40 ... +230 °C																	
High Temperature size 1 ... 230 deg C (diam. 12.7 ... 100 mm)		X		X[1]	X[1]			X			X						
High Temperature size 2 ... 230 deg C (diam. 30 ... 200 mm)	X			X[1]	X[1]			X			X						X
High Temperaturer size 3 ... 230 deg C (diam. 150 ... 610 mm)	X			X[1]	X[1]			X			X						X
High Temperature size 4 ... 230 deg C (diam. 400 ... 1200 mm)	X			X[1]	X[1]			X			X						X
High Temperaturer size 2A ... 230 deg C (diam. 30 ... 200 mm)		X		X[1]	X[1]			X			X						
High Temp. size 3A ... 230 deg C (diam. 150 ... 610 mm)		X		X[1]	X[1]			X			X						
High Temp. size 4A ... 230 deg C (diam. 400 ... 1200 mm)		X		X[1]	X[1]			X			X						
Doppler Sensor																	
Doppler Sensor, for up to 121 °C (250 °F)	X			X[1]	X[1]		X			X						X[1]	X
Corrosion Resistant Doppler, for up to 121 °C (250 °F)		X		X[1]	X[1]	X[1]	X										

[1] Excluding portable
[2] Spare Only
[3] Useable but not recommended

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Sensor mounting availability guide

	Sensor							
	Universal NEMA	**Universal portable**	**WeldSeal sensors**	**Dedicated gas and liquid flow HP sensors**	**Portable liquid flow HP sensors**	**High temperature universal sensors**	**Doppler NEMA**	**Doppler portable**
Mounting								
Trackless	**X**	**X**		**X**	**X**		**X**	**X**
Tracks universal dedicated	**X**	**X**[1)]						
Tracks universal portable	**X**[1)]	**X**						
Tracks HP dedicated				**X**	**X**[1)]			
Tracks HP portable				**X**[1)]	**X**			
Frames universal dedicated	**X**	**X**[1)]						
Frames universal portable	**X**[1)]	**X**						
Frames HP dedicated				**X**	**X**[1)]			
Frames HP portable				**X**[1)]	**X**			
Tracks high temp universal						**X**		
WeldSeal single enclosure			**X**					
WeldSeal dual enclosure			**X**					
SpacerBar	**X**	**X**		**X**	**X**			
Straps	**X**	**X**[1)]		**X**	**X**[1)]	**X**	**X**	**X**[1)]
Chains tension hook		**X**			**X**			
Chains EZ-Clamp 1	**Size C, D**	**Size C, D**		**Size C**	**Size C**			
Chains EZ-Clamp 2	**Size E**	**Size E**		**Size D**	**Size D**			
Denso	**X**			**X**			**X**	
Doppler-Chains								**X**

[1)] Useable but not recommended

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System information SITRANS F US Clamp-on ultrasonic flowmeters

Input/output and function availability guide

			Output										Input								
			Standard	Additional inputs	Expanded/Enhanced	4 ... 20 mA active	4 ... 20 mA passive	0 ... 10 V	0 ... 5 kHz	p-gen (20 ... 40 kHz)	Relais - Dry reed	Status allarm	4 ... 20 mA passive	0 ... 10 V	100 Ohm RTD	NoTot	ClrTot	ATEX	Unimass	Modbus	Doppler
FUS1010	NEMA 4X and NEMA 7 wall mount	Single channel	X			2		2	2		4					1	1	X		X	X
			X	X		2		2	2		4		4		1	1	1	X	X	X	X
		Dual channel	X			2[3]		2	2		4[4]					2	2	X		X	X
			X	X		2[3]		2	2		4[4]		4[4]		2	2	2	X	2	X	X
					X	2[3]	4[4]	2	2		4[4]					2	2	X		X	X
		Dual path	X			2		2	2		4					1	1	X		X	X
			X	X		2		2	2		4		4		1	1	1	X	1	X	X
					X	2	4	2	2		4					1	1	X		X	X
		Four path	X				4[3]	4[3][1]			4					4		X		X	
			X	X			4[3]	4[3][1]			4[3]		4		1	4		X	4	X	
		Four path	X				4	4[1]			4[3]					4		X		X	
			X	X			4	4[1]			4		4		1	4		X	1	X	
	NEMA 7 compact	Single channel	X				2		2			1						X			
				X			2		2			1	1		1			X	X		
		Dual channel	X				2[3]		2[3]			2[3]						X			
				X			2[3]		2[3]			2[3]	2[3]		2			X	X		
		Dual path	X				2		2			4[4]						X			
				X			2		2			4[4]	2		1			X	X		
FST020	NEMA 4X wall mount	Single channel	X				1		1			1									
FUP1010	IP67	Single channel		X			1	1	1			2									X
		Dual channel/ path		X			2[3]	2[3]	2[3]			4[4]									X
FUE1010	NEMA 4X	Single channel	X	X		2		2	2		4		4		2	1	1	FM		X	X
		Dual channel	X	X		2[3]		2[3]	2[3]				2[3]		4	2	2	FM		X	X
				X	X	2[3]		2[3]	2[3]		4[4]		2[3]		4	2	2	FM		X	X
		Dual path	X	X		2		2	2		4		2		4	1	1	FM		X	X
				X	X	2	4	2	2		4		2		4	1	1	FM		X	X
	NEMA 1 portable	Dual channel/ path	X	X			2[3]	2[3]	2[3]			4[4]	2		4	2	2				X
FUH1010	NEMA 4X and NEMA 7 wall mount	Single channel	X	X		2		2	2		4				1	1	1	X		X	
		Dual path	X	X		2		2		2	4		2		1	1	1	X		X	
				X	X[2]	2	2	2		2	4		2		1	1	1	X		X	
		Four path[2]		X	X	2	2	2		2	4		2		1	1	1	X		X	
	NEMA 7 compact	Single channel	X	X			1			1		1			1	1	1	X			
		Dual path	X	X			2					2			1	1	1	X			
				X	X		2			1		1			1	1	1	X			
FUG1010	NEMA 4X and NEMA 7 wall mount	Single channel	X	X		2		2		2	4				1	1	1	X		X	
		Dual path		X	X	2	2	2		2	4		2		1	1	1	X		X	
		Four path		X	X	2	2	2		2	4		2		1	1	1	X		X	
	NEMA 7 compact	Single channel	X	X			1			1		1			1	1	1	X			
		Dual channel	X	X			2					2			1	1	1	X			
				X	X		2			1		1			1	1	1	X			

[1] Fixed to IO adjustment
[2] Not available for Interface Detector
[3] One per channel
[4] Two per channel

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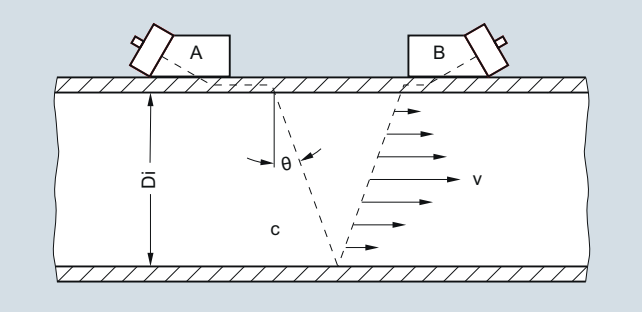
Function

Operating Principle

The SITRANS F US system is a transit-time ultrasonic meter that provides exceptional performance using a non-intrusive clamp-on approach. Ultrasonic sensors transmit and receive acoustic signals directly though the existing pipe wall, where the fluid refraction angle is governed by Snell's law of refraction.



Clamp-on sensor mounted in a reflect configuration

The beam refraction angle is calculated as follows:

$\sin\theta = c / V_\phi$

c = Velocity of sound in fluid

V_φ = Phase velocity (a constant in the pipe wall)

The flowmeter automatically compensates for any change in fluid sound velocity (or beam angle) in response to variations in the average transit time between sensors A and B. By subtracting the computed fixed times (within the sensors and pipe wall) from the measured average transit time, the meter can then infer the required transit time in the fluid (T_{Fluid}).

The sound waves traveling in the same direction as flow ($T_{A,B}$) arrive earlier than sound waves traveling against the direction of flow ($T_{B,A}$). This time difference (Δt) is used to compute the line integrated flow velocity (v) as shown in the equation below:

$v = V_\varphi / 2 \cdot \Delta t / T_{Fluid}$

Once the raw flow velocity is determined, the fluid Reynolds Number (Re) must be determined to properly correct for fully developed flow profile. This requires the entry of the fluid's kinematic viscosity (visc) as shown in the equations below, where Q represents the final flow profile compensated volumetric flow rate.

$Re = Di \cdot v / visc \cdot Q = K(Re) \cdot (\pi / 4 \cdot Di^2) \cdot v$

v = Flow velocity

$visc = \mu / \rho$ = (dynamic viscosity / density)

K(Re) = Reynolds flow profile compensation

In wetted type ultrasonic flowmeters the meter constants are configured prior to leaving the factory. As this is not possible with clamp-on meters, the settings must be made by the customer at the time of installation. These settings include pipe diameter, wall thickness, liquid viscosity, etc.

SITRANS Clamp-On flowmeters that include temperature sensing can be configured to dynamically infer changes in fluid viscosity for the purpose of computing the most accurate flow profile compensation (K_{Re}).

Ultrasonic Sensor Types

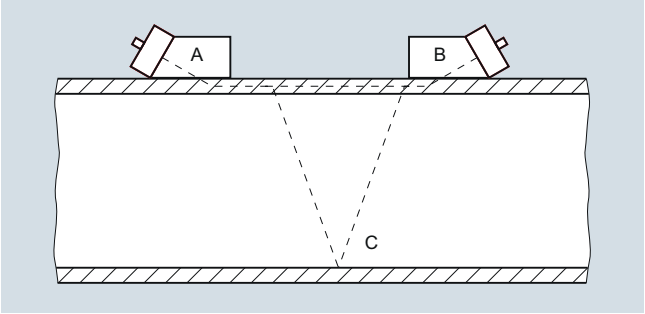
Three basic types of Clamp-On sensors can be selected for use with the SITRANS F US flowmeter. The lower cost "universal" sensor is the most common type in the industry and is suitable for most single liquid applications where the sound velocity does not vary much. This sensor type can be used on any sonically conductive pipe material (including steel) making it well suited for portable survey applications. Universal sensors are selected based on the pipe diameter range alone, so wall thickness is less important to the selection process.

The second sensor type is the WideBeam sensor (called high precision), which utilizes the pipe wall as a kind of waveguide to optimize the signal to noise ratio and provide a wider area of vibration. This makes this kind of sensor less sensitive to any change in the fluid medium.

The WideBeam sensor is designed for steel pipes, but can also be used with aluminum, titanium and plastic pipe. It is the preferred sensor for HPI and gas applications. Note that unlike the universal type, this sensor selection is dependent only on the pipe's wall thickness.

Automatic Zero Drift Correction (ZeroMatic Path)

When WideBeam sensors are installed in the "Reflect" mode shown below, the acoustic signal travels in two different paths between sensors A and B. One path "ACB" travels through the pipe wall and fluid, while the other path "AB" never enters the fluid medium.

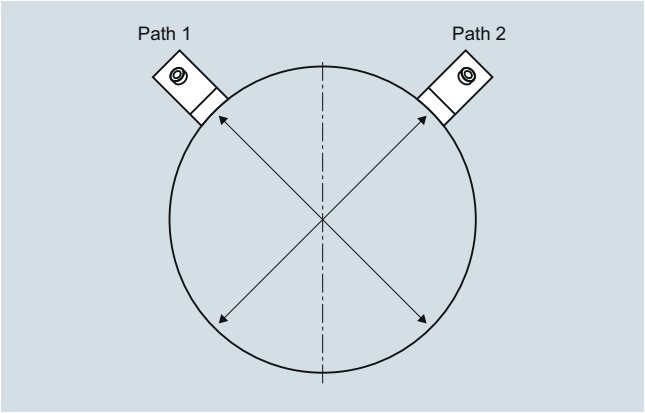


This later path provides the meter with a reference signal that is completely independent of flow rate and can therefore be used as a measure of sensor "mis-match". By continually analyzing this pipe wall signal the SITRANS FUS1010 meter can dynamically correct for flow errors caused by zero drift.

Multi-Channel Flowmeters

For improved flow profile averaging, redundancy or better cost per measurement, Clamp-On meters can be supplied with 2, 3 or 4 path measurement systems.

In the standard FUS, FUP, FUE systems, these channels can be installed on separate independent lines or in a multi-beam installation as shown below. This choice is made during meter setup, where either a multi-path (two paths on same pipe) or multi-channel installation can be selected.



Dual path installation example

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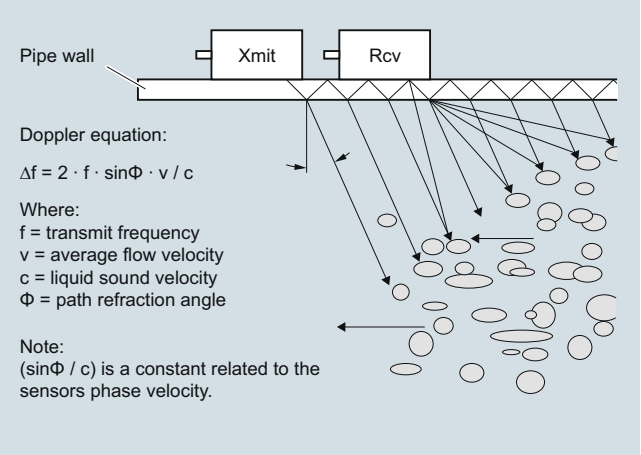
3

Doppler (Reflexor) Operation

The Doppler measurement technique relies on the reflection of sound energy off tiny gas bubbles or suspended particles to create a doppler shift in the fixed frequency acoustic transmit signal, as shown below.



When de-demodulated using FFT signal processing, this doppler shifted frequency (Δf) can be used to measure the flow rate as described in the associated doppler equations below.

Although the standard transit time measurement system is very tolerant of high levels of liquid aeration and high solids content, there will be cases where insufficient signal will be available for operation with transit time mode. For these cases the FUS, FUP and FUE meters can be ordered with this optional doppler capability, which requires an additional doppler sensor.

SITRANS meter family description

SITRANS FUS1010 Standard flowmeters

The SITRANS FUS1010 system is a basic function permanent (or dedicated) clamp-on meter that is available with a full range of safety approvals, I/Os and enclosure types. This meter can be used in a wide range of applications but does not include the special functions found in the hydrocarbon FUH and energy FUE flowmeters.

The SITRANS FUS1010 meter is typically programmed with a fixed viscosity and specific gravity entry, which can limit the mass flow and volumetric flow accuracy when highly variable (multi-product) liquid properties flow through the same pipeline.

If this meter is ordered with the Type 3 hardware and program configuration, it will have the ability to accommodate clamp-on RTDs, or an analog input from a temperature transmitter. With an active measurement of liquid temperature the meter can then be programmed to compensate for changes in liquid density and viscosity by mean of a “UniMass” table (for advanced users).

SITRANS FST020 Basic flowmeters

The SITRANS FST020 system has the same basic function of the SITRANS FUS1010 system, but does not include the same I/O capability or safety approval rating of the SITRANS FUS1010. This basic meter is intended for single liquid applications that do not require these additional features, such as doppler and unimass. Note that the SITRANS FST020 is not available with hazardous area approvals.

SITRANS FUP1010 Portable flowmeters

The SITRANS FUP1010 meter has all the capabilities of the SITRANS FUS1010 meter, but in a battery powered portable configuration. This meter is ideal for general flow survey work where high accuracy is required. Note that the FUP meter is not available with hazardous areas approvals.

SITRANS FUE1010 Energy flowmeters

By combining clamp-on transit time flow measurement with accurate temperature differential measurement, the SITRANS FUE1010 system provides a solution to thermal energy metering with no interruption of service. Energy measurement can be provided for water, ethylene glycol and brine solutions or steam condensate.

Absolute and differential temperature measurement is accomplished with the use of 2 matched 1 kΩ RTD elements installed on the supply and return side of the heating or cooling system. Efficiency calculation (kW/ton, EER or COP) is also available in systems with the optional analog input capability, which allow the meter to accept a power meter output.

The SITRANS FUE1010 system is available in both dedicated (IP65 (NEMA 4X)) and portable configurations (IP40).

SITRANS FUG1010 Gas flowmeters

Be sure to contact a Siemens clamp-on specialist before placing a gas system order.

This unique Clamp-On gas meter uses the same WideBeam transit time operating principle described above. However, due to the very low density and sound velocity characteristics of gases, this meter requires a high gain signal amplifier and the installation of a pipe damping material.

The pipe damping material consists of an adhesive backed viscoelastic film that is designed to attenuate any stray acoustic transmit energy that may otherwise interfere with the transit time gas signal. Damping material installation requires a clean (grease free) pipe surface with well bonded paint.

The Clamp-On gas meter is capable of operation on most gases (natural gas, oxygen, nitrogen, carbon monoxide, etc) with a typical minimum operating pressure of 10 barg (145 psig). Low molecular weight gases such as helium or hydrogen can also be measured, but at a higher minimum pressure.

Standard volume computation: Can provide a standard volume or mass flow output for fixed gas compositions. All SITRANS FUG1010 Gas meters include analog input capability that can be used for pressure and temperature compensation. With the installation of an AGA8 lookup table this meter can dynamically adjust the compressibility factor (Z_{act}) in response to changes in gas pressure and temperature, as indicate below:

Std. Rate = $Q_{act} * P_{act}/P_{base} * T_{base}/T_{act} * Z_{base}/Z_{act}$

SITRANS FUH1010 Oil flowmeters

There are three models of flowmeters included in the SITRANS FUH1010 family, a precision volume model, used for applications that will flow a wide range of viscosity, a standard volume (mass) model, and an interface detection model. All models rely on a variable referred to as “Liquident”, which is used to infer the liquid’s viscosity and optionally the liquid’s density. This variable represents the measured liquid sonic velocity compensated by the operating temperature and pressure, so for a given liquid product the measured Liquident output will remain constant over a wide range of pressure or temperature.

Precision Volume Option:

This is the lower cost SITRANS FUH1010 meter option that uses the Liquident variable to infer only the actual liquid viscosity. This meter does NOT provide the standard volume, mass flow, liquid identification or density output available in the standard volume meter option described below. The precision volume meter is suitable for any petroleum application where actual volume required as the input to an external RTU or flow transmitter.

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Standard Volume Option:

This Liquident variable can also be used to identify the liquid's name (gasoline, fuel oil, crude oil, etc) as well as it's physical properties (specify gravity, API, viscosity and compressibility) at base conditions. With this information the meter can be configured to output a temperature and pressure compensated (standard) volume flow rate using the API 2540 and API MPMS chapter 11.2.1 methods as shown below.

Correction for Temperature:

Compute Thermal Expansion Coefficient (α_b):

$\alpha_b = KO / \rho_b^2 + K1 / \rho_b$

where: KO and K1 are constants dependent on type of liquid and ρb is the liquid density at base conditions

Compute temperature correction factor (K_T):

$K_T = \rho_b * EXP (- \alpha_b \Delta T (1 + 0.8 \alpha_b \Delta T))$

where: ΔT = (T – base temperature)

Correction for Pressure:

Compute Compressibility Factor (F):

$F = EXP(A + B T + (C + D T) / \rho_b^2$

where: A, B, C and D are constants, and "T" is liquid temperature

Compute pressure correction factor (K_p):

$K_p = 1 / (1 – F (P_{act} – P_{base}) * 10^{-4})$

Final Volume Correction: $Q_{std} = Q_{act} * K_t * K_p$

Available outputs from this meter include: API, Density, Mass Flowrate, Standard Volume Flowrate and Liquid Identification.

Interface Detection Option:

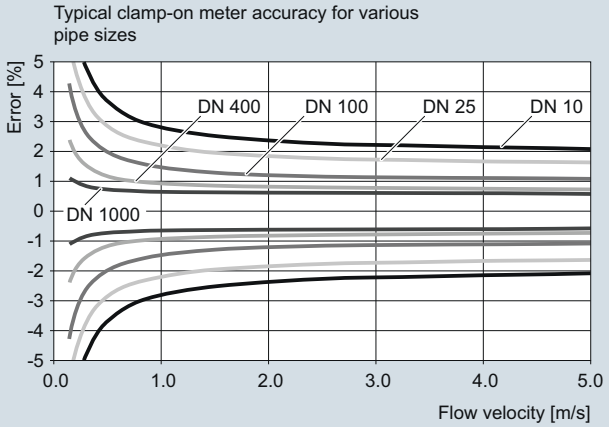
This meter option is designed to provide all the Non-Flow capabilities of a DV meter, making it an ideal non-intrusive alternative to a densitometer. Be aware that this meter does NOT measure flow rate.

SITRANS FUT1010 Liquid and gas flowmeters

The SITRANS FUT1010 is available in two different configurations; a version for liquid hydrocarbon applications and a version for precise gas measurement. Both versions are offered in pipe sizes ranging from 4 inch to 24 inch (DN100 to DN 600) with flange ratings of ANSI Class gas.

General Installation Guidelines for transit time Clamp-On Sensor

- Minimum measuring range: 0 to ± 0.3 m/s velocity (see meter accuracy graph below for more detail)
- Maximum measuring range: 0 to ± 12 m/s (± 30 m/s for high precision sensors). Final flow range determination requires application review



- Pipe must be completely full within the sensor installation volume for accurate flow measurement
- Typical MINIMUM straight pipe requirements are: 10 Diameters upstream/5 Diameters downstream. Additional straight run is required for double out-of-plane elbows and partially open valves. A minimum of 20 upstream diameters is recommended for clamp-on gas systems
- Sensors should be installed at least 20° off vertical for horizontal pipes. This reduces the chance of beam interference from gas buildup at the top of the pipe
- Operation inside the Reynolds transition region, between 1000 < Re < 5000 should be avoided for best accuracy
- Submersible and direct burial installations can be accommodated. Consult sales representative for details
- Ultrasonic coupling compound is provided with all sensor orders. Insure that a permanent coupling compound is used for long term installations
- Refer to the "Sensor type selection guide" to insure proper application of the equipment

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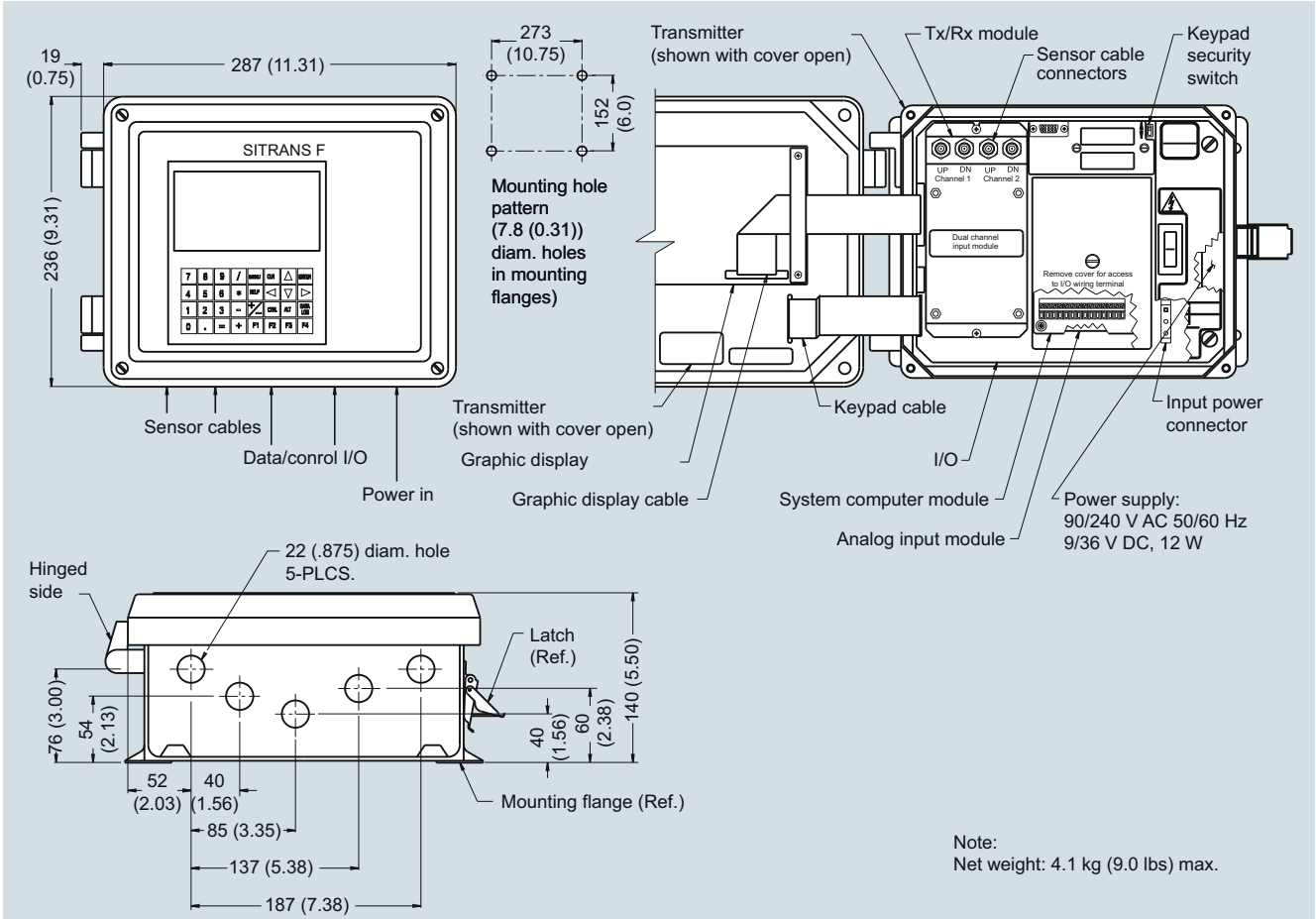
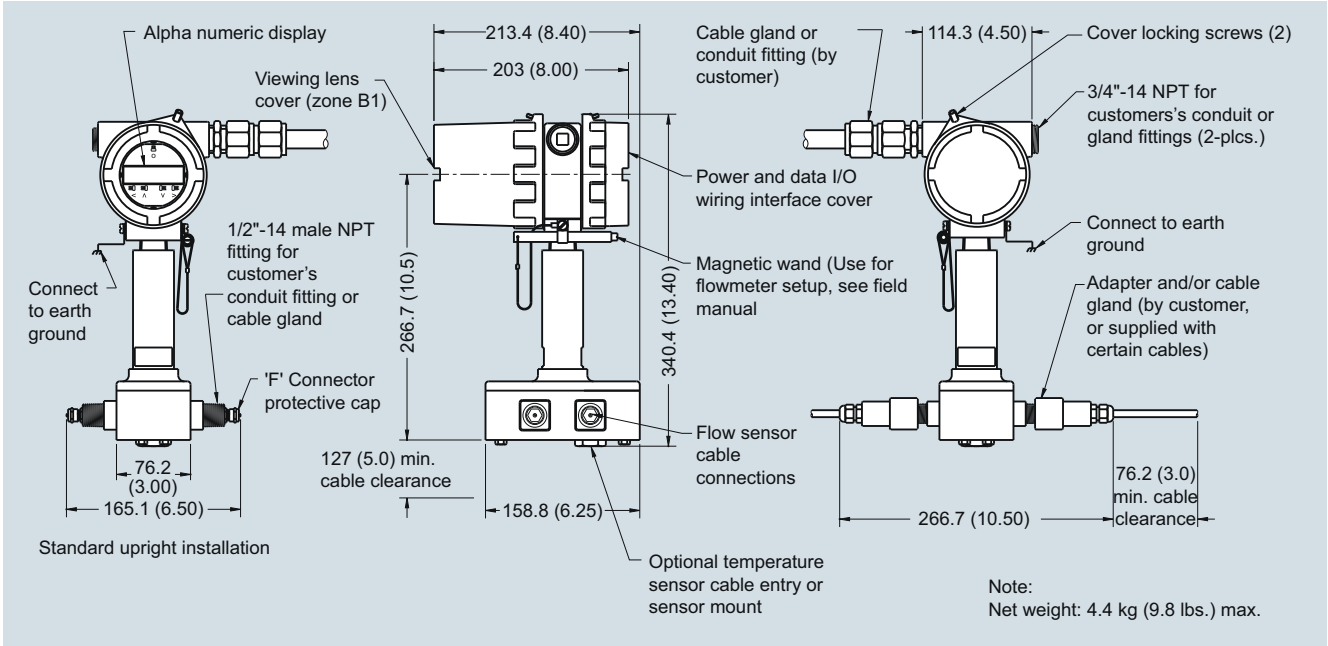
Dimensional drawings

SITRANS FUS1010, FUE1010, FUH1010, FUT1010 and FUG1010 IP65 (NEMA 4X) wall mount enclosure



Dimensions in mm (inch)

SITRANS FUS1010, FUH1010 and FUG1010 IP65 (NEMA 7) compact explosionproof enclosure



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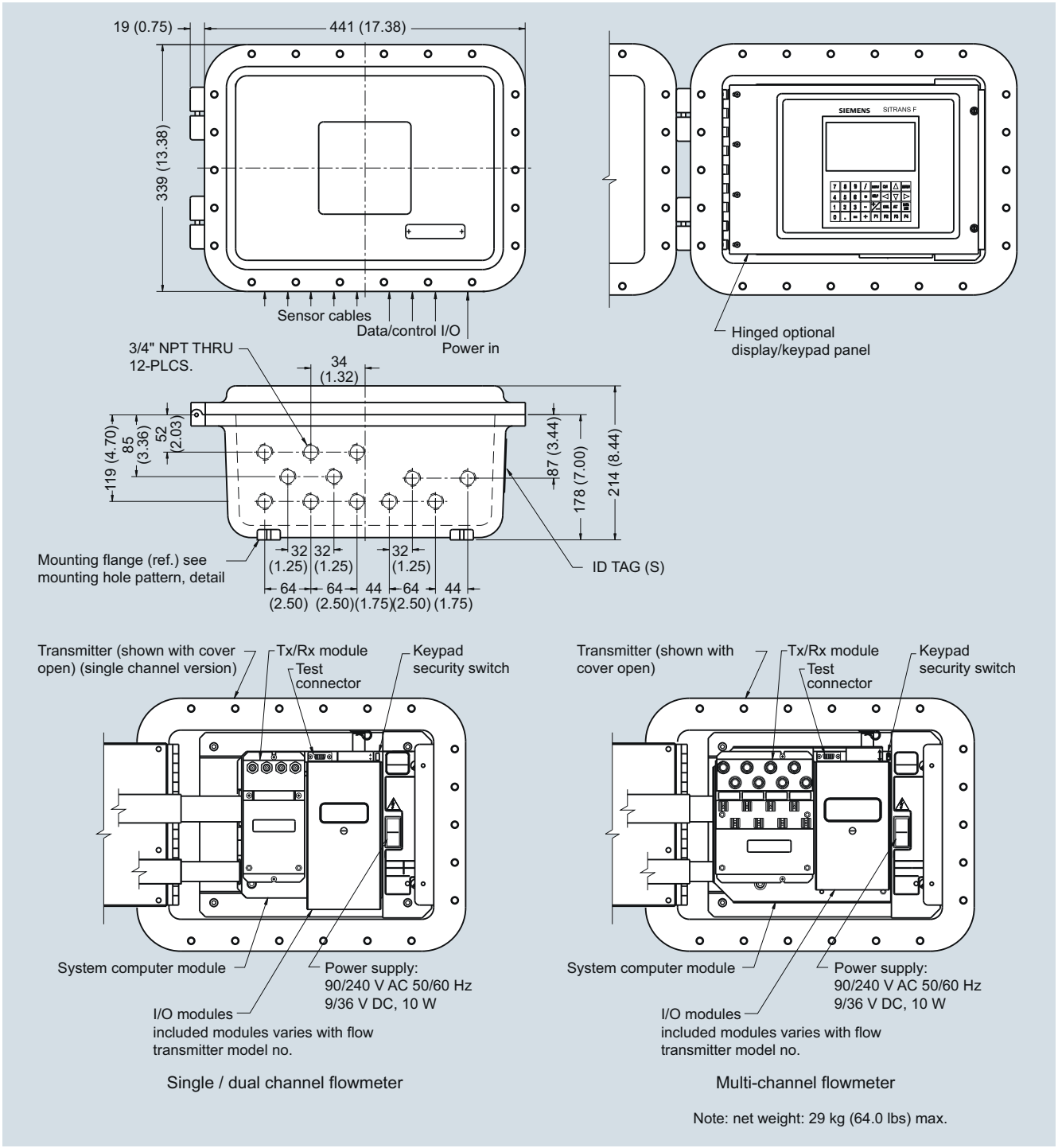
SITRANS FUS1010, FUH1010, FUT1010 and FUG1010 IP66 (NEMA 7) wall mount explosionproof enclosure



DImensions in mm (inch)

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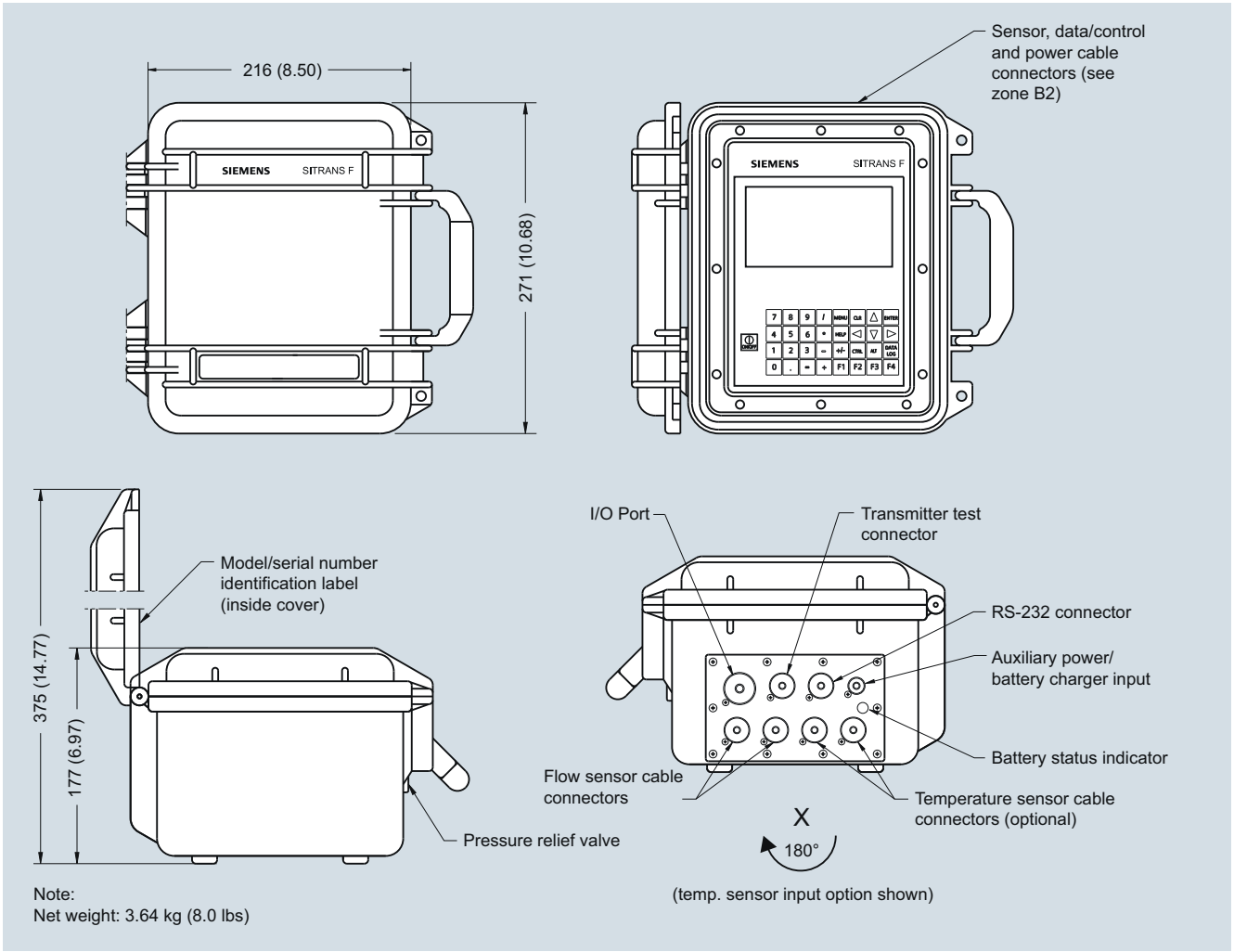
System information SITRANS F US Clamp-on ultrasonic flowmeters

SITRANS FUP1010 IP67 Weatherproof impact resistant enclosure



DImensions in mm (inch)

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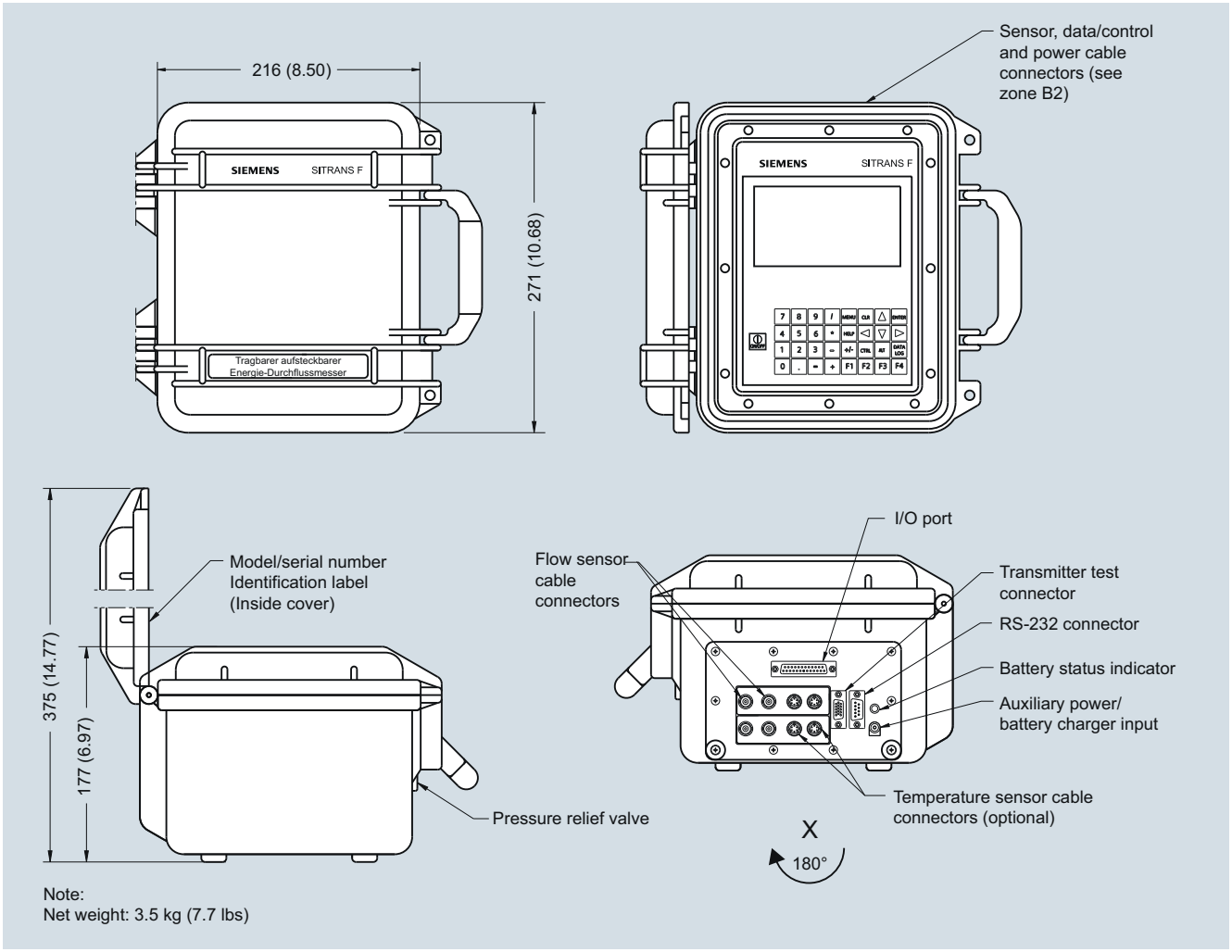
SITRANS FUE1010 IP40 (NEMA 1) Portable impact resistant enclosure



Dimensions in mm (inch)

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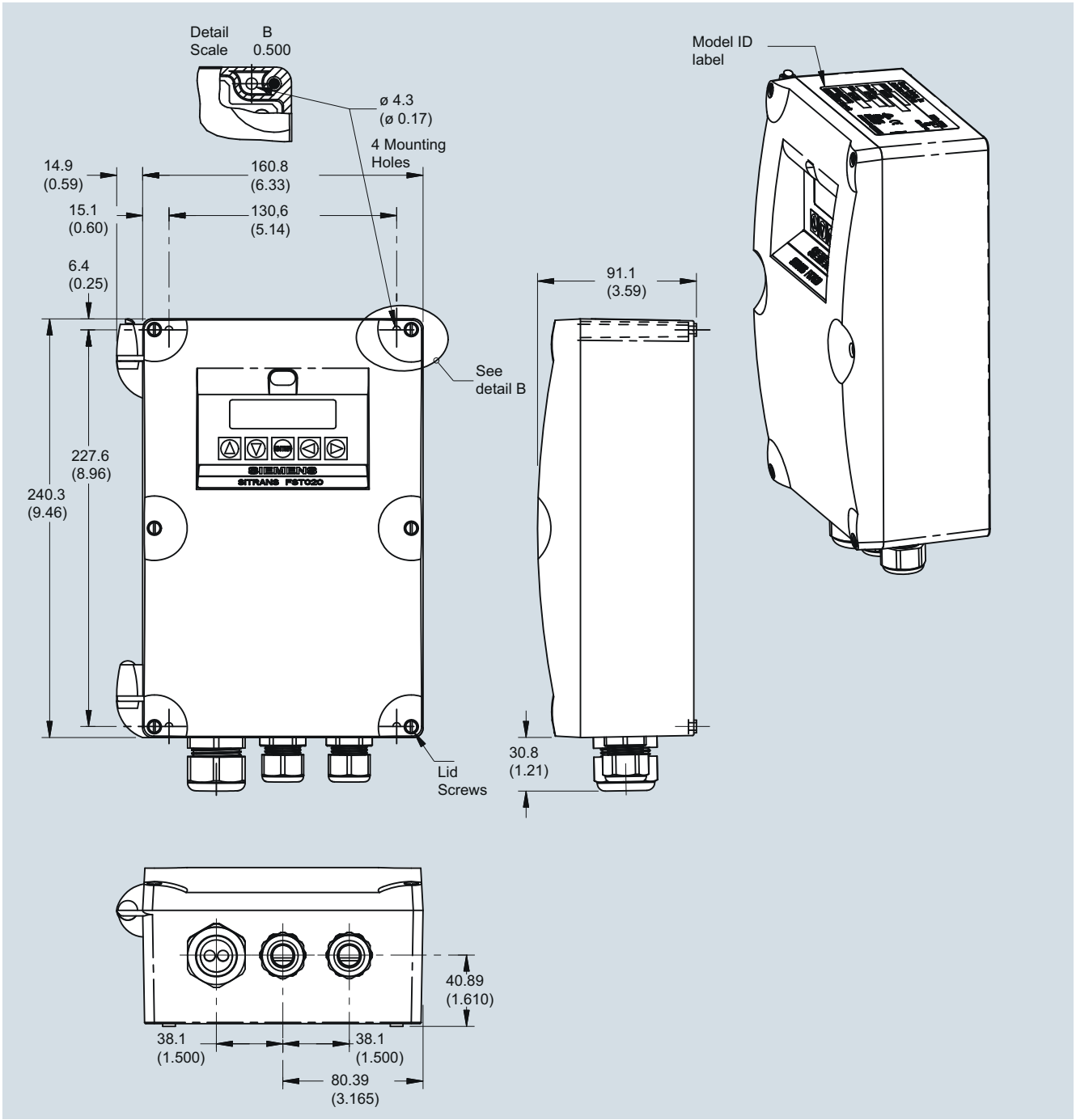
SITRANS FST020 IP65 (NEMA 4X) wall mount enclosure



Dimensions in mm (inch)

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Overview

The thickness gauge is used to measure the wall thickness of the pipe that a clamp-on ultrasonic flowmeter is installed on. The wall thickness value is a vital factor in the flow computation model and a prerequisite for precise clamp-on ultrasonic flow measurement. When measuring any pipe wall thickness the thickness gauge can also be used as a stand-alone tool used to measure the wall thickness of any metallic or non-metallic pipe materials capable of acting as an ultrasonic wave conductor.

Benefits

The thickness gauge is an indispensable tool in accurate clamp-on ultrasonic flow measurement. For a flowmeter to measure correctly it needs to know the exact wall thickness of the pipe it is measuring on. Since even the smallest miscalculation can have a major effect on the flow reading, the pipe thickness gauge has to be extremely precise. This is why the standard probe operates at a 5 MHz frequency making it capable of measuring pipe thickness ranging from 0.1 to 200 mm (0.03“ to 7.9“) with a very high resolution of up to 0.1 mm (0.004“).

Application

The thickness gauge can be used in any field application where there is a need for flow measurement.

Design

The hand-held micro-processor controlled gauge is designed to measure the thickness of various metallic or non-metallic pipe. Such materials include steel, aluminum, titanium, plastics and ceramics. Measurement results are shown in either inches or millimeter; only a simple pre-calibration to a known thickness or sound velocity is required. The simple-to-read 4-digit LCD display featuring a basic user friendly menu is easily navigable with only three conveniently located push buttons. The lightweight computing unit weighs a mere 150 g (5.3 oz) making it ideal for quick and easy on-site pipe wall thickness measurement and with two AAA alkaline batteries trouble-free operation is ensured for 250 hours.

Function

The thickness gauge measurement is based on the transit time ultrasonic wave propagation principle: a high frequency ultrasonic beam is transmitted into the pipe being measured through a probe acting as a sender and receiver. When the probe subsequently retrieves that same signal, an internal counter calculates the time taken for the signals to be sent and received through the pipe. This value is used to evaluate the speed of sound through the pipe and consequently, the thickness of the pipe wall.

Technical specifications

Display type	4-digit LCD
Display resolution	0.1 mm (0.004“)
Measurement units	Metric and imperial
Sound velocity range	1 000 ... 9 999 m/s (3 280 ... 32 805 ft/s)
Operating temperature	-10 ... +50 °C (14 ... 122 °F)
Probe/pipe temperature	70 °C (158 °F)
Update rate	4 Hz
Frequency	5 MHz
Power source	2 x 1.5 V AAA dry cells
Power consumption	Working current is less than 3 mA
Battery life	Approx. 250 h on a set of batteries
Dimensions (W x H x D)	61 x 108 x 28 mm (2.4 x 4.3 x 1.1“)
Weight	150 g (5.3 oz)

Selection and Ordering data	Article No.
Thickness gauge	**7ME3951-0TG20**

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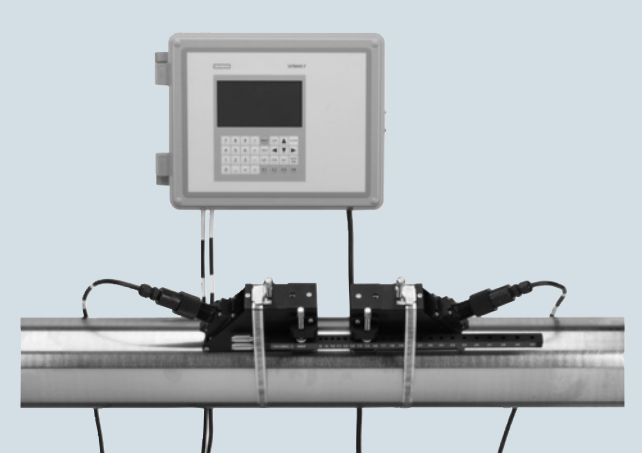
SITRANS FUS1010 (Standard)

Overview



SITRANS FUS1010 is the most versatile clamp-on ultrasonic flow display transmitter available today. It can operate in either Wide-Beam Transit time or Reflexor (Doppler) mode, making it suitable for virtually any liquid, even those with high aeration or suspended solids.

SITRANS FUS1010 is available in single, dual and optional four path configurations, with your choice of IP65 (NEMA 4X) wall mount, IP65 (NEMA7) compact explosionproof enclosures.

Benefits

- Versatility; there is no need to change meters when operating conditions change
- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single channel or dual channel/dual path, with doppler capability. Four channel/four path optional.
  - Optional four channels allow measurement of four independent pipes at the same time, reducing overall ownership costs
  - Dual mode allows for transit time and reflexor operation at the same time on the same pipe
  - Dual path allows for two sets of sensors to be set up on one pipe and averaged for higher accuracy
- ZeroMatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow

Application

SITRANS FUS1010 is suitable for a wide variety of liquid applications, including the following:

- Water industry
  - Raw water
  - Potable water
  - Chemicals
- Wastewater industry
  - Raw sewage
  - Effluent
  - Sludges
  - Mixed liquor
  - Chemicals
- HVAC industry
  - Chillers
  - Condensers
  - Hot and cold water systems
- Power industry
  - Nuclear
  - Fossil
  - Hydroelectric
- Processing industry
  - Process control
  - Batching
  - Rate indication
  - Volumetric and mass measurement

Design

SITRANS FUS1010 is available in three configurations:

- IP65 (NEMA 4X) wall mount enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
  - Single channel
  - Dual channel/dual path
  - Four channel (optional)
- IP65 (NEMA 7) compact explosionproof enclosure constructed of cast aluminum with glass window, stainless steel hardware
  - Single channel
  - Dual channel/dual path
- IP66 (NEMA 7) wall mount explosionproof enclosure constructed of cast aluminum, stainless steel hardware, with glass window
  - Single channel
  - Dual channel/dual path
  - Four channel (optional)

Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) flow display transmitters have integral 33 button keypads and large (128 x 240 pixel) graphic displays visible up to 12 m (40 ft) away
- IP65 (NEMA 7) compact flow display transmitter has a 2 x 16 Alphanumeric LCD display
- Current, voltage, status alarm, frequency outputs and communications including HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 and VT100 RS 232 (see specification section for details)
- Optional current, voltage and temperature inputs (see specification section for details)
- ZeroMatic Path automatically sets zero
- Bidirectional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German,Italian and French language selectable on IP65 (NEMA 7) enclosures[1)]

[1)] Available on NEMA 7 compact as MLFB option, all others are software selectable.

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Technical specifications

SITRANS FUS1010IP65 (NEMA 4X) wall mount

Enclosure IP65 (NEMA 4X)	
Input	
Flow range	± 12 m/s (± 40 ft/s), bidirectional
Flow sensitivity	0.0003 m/s (0.001 ft/s), flow rate independent
Pipe size	6.4 mm ... 9.14 m (0.25“ ... 360“)
Optional inputs Single channel	• Current: 20 mA DC • Temperature: 4 wire 1 kΩ RTD
Output	
Standard outputs	• Current: 20 mA DC (1 kΩ at 30 V DC) • Voltage: 10 V DC (5 kΩ min.) • Status Alarm: 4 x SPDT relays • Form C relays • Pulse rate: 5 kHz
Optional outputs	• Expanded I/Os (additional 4 ... 20 mA outputs) with form C relays • UniMass (requires RTD) • Communications: HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 and VT100 RS 232
Accuracy	
Accuracy	± 0.5 % ... 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 ... 0.003 m/s (± 0.005 ... 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Data refresh rate	5 Hz

Rated operation conditions	
Degree of protection	IP65 (NEMA 4X)
Liquid temperature	
• Standard	-40 ... +120 °C (-40 ... +250 °F)
• Optional	-40 ... +230 °C (-40 ... +450 °F)
Ambient temperature	-18 … +60 °C (0 … 140 °F)
Design	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams
Power supply	90 ... 240 V AC, 50 ... 60 Hz, 30 VA or 9 ... 36 V DC, 12 W
Indication and operation	
Data logger memory	1 MByte
Display	128 x 240 pixel LCD with back-light
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French selectable by software
Certificates and approvals	
FM and CSA ratings	• Transmitter N-I Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
C-TICK	
ATEX ratings	• Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 • Sensors: Ex II 1 G Ex ia IIC T5
IECEx	Pending

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SITRANS FUS1010 (Standard)

SITRANS FUS1010, IP65 (NEMA 7) compact explosionproof

Enclosure IP65 (NEMA 7)	
Input	
Flow range	± 12 m/s (± 40 ft/s), bidirectional
Flow sensitivity	0.0003 m/s (0.001 ft/s), flow rate independent
Pipe size	6.4 mm ... 9.14 m (0.25“ ... 360“)
Optional inputs per channel	• Current: 20 mA DC • Temperature: 4 wire 1 kΩ RTD
Output	
Outputs	• Current (externally powered): 1 x 4 … 20 mA DC (1 kΩ at 30 V DC) • Status Alarm: 1 x Isolated open collector • Pulse rate: 5 kHz • VT100 RS 232
Accuracy	
	± 0.5 % ... 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 ... 0.003 m/s (± 0.005 ... 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Data refresh rate	5 Hz
Rated operation conditions	
Degree of protection	IP65 (NEMA 7)
Liquid temperature	
• Standard	-40 ... +120 °C (-40 ... +250 °F)
• Optional	-40 ... +230 °C (-40 ... +450 °F)
Ambient temperature	-18 … +60 °C (0 … 140 °F)
Design	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams

Power supply	90 ... 240 V AC, 50 ... 60 Hz, 15 VA or 9 ... 36 V DC, 10 W 9 ... 36 V DC, 10 W - ground 9 ... 36 V DC, 10 W + ground
Indication and operation	
Data logger memory	1 MByte
Display	2 x 16 alphanumeric LCD display
Keypad	5 Magnetic hall effect switches
Language options	English, Spanish, German, Italian, French
Certificates and approvals	
FM and CSA ratings	• Transmitter XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
ATEX ratings	• Flow transmitter: Ex II 2 (1) G Ex d [ia] IIB + H2 T5 • Sensors: Ex II 1 G Ex ia IIC T5
IECEx	Pending
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC

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SITRANS FUS1010 IP66 (NEMA 7) wall mount explosionproof

Enclosure IP66 (NEMA 7)	
Input	
Flow range	± 12 m/s (± 40 ft/s), bidirectional
Flow sensitivity	0.0003 m/s (0.001 ft/s), flow rate independent
Pipe size	6.4 mm ... 9.14 m (0.25“ ... 360“)
Optional Inputs per channel	• Current: 20 mA DC • Temperature: 2 x 4 wire 1 kΩ RTD
Output	
Outputs single channel	• Current: 20 mA DC (1 kΩ at 30 V DC) • Voltage: 10 V DC (5 kΩ min.) • Status Alarm: 4 x SPDT Relays • Pulse rate: 5 kHz • Communications: HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 and VT100 RS 232
Accuracy	
Accuracy	± 0.5 % ... 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 ... 0.003 m/s (± 0.005 ... 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Data refresh rate	5 Hz
Rated operation conditions	
Degree of protection	IP66 (NEMA 7)
Liquid temperature	
• Standard	-40 ... +120 °C (-40 ... +250 °F)
• Optional	-40 ... +230 °C (-40 ... +450 °F)
Ambient temperature	-18 … +60 °C (0 … 140 °F)
Design	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams

Power supply	90 ... 240 V AC, 50 ... 60 Hz, 30 VA or 9 ... 36 V DC, 12 W
Indication and operation	
Data logger memory	1 MByte
Display	128 x 240 pixel LCD with back-light
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French
Certificates and approvals	
FM and CSA ratings	• Transmitter XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
C-TICK	
ATEX ratings	• Flow transmitter Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 Ex II 2 (1) G Ex d [ia IIC] IIB + H2 T5 • Sensors: Ex II 1 G Ex ia IIC T5
IECEx	Pending

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SITRANS FUS1010 (Standard)

Standard MLFB for quick delivery on SITRANS FUS1010 (Dedicated standard)

Selection and Ordering data		Article No.	Order code
SITRANS FUS1010 (Standard)	↗	7ME353 - ■■■■■ - 0■■■	■■■ + K02 + K02 + R02
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
IP65 (NEMA 4X) wall mount		0	
Number of channels/ultrasonic paths			
Single channel		1	
Dual channel/Dual path		2	
Flowmeter functions and I/O configurations includes graphic display and Reflexor capability			
Standard outputs • 2 x 0 ... 10 V • 2 x 4 ... 20 mA • 2 x pulse output • 4 x relay C type		A	
Meter power options			
90 ... 240 V AC		A	
9 ... 36 V DC (except NEMA 7 compact)		B	
Communication options			
VT100 RS 232 (standard)		0	
RTD temperature sensor			
(include mounting hardware for pipes between 1.5" and 24" outer diameter)			
No RTDs		0	
1x standard clamp-on		1	
2x standard clamp-on		2	
1x submersible		3	
2x submersible		4	
Sensor for channel 1 (includes pipe mounting kit and spacer bar for indicated max. OD listed) See "Sensor selection charts" for specifications.			
no sensor		A	
A2 universal	Trackmount and straps provided up to 75 mm (3")	B	
B3 universal	Trackmount and straps provided up to 125 mm (5")	C	
C3 universal[3]	Mounting frame and straps provided up to 300 mm (13")	D	
D3 universal[3]	Mounting frame and straps provided up to 600 mm (24")	E	
E2 universal[3]	Mounting frame and straps provided up to 1200 mm (48")[1]	F	
C1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")[2]	M	
C2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")[2]	N	
D1H (high precision)[3]	Mounting frame and straps provided up to 1200 mm (48")[2]	P	
D4H (high precision)[3]	Mounting frame and straps provided up to 1200 mm (48")[2]	R	
Doppler	to 12" with strap kit (not for IP65 (NEMA7)), for up to 121 °C (250 °F)	S	
D1H [3]	High temperature range 104 °C/220 °F HP[2]	Z	P1P

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Selection and Ordering data		Article No.	Order code
SITRANS FUS1010 (Standard)		7ME353 ■ - ■■■■■ - 0 ■■■	■■■ + K02 + K02 + R02
Sensor for channel 2 (includes pipe mounting kit for indicated max. OD listed) See "Sensor selection charts" for specifications.			
No sensor		A	
A2 universal	Trackmount and straps provided up to 75 mm (3")	B	
B3 universal	Trackmount and straps provided up to 125 mm (5")	C	
C3 universal[3]	Mounting frame and straps provided up to 300 mm (13")	D	
D3 universal[3]	Mounting frame and straps provided up to 600 mm (24")	E	
E2 universal[3]	Mounting frame and straps provided up to 1200 mm (48")[1]	F	
C1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")[2]	M	
C2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")[2]	N	
D1H (high precision)[3]	Mounting frame and straps provided up to 1200 mm (48")[2]	P	
D4H (high precision[3])	Mounting frame and straps provided up to 1200 mm (48")[2]	R	
Doppler	to 12" with strap kit (not for IP65 (NEMA7)), for up to 121 °C (250 °F)	S	
D1H [3]	High temperature range 104 °C/220 °F HP[2]	Z	Q1P
Approvals			
FM/CSA, CE (default)		1	
ATEX, CE, C-TICK		2	

1) Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

2) Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4)

3) Made with stainless steel construction.

Standard MLFB product offering represents 4 to 6 weeks delivery time.

For sensor and RTD cables for quick delivery see tables at end of section.

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SITRANS FUS1010 (Standard)

Selection and Ordering data	Article No.	Ord. code
SITRANS FUS1010 (Standard)		
• IP65 (NEMA 4X) wall mount ↗	**7ME3530-**	
• IP65 (NEMA 7) compact explosionproof ↗	**7ME3531-**	
• IP66 (NEMA 7) wall mount explosionproof ↗	**7ME3533-**	
	0 -	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Number of channels/ultrasonic paths		
Single channel	**1**	
Dual channel/Dual path	**2**	
Special: Four channel/Four path (NEMA 4X wall mount and NEMA 7 wall mount explosionproof only)	**9**	**H 1 A**
Flowmeter functions and I/O configurations includes graphic or digital display and Reflexor capability for all except IP65 (NEMA 7) compact units		
IP65 (NEMA 4X) wall mount and IP66 (NEMA 7 wall mount explosionsproof) units		
• Standard outputs - 2 x 0 ... 10 V - 2 x 4 ... 20 mA - 2 x pulse output - 4 x relay C type For H1A multi channel option above: - 4 x 0 ... 10 V - 4 x 4 ... 20 mA - 4 x relay C type	**A**	
• Standard outputs with optional input adder - UniMass capability with 2 x RTD input (1 x RTD only for H1A multi channel option) - 4 x 4 ... 20 mA analog input	**C**	
• Extended outputs plus optional inputs (Dual channel only) Outputs: - 2 x 0 ... 10 V - 2 x 4 ... 20 mA active - 4 x 4 ... 20 mA passive - 2 x 0 ... 5K pulse - 4 x relay C type Inputs: - 4 x 4 ... 20 mA - 1 x RTD inputs per chanel	**Z**	**J 1 B**
IP65 (NEMA 7) compact explosionproof units		
• Standard outputs - 1 x 4 ... 20 mA (Loop) and 1 x status (open collector) **per channel** - 1 x pulse output for single channel units only	**D**	
• Standard outputs with optional input adder - UniMass capability with 1 RTD input (1x RTD only, for H1A multi channel option) - 1 x analog input **per channel**	**F**	
Meter power options		
90 ... 240 V AC	**A**	
9 ... 36 V DC (except compact NEMA 7)	**B**	
9 ... 36 V DC negative GND (compact only)	**J**	
9 ... 36 V DC positive GND (compact only)	**K**	

Selection and Ordering data	Article No.	Ord. code
SITRANS FUS1010 (Standard)		
• IP65 (NEMA 4X) wall mount	**7ME3530-**	
• IP65 (NEMA 7) compact explosionproof	**7ME3531-**	
• IP66 (NEMA 7) wall mount explosionproof	**7ME3533-**	
	0 -	
Communication options		
VT100 RS 232	**0**	
Modbus RTU & TCP/IP, HART, BACnet MSTP/BACnet IP, Ethernet IP, Johnson N2	**6**	
RTD temperature sensor (includes mounting hardware for pipes between 1.5“ and 24“ outer diameter)		
No RTDs	**0**	
1 x Standard clamp-on RTD	**1**	
2 x Standard clamp-on RTD	**2**	
1 x Submersible clamp-on RTD	**3**	
2 x Submersible clamp-on RTD	**4**	
1 x Insertion style RTD with thermowell and lagging	**9**	**N 1 A**
2 x Insertion style RTD with thermowell and lagging	**9**	**N 1 B**
Sensor for channel 1 Including pipe mounting tracks for sizes A & B sensors indented for pipe with a OD less than 125 mm (5") and mounting frame/spacer bars for sizes C, D & E sensors. Straps provided are for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Sensor Selection Charts" for the sensor suitability of pipe size and wall thickness".		
no sensor		**A**
A2 universal	Trackmount and straps provided up to 75 mm (3”)	**B**
B3 universal	Trackmount and straps provided up to 125 mm (5”)	**C**
C3 universal[3]	Mounting frame and straps provided up to 300 mm (13”)	**D**
D3 universal[3]	Mounting frame and straps provided up to 600 mm (24”)	**E**
E2 universal[3]	Mounting frame and straps provided up to 1200 mm (48”)[1]	**F**

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Selection and Ordering data		Article No.	Ord. code
SITRANS FUS1010 (Standard)			
• IP65 (NEMA 4X) wall mount		**7ME3530-**	
• IP65 (NEMA 7) compact explosionproof		**7ME3531-**	
• IP66 (NEMA 7) wall mount explosionproof		**7ME3533-**	
		0 -	
Sensor for channel 1 (continued)			
For the following A1H to D4H sensors, temperature range is -40 °C ... 65 °C			
A2H (high precision)	Trackmount and straps provided up to 75 mm (3")		**H**
A3H (high precision)	Trackmount and straps provided up to 75 mm (3")		**J**
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		**K**
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		**L**
C1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		**M**
C2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		**N**
D1H (high precision)[3]	Mounting frame and straps provided up to 1200 mm (48")[2]		**P**
D2H (high precision)[3]	Mounting frame and straps provided up to 1200 mm (48")[2]		**Q**
D4H (high precision)[3]	Mounting frame and straps provided up to 1200 mm (48")[2]		**R**
Doppler	to 12" with strap kit (not for IP65 (NEMA 7)), for up to 121 °C (250 °F)		**S**
High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.))			**Z** **P 1 A**
High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))			**Z** **P 1 B**
High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))			**Z** **P 1 C**
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):			
B1H (high temperature range HP)			**Z** **P 1 K**
B2H (high temperature range HP)			**Z** **P 1 L**
C1H (high temperature range HP)[3]			**Z** **P 1 M**
C2H (high temperature range HP)[3]			**Z** **P 1 N**
D1H (high temperature range HP)[2][3]			**Z** **P 1 P**
D2H (high temperature range HP)[2][3]			**Z** **P 1 Q**
D4H (high temperature range HP)[2][3]			**Z** **P 1 R**

Selection and Ordering data		Article No.	Ord. code
SITRANS FUS1010 (Standard)			
• IP65 (NEMA 4X) wall mount		**7ME3530-**	
• IP65 (NEMA 7) compact explosionproof		**7ME3531-**	
• IP66 (NEMA 7) wall mount explosionproof		**7ME3533-**	
		0 -	
Sensor for channel 2 (includes pipe mounting kit for indicated max. OD listed) See "Sensor selection charts" for specifications.			
no sensor			**A**
A2 universal	Trackmount and straps provided up to 75 mm (3")		**B**
B3 universal	Trackmount and straps provided up to 125 mm (5")		**C**
C3 universal[3]	Mounting frame and straps provided up to 300 mm (13")		**D**
D3 universal[3]	Mounting frame and straps provided up to 600 mm (24")		**E**
E2 universal[3]	Mounting frame and straps provided up to 1200 mm (48")[1]		**F**
For the following A1H to D4H sensors, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):			
A2H (high precision)	Trackmount and straps provided up to 75 mm (3")		**H**
A3H (high precision)	Trackmount and straps provided up to 75 mm (3")		**J**
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		**K**
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		**L**
C1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		**M**
C2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		**N**
D1H (high precision)[3]	Mounting frame and straps provided up to 1200 mm (48")e[2]		**P**
D2H (high precision)[3]	Mounting frame and straps provided up to 1200 mm (48")[2]		**Q**
D4H (high precision)[3]	Mounting frame and straps provided up to 1200 mm (48")[2]		**R**
Doppler	to 12" with strap kit (not for IP65 (NEMA 7)), for up to 121 °C (250 °F)		**S**

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SITRANS FUS1010 (Standard)

Selection and Ordering data	Article No.	Ord. code
SITRANS FUS1010 (Standard)		
• IP65 (NEMA 4X) wall mount	**7ME3530-**	
• IP65 (NEMA 7) compact explosionproof	**7ME3531-**	
• IP66 (NEMA 7) wall mount explosionproof	**7ME3533-**	
	0 -	
Sensor for channel 2 (continued)		
High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.))		**Z Q 1 A**
High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))		**Z Q 1 B**
High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))		**Z Q 1 C**
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):		
B1H (high temperature range HP)		**Z Q 1 K**
B2H (high temperature range HP)		**Z Q 1 L**
C1H (high temperature range HP)[3]		**Z Q 1 M**
C2H (high temperature range HP)[3]		**Z Q 1 N**
D1H (high temperature range HP)[2][3]		**Z Q 1 P**
D2H (high temperature range HP)[2][3]		**Z Q 1 Q**
D4H (high temperature range HP)[2][3]		**Z Q 1 R**
Approvals		
FM/CSA, CE		**1**
ATEX, CE, C-TICK		**2**

[1] Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

[2] Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

[3] Made with stainless steel construction.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cable assembly for sensors (add for No. of channels)	
See "Sensor cable selection chart"	**K..**
Cable assembly for RTDs (add for No. of RTDs)	
See "RTD cable selection chart"	**R..**
Cable termination kit (for one cable pair)	
• Termination for standard, plenum and armored sensor cable	**T01**
• Termination for submersible sensor cable	**T11**
• RTD cable termination kit for standard RTD	**T21**
• RTD cable termination kit for submersible RTD	**T31**
• Insert RTD cable termination kit	**T41**
• Cable gland kit	**T51**
Languages (Meter and Documentation), English (default) for compact NEMA 7 only	
• German	**B10**
• French	**B12**
• Spanish	**B13**
• Italian	**B14**
Wet flow transfer calibration (priced on request)	
6 point calibration 2/water (Price per channel)	
• 2SS40 pipe	**D01**
• 3CS40 pipe	**D02**
• 4CS40 pipe	**D03**
• 4SS40 pipe	**D04**
• 6CS40 pipe	**D05**
• 6SS40 pipe	**D06**
• 6CS120 pipe	**D07**
• 8CS40 pipe	**D08**
• 8SS40 pipe	**D09**
• 8CS120 pipe	**D10**
• 10CS Standard pipe	**D11**
• 10CS40 pipe	**D12**
• 10SS40 pipe	**D13**
• 12CS Standard pipe	**D14**
• 12CS40 pipe	**D15**
• 14CS30 pipe	**D16**
• 14CS40 pipe	**D17**
• 16CS Standard pipe	**D18**
• 16CS40 pipe	**D19**
• 18CS Standard pipe	**D20**
• 20CS20 pipe	**D21**
• 20CS30 pipe	**D22**
• 24CS Standard pipe	**D23**
• 24CS20 pipe	**D24**
• 24CS30 pipe	**D25**
• 30CS Standard pipe	**D26**
• 36CS Standard pipe	**D27**
• Other pipe, other liquid, additional points, witness	**Y28**
Tag name plate	
• Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.)	**Y19**
Operating Instructions for SITRANS FUS1010	Article No.
English NEMA 4X wall mount & NEMA 7 wall mount explosionproof	**A5E02951520**
German NEMA 4X & wall mount NEMA 7 wall mount explosionproof	**A5E02951532**
NEMA 7 compact explosionproof	**CQO:1010XFM-3**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumtenion

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MLFB example

Application example

A clamp-on meter is required for a 12“ carbon steel jet fuel line, with a wall thickness of 12.7 mm (0.5“). Meter electronics are to be located in a Class I Div 2 area only 18 m (60 ft) from the pipeline. 12 V DC power is available at the site.

Dual path operation is desired for improved accuracy and redundant measurement.

MLFB Article No.: **7ME3530-2AB00-0QQ1-Z**
K03 + K03

Selection and Ordering data	Article No.	Ord. code
SITRANS FUS1010 meter family	**7 M E 3 5 3 -**	**0 -**
IP65 (NEMA 4X) enclosure	**0**	
Dual Path	**2**	
Standard I/O option	**A**	
9 ... 36 V DC power option	**B**	
RS 232 Standard	**0**	
No RTD required		**0**
Sensor code for path 1		**Q**
Sensor code for path 2		**Q**
FM approval required		**1**
30 m (100 ft) sensor cable for path 1		**K 0 3**
30 m (100 ft) sensor cable for path 2		**K 0 3**

Universal sensor selection chart IP68

Based on pipe size (pipes other than steel)					
Sensor	**Order Code**	**Outer diameter range (mm)**		**Outer diameter range (inch)**	
Pipe size		**min.**	**max.**	**min.**	**max.**
A2	**B**	12.7	50.8	0.5	2
B3	**C**	19	127	0.75	5
C3[1]	**D**	51	305	2	12
D3[1]	**E**	203	610	8	24
E2[1]	**F**	254	6 096	10	240

High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Sensor	**Order Code**	**Pipe wall (mm)**		**Pipe wall (inch)**	
Pipe wall		**min.**	**max.**	**min.**	**max.**
A1H	**G**	0.64	1.02	0.025	0.04
A2H	**H**	1.02	1.52	0.04	0.06
A3H	**J**	1.52	2.03	0.06	0.08
B1H	**K**	2.03	3.05	0.08	0.12
B2H	**L**	3.05	4.06	0.12	0.16
C1H[1]	**M**	4.06	5.84	0.16	0.23
C2H[1]	**N**	5.84	8.13	0.23	0.32
D1H[1]	**P**	8.13	11.18	0.32	0.44
D2H[1]	**Q**	11.18	15.75	0.44	0.62
D4H[1]	**R**	15.75	31.75	0.62	1.25

[1] Made with stainless steel construction.

Sensor cable (pair) selection chart

Sensor cable codes for length and type options				
Cable length m (ft)	**Standard (PVC jacket)** -40…+80 °C (-40…+176 °F)	**Submersible (polyethylene jacket)** -40…+80 °C (-40…+176 °F)	**Plenum Rated (teflon jacket)** -40…+200 °C (-40…+392 °F)	**Armored** -40…+80 °C (-40…+176 °F)
	Order code			
6 (20)	**K01**[1]	**K11**	**K21**	**K31**
15 (50)	**K02**[1]	**K12**[1]	**K22**	**K32**[1]
30 (100)	**K03**[1]	**K13**[1]	**K23**	**K33**
46 (150)	**K04**[1]	**K14**	**K24**	**K34**
61 (200)	**K05**	**K15**	**K25**	**K35**
91 (300)	**K06**[1]	**K16**	**K26**	**K36**

RTD cable (single) selection chart

RTD cable codes for length and type		
Cable length m (ft)	**Standard (teflon wrapped)** -40 ... +200 °C (-40 … +392 °F)	**Submersible (extruded jacket)** -40 ... +200 °C (-40 … +392 °F)
	Order code	
6 (20)	**R01**[1]	**R11**
15 (50)	**R02**[1]	**R12**
30 (100)	**R03**[1]	**R13**
46 (150)	**R04**	**R14**
61 (200)	**R05**	**R15**
91 (300)	**R06**	**R16**

[1] Standard MLFB for quick delivery

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SITRANS FST020 (Basic)

Overview

SITRANS FST020 offers reliable flow measurement at a much lower cost than other clamp-on ultrasonic flowmeters, with flow rate accuracy of ± 0.5 % to 1.0 % for most applications.

Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to wear or foul
- No pressure drop or energy loss
- Compact, integral design reduces installation cost
- Wide turn-down ratio
- Optional WideBeam technology ensures high performance.
- ZeroMatic Path automatically sets zero without stopping flow and eliminates zero drift.

Application

SITRANS FST020 is suitable for most clean liquid applications, including the following:

- Water & wastewater industry
  - Potable water
  - Wastewater, influent & effluent
  - Processed sewage, sludge
- Chemical feed industry
  - Sodium hypochlorite
  - Sodium hydroxide
- HVAC & power industries
  - Coolant flow
  - Fuel flow
- Process control
  - Chemicals
  - Pharmaceuticals

The SITRANS FST020 flowmeter is not available with hazardous areas approval.

Design

- IP65 (NEMA 4X) wall mount constructed of polycarbonate
- Single channel versions only

Function

- 2 x16 integral alphanumeric display and 5 key keypad for installation menu and data display
- Pulse rate output
- Communications include VT100 RS 232 with a DB9 connector, Modbus RTU, BACnet MSTP
- Totalizer start/stop and rest control lines.
- Remote PC installation menu
- ZeroMatic Path automatically sets zero
- Bidirectional flow operation
- 1 MByte data logger with both site & data logger storage
- Menu language in English, Spanish, German, Italian and French

Technical specifications

Input	
Flow range	± 12 m/s (± 40 ft/s), bi-directional
Flow sensitivity	0.0003 m/s (0.001 ft/s) flow rate independent
Digital Inputs	
Totalizer Hold	Optically isolated diode Input voltage: 2 … 10 V DC
Totalizer Reset	Optically isolated diode Input voltage: 2 … 10 V DC
Output	
Current	• 4 ... 20 mA (Isolated) • externally powered 10 … 30 V DC
Relay	• Programmable Form C 250 mA • 30 V DC • 3 V A max
Pulse rate[1)]	• Optically isolated transistor 10 mA • 30 V DC max
Accuracy	For velocities ≥ 0.3 m/s (1 ft/s)
• 4 ... 20 mA	± 1.0 % of flow
• Pulse, relay output	± 0.5 % ... 1.0 % of flow
Batch repeatability	± 0.15 %
Zero Drift	0.1 % of rate; 0.0003 m/s (0.001 ft/s)
Data refresh rate	5 Hz
Transmitter conditions	
Operating temperature	-10 … +50 °C (14 … +122 °F)
Storage temperature	-20 … +60 °C (-4 … +140 °F)
Degree of protection	IP65 NEMA 4X
Design	
Weight	1.4 kg (3.0 lb)
Dimensions (W x H x D)	175 x 235 x 92 mm (6.89 x 9.25 x 3.62 inch)
Enclosure material	Polycarbonate
Power supply	100 ... 240 V AC @ 20 VA or 11.5 ... 28.5 V DC @ 10 W
Certificates and approvals	
Unclassified locations	UL, UL_C
Classified locations	
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
C-TICK	

[1)] When used to represent flow rate (PGEN) the frequency can reach as high as 5000 Hz. When used to represent flow total it can reach 50 Hz.

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Standard MLFB for quick delivery on SITRANS FST020 (Basic)

Selection and Ordering data		Article No.
SITRANS FST020 (Basic)		↗ 7ME357 - 30 - 0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Design		
IP65 (NEMA 4X) wall mount		0
Number of channels/ultrasonic paths		
Single channel		1
Flowmeter functions and I/O configurations		
• With display and 1 additional analog output and SPST relay		H
Meter power options		
100 ... 240 V AC		A
11.5 ... 28.5 V DC, 10 W max		B
Sensor (includes pipe mounting kit for indicated max. OD listed) See "Sensor selection charts" for specifications.		
no sensor		A
A2 universal	Trackmount and straps provided up to 75 mm (3")	B
B3 universal	Trackmount and straps provided up to 125 mm (5")	C
C3 universal[2)]	Mounting frame and straps provided up to 300 mm (13")	D
D3 universal[2)]	Mounting frame and straps provided up to 600 mm (24")	E
E2 universal[2)]	Mounting frame and straps provided up to 1200 mm (48")[1)]	F
For the following A1H to C1H sensors, temperature range is -40 ... 65 °C (-41 ... 150 °F), nominal 21 °C (70 °F)		
C1H (high precision)[2)]	Mounting frame and straps provided up to 600 mm (24")	M
C2H (high precision)[2)]	Mounting frame and straps provided up to 600 mm (24")	N
D1H (high precision)[2)]	Mounting frame and straps provided up to 1200 mm (48")[1)]	P
D4H (high precision)[2)]	Mounting frame and straps provided up to 1200 mm (48")[1)]	R
Sensor cables		
No sensor cable		A
6 m (20 ft) PVC Jacket (1 pr)		B
15 m (50 ft) PVC Jacket (1 pr)		C
30 m (100 ft) PVC Jacket		D
46 m (150 ft) PVC Jacket		E
91 m (300 ft) PVC Jacket		G
Approvals		
UL, UL_C, CE, C-TICK		0

Standard MLFB offering represents 2 to 3 weeks delivery time for quantities under 5.

1) Supplied spacer bar suppports pipes up to 750 mm (30 inch). For pipes larger than 750 nn (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

2) Made of stainless steel construction.

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SITRANS FST020 (Basic)

Selection and Ordering data	Article No.	Ord. code
SITRANS FST020 (Basic) IP65 (NEMA 4x) ↗	**7ME3570-**	
		3 0 - 0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Number of channels/ultrasonic paths		
Single channel	1	
Flowmeter functions and I/O configurations		
• With display, keypad, 1x 4 ... 20 mA, 1x relay, 1x pulse/frequency, 2x digital input, VT100 RS232, Modbus RTU, BACnet MSTP	H	
Meter power options		
100 ... 240 V AC	A	
11.5 ... 28.5 V DC	B	
Sensor for channel 1[1] Including pipe mounting tracks for Sizes A & B universal sensors indented for pipe with a OD less than 125 mm (5") and mounting frame/spacer bars for sizes C, D & E universal sensors. Straps provided are for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Sensor Selection Charts" for the sensor suitability of pipe size and wall thickness		
no sensor		A
A2 universal — Trackmount and straps provided up to 75 mm (3")		B
B3 universal — Trackmount and straps provided up to 125 mm (5")		C
C3 universal[2] — Mounting frame and straps provided up to 330 mm (13")		D
D3 universal[2] — Mounting frame and straps provided up to 600 mm (24")		E
E2 universal[2] — Mounting frame and straps provided up to 1200 mm (48")		F
For the following A2H to D4H transducers, temperature range is -40 ... 65 °C (-41 ... 150 °F), nominal 21 °C (70 °F)		
A2H (high precision) — Trackmount and straps provided up to 75 mm (3")		H
A3H (high precision) — Trackmount and straps provided up to 75 mm (5")		J
B1H (high precision) — Trackmount and straps provided up to 125 mm (5")		K
B2H (high precision) — Trackmount and straps provided up to 125 mm (5")		L
C1H (high precision)[2] — up to 600 min (24") with mounting hardware		M
C2H (high precision)[2] — up to 600 min (24") with mounting hardware		N
D1H (high precision)[2] — Mounting frame and straps provided up to 1200 mm (48")[1]		P
D2H (high precision)[2] — Mounting frame and straps provided up to 1200 mm (48")[1]		Q
D4H (high precision)[2] — Mounting frame and straps provided up to 1200 mm (48")[1]		R

Selection and Ordering data	Article No.	Ord. code
SITRANS FST020 (Basic) IP65 (NEMA 4x)	**7ME3570-**	
	3 0 - 0	
High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1 to 8 inch diam.))	Z	**P 1 A**
High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. 6 to 24 inch diam.))	Z	**P 1 B**
High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (16 to 48 inch diam.))	Z	**P 1 C**
Sensor cables (pair)		
No sensor cable	A	
6 m (20 ft) PVC Jacket	B	
15 m (50 ft) PVC Jacket	C	
30 m (100 ft) PVC Jacket	D	
46 m (150 ft) PVC Jacket	E	
61 m (200 ft) PVC Jacket	F	
91 m (300 ft) PVC Jacket	G	
6 m (20 ft) Plenum rated (Teflon jacket)	H	
15 m (50 ft) Plenum rated (Teflon jacket)	J	
30 m (100 ft) Plenum rated (Teflon jacket)	K	
46 m (150 ft) Plenum rated (Teflon jacket)	L	
61 m (200 ft) Plenum rated (Teflon jacket)	M	
91 m (300 ft) Plenum rated (Teflon jacket)	N	
Approvals		
UL, UL_C, CE, C-TiCK	0	

[1] Supplied spacer bar supports pipes up to 1050 mm (42"). For pipes larger than 1050 mm (42") purchase also, spare part 7ME3960-0MS40 (1012BN-4)

[2] Made of stainless steel construction.

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Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code(s).	
Cable termination kit (for one cable pair) • Sensor cable termination for standard and plenum cable	**T01**
Wet flow transfer calibration (priced on request)	
6 point calibration 2/water (Price per channel)	
• 2SS40 pipe	**D01**
• 3CS40 pipe	**D02**
• 4CS40 pipe	**D03**
• 4SS40 pipe	**D04**
• 6CS40 pipe	**D05**
• 6SS40 pipe	**D06**
• 6CS120 pipe	**D07**
• 8CS40 pipe	**D08**
• 8SS40 pipe	**D09**
• 8CS120 pipe	**D10**
• 10CS Standard pipe	**D11**
• 10CS40 pipe	**D12**
• 10SS40 pipe	**D13**
• 12CS Standard pipe	**D14**
• 12CS40 pipe	**D15**
• 14CS30 pipe	**D16**
• 14CS40 pipe	**D17**
• 16CS Standard pipe	**D18**
• 16CS40 pipe	**D19**
• 18CS Standard pipe	**D20**
• 20CS20 pipe	**D21**
• 20CS30 pipe	**D22**
• 24CS Standard pipe	**D23**
• 24CS20 pipe	**D24**
• 24CS30 pipe	**D25**
• 30CS Standard pipe	**D26**
• 36CS Standard pipe	**D27**
• Other pipe, other liquid, additional points, witness	**Y28**
Tag name plate • Stainless steel tags with 3.2 mm (0.13 inch) character size (68 characters max.)	**Y19**

MLFB example

Application example

A basic clamp-on meter is required for a DN 150 (6“ schedule 40) carbon steel waste water line, with a pipe wall thickness of 7.1 mm (0.28“). Meter electronics are to be located in an instrumentation shed with available AC power. 36 m (120 ft) of sensor cable is needed to reach pipe location.

MLFB Article No.: **7ME3570-1HA30-0NE0**

Selection and Ordering data	Article No.	Ord. code
SITRANS FST020 meter family	**7ME357** - ■■■ **30-0** ■■	**0** ■■■
IP65 (NEMA 4X) enclosure	**0**	
Single channel	**1**	
Standard I/O option	**H**	
100 ... 240 V AC power option	**A**	
Sensor code for channel 1		**N**
46 m (150 ft) sensor cable		**E**

Selection and Ordering data	Order code
Operating Instructions for SITRANS FST020	
English NEMA 4X	**A5E03086487**
German NEMA 4X	**A5E03086488**

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Universal sensor selection chart IP68

Based on pipe size (pipes other than steel)					
Pipe size	**Order Code**	**Outer diameter range (mm)**		**Outer diameter range (inch)**	
		min.	**max.**	**min.**	**max.**
A2	**B**	12.7	50.8	0.5	2
B3	**C**	19	127	0.75	5
C3[1)]	**D**	51	305	2	12
D3[1)]	**E**	203	610	8	24
E2[1)]	**F**	254	6096	10	249

High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Pipe Wall	**Order Code**	**Pipe Wall [mm]**		**Pipe Wall [inch]**	
		min.	**max.**	**min.**	**max.**
A1H	**G**	0.64	1.02	0.025	0.04
A2H	**H**	1.02	1.52	0.04	0.06
A3H	**J**	1.52	2.03	0.06	0.08
B1H	**K**	2.03	3.05	0.08	0.12
B2H	**L**	3.05	4.06	0.12	0.16
C1H[1)]	**M**	4.06	5.84	0.16	0.23
C2H[1)]	**N**	5.84	8.13	0.23	0.32
D1H[1)]	**P**	8.13	11.18	0.32	0.44
D2H[1)]	**Q**	11.18	15.75	0.44	0.62
D4H[1)]	**R**	15.75	31.75	0.62	1.25

[1)] Made of stainless steel construction.

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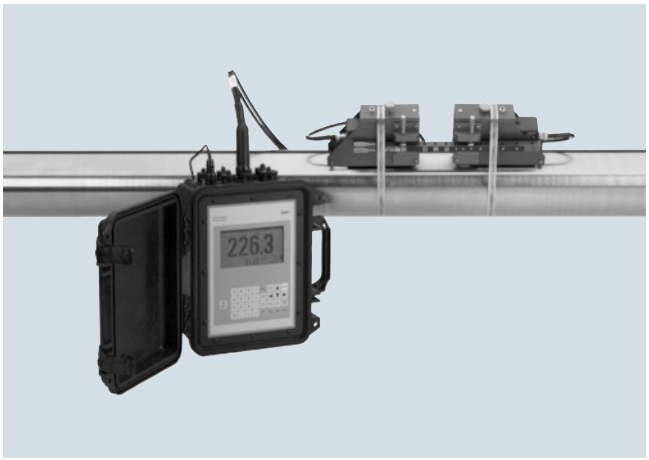
SITRANS FUP1010 (Portable)

Overview



SITRANS FUP1010 clamp-on non-intrusive ultrasonic flow transmitter offers maximum versatility plus battery power for portable field use. It can operate in either WideBeam transit time or reflexor (Doppler) mode, making it suitable for virtually any liquid, even those with high aeration or suspended solids.

SITRANS FUP1010 is available in single and dual channel or dual path configurations, with IP67 weatherproof enclosure.

Benefits

- Battery power facilitates field use; the meter is easily transported from one installation to another – saving time for surveys, monitoring and temporary installations
- Weatherproof enclosure can be used outdoors and left in place without concern for rain damage
- Rugged plastic case enables it to withstand rough treatment that would destroy most other meters
- Versatility - there is no need to change meters when operating conditions change
- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to wear or foul
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single or dual channel models minimizes total cost
- ZeroMatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow
- Note that the SITRANS FUP1010 flow transmitter is not available with hazardous area approvals

Application

SITRANS FUP1010 is suitable for a wide variety of liquid applications, including the following:

- Water industry
  - Raw water
  - Potable water
  - Chemicals
- Wastewater industry
  - Raw sewage
  - Effluent
  - Sludges
  - Mixed liquor
  - Chemicals
- HVAC industry
  - Chillers
  - Condensers
  - Hot and cold water systems
  - Thermal energy rate and total
- Power industry
  - Nuclear
  - Fossil
  - Hydroelectric
- Processing industry
  - Process control
  - Batching
  - Rate indication
  - Volumetric and mass measurement

Design

- IP67 Weatherproof/Impact resistant enclosure constructed of mineral reinforced copolymer polypropylene
  - Single channel
  - Dual channel/dual path

Function

- Integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- Current, voltage, frequency and RS 232 outputs (see specification section for details)
- Optional current, voltage and temperature inputs (see specification section for details)
- ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options
- VT100 RS 232 communications

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Technical specifications

Input	
Flow range	± 12 m/s (± 40 ft/s), bidirectional
Flow sensitivity	0.0003 m/s (0.001 ft/s), flow rate independent
Pipe size	6.4 mm … 9.14 m (0.25“ … 360“)
Inputs, single channel	• Current: 20 mA DC • Temperature: 4 wire 1 kΩ RTD
Output	
Outputs	• Current: 20 mA DC (1 kΩ at 30 V DC) • Voltage: 10 V DC (5 kΩ minimum) • Status Alarm: SPDT Relays • Pulse rate: 5 kHz • VT100 RS 232
Accuracy	
Accuracy	± 0.5 % … 2 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 … 0.006 m/s (± 0.005 … 0.02 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Rated operation conditions	
Degree of protection	
• Weatherproof/impact resistant	IP67
Liquid temperature	
• Standard	-40 … +120 °C (-40 … +250 °F)
• Optional	-40 … +230 °C (-40 … +450 °F)
Ambient temperature	-18 … +60 °C (0 … 140 °F)
Design	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams
Power supply	
Power	Internal rechargeable battery
Battery operation	7 hours
Indication and operation	
Data logger memory	1 MByte
Site storage memory	50 sites minimum
Display	128 x 240 pixel LCD with back-light
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French
Certificates and approvals	
Unclassified locations	UL ULc
Classified locations	
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC

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SITRANS FUP1010 (Portable)

Standard MLFB for quick delivery on SITRANS FUP1010 Portable (excluding energy)

Selection and Ordering data		Article No.	Order Code
SITRANS FUP1010 (Portable)			
• IP67 weatherproof battery powered	↗	**7ME3510-**	
		- 0 0	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Number of channels/ultrasonic paths			
Single channel		**1**	
Dual channel/Dual path		**2**	
Standard flowmeter types and I/O configurations			
• Standard I/O - 2 x 4 ... 20 mA analog in - 2 x RTD input		**C**	
Sensor cables			
No sensor cable		**A**	
1 x PVC Jacket cable, length 6 m/20 ft[2]		**B**	
2 x PVC Jacket cable, length 6 m/20 ft[2]		**C**	
1 x PVC Jacket cable, length 15 m/50 ft[2]		**D**	
2 x PVC Jacket cable, length 15 m/50 ft[2]		**E**	
RTD temperature Sensor (Mounting hardware & cable included)			
No RTDs		**0**	
1 x standard clamp-on RTD, 6 m/20 ft cable[1]		**5**	
2 x standard clamp-on RTD with 6 m/20 ft cable[1]		**6**	
1 x standard clamp-on RTD with 15 m/50 ft cable[1]		**7**	
2 x standard clamp-on RTD with 15 m/50 ft cable[1]		**8**	
Battery charger options			
No battery charger		**0**	
Charger Type A for Europe (CEE7/7)		**1**	
Charger Type G for U.S. (NEMA 5-15P)		**5**	
Sensor for channel 1 (includes pipe mounting kit and spacer bar for indicated max. outer diameter listed) See "Sensor selection charts" for specifications.			
no sensor		**A**	
A2 universal	Trackmount and straps provided up to 75 mm (3")	**B**	
B3 universal	Trackmount and straps provided up to 125 mm (5")	**C**	
C3 universal	Mounting frame and straps provided up to 300 mm (13")	**D**	
D3 universal	Mounting frame and straps provided up to 600 mm (24")	**E**	
E2 universal	Mounting frame and straps provided up to 600 mm (24")	**F**	
C1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")	**M**	
C2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")	**N**	
D1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")	**P**	
D4H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")	**R**	
Doppler	to 12" with strap kit (not for IP65 (NEMA 7))	**S**	
D1H [3]	High temperature range 104 °C/220 °F HP	**Z**	**P 1 P**

Selection and Ordering data		Article No.	Order Code
SITRANS FUP1010 (Portable)			
• IP67 weatherproof battery powered		**7ME3510-**	
		- 0 0	
Sensor for channel 2 (includes pipe mounting kit and spacer bar for indicated max. outer diameter listed) See "Sensor selection charts" for specifications.			
no sensor		**A**	
A2 universal	Trackmount and straps provided up to 75 mm (3")	**B**	
B3 universal	Trackmount and straps provided up to 125 mm (5")	**C**	
C3 universal	Mounting frame and straps provided up to 300 mm (13")	**D**	
D3 universal	Mounting frame and straps provided up to 600 mm (24")	**E**	
E2 universal	Mounting frame and straps provided up to 600 mm (24")	**F**	
C1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")	**M**	
C2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")	**N**	
D1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")	**P**	
D2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")	**Q**	
Doppler	to 12" with strap kit (not for IP65 (NEMA 7))	**S**	
D1H[3]	High temperature range 104 °C/220 °F HP	**Z**	**Q 1 P**

Approvals: No options (UL, ULc, CE by default)

Standard MLFB product offering represents 4 to 6 weeks delivery time

[1] -40 ... +200 °C (-40 ... +392 °F)
[2] -40 ... +80 °C (-40 ... +176 °F)
[3] Made of stainless steel constructions.

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Selection and Ordering data	Article No.	Ord. code
SITRANS FUP1010 (Portable)		
• IP67 weatherproof battery powered ↗	**7ME3510-**	- 0 0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Number of channels/ultrasonic paths		
Single channel	**1**	
Dual channel/Dual path	**2**	
Standard flowmeter types and I/O configurations		
• Standard I/O - Reflexor capable - Graphic display - 2 x 0 ... 10 V - 2 x 4 ... 20 mA - 2 x pulse outputs - 4 x status logic - 2 x 4 ... 20 mA analog in - 1 x RTD per channel	**C**	
Sensor cables (select proper quantity of active channels)		
No sensor cable	**A**	
IP67 (weatherproof) only		
1 x PVC-jacket, length 6 m (20 ft) (for IP67 NEMA 6)[2]	**B**	
2 x PVC-jacket, length 6 m (20 ft) (for IP67 NEMA 6)[2]	**C**	
1 x PVC-jacket, length 15 m (50 ft) (for IP67 NEMA 6)[2]	**D**	
2 x PVC-jacket, length 15 m (50 ft) (for IP67 NEMA 6)[2]	**E**	
RTD temperature sensor (for type 3 meter only, mounting hardware and cable included)		
No RTDs	**0**	
IP67 (weatherproof) only		
1 x standard clamp-on RTD (NEMA 6) with 6 m (20 ft) cable[1]	**5**	
2 x standard clamp-on RTD (NEMA 6) with 6 m (20 ft) cable[1]	**6**	
1 x standard clamp-on RTD (NEMA 6) with 15 m (50 ft) cable[1]	**7**	
2 x standard clamp-on RTD (NEMA 6) with 15 m (50 ft) cable[1]	**8**	
Battery charger options		
no battery charger	**0**	
Charger Type A for Europe (CEE7/7)	**1**	
Charger Type C for Australia (AS3112)	**2**	
Charger Type D for U.K. (BS1363)	**3**	
Charger Type J for Japan (JIS8303)	**4**	
Charger Type G for U.S. (NEMA 5-15P)	**5**	
Charger Type L for Switzerland (SEV1011)	**6**	

Selection and Ordering data		Article No.	Ord. code
SITRANS FUP1010 (Portable)			
• IP67 weatherproof battery powered		**7ME3510-**	- 0 0
Sensor for channel 1 Including pipe mounting tracks for sizes A & B sensors indented for pipe with a OD less than 125 mm (5") and mounting frame/spacer bars for sizes C, D & E sensors. Straps provided are for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Sensor Selection Charts" for the sensor suitability of pipe size and wall thickness.			
no sensor			**A**
A2 universal	Trackmount and straps provided up to 75 mm (3")		**B**
B3 universal	Trackmount and straps provided up to 125 mm (5")		**C**
C3 universal	Mounting frame and straps provided up to 300 mm (13")		**D**
D3 universal	Mounting frame and straps provided up to 600 mm (24")		**E**
E2 universal	Mounting frame and straps provided up to 600 mm (24")		**F**
For the following A2H to D4H sensors, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):			
A2H (high precision)	Trackmount and straps provided up to 75 mm (3")		**H**
A3H (high precision)	Trackmount and straps provided up to 75 mm (3")		**J**
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		**K**
B2H (high precision)	Trackmount and straps provided up to 125 mm (5)		**L**
C1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		**M**
C2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		**N**
D1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		**P**
D2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		**Q**
D4H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		**R**
Doppler	to 12" with chain kit		**S**
High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.))			**Z P 1 A**
High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))			**Z P 1 B**
High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))			**Z P 1 C**

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SITRANS FUP1010 (Portable)

Selection and Ordering data		Article No.	Ord. code
SITRANS FUP1010 (Portable)			
• IP67 weatherproof battery powered		**7ME3510-**	- 0 0
Sensor for channel 1 (continued)			
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):			
B1H (high temperature range HP)			Z P 1 K
B2H (high temperature range HP)			Z P 1 L
C1H (high temperature range HP)			Z P 1 M
C2H (high temperature range HP)			Z P 1 N
D1H (high temperature range HP)			Z P 1 P
D2H (high temperature range HP)			Z P 1 Q
D4H (high temperature range HP)			Z P 1 R
Sensor for channel 2 (includes pipe mounting kit and spacer bar for indicated max. outer diameter listed) See "Sensor selection charts" for specifications.			
no sensor			A
A2 universal	Trackmount and straps provided up to 75 mm (3")		B
B3 universal	Trackmount and straps provided up to 125 mm (5")		C
C3 universal	Mounting frame and straps provided up to 300 mm (13")		D
D3 universal	Mounting frame and straps provided up to 600 mm (24")		E
E2 universal	Mounting frame and straps provided up to 600 mm (24")		F
For the following A2H to D4H sensors, temperature range is -40 °C ... 65 °C (-41 °F ... 150 °F), nominal 21 °C (70 °F):			
A2H (high precision)	Trackmount and straps provided up to 75 mm (3")		H
A3H (high precision)	Trackmount and straps provided up to 75 mm (3")		J
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		K
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		L
C1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		M
C2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		N
D1H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		P
D2H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		Q
D4H (high precision)[3]	Mounting frame and straps provided up to 600 mm (24")		R
Doppler	to 12" with chain kit		S

Selection and Ordering data		Article No.	Ord. code
SITRANS FUP1010 (Portable)			
• IP67 weatherproof battery powered		**7ME3510-**	- 0 0
Sensor for channel 2 (continued)			
High temperature sensor size 2 for up to 230 °C (446 °F) (30 to 200 mm diam. (1.18 to 7.67 inch diam.))			Z Q 1 A
High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))			Z Q 1 B
High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))			Z Q 1 C
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):			
B1H (high temperature range HP)			Z Q 1 K
B2H (high temperature range HP)			Z Q 1 L
C1H (high temperature range HP)			Z Q 1 M
C2H (high temperature range HP)			Z Q 1 N
D1H (high temperature range HP)			Z Q 1 P
D2H (high temperature range HP)			Z Q 1 Q
D4H (high temperature range HP)			Z Q 1 R

Approvals: No options (UL, ULc, CE by default)

[1] -40 ... +200 °C (-40 ... +392 °F)
[2] -40 ... +80 °C (-40 ... +176 °F)
[3] Made of stainless steel constructions.

Selection and Ordering data	Article No.
Operating Instructions for SITRANS FUP1010	
English IP67 Weatherproof	**A5E02951522**
German IP67 Weatherproof	**A5E02951534**

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Languages (Meter and Documentation), English (default). All languages now come standard in all flow-meters	
Wet flow transfer calibration (priced on request)	
6 point calibration 2/water (Price per channel)	
• 2SS40 pipe	**D01**
• 3CS40 pipe	**D02**
• 4CS40 pipe	**D03**
• 4SS40 pipe	**D04**
• 6CS40 pipe	**D05**
• 6SS40 pipe	**D06**
• 6CS120 pipe	**D07**
• 8CS40 pipe	**D08**
• 8SS40 pipe	**D09**
• 8CS120 pipe	**D10**
• 10CS Standard pipe	**D11**
• 10CS40 pipe	**D12**
• 10SS40 pipe	**D13**
• 12CS Standard pipe	**D14**
• 12CS40 pipe	**D15**
• 14CS30 pipe	**D16**
• 14CS40 pipe	**D17**
• 16CS Standard pipe	**D18**
• 16CS40 pipe	**D19**
• 18CS Standard pipe	**D20**
• 20CS20 pipe	**D21**
• 20CS30 pipe	**D22**
• 24CS Standard pipe	**D23**
• 24CS20 pipe	**D24**
• 24CS30 pipe	**D25**
• 30CS Standard pipe	**D26**
• 36CS Standard pipe	**D27**
• Other pipe, other liquid, additional points, witness	**Y28**
1x Insertion RTD with thermowell and lagging	**M1A**
2x Insertion RTD with thermowell and lagging	**M1B**
Tag name plate	
• Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.)	**Y19**

MLFB example

Application example

A general survey portable flowmeter is required for pipes sizes ranging from 76 ... 500 mm (3" ... 20") with both cast iron and steel material. Doppler may be required as liquid may be moderately aerated.

Requires language support for German.

MLFB Article No.: **7ME3510-2CB01-0DE0-Z**
B10

Selection and Ordering data	Article No.	Ord. code
SITRANS FUP1010 meter family	**7 M E 3 5 1 -**	**- 0** **0**
IP67 weatherproof	**0**	
Dual channel	**2**	
Portable I/O with Doppler capable, temperature	**C**	
1 x PVC-Jacket, length 6 m (20 ft)	**B**	
No RTDs required	**0**	
Charger Type A for Europe (CEE7/7)	**1**	
Sensor for DN 50 ... DN 300 (2“ ... 12“) pipes		**D**
Sensor for DN 200 ... DN 600 (8“ ... 24“) pipes		**E**

Universal sensor selection chart IP68

Based on pipe size (all pipe materials)					
Pipe size	**Order Code**	**Outer diameter range (mm)**		**Outer diameter range (inch)**	
		min.	**max.**	**min.**	**max.**
A2	**B**	12.7	50.8	0.5	2
B3	**C**	19	127	0.75	5
C3	**D**	51	305	2	12
D3	**E**	203	610	8	24
E2	**F**	254	6096	10	249

High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Pipe Wall	**Order Code**	**Pipe Wall [mm]**		**Pipe Wall [inch]**	
		min.	**max.**	**min.**	**max.**
A1H	**G**	0.64	1.02	0.025	0.04
A2H	**H**	1.02	1.52	0.04	0.06
A3H	**J**	1.52	2.03	0.06	0.08
B1H	**K**	2.03	3.05	0.08	0.12
B2H	**L**	3.05	4.06	0.12	0.16
C1H[1)]	**M**	4.06	5.84	0.16	0.23
C2H[1)]	**N**	5.84	8.13	0.23	0.32
D1H[1)]	**P**	8.13	11.18	0.32	0.44
D2H[1)]	**Q**	11.18	15.75	0.44	0.62
D4H[1)]	**R**	15.75	31.75	0.62	1.25

[1)] Made of stainless steel constructions.

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SITRANS FUP1010 Water and Liquid check metering kits

Overview

There are two check kits available: SITRANS FUP1010 Water check metering kit for water and wastewater applications, and SITRANS FUP1010 Liquid check metering kit for liquid applications other than water. The kits have been developed especially for verifying the accuracy and performance of any brand or type of flowmeter. They can be used to verify the performance of meters based on any existing flow measurement principle: orifice, electromagnetic, ultrasonic, rotary piston, coriolis, etc. In addition, they measure practically all conductive or non-conductive clean or moderately aerated liquids or liquids with suspended solids.

Benefits

- Performance check or verification of any type or brand of flowmeter
- Field use is facilitated by meter portability and 7 hours or normal battery operation.
- Weatherproof enclosure withstands even severe weather conditions
- 1 MByte datalogger capability downloadable to PC via included RS 232 cable
- Fast, easy and cost-efficient on-site measurement of any convoluted pipe from 20 to 1200 mm (0.75 to 48“)
- Delivered as an all inclusive kit in a sturdy rolling case that holds all the equipment needed to conduct performance and verification tests (cables, multiple sensors, flow transmitter etc.)

Application

The SITRANS FUP1010 Water and Liquid Check Metering Kits measure practically all conductive or non-conductive clean or moderately aerated liquids or liquids with suspended solids.This basic feature enables the performance check and verification of existing meters used in various water and wastewater applications such as:

Raw Water and sewage

- Potable water
- Chemicals
- Effluent and sludges
- Process control
- Batching
- Rate indication
- Hot and cold water systems

Design

- IP67 weatherproof/impact resistant enclosure, constructed of mineral reinforced copolymer polypropylene
- Single channel

Function

- Integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- Current, voltage, frequency and RS 232 outputs (see Technical specification section for details)
- ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

Technical specifications

Pipe sizes	
• Water Check Metering Kit	50 ... 1050 mm (2 ... 42“)
• Liquid Check Metering Kit	20 ... 1200 mm (0.75 ... 48“)
Accuracy	±0.5 % ... ±2.0 % of flow rate
Flow range	12 m/s (40 ft/s) bidirectional
Media temperature	-40 ... +104 °C (-40 ... 220 °F)
Enclosure ratings	IP67 (Weatherproof)

See page 3/343 for complete technical specifications

Cerificates and approvals	
Unclassified locations	UL ULc
Classified locations	
CE	EMV Directive 2004/108/EC ATEX Directive 94/9/EC

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Selection and Ordering data	Article No.
SITRANS FUP1010 Water Check Metering Kit	**CQO:FUPW-WWKIT**

Content of delivery

1	Single channel portable submersible flow transmitter
1 pair	Universal sensor C3[1)]
1 pair	Universal sensor E2[1)]
1 pair	Doppler sensors
1 pair	Mounting Ezclamp (2 mounting Ezclamp chains)
1	Ladder chain
1	Battery charger
1 pair	20 ft sensor cable
1	Cable - 1010WP/WDP to PC
1	PinStop spacer bar (universal)
1	Flow case
1	Flowmeter manual
1	Laminated card set
1	Certificate of intrinsic calibration

Selection and Ordering data	Article No.
SITRANS FUP1010 Liquid Check Metering Kit	**CQO:FUS-LIQKIT**

Content of delivery

1	Single channel portable submersible transmitter
1 pair	Universal sensor B3
1 pair	Universal sensor C3[1)]
1 pair	Universal sensor D3[1)]
1 pair	Universal sensor E2[1)]
1 pair	Doppler sensors
1 pair	Sensor cables 6m (20 ft)
1 pair	Mounting track
1 pair	Mounting Ezclamp
1	Spacer bar (portable)
1	Ladder chain
1	Battery charger
1	RS 232 cable for PC connection
1	Flow case
1	Clamp-on flowmeter manual CD
1	Flowmeter manual
1	Laminated card set
1	Certificate of intrinsic calibration

[1)] Made of stainless steel constructions.

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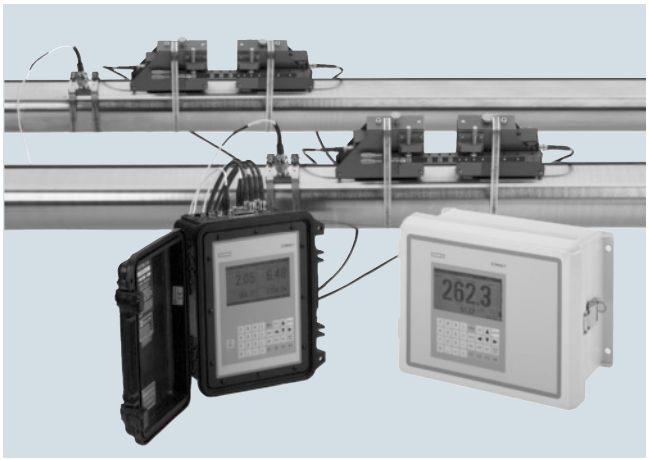
SITRANS FUE1010 (Energy)

Overview



SITRANS FUE1010 is a highly accurate clamp-on non-intrusive ultrasonic flow transmitter for revenue grade thermal energy sub-metering and energy efficiency distribution monitoring, with a real time coefficient of performance (COP) for HVAC systems.

SITRANS FUE1010 is available in single and dual channel or dual path configurations, with your choice of IP65 (NEMA 4X) dedicated wall mount or IP40 (NEMA 1) portable enclosures.

Benefits

- Measures energy rate and total consumption with highest accuracy available
- Accurately measures at both low flow rates and low differential temperatures
- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio
- Choice of single or dual channel/dual path or dual mode operation:
  - Dual channel operation reduces the cost for the system on a per channel measurement basis and permits measuring hot and chilled water lines at the same time
  - Dual path capability insures high flow measurement accuracy on installations with less than desirable piping runs
- Ability to operate in either Wide-Beam Transit-time or reflexor (Doppler) mode for applications with high aeration
- ZeroMatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow

Application

SITRANS FUE1010 is ideally suited to thermal energy/power industry applications, including:

- Chilled water sub-metering
- Hot water sub-metering
- Condenser water
- Glycol
- Thermal storage
- Lake source cooling

Design

SITRANS FUE1010 is available in three configurations:

- IP65 (NEMA 4X) wall mount enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
  - Single channel
  - Dual channel/dual path
- IP40 (NEMA 1) Portable impact resistant enclosure constructed of mineral reinforced copolymer polypropylene
  - Dual channel/dual path

Function

- Flow transmitter has an integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- 4-wire 1000 Ω platinum RTD's for supply and return temperature measurements are precision matched to within 0.01 °C (0.02 °F)
- Temperature is factory calibrated with built-in field calibrator.
- Built-in energy/BTU mode
- Detection of aeration and cavitation caused by worn or damaged impellers, misaligned shafts, etc.
- Reverse flow and empty pipe detection
- Chiller efficiency analysis: accepts an independent analog input representing kW usage for calculation of the following functions which can be selected for data logging or output purposes:
  - Cooling load (kW/ton)
  - Coefficient of performance (COP)
  - Energy efficiency ratio (EER)
- Optional current inputs
- Digital communication options:
  - HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)
  - VT100 RS 232 serial communications (Portable and NEMA 4X)
- ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

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Technical specifications

Input	
Flow range	0 … 12 m/s (0 … 40 ft/s), bi-directional
Flow sensitivity	0.0003 m/s (0.001 ft/s)
Pipe size	6.4 mm … 9.14 m (0.25“ … 360“)
Inputs per channel	• Current: 20 mA • Temperature: 4 wire 1 kΩ RTD • Totalizer commands (clear/hold)
Output	
Standard outputs	• Current: 20 mA DC (1 kΩ at 30 V DC) • Voltage: 10 V DC (5 kΩ minimum) • Status Alarm: SPDT Relays • Form C relays • Pulse rate: 5 kHz • VT100 RS 232
Optional outputs	• Expanded I/Os (4 additional 4 ... 20 mA outputs) with form C relays • HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 (IP65, NEMA 4X only)
Accuracy	
Accuracy	± 0.5 % ... 1.0 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0015 ... 0.003 m/s (± 0.005 ... 0.01 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Batch repeatability	± 0.15 % of flow, for velocities greater than 0.3 m/s (1 ft/s) ± 0.0005 m/s (± 0.0015 ft/s), for velocities less than 0.3 m/s (1 ft/s)
Rated operation conditions	
Degree of protection	Wall mount enclosure: IP65 (NEMA 4X) Portable enclosure: IP40 (NEMA 1)
Liquid temperature	
• Standard	-40 … +120 °C (-40 … +250 °F)
• Optional	-40 … +230 °C (-40 … +450 °F)
Sensor temperature	
• Standard	-40 … +120 °C (-40 … +250 °F)
• Optional	-40 … +232 °C (-80 … +450 °F)
Ambient temperature	-18 ... +60 °C (0 ... 140 °F)
Design	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams
Power supply	
Dedicated	90 … 240 V AC, 50 ... 60 Hz, 30 VA or 9 ... 36 V DC
Portable enclosure	Rechargeable battery

Indication and operation	
Data logger memory	1 Mbyte of storage
Display	128 x 240 pixel LCD with back-light
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French
Certificates and approvals	
Dedicated enclosures	
FM and CSA ratings	• Transmitter NI Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
Portable enclosures	UL ULc
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC

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SITRANS FUE1010 (Energy)

Standard MLFB for quick delivery on SITRANS FUE1010 (Energy system)

Selection and Ordering data	Article No.	Order code
SITRANS FUE1010 (Energy) ↗	**7ME350** - - **0**	+ +
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Design		
Dedicated		
IP65 (NEMA 4X) wall mount	**0**	**K02** + **K02** + **R02**
Portable		
IP40 (NEMA 1) Battery powered	**2**	**K01** + **K01** + **R01**
Number of channels/ultrasonic paths		
Dedicated meters		
Single channel	**1**	
Portable meters		
Dual channel/Dual path	**4**	
Flowmeter functions and I/O configurations		
• Portable Standard I/O	**C**	
- Reflexor capability - Graphic display - 2 x 0 ... 10 V - 2 x 4 ... 20 mA - 2 x pulse output - 4 x status logic - Energy efficiency COP/EER output - 2 x 4 ... 20 mA analog input		
• Dedicated Standard I/O	**F**	
- Reflexor capability - Graphic display - 2 x 0 ... 10 V - 2 x 4 ... 20 mA - 2 x pulse output - 4 x relay C type - Energy efficiency COP/EER output - 2 x 4 ... 20 mA analog input		
Meter power options		
90 ... 240 V AC (Dedicated only)	**A**	
Charger Type A for Europe (CEE7/7)	**C**	
Charger Type K for U.S. (NEMA 5-15P)	**G**	
No charger	**J**	
Communication options		
VT100 RS 232	**0**	
RTD temperature sensor pair (includes mounting hardware for pipes above 1.5" outer diameter)		
No RTDs (Note: Temperature input is required for Energy systems)	**0**	
1 x Pair Std clamp-on RTD (NEMA 4X only)[3]	**1**	
2 x Pair Std clamp-on RTD (For Dual Channel NEMA 4X only)[3]	**2**	
1 x Pair Std clamp-on RTD (For NEMA 12 Portable)[3]	**3**	
2 x Pair Std clamp-on RTD (For Dual Channel NEMA 1 Portable)[3]	**4**	
1 x Insertion RTD with Thermowell and Lagging[3]	**9**	**M1A**
2 x Insertion RTD with Thermowell and Lagging[3]	**9**	**M1B**
Sensor for channel 1 (includes pipe mounting kit and spacer bar for indicated max. OD listed) See "Sensor selection charts" for specifications.		
no sensor	**A**	
A2 universal — Trackmount and straps provided up to 75 mm (3")	**B**	
B3 universal — Trackmount and straps provided up to 125 mm (5")	**C**	
C3 universal[5] — Mounting frame and straps provided up to 300 mm (13")	**D**	
D3 universal[5] — Mounting frame and straps provided up to 600 mm (24")	**E**	
E2 universal[5] — Mounting frame and straps provided up to 1200 mm (48")[1][4]	**F**	
C1H (high precision)[5] — Mounting frame and straps provided up to 600 mm (24")[4]	**M**	
C2H (high precision)[5] — Mounting frame and straps provided up to 600 mm (24")[4]	**N**	
D1H (high precision)[5] — Mounting frame and straps provided up to 1200 mm (48")[4]	**P**	
D2H (high precision)[5] — Mounting frame and straps provided up to 1200 mm (48")[4]	**Q**	
Doppler — to 12" with strap kit (not for IP65 (NEMA7)), for up to 121 °C (250 °F)	**S**	
D1H[5] — High temperature range 104 °C/220 °F HP[2]	**Z**	**P1P**

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Selection and Ordering data		Article No.	Order code
SITRANS FUE1010 (Energy)		7ME350 ■ - ■■■■■ - 0 ■■■	■■■ ■■■ + ■■■ + ■■■
Sensor for channel 2 (includes pipe mounting kit and spacer bar for indicated max. OD listed) See "Sensor selection charts" for specifications.			
no sensor		A	
A2 universal	Trackmount and straps provided up to 75 mm (3")	B	
B3 universal	Trackmount and straps provided up to 125 mm (5")	C	
C3 universal[5]	Mounting frame and straps provided up to 300 mm (13")	D	
D3 universal[5]	Mounting frame and straps provided up to 600 mm (24")	E	
E2 universal[5]	Mounting frame and straps provided up to 1200 mm (48")[1)4)]	F	
C1H (high precision)[5]	Mounting frame and straps provided up to 600 mm (24")[4]	M	
C2H (high precision)[5]	Mounting frame and straps provided up to 600 mm (24")[4]	N	
D1H (high precision)[5]	Mounting frame and straps provided up to 1200 mm (48")[4]	P	
D4H (high precision)[5]	Mounting frame and straps provided up to 1200 mm (48")[4]	R	
Doppler	to 12" with strap kit (not for IP65 (NEMA7)), for up to 121 °C (250 °F)	S	
D1H[5]	High temperature range 104 °C/220 °F HP[2]	Z	Q 1 P
Approvals	UL/Portable	0	
	FM, CSA, CE, Dedicated	1	

1) Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4)
2) Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4)
3) Requires two R** cables per one RTD pair
4) 600 mm (24") for portable systems only
5) Made with stainless steel constructions.

Standard MLFB product offering represents 4 to 6 weeks delivery time

For sensor and RTD cables for quick delivery see tables at end of section

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SITRANS FUE1010 (Energy)

Selection and Ordering data	Article No.	Ord. code
SITRANS FUE1010 (Energy)		
• Dedicated IP65 (NEMA 4X) wall mount ↗	**7ME3500-**	
• Portable IP40 (NEMA 1) Battery powered ↗	**7ME3502-**	
		- 0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Number of channels/ultrasonic paths Dedicated meter		
Dedicated meter		
Single channel	1	
Dual channel/Dual path	2	
Portables		
Dual channel/Dual path	4	
Flowmeter functions and I/O configurations		
• Portable Standard I/O - Reflexor capability - Graphic display - 2 x 0 ... 10 V - 2 x 4 ... 20 mA - 2 x pulse output - 4 x status logic - Energy efficiency COP/EER output - 2 x 4 ... 20 mA analog input	C	
• Dedicated Standard I/O - Reflexor capability - Graphic display - 2 x 0 ... 10 V - 2 x 4 ... 20 mA - 2 x pulse output - 4 x relay C type - Energy efficiency COP/EER output - 2 x 4 ... 20 mA analog input	F	
• Extended output adder plus standard inputs (4 additional 4 ... 20 mA outputs) and form C relay	Z	J 1 B
Meter power options		
90 ... 240 V AC (Dedicated only)	A	
9 ... 36 V DC (Dedicated only)	B	
Charger Type A for Europe (CEE7/7)	C	
Charger Type C for Australia (AS3112)	D	
Charger Type D for U.K. (BS1363)	E	
Charger Type J for Japan (JIS8303)	F	
Charger Type K for U.S. (NEMA 5-15P)	G	
Charger Type L for Switzerland (SEV1011)	H	
No Charger	J	
External 4 hours battery with US plug for Portable	Z	K 1 A
External 4 hours battery with European plug for Portable	Z	K 1 B
Communication options		
VT100 RS 232	0	
7ME3500 only; HART, BACnet MSTP/BACnet IP, Modbus RTU/TCPIP, Ethernet IP, Johnson N2	3	

Selection and Ordering data	Article No.	Ord. code
SITRANS FUE1010 (Energy)		
• Dedicated IP65 (NEMA 4X) wall mount	**7ME3500-**	
• Portable IP40 (NEMA 1) Battery powered	**7ME3502-**	
		- 0
RTD temperature sensor (includes mounting hardware for pipes above 1.5“ outer diameter)		
No RTDs (Note: temperature input is required for energy system)	0	
1 x pair standard clamp-on RTD (NEMA 4X only)[3]	1	
2 x pair standard clamp-on RTD (for dual channel NEMA 4X only)[3]	2	
1 x pair standard clamp-on RTD (NEMA 1 Portable)[3]	3	
2 x pair standard clamp-on RTD (for dual channel NEMA 1 Portable)[3]	4	
1 x Insertion style RTD with thermowell and lagging[3]	9	M 1 A
2 x Insertion style RTD with thermowell and lagging[3]	9	M 1 B
Sensor for channel 1 Including pipe mounting tracks for sizes A & B sensors indented for pipe with a OD less than 125 mm (5") and mounting frame/spacer bars for sizes C, D & E sensors. Straps provided are for the indicated maximum OD listed below. Strap kits are available to accommodate larger pipes (refer to spare part list). Refer to "Sensor Selection Charts" for the sensor suitability of pipe size and wall thickness.		
No sensor		A
A2 universal — Trackmount and straps provided up to 75 mm (3”)		B
B3 universal — Trackmount and straps provided up to 125 mm (5")		C
C3 universal[5] — Mounting frame and straps provided up to 300 mm (13”)		D
D3 universal[5] — Mounting frame and straps provided up to 600 mm (24”)		E
E2 universal[5] — Mounting frame and straps provided up to 1200 mm (48”)[1)4)]		F
For the following A1H to D4H sensors, temperature range is -40 °C ... 65 °C (-41 °F ... 150 °F), nominal 21 °C (70 °F):		
For other temperature ranges please see spare parts list.		
A2H (high precision) — Trackmount and straps provided up to 75 mm (3”)		H
A3H (high precision) — Trackmount and straps provided up to 75 mm (3”)		J
B1H (high precision) — Trackmount and straps provided up to 125 mm (5")		K

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Selection and Ordering data		Article No.	Ord. code
SITRANS FUE1010 (Energy)			
• Dedicated IP65 (NEMA 4X) wall mount		**7ME3500-**	
• Portable IP40 (NEMA 1) Battery powered		**7ME3502-**	
		■■■■■ - 0 ■■■	■■■ ■■■
Sensor for channel 1 (continued)			
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		**L**
C1H (high precision)[5]	Mounting frame and straps provided up to 600 mm (24")[4]		**M**
C2H (high precision)[5]	Mounting frame and straps provided up to 600 mm (24")[4]		**N**
D1H (high precision)[5]	Mounting frame and straps provided up to 1200 mm (48")[2)4]		**P**
D2H (high precision)[5]	Mounting frame and straps provided up to 1200 mm (48")[2)4]		**Q**
D4H (high precision)[5]	Mounting frame and straps provided up to 1200 mm (48")[2)4]		**R**
Doppler	to 12" with strap kit, for up to 121 °C (250 °F)		**S**
High temperature sensor size 2 for up to 230 °C (446 °F) (30 ... 200 mm diam. (1.18 ... 7.67 inch diam.))			**Z** **P 1 A**
High temperature sensor size 3 for up to 230 °C (446 °F) (150 ... 610 mm diam. (5.90 ... 24 inch diam.))			**Z** **P 1 B**
High temperature sensor size 4 for up to 230 °C (446 °F) (400 ... 1200 mm diam. (15.75 ... 47.25 inch diam.))			**Z** **P 1 C**
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):			
B1H (high temperature range HP)			**Z** **P 1 K**
B2H (high temperature range HP)			**Z** **P 1 L**
C1H (high temperature range HP)[5]			**Z** **P 1 M**
C2H (high temperature range HP)[5]			**Z** **P 1 N**
D1H (high temperature range HP)[2)5]			**Z** **P 1 P**
D2H (high temperature range HP)[2)5]			**Z** **P 1 Q**
D4H (high temperature range HP)[2)5]			**Z** **P 1 R**
Sensor for channel 2 (includes pipe mounting kit for indicated max. outer diameter listed) See "Sensor selection charts" for specifications.			
no sensor			**A**
A2 universal	Trackmount and straps provided up to 75 mm (3")		**B**
B3 universal	Trackmount and straps provided up to 125 mm (5")		**C**
C3 universal	Mounting frame and straps provided up to 300 mm (13")		**D**
D3 universal	Mounting frame and straps provided up to 600 mm (24")		**E**
E2 universal	Mounting frame and straps provided up to 1200 mm (48")[1)4]		**F**

Selection and Ordering data		Article No.	Ord. code
SITRANS FUE1010 (Energy)			
• Dedicated IP65 (NEMA 4X) wall mount		**7ME3500-**	
• Portable IP40 (NEMA 1) Battery powered		**7ME3502-**	
		■■■■■ - 0 ■■■	■■■ ■■■
Sensor for channel 2 (continued)			
For the following A1H to D4H sensors, temperature range is -40 °C ... 65 °C (-41 °F ... 150 °F), nominal 21 °C (70 °F):			
A2H (high precision)	Trackmount and straps provided up to 75 mm (3")		**H**
A3H (high precision)	Trackmount and straps provided up to 75 mm (3")		**J**
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		**K**
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		**L**
C1H (high precision)[5]	Mounting frame and straps provided up to 600 mm (24")[4]		**M**
C2H (high precision)[5]	Mounting frame and straps provided up to 600 mm (24")[4]		**N**
D1H (high precision)[5]	Mounting frame and straps provided up to 1200 mm (48")[2)4]		**P**
D2H (high precision)[5]	Mounting frame and straps provided up to 1200 mm (48")[2)4]		**Q**
D4H (high precision)[5]	Mounting frame and straps provided up to 1200 mm (48")[2)4]		**R**
Doppler	to 12" with strap kit, for up to 121 °C (250 °F)		**S**
High temperature sensor size 2 for up to 230 °C (446 °F) (30 ... 200 mm diam. (1.18 ... 7.67 inch diam.))			**Z** **Q 1 A**
High temperature sensor size 3 for up to 230 °C (446 °F) (150 to 610 mm diam. (5.90 to 24 inch diam.))			**Z** **Q 1 B**
High temperature sensor size 4 for up to 230 °C (446 °F) (400 to 1200 mm diam. (15.75 to 47.25 inch diam.))			**Z** **Q 1 C**
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up ... 220 °F), nominal 65 °C (150 °F):			
B1H (high temperature range HP)			**Z** **Q 1 K**
B2H (high temperature range HP)			**Z** **Q 1 L**
C1H (high temperature range HP)[5]			**Z** **Q 1 M**
C2H (high temperature range HP)[5]			**Z** **Q 1 N**
D1H (high temperature range HP)[2)5]			**Z** **Q 1 P**
D2H (high temperature range HP)[2)5]			**Z** **Q 1 Q**
D4H (high temperature range HP)[2)5]			**Z** **Q 1 R**
Approvals			
FM/CSA/CE Dedicated			**1**
UL/ULc/CE Portable			**0**

[1] Supplied spacer bar supports pipes up to 1050 mm (42 inch). For pipes larger than 1050 mm (42 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

[2] Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

[3] Requires two R** cables per one RTD pair

[4] 600 mm (24") for portable systems only

[5] Made with stainless steel construction.

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SITRANS FUE1010 (Energy)

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cable assembly for sensors (add for # of channels) See "Sensor cable selection chart"	**K..**
Cable assembly for RTDs (add for # of RTDs) See "RTD cable selection chart"	**R..**
Cable termination kit (for one cable pair) dedicated only	
• Termination for standard, plenum and armored sensor cable	**T01**
• Termination for submersible sensor cable	**T11**
• RTD cable termination kit for standard RTD	**T21**
• RTD cable termination kit for submersible RTD	**T31**
• Insert RTD cable termination kit	**T41**
• Cable gland kit	**T51**
Wet flow transfer calibration (priced on request)	
6 point calibration 2/water (Price per channel)	
• 2SS40 pipe	**D01**
• 3CS40 pipe	**D02**
• 4CS40 pipe	**D03**
• 4SS40 pipe	**D04**
• 6CS40 pipe	**D05**
• 6SS40 pipe	**D06**
• 6CS120 pipe	**D07**
• 8CS40 pipe	**D08**
• 8SS40 pipe	**D09**
• 8CS120 pipe	**D10**
• 10CS Standard pipe	**D11**
• 10CS40 pipe	**D12**
• 10SS40 pipe	**D13**
• 12CS Standard pipe	**D14**
• 12CS40 pipe	**D15**
• 14CS30 pipe	**D16**
• 14CS40 pipe	**D17**
• 16CS Standard pipe	**D18**
• 16CS40 pipe	**D19**
• 18CS Standard pipe	**D20**
• 20CS20 pipe	**D21**
• 20CS30 pipe	**D22**
• 24CS Standard pipe	**D23**
• 24CS20 pipe	**D24**
• 24CS30 pipe	**D25**
• 30CS Standard pipe	**D26**
• 36CS Standard pipe	**D27**
• Other pipe, other liquid, additional points, witness	**Y28**
Tag name plate	
• Stainless steel tag with 3.2 mm (0.13 inch) character size (68 characters max.)	**Y19**

MLFB example

Application example

A dedicated clamp-on energy meter is required for two separate return lines. Both will use clamp-on RTDs for the supply and return lines. AC power is available and data access will be via Modbus communication.

Pipe 1 is a DN150 (6") schedule 40 carbon steel line
Pipe 2 is a DN 300 (12") ductile iron line

MLFB Article No.: **7ME3500-2FA30-2NE0-Z**
K03 + K05 + R03 + R05 + R02 + R03

Selection and Ordering data	Article No.	Ord. code
SITRANS FUE1010 meter family	**7 ME 3 5 0**	**- 0 -**
IP65 (NEMA 4X) enclosure	**0**	
Dual channel	**2**	
Dedicated Type 1 I/O option	**F**	
90 ... 230 V AC power option	**A**	
Modbus option	**3**	
2 pairs of clamp-on RTDs	**2**	
Sensor code for 6" pipe	**N**	
Sensor code for 12" pipe	**E**	
No approval required	**0**	
30 m (100 ft) sensor cable for channel 1		**K 0 3**
61 m (200 ft) sensor cable for channel 1		**K 0 5**
30 m (100 ft) cable for RTD 1		**R 0 3**
61 m (200 ft) cable for RTD 2		**R 0 5**
15 m (50 ft) cable for RTD 3		**R 0 2**
30 m (100 ft) cable for RTD 4		**R 0 3**

Selection and Ordering data	Order code
Operating Instructions for SITRANS FUE1010	
English NEMA 4X Wall mount	**A5E03086491**
German NEMA 4X Wall mount	**A5E03086492**
English IP40 NEMA 1 Battery powered	**A5E02951524**
German IP40 NEMA 1 Battery powered	**A5E02951536**

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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Universal sensor selection chart IP68

Based on pipe size (all pipe materials)					
Pipe size	**Order Code**	**Outer diameter range (mm)**		**Outer diameter range (inch)**	
		min.	**max.**	**min.**	**max.**
A2	**B**	12.7	50.8	0.5	2
B3	**C**	19	127	0.75	5
C3	**D**	51	305	2	12
D3	**E**	203	610	8	24
E2	**F**	254	6096	10	249

High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Pipe Wall	**Order Code**	**Pipe Wall [mm]**		**Pipe Wall [inch]**	
		min.	**max.**	**min.**	**max.**
A1H	**G**	0.64	1.02	0.025	0.04
A2H	**H**	1.02	1.52	0.04	0.06
A3H	**J**	1.52	2.03	0.06	0.08
B1H	**K**	2.03	3.05	0.08	0.12
B2H	**L**	3.05	4.06	0.12	0.16
C1H[1)]	**M**	4.06	5.84	0.16	0.23
C2H[1)]	**N**	5.84	8.13	0.23	0.32
D1H[1)]	**P**	8.13	11.18	0.32	0.44
D2H[1)]	**Q**	11.18	15.75	0.44	0.62
D4H[1)]	**R**	15.75	31.75	0.62	1.25

[1)] Made with stainless steel construction.

Sensor cable (single pair) selection chart

Sensor cable codes for length and type options				
Cable length m (ft)	**Standard (PVC jacket)** **-40…+80 °C (-40…+176 °F)**	**Submersible[1)] (polyethylene jacket)** **-40…+80 °C (-40…+176 °F)**	**Plenum Rated (teflon jacket)** **-40…+200 °C (-40…+392 °F)**	**Armored[1)]** **-40…+80 °C (-40…+176 °F)**
	Order code			
6 (20)	**K01**[2)]	**K11**	**K21**	**K31**
15 (50)	**K02**	**K12**[2)]	**K22**	**K32**[2)]
30 (100)	**K03**[2)]	**K13**[2)]	**K23**	**K33**
46 (150)	**K04**[2)]	**K14**	**K24**	**K34**
61 (200)	**K05**	**K15**	**K25**	**K35**
91 (300)	**K06**[2)]	**K16**	**K26**	**K36**

[1)] Submersible and armored sensor cable is not available for portable versions.
[2)] Standard MLFB for quick delivery

RTD cable (single) selection chart

RTD cable codes for length and type		
Cable length m (ft)	**Standard (teflon wrapped)** **-40 ... +200 °C (-40 … +392 °F)**	**Insert[1)]** **-40 ... +200 °C (-40 … +392 °F)**
	Order code	
6 (20)	**R01**[2)]	**R21**
15 (50)	**R02**[2)]	**R22**
30 (100)	**R03**[2)]	**R23**
46 (150)	**R04**	**R24**
61 (200)	**R05**	**R25**
91 (300)	**R06**	**R26**

[1)] Submersible RTD cable is not available for portable versions.
[2)] Standard MLFB for quick delivery

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SITRANS FUE1010 (HVAC) Check metering kit

Overview

The SITRANS FUE1010 dual channel clamp-on check metering kit is an all inclusive HVAC chilled water kit developed especially for verifying the accuracy and performance of any brand or type of flowmeter. The meter's portability makes it capable of verifying the performance of meters based on any existing flow measurement principle: electromagnetic, vortex, insertion turbine, or ultrasonic. Perfect for areas where no metering exists. Ideal for balancing building performance. It accurately computes flow over an extremely wide range and measures practically all conductive or non-conductive clean or moderately aerated liquids or liquids with suspended solids. Dual channel models can measure two separate applications at the same time.

Benefits

- Performance check or verification of any type or brand of flowmeter
- Measures energy rate and total consumption with highest accuracy available
- Accurately measures at both low flow rates and low differential temperatures
- Field use is facilitated by meter portability charge for 4 hours of normal operation
- 1 MByte datalogger capability downloadable to PC via included RS 232 cable
- Performs fast, easy and cost-efficient on-site measurement of any convoluted pipe from 25.4 mm to 9.14 m (1.0" to 360")
- Delivered as an all inclusive kit with all the equipment needed to conduct performance and verification tests (cables, multiple sensors, flow transmitter etc.)
- Comes in a sturdy rolling case with a telescope handle that holds all the equipment needed to conduct performance and verification tests.

Application

The SITRANS FUE1010 Check Metering Kit is a highly accurate clamp-on non-intrusive ultrasonic flow display transmitter or revenue grade thermal energy sub-metering and energy efficiency distribution monitoring, with a real time coefficient of performance (COP) for HVAC systems. This kit is ideal for applications which include:

- Chilled water sub-metering
- Condenser water
- Potable water
- Ammonia and glycol
- River and lake water
- Lake source cooling

Design

- IP40 (NEMA 1) Impact resistant enclosure, constructed of flame retardant ABS with polycarbonate display and polyester keypad
- Dual channel/dual path

Function

- Integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- 4-wire 1000 Ω platinum RTD's for supply and return temperature measurements are precision matched to within 0.01 °C (0.02 °F)
- Chiller efficiency analysis: accepts an independent analog input representing kW usage for calculation of the following functions which can be selected for data logging or output purposes:
  - Cooling load (kW/ton)
  - Coefficient of performance (COP)
  - Energy efficiency ratio (EER)
- Temperature is factory calibrated with built-in field calibrator
- Built-in energy/BTU mode
- Detection of aeration and cavitation caused by worn or damaged impellers, misaligned shafts, etc.
- Current, voltage, frequency and RS 232 outputs (see specification section for details)
- Optional current, voltage and temperature inputs (see specification section for details)
- ZeroMatic Path automatically sets zero
- Bi-directional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

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Technical specifications

Pipe sizes	25.4 mm ... 9.14 m (1 ... 360“)
Accuracy	± 0.5 % ... ± 2.0 % of flow rate
Flow range	12 m/s (40 ft/s) bidirectional
Media temperature	-40 ... +104 °C (-40 ... 220 °F)
Enclosure ratings	IP40 (NEMA 1) impact resistant

See page 3/351 for complete technical specifications

Cerificates and approvals	
Portable enclosures	
Unclassified locations	UL ULc
Classified locations	
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC

Selection and Ordering data		Article No.
Energy check metering kit		**CQO:FUEHVACKIT**
Content of delivery		
1	Dual channel portable submersible flow transmitter	
1 pair	Universal sensors C3[1)]	
1 pair	Doppler sensors	
1 pair	High precision sensors C2[1)]	
1 pair	High precision sensors D1[1)]	
2 pairs	RTDs	
2 pairs	Mounting Ezclamp (4 mounting Ezclamp chains)	
1	Battery charger	
2 pairs	6 m (20 ft) sensor cables	
1	RS 232 cable	
4	RTD cable 6 m (20 ft)	
4	Mountings for RTDs	
1	Spacer bar (Portable)	
2	F connector to BNC	
1	Flow case	
1	Flow meter manual	
1	Laminated card set	
1	Certificate of intrinsic calibration	

[1)] Made with stainless steel construction.

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SITRANS FUH1010 (Oil)

Overview

SITRANS FUH1010 clamp-on non-intrusive ultrasonic flowmeter is ideal for applications carrying crude oil, refined petroleum or liquefied gas.

SITRANS FUH1010 has three application areas: Interface detectors, precision volume or standard volume flowmeters.

Benefits

For all SITRANS FUH1010 products

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear
- No pressure drop or energy loss
- Wide turn-down ratio, 30:1
- Choice of single, dual, or optional, three or four path versions.
  - Single path version reduces initial investment
  - Two or optional three and four path versions provide higher accuracy, especially where limited straight run or poor flow profile exists
- WideBeam technology
  - Helps provide improved accuracy over a wide range of liquid conditions and flow rates
  - Accommodates pipelines transporting multiple liquid products
- ZeroMatic Path automatically corrects for zero drift without stopping flow

Interface detection

- Outputs liquid density and API as a direct replacement for intrusive densitometers
- Exceptional repeatability is maintained, independent of changes in temperature, pressure or viscosity
- No need for straight run

Precision volume

- Moderate cost
- Precise measurement is maintained with automatic "Reynolds Number" compensation for temperature and viscosity changes.

Standard volume

- Exceptional repeatability is maintained, independent of changes in temperature, density or viscosity
- Batch interface and product quality diagnostics provided
- Density and API outputs provided
- Scraper („pig“) detection provided

Application

Interface detection

- Precise identification of interfaces on multi-liquid pipelines
- Product identification
- Density indication

Precision volume

- Applications with multiple liquids having a wide viscosity range
- Automatic gross volume compensation due to viscosity changes

Standard volume

- Standard (net) volume flow measurement
- Suitable for use in leak detection systems
- Mass flow output measurement
- Interface detection
- "Pig" detection
- Chemical and petrochemical processing

Design

SITRANS FUH1010 is available in three enclosures:

- IP65 (NEMA 4X) wall mount enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
  - Single path
  - Dual path
  - Optional four path
- IP65 (NEMA 7) compact explosionproof enclosure constructed of cast aluminum with glass window, stainless steel hardware
  - Single path
  - Dual path (option)
- IP66 (NEMA 7) wall mount explosionproof enclosure constructed of cast aluminum, stainless steel hardware, with glass window
  - Single path
  - Dual path
  - Four path (optional)
- There are 2 types of mounting assemblies
  - Aluminum mounting frames (default)
  - Stainless steel weld seal (optional)

Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) flowmeters have integral 33 button keypads and large (128 x 240 pixel) graphic displays visible up to 12 m (40 ft) away
- IP65 (NEMA 7) compact explosionproof flowmeter has a 2 x 16 alpha-numeric LCD display
- Current, voltage, status alarm, frequency outputs and communications HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2, VT100 RS 232 (see specification section for details)
- Analog inputs (see specification section for details)
- ZeroMatic Path automatically corrects for zero drift
- Bidirectional flow operation
- 1 MByte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options

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Technical specifications

Specifications for interface detectors	
Accuracy	
Accuracy	± 0.05 of API No.
Repeatability	± 0.01 of API No.

Specifications for volumetric and mass flowmeters	
Input	
Flow range	± 12 m/s (± 40 ft/s), bidirectional
Flow sensitivity	0.0003 m/s (0.001 ft/s), flow rate independent
Accuracy	
Typical accuracy	± 0.5 to 1 % of flow
Calibratable accuracy	± 0.15 % … 0.3 % of flow, depending on version
Batch repeatability	± 0.05 % of flow, maximum

Specifications for all SITRANS FUH1010 products	
Input	
Pipe size	6.4 mm ... 9.14 m (0.25“ ... 360“)
Analog inputs	• Current: 4 x 4 ... 20 mA (IP65 (NEMA 7) enclosure has (2))
Output	
Standard outputs	• Current: 20 mA (1 kΩ at 30 VDC) • Voltage: 10 V DC (5 kΩ minimum) (None for IP65 (NEMA 7) enclosure) • Pulse Rate: 5 kHz, Digital Quad. (None for IP65 (NEMA7)) • VT100 RS 232
Extended outputs	• HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2 • 4 x 4 ... 20 mA (not for IP65 (NEMA 7) enclosure) • Form C relays (not for IP65 (NEMA 7) enclosure) • Digital pulse (not for IP65 (NEMA 7) enclosure)
Status/Alarm I/O	• Programmable relays (not for IP65 (NEMA 7) enclosure) • Optically coupled output logic gates (for IP65 (NEMA 7) enclosure, only) • Totalizer clear switch input (not for IP65 (NEMA 4X) enclosure)[1)] • Totalizer hold switch input (not for IP65 (NEMA 7) enclosure)[1)] • Opto iso. totalizer clear switch input (for IP65 (NEMA 7) enclosure, only)[1)] • Opto iso. totalizer hold switch input (for IP65 (NEMA 7) enclosure, only)[1)]
Accuracy	
Zero Drift	0.0003 m/s (0.001 ft/s), with ZeroMatic Path active (not provided for interface detector)
Data refresh rate	5 Hz
Rated operation conditions	
Degree of protection	
• Wall mount	IP65 (NEMA 4X)
• Compact explosionproof	IP65 (NEMA 7)
• Wall mount explosionproof	IP66 (NEMA 7)
Liquid temperature	
• Standard	-40 ... +120 °C (-40 ... +250 °F)
• Optional	-40 ... +230 °C (-40 ... +450 °F)
Ambient temperature	-18 ... +60 °C (0 ... 140 °F)
Design	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams
Power supply	
• IP65 (NEMA 4X) wall mount and IP66 (NEMA 7) wall mount explosionproof	90 ... 240 V AC, 50 … 60 Hz, 30 VA or 9 ... 36 V DC, 12 W
• IP65 (NEMA 7) compact explosionproof	90 ... 240 V AC, 50 ... 60 Hz, 15 VA or 9 ... 36 V DC, 10 W
Indication and operation	
Data logger memory	1 MByte
Display	
• IP65 (NEMA 4X) and IP66 (NEMA 7) Enclosures	128 x 240 pixel LCD with backlight
• IP65 (NEMA 7) Enclosure	2 x 16 Alphanumeric LCD Display
Keypad	
• IP65 (NEMA 4X) and IP66 (NEMA 7) Enclosures	33 keypad buttons with tactile feedback
• IP65 (NEMA 7) Enclosure	5 Magnetic hall effect switches
Language options	English, Spanish, German, Italian, French

[1)] Totalizer switch inputs are not provided for the interface detector.

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SITRANS FUH1010 (Oil)

Certificates and approvals	
IP65 (NEMA 4X) wall mount enclosure	
FM and CSA	• Transmitter N-I Class I, Div 2 S Class II, Div 2 Sensor • I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
C-TICK	
ATEX	• Transmitter: Ex II (1) G [Ex ia] IIC EX II 3 (1) G Ex nC [ia] IIC T5 • Sensors: Ex II 1 G Ex ia IIC T5
IP65 (NEMA 7) compact explosion-proof enclosure ratings	
FM and CSA	• Tranmitter XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2 Sensor • I.S. Class I, II, Div 1
CE	• EMC Directive 2004/108/EC • ATEX Directive 94/9/EC
C-TICK	
ATEX	• Transmitter: Ex II 2 (1) G Ex d [ia] IIB + H2 T5 • Sensors: Ex II 1 G Ex ia IIC T5
IP66 (NEMA 7) wall mount explosionproof enclosure ratings	
FM and CSA	• Transmitter XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2 Sensor • I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
ATEX	• Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 Ex II 2 (1) G Ex d [ia IIC] IIB + H2 T5 • Sensors: Ex II 1 G Ex ia IIC T5

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Standard MLFB for quick delivery on SITRANS FUH1010 (Oil)

Selection and Ordering data		Article No.	Order code
SITRANS FUH1010 (Oil)	↗	7ME360 - ■■■■ 0 - ■■■■	■■■ K12 + K12 + R12
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Design			
IP65 (NEMA 4X) wall mount		0	
Number of ultrasonic paths/meter type			
Dual path Standard Volume		4	
Flowmeter functions and I/O configurations includes graphic or digital display, IP66 (BNB6665 (NEMA 4X)) and IP66 (NEMA 7) wall mount explosionproof units:			
Standard • Graphic display • 4 x 4 ... 20 mA analog input • 2 x 0 ... 10 V • 2 x 4 ... 20 mA • 2 x pulse outputs • 4 x form C relays • 2 x RTD input		A	
Meter power options			
90 ... 240 V AC		A	
Communication options			
VT100 RS 232		0	
RTD temperature sensor (includes mounting hardware for pipes above 1.5"/38 mm OD)			
No RTDs		0	
1 x standard clamp-on RTD		1	
2 x standard clamp-on RTD		2	
1 x submersible clamp-on RTD		3	
2 x submersible clamp-on RTD		4	
Notes: 1. Temperature input is required for SITRANS FUH1010 systems 2. Only the Interface detector set up as a dual channel can use 2 RTD's			
Sensor for channel 1 (includes pipe mounting kit and spacer bar for indicated max. outer diam. listed)			
no sensor		A	
C2H (high precision)[1]	Mounting frame and straps provided up to 600 mm (24")	N	
D1H (high precision)[1]	Mounting frame and straps provided up to 1200 mm (48")	P	
D4H (high precision)[1]	Mounting frame and straps provided up to 1200 mm (48")	R	
D1H (high precision)[1]	High Temperature to 104 °C/220 °F	Z	P1P
Sensor for channel 2 (includes pipe mounting kit and spacer bar for indicated max. OD listed) See "Sensor selection charts" for specifications.			
no sensor		A	
C2H (high precision)[1]	Mounting frame and straps provided up to 600 mm (24")	N	
D1H (high precision)[1]	Mounting frame and straps provided up to 1200 mm (48")	P	
D4H (high precision)[1]	Mounting frame and straps provided up to 1200 mm (48")	R	
D1H (high precision)[1]	High Temperature to 104 °C/220 °F	Z	Q1P
Approvals			
FM/CSA/CE (default)		1	
ATEX, CE, C-TICK		2	

Standard MLFB product offering represents 4 to 6 weeks delivery time

[1] Made with stainless steel constuction.

For sensor and RTD cables for quick delivery see tables at end of section.

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SITRANS FUH1010 (Oil)

Selection and Ordering data	Article No.	Ord. code
SITRANS FUH1010 (Oil)		
• IP65 (NEMA 4X) wall mount	↗ **7ME3600-**	
• IP65 (NEMA 7) compact explosionproof	↗ **7ME3601-**	
• IP66 (NEMA 7) wall mount explosionproof	↗ **7ME3603-**	
		0 -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Number of ultrasonic paths/meter type		
Single path (precision volume)		**0**
Single path (interface detector)		**1**
Dual channel/Dual path (interface detector)		**2**
Dual path (precision volume)		**3**
Dual path (standard volume/mass)		**4**
Special: Four path (standard volume/mass) only		**9** **H 1 A**
Flowmeter functions and I/O configurations Includes graphic or digital display		
IP65 (NEMA 4X) wall mount and IP66 (NEMA 7 wall mount explosionsproof) units		
• Standard - Graphic display - 4 x 4 ... 20 mA analog input - 2 x 0 ... 10 V - 2 x 4 ... 20 mA analog output - 2 x pulse output - 4 x form C relay - 2 x RTD input		**A**
• Extended I/O option - additional 2 x 4 ... 20 mA outputs - Form C relays - 4 x digital pulse outputs (2 x open collector and 2 x 0 ... 5 V TTL)		**C**
IP65 (NEMA 7) compact explosionproof units		
• Standard - Digital display - 2 x 4 ... 20 mA (Loop) - 2 x 4 ... 20 mA analog input - 2 x status (open collector) - 1 x RTD input		**D**
• Digital pulse option - 1 x digital pulse open collector output - 2 x 4 ... 20 mA (Loop) - 2 x 4 ... 20 mA analog input - 1 x status (open collector) - 1 x RTD input		**F**
Meter power options		
90 ... 240 V AC		**A**
9 ... 36 V DC (except compact NEMA 7)		**B**
9 ... 36 V DC negative GND (compact only)		**J**
9 ... 36 V DC positive GND (compact only)		**K**
Communication options		
VT100 RS 232		**0**
HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2, VT100 RS 232		**2**

Selection and Ordering data	Article No.	Ord. code
SITRANS FUH1010 (Oil)		
• IP65 (NEMA 4X) wall mount	**7ME3600-**	
• IP65 (NEMA 7) compact explosionproof	**7ME3601-**	
• IP66 (NEMA 7) wall mount explosionproof	**7ME3603-**	
		0 -
RTD temperature sensor (includes mounting hardware for pipes above 1.5“ OD)		
No RTDs (Note: temperature input is required for SITRANS FUH systems)		**0**
1 x Standard clamp-on RTD		**1**
2 x Standard clamp-on RTD[2)]		**2**
1 x Submersible clamp-on RTD		**3**
2 x Submersible clamp-on RTD[2)]		**4**
Sensor for channel/path 1 (includes standard pipe mounting kit and spacer bar for indicated max. outer diameter listed) See "Sensor selection charts" for specifications.		
no sensor		**A**
For the following A1H to D4H sensors, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):		
A2H (high precision) Trackmount and straps provided up to 75 mm (3”)		**H**
A3H (high precision) Trackmount and straps provided up to 75 mm (3”)		**J**
B1H (high precision) Trackmount and straps provided up to 125 mm (5”)		**K**
B2H (high precision) Trackmount and straps provided up to 125 mm (5”)		**L**
B3H (high precision) Trackmount and straps provided up to 125 mm (5”)		**T**
C1H (high precision)[3)] Mounting frame and straps provided up to 600 mm (24”)[1)]		**M**
C2H (high precision)[3)] Mounting frame and straps provided up to 600 mm (24”)[1)]		**N**
D1H (high precision)[3)] Mounting frame and straps provided up to 1200 mm (48”)[1)]		**P**
D2H (high precision)[3)] Mounting frame and straps provided up to 1200 mm (48”)[1)]		**Q**
D3H (high precision)[3)] Mounting frame and straps provided up to 1200 mm (48”)[1)]		**U**
D4H (high precision)[3)] Mounting frame and straps provided up to 1200 mm (48”)[1)]		**R**

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Selection and Ordering data	Article No.	Ord. code
SITRANS FUH1010 (Oil)		
• IP65 (NEMA 4X) wall mount	**7ME3600-**	
• IP65 (NEMA 7) compact explosionproof	**7ME3601-**	
• IP66 (NEMA 7) wall mount explosionproof	**7ME3603-**	
	0 -	
Sensor for channel/path 1 (continued)		
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):		
B1H (high temperature range HP)		**Z** **P 1 K**
B2H (high temperature range HP)		**Z** **P 1 L**
B3H (high temperature range HP)		**Z** **P 1 T**
C1H (high temperature range HP)[3]		**Z** **P 1 M**
C2H (high temperature range HP)[3]		**Z** **P 1 N**
D1H (high temperature range HP)[1][3]		**Z** **P 1 P**
D2H (high temperature range HP)[1][3]		**Z** **P 1 Q**
D3H (high temperature range HP)[1][3]		**Z** **P 1 U**
D4H (high temperature range HP)[1][3]		**Z** **P 1 R**
Sensor for channel/path 2 (includes pipe mounting kit and spacer bar for indicated max. outer diameter listed) See "Sensor selection charts" for specifications.		
no sensor		**A**
For the following A1H to D4H sensors, temperature range is -40 °C to 65 °C (-41 °F to 150 °F), nominal 21 °C (70 °F):		
A2H (high precision) Trackmount and straps provided up to 75 mm (3")		**H**
A3H (high precision) Trackmount and straps provided up to 75 mm (3")		**J**
B1H (high precision) Trackmount and straps provided up to 125 mm (5")		**K**
B2H (high precision) Trackmount and straps provided up to 125 mm (5")		**L**
B3H (high precision) Trackmount and straps provided up to 125 mm (5")		**T**
C1H (high precision)[3] Mounting frame and straps provided up to 600 mm (24")[1]		**M**
C2H (high precision)[3] Mounting frame and straps provided up to 600 mm (24")[1]		**N**
D1H (high precision)[3] Mounting frame and straps provided up to 1200 mm (48")[1]		**P**
D2H (high precision)[3] Mounting frame and straps provided up to 1200 mm (48")[1]		**Q**
D3H (high precision)[3] Mounting frame and straps provided up to 1200 mm (48")[1]		**U**
D4H (high precision)[3] Mounting frame and straps provided up to 1200 mm (48")[1]		**R**

Selection and Ordering data	Article No.	Ord. code
SITRANS FUH1010 (Oil)		
• IP65 (NEMA 4X) wall mount	**7ME3600-**	
• IP65 (NEMA 7) compact explosionproof	**7ME3601-**	
• IP66 (NEMA 7) wall mount explosionproof	**7ME3603-**	
	0 -	
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):		
B1H (high temperature range HP)		**Z** **Q 1 K**
B2H (high temperature range HP)		**Z** **Q 1 L**
B3H (high temperature range HP)		**Z** **Q 1 T**
C1H (high temperature range HP)[3]		**Z** **Q 1 M**
C2H (high temperature range HP)[3]		**Z** **Q 1 N**
D1H (high temperature range HP)[1][3]		**Z** **Q 1 P**
D2H (high temperature range HP)[1][3]		**Z** **Q 1 Q**
D3H (high temperature range HP)[1][3]		**Z** **Q 1 U**
D4H (high temperature range HP)[1][3]		**Z** **Q 1 R**
Approvals		
FM/CSA/CE/C-TICK (default), also for non hazardous area		**1**
ATEX		**2**

[1] Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

[2] Dual channel interface detector only

[3] Made with stainless steel construction.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cable assembly for sensors (add for # of paths) See "Sensor cable selection chart"	**K..**
Cable assembly for RTDs (add for # of RTDs) See "RTD cable selection chart"	**R..**
Cable termination kit (for one cable pair)	
• Termination for standard, plenum and armored sensor cable	**T01**
• Termination for submersible cable	**T11**
• RTD cable termination kit for standard RTD	**T21**
• RTD cable termination kit for submersible RTD	**T31**
• Cable gland kit	**T51**
Languages (Meter and Documentation), English (default)	
• German	**B10**
• French	**B12**
• Spanish	**B13**
• Italian	**B14**
Tag name plate	
• Stainless steel tags with 3.2 mm (0.13 inch) characters (68 characters max.)	**Y19**

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SITRANS FUH1010 (Oil)

Selection and Ordering data	Article No.
Operating Instructions for SITRANS FUH1010	
English NEMA 4X & NEMA 7 wall mount Standard Volume	**A5E02951449**
German NEMA 4X & NEMA 7 wall mount Standard Volume	**A5E02951529**
English NEMA 4X & NEMA 7 wall mount explosionproof Precision Volume	**CQO:1010PVNFM-3**
English NEMA 4X & NEMA 7 wall mount explosionproof Interface Detector	**A5E02951504**
English NEMA 7 compact explosionproof Standard Volume	**CQO:1010DVXFM-3**
English NEMA 7 compact explosionproof Precision Volume	**CQO:1010PVXFM-3**
English NEMA 7 compact explosionproof Interface Detector	**CQO:1010BXFM-3**

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

MLFB example

Application example

A clamp-on meter is required for a 12“ carbon steel hydrocarbon line flowing multiple products, with a wall thickness of 12.7 mm (0.5“). Meter electronics are to be located in a Class I Div 2 area only 60 ft from the pipeline. 12 V DC power is available at the site.

Dual path operation is desired for improved accuracy and redundant measurement. Pulse output will be primary flow data source.

MLFB Article No.: **7ME3600-3CB00-3QQ1-Z**
K03 + K03 + R03

Selection and Ordering data	Article No.	Ord. code
SITRANS FUH1010 meter family	**7 M E 3 6 0 -**	**0 -**
IP65 (NEMA 4X) enclosure	**0**	
Dual path precision volume	**3**	
Custody Transfer option with digital pulse	**C**	
9 ... 36 V DC power option	**B**	
VT100 RS 232	**0**	
RTD required for viscosity comp		**3**
Sensor code for path 1		**Q**
Sensor code for path 2		**Q**
FM approval required		**1**
30 m (100 ft) sensor cable for path 1		**K 0 3**
30 m (100 ft) sensor cable for path 2		**K 0 3**
30 m (100 ft) cable for RTD		**R 0 3**

High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Sensor Pipe wall	**Order Code**	**Pipe wall (mm)**		**Pipe wall (inch)**	
		min.	**max.**	**min.**	**max.**
A1H	**G**	0.64	1.02	0.025	0.04
A2H	**H**	1.02	1.52	0.04	0.06
A3H	**J**	1.52	2.03	0.06	0.08
B1H	**K**	2.03	3.05	0.08	0.12
B2H	**L**	3.05	4.06	0.12	0.16
C1H[1)]	**M**	4.06	5.84	0.16	0.23
C2H[1)]	**N**	5.84	8.13	0.23	0.32
D1H[1)]	**P**	8.13	11.18	0.32	0.44
D2H[1)]	**Q**	11.18	15.75	0.44	0.62
D4H[1)]	**R**	15.75	31.75	0.62	1.25
B3H[1)]	**T**	2.7	3.3	0.106	0.128
D3H[1)]	**U**	7.4	9.0	0.293	0.354

[1)] Made with stainless steel construction.

Sensor Cable Selection Chart

Sensor cable codes for length and type options				
Cable length m (ft)	**Standard (PVC jacket) -40…+80 °C (-40…+176 °F)**	**Submersible (polyethylene jacket) -40…+80 °C (-40…+176 °F)**	**Plenum Rated (teflon jacket) -40…+200 °C (-40…+392 °F)**	**Armored -40…+80 °C (-40…+176 °F)**
	Order code			
6 (20)	**K01**[1)]	**K11**	**K21**	**K31**
15 (50)	**K02**	**K12**[1)]	**K22**	**K32**[1)]
30 (100)	**K03**[1)]	**K13**[1)]	**K23**	**K33**
46 (150)	**K04**[1)]	**K14**	**K24**	**K34**
61 (200)	**K05**	**K15**	**K25**	**K35**
91 (300)	**K06**	**K16**	**K26**	**K36**

[1)] Standard MLFB for quick delivery

RTD Cable Selection Chart

RTD cable codes for length and type		
Cable length m (ft)	**Standard (teflon wrapped) -40 ... +200 °C (-40 … +392 °F)**	**Submersible (extruded jacket) -40 ... +200 °C (-40 … +392 °F)**
	Order code	
6 (20)	**R01**[1)]	**R11**
15 (50)	**R02**[1)]	**R12**
30 (100)	**R03**[1)]	**R13**
46 (150)	**R04**	**R14**
61 (200)	**R05**	**R15**
91 (300)	**R06**	**R16**

[1)] Standard MLFB for quick delivery

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Overview

SITRANS FUG1010 clamp-on non-intrusive ultrasonic flow transmitter is ideal for natural and process gas applications, including checkmetering, allocation, production, storage and gas fired power station applications.

SITRANS FUG1010 is available in single, dual and optional four path configurations, with your choice of IP65 (NEMA 4X) wall mount, IP65 (NEMA 7) compact explosionproof, and IP66 (NEMA 7) wall mount explosionproof enclosures.

Benefits

- Easy installation; no need to cut pipe or stop flow
- Minimal maintenance; external sensors do not require periodic cleaning
- No moving parts to foul or wear as found in turbine and PD meters
- Eliminates the pressure drop or energy loss in orifice metering
- Wide turn-down ratio
- Choice of single, dual or optional four path versions
  - Single path version reduces initial investment
  - Multiple path versions provide higher accuracy, especially with limited straight run and poor flow profile conditions
  - In diametric reflect mode configuration, the meter is less sensitive to crossflow and swirl
- Wide-Beam technology provides improved accuracy over a wide range of flow velocity and operating pressure
- ZeroMatic Path automatically sets zero without stopping flow and reduces zero drift, even at low flow
- Tolerant of most wet gas conditions
- Immune to most pressure reducing valve noise
- Optional rugged stainless steel sensor enclosure permits permanent and direct burial installations
- Easy to use “Si-Ware” diagnostic software

Application

SITRANS FUG1010 is ideal for most natural and process gas industry applications, including:

- Checkmetering
- Allocation
- Flow survey verification
- Lost and unaccounted for (LAUF) gas analysis
- Production
- Storage

Design

SITRANS FUG1010 is available in three enclosures:

- IP65 (NEMA 4X) wall mount enclosure constructed of fiberglass reinforced polyester with stainless steel hardware and polyester keypad
  - Single path
  - Dual path
  - Four path (optional)
- IP65 (NEMA 7) compact explosionproof enclosure constructed of cast aluminum with glass window, stainless steel hardware
  - Single path
  - Dual path
- IP66 (NEMA 7) wall mount explosionproof enclosure constructed of cast aluminum stainless steel hardware, with glass window
  - Single path
  - Dual path
  - Four path (optional)

Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) flow display transmitters have integral 33 button keypads and large (128 x 240 pixel) graphic displays visible up to 12 m (40 ft) away
- IP65 (NEMA 7) compact flow transmitter has a 2 x 16 alphanumeric LCD display
- Current, voltage, frequency and RS 232 outputs (see specification section for details)
- Analog inputs for pressure and temperature
- ZeroMatic Path automatically compensates for zero flow drift
- Bidirectional flow operation
- 1 Mbyte data logger with both site and data logger storage
- English, Spanish, German, Italian and French language options
- Internal AGA-8 table for fixed gas composition is available for standard volume computation.
- Complete application and operation diagnostics, to assure calibration and operational integrity
- Upward compatibility and compliance with AGA-10 speed of sound measurement practice

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Technical specifications

Input	
Flow range	± 30 m/s (± 100 ft/s), bidirectional
Flow sensitivity	0.0003 m/s (0.001 ft/s), flow rate independent
Minimum pressure	7 … 10 bar (100 … 145 psi), typical (gas composition and application dependent; plastic pipes support operation at atmospheric pressure)
Pipe size	25 mm … 1.52 m (1“ … 48“) (for other sizes, consult factory)
Analog inputs	Current: 20 mA, programmable (IP65 (NEMA 7) enclosure has 20 mA, programmable)
Output	
Standard outputs	• Current: 20 mA, a programmable, standard Additional 2 x optional, except IP65 (NEMA 7) • Voltage: 10 V DC, menu programmable (None for IP65 (NEMA 7) enclosure) • Open collector digital pulses (quadrature) (None for IP65 (NEMA 7) enclosure) • Pulse rate: 5 kHz (None for IP65 (NEMA 7) enclosure) • Optically isolated digital pulse & source, IP65 (NEMA 7) enclosure only • VT100 RS 232
Extended outputs	• HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2
Status/Alarm I/O	• Programmable form C relays (not for IP65 (NEMA 7) enclosure) • Programmable N.O. Mer. Wet. Relays optional (not for IP65 (NEMA 7) enclosure) • Optically coupled output logic gates (for IP65 (NEMA 7) enclosure, only) • 1 Totalizer clear switch input (not for IP65 (NEMA 7)) • 1 Totalizer hold switch input (not for IP65 (NEMA 7) enclosure) • Opto iso. totalizer clear switch input (for IP65 (NEMA 7) enclosure, only) • Opto iso. totalizer hold switch input (for IP 65 (NEMA 7) enclosure, only)

Accuracy	
Typical accuracy	1 % … 2 % of actual volume reading (higher accuracy is pipe condition and flow profile dependent)
Calibratable Accuracy	± 0.2 ... 0.5 % of flow
Repeatability	0.05 % … 0.1 %, of actual volume reading, for 1.5 … 30 m/s (5 … 100 ft/s) velocities (pipe condition dependent)
Zero drift	0.0003 m/s (0.001 ft/s), with ZeroMatic Path active
Data refresh rate	5 Hz
Rated operation conditions	
Degree of protection	
• Wall mount	IP65 (NEMA 4X)
• Compact explosionproof	IP65 (NEMA 7)
• Wall mount explosionproof	IP66 (NEMA 7)
Gas temperature	-40 … +60 °C (-40 … +140 °F) (for higher temperatures consult factory)
Ambient temperature	-18 … +60 °C (0 … 140 °F)
Design	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams
Power supply	
• For IP65 (NEMA 4X) and IP66 (NEMA 7)	• 90 … 240 V AC, 50 … 60 Hz (30 VA) or 9 … 36 V DC (12 W)
• For IP65 (NEMA 7):	• 90 … 240 V AC, 50 … 60 Hz (15 VA) or 9 … 36 V DC (10 W)
Indication and operation	
Data logger memory	1 Mbyte, programmable for 17 data functions
Display	
• IP65 (NEMA 4X) and IP66 (NEMA 7) enclosures	128 x 240 pixel LCD with backlight
• IP65 (NEMA 7) enclosure	2 x 16 alphanumeric LCD display
Keypad	
• IP65 (NEMA 4X) and IP66 (NEMA 7) Enclosures	33 keypad buttons with tactile feedback
• IP65 (NEMA 7) Enclosure	5 magnetic hall effect switches
Language options	English, Spanish, German, Italian, French

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Certificates and approvals	
IP65 (NEMA 4X) wall mount flow display transmitter ratings	
FM and CSA	• Transmitter N-I Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
C-TICK	
ATEX	• Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 • Sensors: Ex II 1 G Ex ia IIC T5
IP65 (NEMA 7) compact explosion-proof enclosure ratings	
FM and CSA	• Transmitter XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
C-TICK	
ATEX	• Transmitter: Ex II 2 (1) G Ex d [ia] IIB + H2 T5 • Sensors: Ex II 1 G Ex ia IIC T5
IP66 (NEMA 7) wall mount explo-sionproof enclosure ratings	
FM and CSA	• Tranmitter XP Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC
C-TICK	
ATEX	• Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 Ex II 2 (1) G Ex d [ia IIC] IIB+H2 T5 • Sensors: Ex II 1 G Ex ia IIC T5

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SITRANS FUG1010 (Gas)

Standard MLFB for quick delivery on SITRANS FUG1010 (Gas)

Selection and Ordering data	Article No. / Order code
SITRANS FUG1010 (Gas) ↗	7ME361 - ■■■■ 0 - ■■■■ K12 + K12 + R12
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Design	
IP65 (NEMA 4X) wall mount	0
Number of ultrasonic paths	
Dual path	2
Flowmeter functions and I/O configurations includes graphic or digital display	
• Extended I/O option - additional 2 x 4 ... 20 mA - form C relays - 4 x digital pulse outputs (2 x open collector and 2 x 0 ... 5 V TTL)	B
Meter power options	
9 ... 36 V, DC (except compact NEMA 7)	B
Communication options	
VT100 RS 232	0
HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2	1
RTD temperature sensor (includes mounting hardware for pipes above 1.5"/38 mm OD)	
No RTDs	0
1 x standard clamp-on RTD	1
2 x standard clamp-on RTD	2
1 x submersible clamp-on RTD	3
2 x submersible clamp-on RTD	4
Notes: 1. Temperature input is required for FUH systems 2. Only the Interface detector set up as a dual channel can use 2 RTD's	
Sensor for channel 1 (includes pipe mounting kit and spacer bar for indicated max. OD listed) See "Sensor selection charts" for specifications.	
no sensor	A
C2H (high precision)[1] Mounting frame and straps provided up to 600 mm (24")	N
D1H (high precision)[1] Mounting frame and straps provided up to 1200 mm (48")	P
D2H (high precision)[1] Mounting frame and straps provided up to 1200 mm (48")	Q
Sensor for channel 2 (includes pipe mounting kit and spacer bar for indicated max. OD listed) See "Sensor selection charts" for specifications.	
no sensor	A
C2H (high precision)[1] Mounting frame and straps provided up to 600 mm (24")	N
D1H (high precision)[1] Mounting frame and straps provided up to 1200 mm (48")	P
D2H (high precision)[1] Mounting frame and straps provided up to 1200 mm (48")	Q
Approvals	
FM/CSA/CE (default)	1
ATEX, CE, C-TICK	2

Standard MLFB product offering represents 4 to 6 weeks delivery time

For sensor and RTD cables for quick delivery see tables at end of section.

[1] Made with stainless steel construction.

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Selection and Ordering data	Article No.	Ord. code
SITRANS FUG1010 (Gas)		
• IP65 (NEMA 4X) wall mount ↗	**7ME3610-**	
• IP65 (NEMA 7) compact explosionproof ↗	**7ME3611-**	
• IP66 (NEMA 7) wall mount explosionproof ↗	**7ME3613-**	
	0 -	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Number of channels/ultrasonic paths		
Single path	**1**	
Dual path	**2**	
Special: Four path (NEMA 4X and NEMA 7 wall mount only)	**9**	**H 1 A**
Flowmeter functions and I/O configurations (includes graphic or digital display)		
IP65 (NEMA 4X) wall mount and IP66 (NEMA 7) wall mount explosionproof units		
• Standard (all but NEMA 7 compact explosionproof) - Graphic display - 4 x 4 ... 20 mA analog input - 2 x 0 ... 10 V - 2 x 4 ... 20 mA analog output - 2 x pulse output - 4 x Form C relays - 2 x RTD input	**A**	
• Extended I/O option - additional 2 x 4 ... 20 mA - Form C relays - 4 x digital pulse outputs (2 x open collector and 2 x 0 ... 5 V TTL)	**B**	
IP65 (NEMA 7) compact explosionproof units		
• Standard - Digital display - 2 x 4 ... 20 mA (loop) - 2 x 4 ... 20 mA analog input - 2 x status (open collector) - 1 x RTD input	**D**	
• Digital pulse option 1 x digital pulse open collector output	**E**	
Meter power options		
90 ... 240 V AC	**A**	
9 ... 36 V DC (except NEMA 7 compact explosionproof)	**B**	
9 ... 36 V DC negative GND (Compact only)	**J**	
9 ... 36 V DC positive GND (Compact only)	**K**	
Communication options		
VT100 RS 232	**0**	
HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2, VT100 RS 232	**1**	
RTD temperature sensor (includes mounting hardware for pipes above 1.5“ outer diameter)		
No RTDs	**0**	
1 x standard clamp-on RTD	**1**	
2 x standard clamp-on RTD	**2**	
1 x submersible clamp-on RTD	**3**	
2 x submersible clamp-on RTD	**4**	

Selection and Ordering data	Article No.	Ord. code
SITRANS FUG1010 (Gas)		
• IP65 (NEMA 4X) wall mount	**7ME3610-**	
• IP65 (NEMA 7) compact explosionproof	**7ME3611-**	
• IP66 (NEMA 7) wall mount explosionproof	**7ME3613-**	
	0 -	
Sensor for channel 1 (includes pipe mounting kit and spacer bar for indicated max. outer diameter listed) See "Sensor selection chart" for specifications.		
no sensor	**A**	
For the following B1H to D4H sensors, temperature range is -40 °C ... 65 °C (-41 °F ... 150 °F), nominal 21 °C (70 °F):		
B1H (high precision) Trackmount and straps provided up to 125 mm (5”)	**K**	
B2H (high precision) Trackmount and straps provided up to 125 mm (5”)	**L**	
B3H (high precision) Trackmount and straps provided up to 125 mm (5”)	**T**	
C1H (high precision)[2] Mounting frame and straps provided up to 600 mm (24”)[1]	**M**	
C2H (high precision)[2] Mounting frame and straps provided up to 600 mm (24”)[1]	**N**	
D1H (high precision)[2] Mounting frame and straps provided up to 1200 mm (48”)[1]	**P**	
D2H (high precision)[2] Mounting frame and straps provided up to 1200 mm (48”)[1]	**Q**	
D3H (high precision)[2] Mounting frame and straps provided up to 1200 mm (48”)[1]	**U**	
D4H (high precision)[2] Mounting frame and straps provided up to 1200 mm (48”)[1]	**R**	
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):		
B1H (high temperature range HP)	**Z**	**P 1 K**
B2H (high temperature range HP)	**Z**	**P 1 L**
B3H (high temperature range HP)	**Z**	**P 1 T**
C1H (high temperature range HP)[2]	**Z**	**P 1 M**
C2H (high temperature range HP)[2]	**Z**	**P 1 N**
D1H (high temperature range HP)[1)2)]	**Z**	**P 1 P**
D2H (high temperature range HP)[1)2)]	**Z**	**P 1 Q**
D3H (high temperature range HP)[1)2)]	**Z**	**P 1 U**
D4H (high temperature range HP)[1)2)]	**Z**	**P 1 R**

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SITRANS FUG1010 (Gas)

Selection and Ordering data		Article No.	Ord. code
SITRANS FUG1010 (Gas)			
• IP65 (NEMA 4X) wall mount		**7ME3610-**	
• IP65 (NEMA 7) compact explosionproof		**7ME3611-**	
• IP66 (NEMA 7) wall mount explosionproof		**7ME3613-**	
			0 -
Sensor for channel 2 (includes pipe mounting kit and spacer bar for indicated max. outer diameter listed) See "Sensor selection chart" for specifications.			
no sensor			**A**
For the following B1H to D4H sensors, temperature range is -40 °C ... 65 °C (-41 °F ... 150 °F), nominal 21 °C (70 °F):			
B1H (high precision)	Trackmount and straps provided up to 125 mm (5")		**K**
B2H (high precision)	Trackmount and straps provided up to 125 mm (5")		**L**
B3H (high precision)	Trackmount and straps provided up to 125 mm (5")		**T**
C1H (high precision)[2]	Mounting frame and straps provided up to 600 mm (24")[1]		**M**
C2H (high precision)[2]	Mounting frame and straps provided up to 600 mm (24")[1]		**N**
D1H (high precision)[2]	Mounting frame and straps provided up to 1200 mm (48")[1]		**P**
D2H (high precision)[2]	Mounting frame and straps provided up to 1200 mm (48")[1]		**Q**
D3H (high precision)[2]	Mounting frame and straps provided up to 1200 mm (48")[1]		**U**
D4H (high precision)[2]	Mounting frame and straps provided up to 1200 mm (48")[1]		**R**
Other versions (different size, mount, type or pipe larger than DN 1200 (48") or corrosion resistant), add Order code and plain text.			**Z** **Q 1 Y**
For the following B1H to D4H sensors, temperature range is -1 °C up to 104 °C (30 °F up to 220 °F), nominal 65 °C (150 °F):			
B1H (high temperature range HP)			**Z** **Q 1 K**
B2H (high temperature range HP)			**Z** **Q 1 L**
B3H (high temperature range HP)			**Z** **Q 1 T**
C1H (high temperature range HP)[2]			**Z** **Q 1 M**
C2H (high temperature range HP)[2]			**Z** **Q 1 N**
D1H (high temperature range HP)[2]			**Z** **Q 1 P**
D2H (high temperature range HP)[2]			**Z** **Q 1 Q**
D3H (high temperature range HP)[2]			**Z** **Q 1 U**
D4H (high temperature range HP)[2]			**Z** **Q 1 R**
Approvals			
FM/CSA/CE/C-TICK (default)			**1**
ATEX, CE, C-TICK			**2**

[1] Supplied spacer bar supports pipes up to 750 mm (30 inch). For pipes larger than 750 mm (30 inch) purchase also, spare part 7ME3960-0MS40 (1012BN-4).

[2] Made with stainless steel construction.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cable assembly for sensors (add for # of paths) See "Sensor cable selection chart"	**K..**
Cable assembly for RTDs (add for # of RTDs) See "RTD cable selection chart"	**R..**
Cable termination kit (for one cable pair)	
• Termination for standard, plenum and armored sensor cable	**T01**
• Termination for submersible sensor cable	**T11**
• RTD cable termination kit for standard RTD	**T21**
• RTD cable termination kit for submersible RTD	**T31**
• Insert RTD cable termination kit	**T41**
• Cable gland kit	**T51**
Languages (Meter and Documentation) for compact NEMA 7	
• German	**B10**
• French	**B12**
• Spanish	**B13**
• Italian	**B14**
Tag name plate	
• Stainless steel tags with 3.2 mm (0.13 inch) characters (68 characters max.)	**Y19**

MLFB example

Application example

A clamp-on meter is required for a 300 mm (12") carbon steel gas line with a wall thickness of 12.7 mm (0.5"). Meter electronics are to be located in a Class I Div 2 area only 18 m (60 ft) from the pipeline. 12 V DC power is available at the site.

Dual path operation is desired for improved accuracy and redundant measurement. Pulse output will be primary flow data source.

MLFB Article No.: **7ME3610-2BB00-0QQ1-Z**
K03 + K03

Selection and Ordering data	Article No.	Ord. code
SITRANS FUG1010 meter family	**7 ME 3 6 1 -**	**0 -**
IP65 (NEMA 4X) wall mount	**0**	
Dual path	**2**	
Option with digital pulse	**B**	
9 ... 36 V DC power option	**B**	
RS 232 Standard	**0**	
No RTD required		**0**
Sensor code for path 1		**Q**
Sensor code for path 2		**Q**
FM approval required		**1**
30 m (100 ft) sensor cab. for path 1		**K 0 3**
30 m (100 ft) sensor cab. for path 2		**K 0 3**

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Selection and Ordering data	Article No.
Operating Instructions for SITRANS FUG1010	
English NEMA 4X wall mount & NEMA 7 wall mount explosionproof	**A5E02951519**
German NEMA 4X wall mount & NEMA 7 wall mount explosionproof	**A5E02951531**
English NEMA 7 compact explosionproof	**CQO:1010GCXFM-3**

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

High precision sensor selection chart IP68

Based on pipe wall thickness (steel pipes only)					
Sensor Pipe wall	**Order Code**	**Pipe wall (mm)**		**Pipe wall (inch)**	
		min.	**max.**	**min.**	**max.**
B1H	**K**	2.0	3.0	0.08	0.12
B2H	**L**	3.0	4.1	0.12	0.16
B3H	**T**	2.7	3.3	0.106	0.128
C1H[1)]	**M**	4.1	5.8	0.16	0.23
C2H[1)]	**N**	5.8	8.1	0.23	0.32
D1H[1)]	**P**	8.1	11.2	0.32	0.44
D2H[1)]	**Q**	11.2	15.7	0.44	0.62
D3H[1)]	**U**	7.4	9.0	0.293	0.354
D4H[1)]	**R**	15.7	31.8	0.62	1.25

[1)] Made with stainless steel construction.

Sensor Cable (pair) Selection Chart

Sensor cable codes for length and type options				
Cable length m (ft)	**Standard (PVC jacket) -40…+80 °C (-40…+176 °F)**	**Submersible (polyethylene jacket) -40…+80 °C (-40…+176 °F)**	**Plenum Rated (teflon jacket) -40…+200 °C (-40…+392 °F)**	**Armored -40…+80 °C (-40…+176 °F)**
	Order code			
6 (20)	**K01**[1)]	**K11**	**K21**	**K31**
15 (50)	**K02**	**K12**[1)]	**K22**	**K32**[1)]
30 (100)	**K03**[1)]	**K13**[1)]	**K23**	**K33**
46 (150)	**K04**[1)]	**K14**	**K24**	**K34**
61 (200)	**K05**	**K15**	**K25**	**K35**
91 (300)	**K06**[1)]	**K16**	**K26**	**K36**

[1)] Standard MLFB for quick deliver

RTD Cable (single) Selection Chart

RTD cable codes for length and type		
Cable length m (ft)	**Standard (teflon wrapped) -40 … +200 °C (-40 … +392 °F)**	**Submersible (extruded jacket) -40 … +200 °C (-40 … +392 °F)**
	Order code	
6 (20)	**R01**[1)]	**R11**
15 (50)	**R02**[1)]	**R12**
30 (100)	**R03**[1)]	**R13**
46 (150)	**R04**	**R14**
61 (200)	**R05**	**R15**
91 (300)	**R06**	**R16**

[1)] Standard MLFB for quick deliver

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SITRANS FUG1010 Gas check metering kit

Overview

The clamp-on SITRANS FUG1010 Gas check metering kit is an all-inclusive solution developed especially for verifying the accuracy and performance of any brand or type of flowmeter. The kit is ideal for natural and process gas applications, including check metering, allocation, production, storage and gas fired power station applications. The flowmeter is available with FM/CSA or ATEX approval.

Benefits

- Performance check or verification of any type or brand of flow meter
- WideBeam technology provides improved accuracy over a wide range of flow velocity and operating pressure
- Tolerant of most wet gas conditions
- Immune to most pressure reducing valve noise
- Fast, easy and cost-efficient on-site measurement of any convoluted pipe from 50 ... 1200 mm (2 ... 48") up to 15.7 mm (0.62") pipe wall thickness
- Delivered as an all inclusive kit in a sturdy rolling case that holds all the equipment needed to conduct performance and verification tests (cables, multiple sensors, transmitter, etc.)

Application

The SITRANS FUG1010 Gas check metering kit is ideal for most natural and process gas industry applications, including:

- Check metering
- Allocation
- Flow survey verification
- Lost and unaccounted for (LAUF) gas analysis
- Production
- Storage

Design

- IP65 (NEMA 4X) wall mount enclosure constructed of fiber-glass reinforced polyester with stainless steel hardware and polyester keypad
- Dual channel

Function

- Integral 33 button keypad and large (128 x 240 pixel) graphic display visible up to 12 m (40 ft) away
- Current, voltage, frequency and RS 232 outputs (see Technical specification section for details)
- Analog inputs for pressure and temperature
- Internal AGA-8 table for fixed gas composition is available for standard volume computation
- Upward compatibility and compliance with AGA-10 speed of sound measurement practice
- Bi-directional flow operation
- English, Spanish, German, Italian and French language options

Technical specifications

Pipe sizes	50 ... 1200 mm (2 ... 48") up to 15.7 mm (0.62") pipe wall thickness
Accuracy	±0.5 %...1.0 % of flow rate
Flow range	30 m/s (100 ft/s) bidirectional
Media temperature	-40 …+60 °C (-40 … +140 °F)
Enclosure ratings	IP65 (NEMA 4X)

See page 3/368 for complete technical specifications

Cerificates and approvals	
FM and CSA	• Transmitter N-I Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
ATEX	• Transmitter: Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 • Sensors: Ex II 1 G Ex ia IIC T5
CE	EMC Directive 2004/108/EC ATEX Directive 94/9/EC

Selection and Ordering data

		Article No.
SITRANS FUG1010 Gas Check Metering Kit		
• FM/CSA approved		**CQO:FUG-GASKIT**
• ATEX approved		**CQO:FUG-GASAKIT**
Content of delivery		
1	Dual channel dedicated transmitter (FM/CSA or ATEX approved)	
1 pair	Transportable sensors C1[1)] Pipe: od 3.500 inch, wt 0.216 inch, carbon steel	
1 pair	Transportable sensors C2[1)] Pipe: od 6.625 inch, wt 0.280 inch, carbon steel	
1 pair	Transportable sensors D1[1)] Pipe: od 10.750 inch, wt 0.365 inch, carbon steel	
1 pair	Transportable sensors D2[1)] Pipe: od 16.000 inch, wt 0.500 , carbon steel	
2 pairs	Sensor cables 6m (20 ft)	
2 pairs	Mounting frames	
2	Spacer bar (dedicated)	
1	Mounting strap	
4	Couplant CC128	
1 kit	Couplant/Damping Film	
1	Flow case	
1	Flowmeter manual	
1	Laminated card set	

[1)] Made with stainless steel construction.

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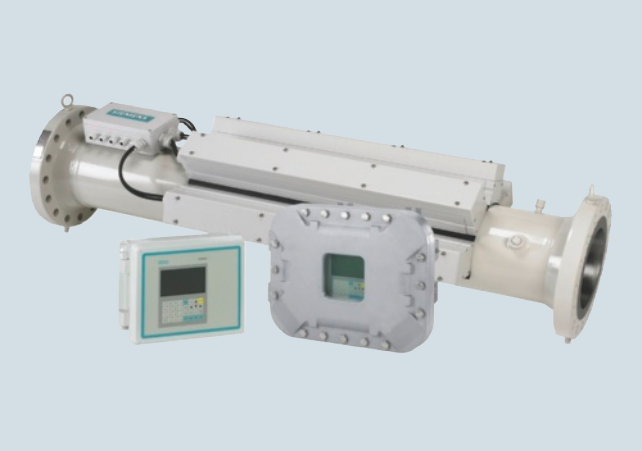
Overview



SITRANS FUT1010 is the latest ultrasonic flow meter from Siemens. Ideal for applications within the liquid and gas hydrocarbon industry capable of providing custody transfer accuracy. With the newly developed permanent TransLoc™ mounting system, the sensors are permanently mounted on the outside of the pipe, eliminating any contact with the medium.

SITRANS FUT1010 is available in two different configurations; a version for liquid hydrocarbon applications and a version for precise gas measurement. Both versions are offered in pipe sizes ranging from 4 inch to 24 inch (DN 100 to DN 600) with flange ratings of ANSI Class 150/300/600 for liquid and 300/600 for gas.

Benefits

- Calibrated performance that meets custody transfer accuracy
- WideBeam® technology allows for precision flow measurement by reducing the meter's sensitivity to changes in the medium's physical properties
- TransLoc™ permanent mounting system ensures sealing and virtually no maintenance
- Available in a wide range of sizes
- High viscosity range (up to 2800 Cst)
- ZeroMatic Path™ capability automatically corrects for zero drift with no interruption of flow
- Completely cavity free design which eliminates any signal degrading buildup or ports to clog
- Large bi-directional flow range
- Modbus RTU RS 232/485 output available
- Dynamic Reynolds Number compensation

Application

Liquid applications		Gas applications	
Pipelines	Custody transfer, allocation, line balance, interface/densitometer	**Upstream**	Production wells, gathering, separation and dehydration
Terminals	Check metering, transmix metering, product identification	**Midstream**	Underground storage, transmission, compressor stations
Refineries	Process control, blending, tank measurement, ship loading and unloading	**Downstream**	Electric power generation, industrial use, gas processing plants
Transportation	Crude oil pipelines, LPG pipelines, multiple product pipelines, airport facilities, liquid terminals		
Downstream	Petrochemical and processing plants		

Design

SITRANS FUT1010 is available in two different configurations, both featuring the TransLoc mounting system:

- A version for liquid hydrocarbon applications
- A version for precise gas measurement

Transmitter

SITRANS FUT1010 is available with two, three or four paths and IP65 (NEMA 4X) wall mount or IP66 (NEMA 7) wall mount explosionproof enclosures.

Sensor

Available sizes include 4 to 24 inch (DN 100 to DN 600) with flange ratings of ANSI Class 150, 300 and 600 for the liquid meter and ANSI Class 300 and 600 for gas.

If the installation warrants, SITRANS FUT1010 can be delivered with a ten diameter upstream and five diameter downstream tubes and a flow conditioner.

Function

- IP65 (NEMA 4X) and IP66 (NEMA 7) transmitters have integral 33 button keypads and large (128 x 240 pixel) graphic displays readable up to 12 m (40 ft) away
- Current, voltage, status alarm, frequency and RS 232 outputs (see specification section for details)
- Analog inputs (see specification section for details)
- 1 MByte data logger with both site and data logger storage
- Standard or actual volume flow outputs
- Standard or actual totalize outputs
- Complete application and operation diagnostics, to ensure operational integrity
- Temperature provided by non-intrusive sensor (¾" tap available for insert temperature sensor)
- Detection of aeration or contamination

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SITRANS FUT1010 (Liquid and Gas)

Technical specifications

Input	
Flow range (Gas)	± 36.5 m/s (± 120 f/s) for DN 100 ... DN 200 (4" ... 8") pipes bi-directional ± 30.5 m/s (± 100 ft/s) for DN 250 ... DN 600 (10" ... 24") pipes bi-directional
Flow range (Liquid)	± 12 m/s (± 40 f/s) including zero flow, bi-directional
Flow sensitivity	0.0003 m/s (0.001 f/s) flow rate independent
Flow temperature range	-28 ... +93 °C (-20 ... +200°F)
Analog inputs	4 x 4 ... 20 mA, (Programmable to Density, Pressure, viscosity or Temperature)
Output	
Standard outputs	• 4x isolated 4 ... 20 mA, programmable • 2x 0 ... 10 V DC, programmable • 4x Digital Pulse outputs (2x open collector and 2x 0-5V TTL) One each for positive flow, one each for negative flow • Standard VT100 RS 232, Optional HART, BACnet MSTP/BACnet IP, Modbus RTU & TCP/IP, Ethernet IP, Johnson N2
Status/Alarm I/O	• Programmable, 4x Form C Relays • Clear Switch Input Totalizer Hold Switch Input
Calibrated accuracy	
Gas	
2-path	0.5 ... 1.0 % (4" ... 6" < 0.25 %)
3-path	< 0.5 %
4-path	< 0.2 %
Liquid	
2-path	0.5 ... 1.0 % (4" ... 6" < 0.15 %)
3-path	< 0.5 %
4-path	< 0.15 %
Repeatability	± 0.05 ... 0.1 %
Data refresh rate	5 Hz
Design	
Design Flow transmitter	
Dimensions	see SITRANS F US Clamp-on "System info and selection guide"
Weight	see diagrams
Power supply	
Power supply	90 ... 240 V AC, 50 … 60 Hz, 30 VA or 9 ... 36 V DC, 12 W
Indication and operation	
Data logger memory	1 MByte, programmable for all available data variables
Display	128 x 240 pixel LCD with back-light
Keypad	33 keypad buttons with tactile feedback
Language options	English, Spanish, German, Italian, French

Design Flow sensor	
Nominal pipe sizes	4" ... 24" (DN 100 ... DN 600)
Pipe material specification	API 5L ERW
Temperature tap	¾"
Pressure tap	¼"
Flange class	
• Liquid	150, 300, 600
• Gas	300, 600
Flange specification	• ASME B16.5 • Liquid 150, 300, 600 • Gas 300, 600
Flange facing	Raised face weld neck
Flange material	A105
Flow sensor paths	Two, three, or four
Sensor length	See diagram
Design temperature	-28 ... +93 °C (-20 ... +200 °F)
Exterior finish	Marine/offshore grade per ASTM B117
Optional pipe sections	• 10 D upstream (with optional flow conditioner) • 5 D downstream
Certificates and approvals	
Flow transmitter IP65 (NEMA 4X)	
FM and CSA	• Transmitter N-I Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
ATEX	Ex II (1) G [Ex ia] IIC EX II 3 (1) G Ex nC [ia] IIC T5
CE markings	EMC 2004/108/EC ATEX 94/9/EC
Flow Transmitter - IP66 (NEMA 7)	
FM and CSA	• Transmitter Ex Class I, Div 1 D-I Class II, Div 1 N-I Class I, Div 2 S Class II, Div 2 • Sensor I.S. Class I, II, Div 1
ATEX	Ex II (1) G [Ex ia] IIC Ex II 3 (1) G Ex nC [ia] IIC T5 Ex II 2 (1) G Ex d [ia IIC] IIB + H2 T5
CE markings	EMC 2004/108/EC ATEX 94/9/EC
Sensor	
FM and CSA	I.S. Class I, Div 1 N-I Class I, Div 2 S Class II, Div 2
ATEX	Ex II 1 G Ex ia IIC T5
CE markings	EMC 2004/108/EC PED 97/23/EEC ATEX 94/9/EC

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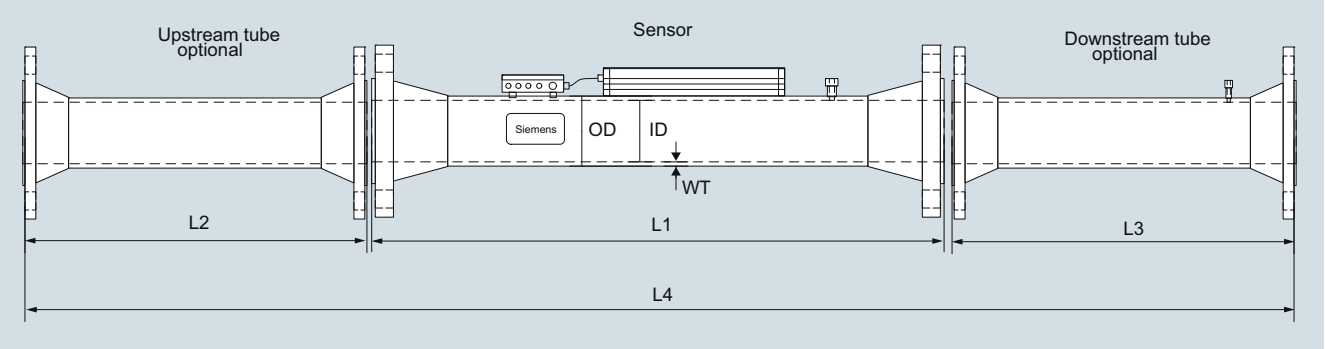
Dimensional drawings



Length															
Liquid Flange Class 150		**Nominal O.D.**		**Nominal I.D.**		**Max operating pressure (psi)**		**Mat. Grade**	**Length L1**		**Length L2**		**Length L3**		**Length L4**	
mm	**inch**	**mm**	**inch**	**mm**	**inch**	**bar**	**psi**		**mm**	**inch**	**mm**	**inch**	**mm**	**inch**	**mm**	**inch**
101.6	4.0	114.3	4.5	102.3	4.026	19.7	285.0	B	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	19.7	285.0	B	1828.8	72.0	1541.8	60.7	769.6	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	202.7	7.981	19.7	285.0	B	1828.8	72.0	2026.9	79.8	1013.5	39.9	4875.5	191.95
254.0	10.0	273.1	10.75	254.5	10.02	19.7	285.0	B	2184.4	86.0	2545.1	100.2	1272.5	50.1	6008.4	236.55
304.8	12.0	323.9	12.75	304.8	12.0	19.7	285.0	B	2184.4	86.0	3048.0	120.0	1524.0	60.0	6762.8	266.25
406.4	16.0	406.4	16.0	387.4	15.25	19.7	285.0	B	2184.4	86.0	3873.5	152.5	1938.0	76.3	8002.3	315.05
457.2	18.0	457.2	18.0	438.2	17.25	19.7	285.0	B	2501.9	98.5	4381.5	172.5	2192.0	86.3	9081.8	357.55
508.0	20.0	508.0	20.0	489.0	19.25	19.7	285.0	B	2501.9	98.5	4889.5	192.5	2446.0	96.3	9843.8	387.55
609.6	24.0	609.6	24.0	590.6	23.25	19.7	285.0	B	2501.9	98.5	5905.5	232.5	2954.0	116.3	11367.8	447.55

Length															
Liquid Flange Class 300		**Nominal O.D.**		**Nominal I.D.**		**Max operating pressure (psi)**		**Mat. Grade**	**Length L1**		**Length L2**		**Length L3**		**Length L4**	
mm	**inch**	**mm**	**inch**	**mm**	**inch**	**bar**	**psi**		**mm**	**inch**	**mm**	**inch**	**mm**	**inch**	**mm**	**inch**
101.6	4.0	114.3	4.5	102.3	4.026	51.0	740.0	B	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	51.0	740.0	B	1828.8	72.0	1541.8	60.7	769.6	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	202.7	7.981	51.0	740.0	B	1828.8	72.0	2026.9	79.8	1013.5	39.9	4875.5	191.95
254.0	10.0	273.1	10.75	254.5	10.020	51.0	740.0	B	2184.4	86.0	2544.1	100.2	1272.5	50.1	6008.4	236.55
304.8	12.0	323.9	12.75	304.8	12.0	51.0	740.0	B	2184.4	86.0	3048.0	120.0	1524.0	60.0	6762.8	266.25
406.4	16.0	406.4	16.0	381.0	15.0	51.0	740.0	B	2184.4	86.0	3810.0	150.0	1905.0	75.0	7905.8	311.25
457.2	18.0	457.2	18.0	428.7	16.876	51.0	740.0	B	2501.9	98.5	4287.5	168.8	2143.8	84.4	8939.5	351.95
508.0	20.0	508.0	20.0	477.9	18.814	51.0	740.0	X42	2501.9	98.5	4777.7	188.1	2390.1	94.1	9676.1	380.95
609.6	24.0	609.6	24.0	574.7	22.626	51.0	740.0	X42	2501.9	98.5	5748.0	226.3	2872.7	113.1	11129.0	438.15

Length															
Liquid Flange Class 600		**Nominal O.D.**		**Nominal I.D.**		**Max operating pressure (psi)**		**Mat. Grade**	**Length L1**		**Length L2**		**Length L3**		**Length L4**	
mm	**inch**	**mm**	**inch**	**mm**	**inch**	**bar**	**psi**		**mm**	**inch**	**mm**	**inch**	**mm**	**inch**	**mm**	**inch**
101.6	4.0	114.3	4.5	102.3	4.026	96.6	1400.0	B	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	81.0	1175.0	B	1828.8	72.0	1541.8	60.7	769.6	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	193.7	7.625	102.1	1480.0	B	1828.8	72.0	1938.0	76.3	967.7	38.1	4740.9	186.65
254.0	10.0	273.1	10.75	247.7	9.75	82.8	1200.0	B	2184.4	86.0	2476.5	97.5	1239.5	48.8	5906.8	232.55
304.8	12.0	323.9	12.75	298.5	11.75	79.3	1150.0	B	2184.4	86.0	2984.5	117.5	1493.5	58.8	6668.8	262.55
406.4	16.0	406.4	16.0	373.1	14.688	82.8	1200.0	B	2184.4	86.0	3731.3	146.9	1864.4	73.4	7786.4	306.55
457.2	18.0	457.2	18.0	419.1	16.5	86.2	1250.0	B	2501.9	98.5	4191.0	165.0	2095.5	82.5	8794.8	346.25
508.0	20.0	508.0	20.0	466.8	18.376	82.8	1200.0	X42	2501.9	98.5	4668.5	183.8	2334.3	91.9	9511.0	374.45
609.6	24.0	609.6	24.0	560.4	22.064	77.6	1125.0	X42	2501.9	98.5	5603.2	220.6	2801.6	110.3	10913.1	429.65

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SITRANS FUT1010 (Liquid and Gas)

Length															
Gas Class 300		**Nominal O.D.**		**Nominal I.D.**		**Max operating pressure (psi)**		**Mat. Grade**	**Length L1**		**Length L2**		**Length L3**		**Length L4**	
mm	**inch**	**mm**	**inch**	**mm**	**inch**	**bar**	**psi**		**mm**	**inch**	**mm**	**inch**	**mm**	**inch**	**mm**	**inch**
101.6	4.0	114.3	4.5	102.3	4.026	51.0	740.0	B	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	51.0	740.0	B	1828.8	72.0	1541.8	60.7	769.6	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	202.7	7.981	51.0	740.0	X42	1828.8	72.0	2026.9	79.8	1013.5	39.9	4875.5	191.95
254.0	10.0	273.1	10.75	254.5	10.020	51.0	740.0	X42	1828.8	72.0	2545.1	100.2	1272.5	50.1	5652.8	222.55
304.8	12.0	323.9	12.75	303.2	11.938	51.0	740.0	X42	1828.8	72.0	3032.8	119.4	1516.4	59.7	6384.3	251.35
406.4	16.0	406.4	16.0	381.0	15.0	51.0	740.0	X42	1981.2	78.0	3810.0	150.0	1905.0	75.0	7702.6	303.25
457.2	18.0	457.2	18.0	428.7	16.876	51.0	740.0	X42	1981.2	78.0	4287.5	168.8	2143.8	84.4	8418.8	331.45
508.0	20.0	508.0	20.0	477.9	18.814	51.0	740.0	B	1981.2	78.0	4777.7	188.1	2390.1	94.1	9155.4	360.45
609.6	24.0	609.6	24.0	574.7	22.626	51.0	740.0	B	1981.2	78.0	5748.0	226.3	2872.7	113.1	10608.3	417.65

Length															
Gas Class 600		**Nominal O.D.**		**Nominal I.D.**		**Max operating pressure (psi)**		**Mat. Grade**	**Length L1**		**Length L2**		**Length L3**		**Length L4**	
mm	**inch**	**mm**	**inch**	**mm**	**inch**	**bar**	**psi**		**mm**	**inch**	**mm**	**inch**	**mm**	**inch**	**mm**	**inch**
101.6	4.0	114.3	4.5	102.3	4.026	102.1	1480.0	X42	1828.8	72.0	1023.6	40.3	510.5	20.1	3369.3	132.65
152.4	6.0	168.3	6.625	154.1	6.065	96.6	1400.0	X42	1828.8	72.0	1541.8	60.7	769.9	30.3	4146.6	163.25
203.2	8.0	219.1	8.625	202.7	7.981	87.9	1275.0	X42	1828.8	72.0	2026.9	79.8	1013.5	39.9	4875.5	191.95
254.0	10.0	273.1	10.75	247.7	9.75	102.1	1480.0	X42	1981.2	78.0	2476.5	97.5	1239.5	48.8	5703.6	224.55
304.8	12.0	323.9	12.75	298.5	11.75	94.8	1375.0	X42	1981.2	78.0	2984.5	117.5	1493.5	58.8	6465.6	254.55
406.4	16.0	406.4	16.0	381.0	15.0	75.9	1100.0	X42	1981.2	78.0	3810.0	150.0	1905.0	75.0	7702.6	303.25
457.2	18.0	457.2	18.0	428.7	16.876	75.9	1100.0	X42	1981.2	78.0	4287.5	168.8	2143.8	84.4	8418.8	331.45
508.0	20.0	508.0	20.0	477.9	18.814	75.9	1100.0	X42	1981.2	78.0	4777.7	188.1	2390.1	94.1	9155.4	360.45
609.6	24.0	609.6	24.0	574.7	22.626	72.4	1050.0	X42	1981.2	78.0	5748.0	226.3	2872.7	113.1	10608.3	417.65

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SITRANS FUT1010 Liquid sizing chart

Nominal diameter		Q_{min}	Q_{max}	Q_{min}	Q_{max}
mm	inch	[m^3/h]	[m^3/h]	[42 GAL BBL/h]	[42 GAL BBL/h]
100	4	14	360	85	2267
150	6	29	818	180	5146
200	8	46	1417	290	8910
250	10	67	2233	421	14045
300	12	80	3203	504	20143
400	16	103	5172	651	32532
450	18	116	6618	728	41625
500	20	124	8241	778	51836
600	24	150	12022	945	75617

SITRANS FUT1010 Gas sizing chart

	SITRANS FUT1010 maximum flow rate (MMSCFD) [Millions of standard cubic feet per day]							
	Meter size and maximum velocity							
	4"	**6"**	**8"**	**10"**	**12"**	**16"**	**20"**	**24"**
Pressure (psig)	**135 ft/s**	**126 ft/s**	**117 ft/s**	**144 ft/s**	**126 ft/s**	**99 ft/s**	**81 ft/s**	**90 ft/s**
100	8.2	17.3	27.9	54.1	67.1	83.3	107.1	174.9
200	15.5	32.9	52.9	102.7	127.6	158.2	203.4	332.3
300	23.1	49.0	78.7	152.8	189.8	235.4	302.6	494.5
400	30.9	65.5	105.3	204.4	253.9	315.0	404.8	661.5
500	39.0	82.6	132.8	257.6	320.0	396.9	510.1	833.6
600	47.3	100.1	161.0	312.4	388.0	481.2	618.5	1010.8
700	55.8	118.2	190.0	368.7	457.9	568.1	730.1	1193.1
800	64.6	136.8	219.8	426.6	529.9	657.3	844.8	1380.5
900	73.6	155.8	250.5	486.1	603.8	749.0	962.6	1573.1
1000	82.8	175.4	282.0	547.2	679.6	843.0	1083.5	1770.6
1100	92.3	195.4	314.1	609.6	757.1	939.2	1207.1	1972.7
1200	101.9	215.9	347.0	673.3	836.3	1037.4	1333.3	2178.9

	SITRANS FUT1010 maximum flow rate (MMSCFD) [Millions of standard cubic feet per day]							
	Meter size and maximum velocity			**[Minimum flow rate above which 0.2 % accuracy can be maintained]**				
	4"	**6"**	**8"**	**10"**	**12"**	**16"**	**20"**	**24"**
Pressure (psig)	**1.55 ft/s**	**1.4 ft/s**	**1.3 ft/s**	**1.65 ft/s**	**1.35 ft/s**	**1.1 ft/s**	**0.85 ft/s**	**1 ft/s**
100	0.1	0.2	0.3	0.6	0.7	0.9	1.1	1.9
200	0.2	0.4	0.6	1.2	1.4	1.8	2.1	3.7
300	0.3	0.5	0.9	1.8	2.0	2.6	3.2	5.5
400	0.4	0.7	1.2	2.3	2.7	3.5	4.2	7.4
500	0.4	0.9	1.5	3.0	3.4	4.4	5.4	9.3
600	0.5	1.1	1.8	3.6	4.2	5.3	6.5	11.2
700	0.6	1.3	2.1	4.2	4.9	6.3	7.7	13.3
800	0.7	1.5	2.4	4.9	5.7	7.3	8.9	15.3
900	0.8	1.7	2.8	5.6	6.5	8.3	10.1	17.5
1000	1.0	1.9	3.1	6.3	7.3	9.4	11.4	19.7
1100	1.1	2.2	3.5	7.0	8.1	10.4	12.7	21.9
1200	1.2	2.4	3.9	7.7	9.0	11.5	14.0	24.2

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SITRANS FUT1010 (Liquid and Gas)

	SITRANS FUT1010 Maximum Flow Rate (Nm^3/h x 1000) [Thousands of normal cubic meters per hour]							
	DIN meter size and maximum velocity							
	100 mm	150 mm	200 mm	250 mm	300 mm	400 mm	500 mm	600 mm
Pressure (barg)	41.1 m/s	38.4 m/s	35.6 m/s	43.9 m/s	38.4 m/s	30.1 m/s	24.6 m/s	27.4 m/s
10	13.5	28.7	46.1	89.5	111.2	137.9	177.2	289.6
20	26.4	55.9	89.9	174.5	216.7	268.8	345.5	564.6
30	39.8	84.4	135.6	263.2	326.9	405.5	521.2	851.8
40	53.9	114.1	183.4	355.8	441.9	548.2	704.6	1151.4
50	68.5	145.0	233.1	452.4	561.9	697.0	895.9	1464.0
60	83.7	177.2	284.9	552.9	686.7	851.9	1094.8	1789.2
70	99.5	210.7	338.7	657.2	816.3	1012.6	1301.5	2126.9
80	115.8	245.3	394.3	765.1	950.2	1178.7	1514.9	2475.8
90	132.6	280.8	451.4	875.9	1087.8	1349.4	1734.3	2834.3
100	149.7	317.1	509.7	989.1	1228.5	1523.9	1958.6	3200.8
110	167.1	353.8	568.8	1103.8	1370.9	1700.6	2185.7	3571.9
120	184.5	390.8	628.2	1218.9	1514.0	1878.0	2413.7	3944.5

	SITRANS FUT1010 Transition Flow Rate (Nm^3/h x 1000) [Thousands of normal cubic meters per hour]							
	DIN meter size and maximum velocity			Minimum flow rate above which 0.2 % accuracy can be maintained				
	100 mm	150 mm	200 mm	250 mm	300 mm	400 mm	500 mm	600 mm
Pressure (barg)	0.47 m/s	0.42 m/s	0.39 m/s	0.50 m/s	0.41 m/s	0.33 m/s	0.25 m/s	0.30 m/s
10	0.2	0.3	0.5	1.0	1.2	1.5	1.9	3.2
20	0.3	0.6	1.0	2.0	2.3	3.0	3.6	6.3
30	0.5	0.9	1.5	3.0	3.5	4.5	5.5	9.5
40	0.6	1.3	2.0	4.1	4.7	6.1	7.4	12.8
50	0.8	1.6	2.6	5.2	6.0	7.7	9.4	16.3
60	1.0	2.0	3.2	6.3	7.4	9.5	11.5	19.9
70	1.1	2.3	3.8	7.5	8.7	11.3	13.7	23.6
80	1.3	2.7	4.4	8.8	10.2	13.1	15.9	27.5
90	1.5	3.1	5.0	10.0	11.7	15.0	18.2	31.5
100	1.7	3.5	5.7	11.3	13.2	16.9	20.6	35.6
110	1.9	3.9	6.3	12.6	14.7	18.9	22.9	39.7
120	2.1	4.3	7.0	14.0	16.2	20.9	25.3	43.8

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Selection and Ordering data	Article No.	Order Code
SITRANS FUT1010 (Liquid)	↗ **7 ME3 6 2 - - - 0**	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Transmitter type		
No Transmitter	**0**	
IP65 NEMA 4X (2 path)	**1**	
IP65 NEMA 4X (2 path) with optional communications	**2**	
IP65 NEMA 4X (3 or 4 path)	**3**	
IP65 NEMA 4X (3 or 4 path) with optional communications	**4**	
IP66 NEMA 7 wall mount/explosionproof (2 Path)	**5**	
P66 NEMA 7 wall mount/explosionproof (2 Path) with optional communications	**6**	
P66 NEMA 7 wall mount/explosionproof (3 or 4 Path)	**7**	
P66 NEMA 7 wall mount/explosionproof (3 or 4 Path) lwith optional communications	**8**	
Input power		
90 ... 240 V AC	**1**	
9 ... 36 V DC	**2**	
Number of ultrasonic paths		
2 path	**B**	
3 path	**C**	
4 path	**D**	
Pipe size		
DN 100 (4") (Dual Path only)	**A**	
DN 150 (6")(Dual Path only)	**B**	
DN 200 (8")	**C**	
DN 250 (10")	**D**	
DN 300 (12")	**E**	
DN 400 (16")	**F**	
DN 450 (18")	**G**	
DN 500 (20")	**H**	
DN 600 (24")	**J**	
Flange rating		
Class 150 (Raised Face)	**0**	
Class 300 (Raised Face)	**1**	
Class 600 (Raised Face)	**2**	
Upstream/downstream meter run		
None	**0**	
10 pipe diameter upstream Tube only	**1**	
10 pipe diameter upstream Tube with flow conditioner	**2**	
5 pipe diameter downstream tube only	**3**	
10D up and 5D downstream tubes	**4**	
10D up and 5D downstream tubes with flow conditioner	**5**	
Liquid type range (select closest match)		
Water	**A**	
Multiple Crude Oils	**B**	
Light Crude only	**C**	
Heavy Crude only	**D**	
Multiple Finished Products	**E**	
Gasolines Only	**F**	
Kerosene	**G**	
Jet Fuel	**H**	
Diesel	**J**	
Multiple Fuel Oils	**K**	
Heavy Fuel Oils	**L**	
Liquified Gases	**M**	
Liquid temperature range		
-28 ... +65 °C (-20 ... +150 °F)	**A**	
1 ... 93 °C (30 ... 200 °F)	**B**	
Transmitter and sensor approval		
FM/CSA, CE	**1**	
ATEX and PED, CE, C-TICK	**2**	

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SITRANS FUT1010 (Liquid and Gas)

Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code(s).	
Cable assembly for flow sensor (add one K.. per flow path)	
• Cable and termination for one sensor path (see "Sensor cable chart for options")	**K..**
• Termination for user supplied cable	**T01**
Cable assembly for temperature sensor (only 1 required)	
• Cable and termination for temperature sensor (see "Transducer cable chart for options").	**R..**
• Termination for user supplied RTD cable	**T31**
Nace Certification	
• Nace, Spool only	**C10**
• Nace, W/10D upstream	**C11**
• Nace, W/10D upstream, cond	**C12**
• Nace, W/5D downstream	**C13**
• Nace, W/10D up, 5D dn	**C14**
• Nace, W/10D up, cond, 5D dn	**C15**
Standard Cal: Oil (2 cst), Forward flow direction, 6 points, 6 verification points, Range 2 ... 20 ft/sec, Lab pressure and temperature	
• Calibration, 100 DN (4 inch)	**D10**
• Calibration, 150 DN (6 inch)	**D11**
• Calibration, 200 DN (8 inch)	**D12**
• Calibration, 250 DN (10 inch)	**D13**
• Calibration, 300 DN (12 inch)	**D14**
• Calibration, 400 DN (16 inch)	**D15**
• Calibration, 450 DN (18 inch)	**D16**
• Calibration, 500 DN (20 inch)	**D17**
• Calibration, 600 DN (24 inch)	**D18**
• Calibration, Other contact factory for quote	**Y28**
Tag name plate	
• Stainless steel tags with 3.2 mm (0.13 inch) character size (68 characters max.)	**Y19**

Selection and Ordering data	Article No.
Operating Instructions for SITRANS FUT1010 (Liquid)	
English NEMA 4X wall mount& NEMA 7 wall mount explosionproof	**A5E02639184**
German NEMA 4X wall mount & NEMA 7 wall mount explosionproof	**A5E03086468**

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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Selection and Ordering data	Article No.	Order Code
SITRANS FUT1010 (Gas)	↗ **7ME363 - - 0**	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Transmitter type		
No meter	**0**	
IP65 NEMA 4X (2 path)	**1**	
IP65 NEMA 4X (2 path) with Modbus	**2**	
IP65 NEMA 4X (3 or 4 path)	**3**	
IP65 NEMA 4X (3 or 4 path) with Modbus	**4**	
IP66 NEMA 7 wall mount flame/explosion proof (2 Path)	**5**	
IP66 NEMA 7 wall mount flame/explosion proof (2 Path) with Modbus	**6**	
IP66 NEMA 7 wall mount flame/explosion proof (3 or 4 Path)	**7**	
IP66 NEMA 7 wall mount flame/explosion proof (3 or 4 Path) with Modbus	**8**	
Input power		
90 ... 240 V AC	**1**	
9 ... 36 V DC	**2**	
Number of ultrasonic paths		
2 path (standard enclosure material)	**B**	
3 path (standard material)	**C**	
4 path (standard material)	**D**	
Pipe size		
DN 100 (4") (Dual Path only)	**A**	
DN 150 (6")(Dual Path only)	**B**	
DN 200 (8")	**C**	
DN 250 (10")	**D**	
DN 300 (12")	**E**	
DN 400 (16")	**F**	
DN 450 (18")	**G**	
DN 500 (20")	**H**	
DN 600 (24")	**J**	
Flange rating		
Class 300 (Raised Face)	**1**	
Class 600 (Raised Face)	**2**	
Upstream/downstream meter run		
None	**0**	
10 pipe diameter upstream Tube only	**1**	
10 pipe diameter upstream Tube with flow conditioner	**2**	
5 pipe diameter downstream tube only	**3**	
10D up and 5D downstream tubes	**4**	
10D up and 5D downstream tubes with flow conditioner	**5**	
Gas type range (select closest match)		
Natural Gas (mostly CH_4)	**A**	
Process Gases (N_2, O_2, CO, Ar)	**B**	
Helium	**C**	
Hydrogen	**D**	
Gas temperature range		
-28 ... +65 °C (-20 ... +150 °F)	**A**	
1 ... 93 °C (30 ... 200 °F)	**B**	
Transmitter and sensor approval		
FM/CSA, CE	**1**	
ATEX and PED, CE, C-TICK	**2**	

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SITRANS FUT1010 (Liquid and Gas)

Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code(s).	
Cable assembly for flow sensor (Add one K.. per flow path)	
• Cable and termination for one sensor path (see "Transducer cable chart for options")	**K..**
• Termination for user supplied cable	**T01**
Cable assembly for temperature sensor (only 1 required)	
• Cable and termination for temperature sensor (see "Transducer cable chart for options").	**R..**
• Termination for user supplied RTD cable	**T31**
Nace Certification	
• Nace, Spool only	**C10**
• Nace, W/10D upstream	**C11**
• Nace, W/10D upstream, cond	**C12**
• Nace, W/5D downstream	**C13**
• Nace, W/10D up, 5D dn	**C14**
• Nace, W/10D up, cond, 5D dn	**C15**
Standard Cal: Nat Gas, Forward flow direction, 7 points, 2 verification points, Range 10 ... 100 ft/sec, Lab pressure and temperature	
• Calibration, 100 DN (4 inch)	**D10**
• Calibration, 150 DN (6 inch)	**D11**
• Calibration, 200 DN (8 inch)	**D12**
• Calibration, 250 DN (10 inch)	**D13**
• Calibration, 300 DN (12 inch)	**D14**
• Calibration, 400 DN (16 inch)	**D15**
• Calibration, 450 DN (18 inch)	**D16**
• Calibration, 500 DN (20 inch)	**D17**
• Calibration, 600 DN (24 inch)	**D18**
• Calibration, Other contact factory for quote	**Y28**
Tag name plate	
• Stainless steel tags with 3.2 mm (0.13 inch) character size (68 characters max.)	**Y19**

Selection and Ordering data	Article No.
Operating Instructions for SITRANS FUT1010 (Gas)	
English NEMA 4X wall mount & NEMA 7 wall mount explosionproof	**A5E02639185**
German NEMA 4X wall mount & NEMA 7 wall mount explosionproof	**A5E03086485**

This device is shipped with a Quick Start Guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

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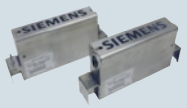
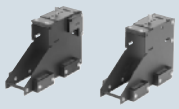
Accessories/Spare parts for clamp-on ultrasonic flowmeters

Description	Article No.	
Universal Portable Sensors Selected generally for portable systems where a wide variety of pipes are to be measured. Since they are selected based on diameter only, a wide range of pipe sizes and materials can be covered with a minimum number of sensors. These can also be selected as a cost savings on applications where standard accuracy is sufficient.	**7ME3951-...**	
High Precision Sensors Selected generally for dedicated meters since the need to cover a range of pipes is not a requirement. They provide the highest accuracy achievable by the meters and therefore should be selected whenever higher accuracy/repeatability is required. They are only applicable to steel pipes but no other metals, and are selected solely by wall thickness.	**7ME3950-...**	
High Temperature Sensors Are selected whenever pipe temperature will exceed 250 °F (120 °C) up to a maximum of 450 °F (232 °C). They are universal type and can therefore be used on any pipe material and are selected by pipe diameter. Made with stainless steel construction.	**7ME3950-...**	
High Precision Mount These provide the most secure and strongest mounting of the flow sensors. They are generally selected for "High End" meter types where maximum performance criteria applies. They accommodate high precision sensors designed to mount inside these enclosures. May be welded to the pipe if so desired by the customer. They come in 2-piece or 1-piece configurations depending upon the application pipe size and type (Liquid/Gas).	**7ME3960-...**	
Mounting tracks Typically used on smaller pipes for easier and more stable mounting for dedicated universal style sensor size A or B, also available for dedicated high precision sensor size A or B.	**7ME3960-...**	
Magnetic mounting frames Magnetic mounting frames are designed to simplify clamp-on sensor installation on pipelines 8 inches (DN 200) and larger by eliminating the need for straps to secure them. They feature powerful magnets to ensure quick and accurate setup. Compatible with all C, D and E universal and high-precision sensors belonging to the SITRANS F US clamp-on family, magnetic mounting frames can be installed on any carbon steel pipe and are constructed in aluminum for a high level of durability.	**7ME3960-0MD02**	

Description	Article No.	
Mounting Frames These items are useful in simplifying sensor installation. They are strapped to the pipe first then the sensors are installed, making the installation less cumbersome and more precise. They also enable easy repeated mounting of the sensors assuring conformation to the original sensor positioning. They may be left in place at each measurement location where periodic flow surveys are conducted to simplify subsequent installations and ensure repeatable results.	**7ME3960-...**	
Spacer Bars Sensors are required to be mounted at a set distance from each other as determined by pipe size and medium being measured. The spacer bar simplifies this requirement by eliminating the need to undertake a precise dimensional measurement. The flowmeter will specify a specific spacing index which is easily accommodated with the marked indices on the bar.	**7ME3960-...**	
Clamp-On RTD's 1000 Ω platinum RTD's for use where temperature is required. Used with Energy Meters to record supply/return temperature. For this purpose precision matched pairs (to 0.02 °C) are supplied. Single RTD's are also used with SITRANS FUH and SITRANS FUG meters to enable live calculations of "Liquident" and Standard Volume Correction.	**7ME3950-...**	
Insert RTD's Are identical to clamp-on RTD's as described above except that they are inserted into the pipe (In a Thermowell). They provide more precise and quicker responding temperature measurement. They are selected when precise temperature measurement of the actual liquid or gas is required as opposed to pipe "skin temperature". Since they project into the pipe they cannot be used in pipeline that undergo periodic "pigging".	**7ME3950-...**	
Standard Cable (Flow Sensor or RTD) Selected for general purpose installations where no special application requirements exist.	**7ME3960-...**	
Submersible Cable (Flow Sensor) Polyethylene jacketed, for locations that experience periodical or continual submersion of the flow sensors.	**7ME3960-...**	

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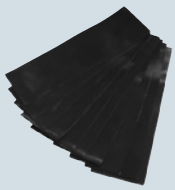
Accessories/Spare parts

Description	Article No.	
Plenum Cable (Flow Sensor or RTD) For temperatures above 180 °F. Teflon jacketed to withstand high temperatures, is used when high temp sensors are specified.	**7ME3960-...**	
Armored Cable (Flow Sensor) Double shielded cable, selected when cable will not be installed in conduit between meter and sensors.	**7ME3960-...**	
Temperature sensor cable Cable to connect field installed RTD to flow meter, available in Teflon wrapped, plenum or submersible grade. Typically used for SITRANS FUE, FUH and FUG series meters where a temperature sensor is employed.	**7ME3960-...**	
Straps Used to fasten sensors or mounting frames to pipe for dedicated meter installations. Stainless steel construction for corrosion resistance.	**7ME3960-...**	
Chains (EZ clamps) Used to fasten portable sensors or mounting frames to pipe. Thumbscrews eliminate need for hand tools when mounting sensors, and allow for easy on/off operations.	**7ME3960-...**	
Ultrasonic Couplant Fills any voids between sensor emitting surface and pipe wall to allow maximum energy transfer between sensor and pipe. Several different types of couplants are employed as determined by the application conditions and type of installation (Temporary or permanent).	**7ME3960-...**	
Dry Couplant The dry coupling pad is intended for use in any liquid, clamp-on transit time or Doppler applications that require a more durable coupling material. Installation is easy by simply placing one strip of material between sensor and pipe. Not intended for clamp-on gas where damping material is used. The temperature range is -34 to +200 °C (-30 to +392 °F).	**7ME3960-...**	
Damping Material Used with gas meters, and required as part of their sensor installation. This material absorbs excess ultrasonic energy from the pipe wall to enable the meter to detect and operate with low amplitude sensor signals normally associated with Clamp-on Gas applications.	**7ME3960-...**	

Description	Article No.	
Test Block Used for checking operation of a meter and sensors prior to a field installation, or as a troubleshooting tool. Selected by sensor size, each block accommodates 2 sensor sizes. Available only for universal sensors.	**7ME3960-...**	
Termination Kit (Flow Sensor or RTD) Provides the connectors, labels and shrink tubing or other associated hardware to complete the termination of a specific cable type. These can be provided in cases where users will be purchasing bulk cable directly and cutting to length at their site, or when existing cable length is to be altered. Selected by cable type.	**7ME3960-...**	
Cable Gland Kit Cable gland kit for use with SITRANS FUS1010, FUH1010 and FUG1010 Ultrasonic Flowmeters housed in IP65 NEMA 4X wall mount enclosures. Kit contains a total of 5 glands to manage and seal the exit and entry of wires and cables to ancillary devices.	**A5E32834162**	

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Selection and Ordering data	Article No.
Spare parts (System)	
SITRANS F US clamp-on	**7ME3940-** ■■■■
Power supplies, batteries and chargers	
Power supply 90 ... 240 V AC	
• for IP65 (NEMA 4X) wall mount or IP66 (NEMA 7) wall mount explosionproof	**0PA00**
• for IP65 (NEMA 7) compact explosionproof	**2PA00**
Power supply 9 ... 36 V DC	
• for IP65 (NEMA 4X) wall mount or IP66 (NEMA7) wall mount explosionproof	**0PB01**
• negative ground for NEMA 7 compact explosionproof	**2PJ00**
• positive ground for NEMA 7 compact explosionproof	**2PK00**
Portable meter batteries and accessories	
• Internal battery (Portable meters only)	**3PP00**
IP67 Portable meter charger	
• Type A for Europe (CEE7/7)	**3PC00**
• Type C for Australia (AS3112)	**3PD00**
• Type D for UK (BS1363)	**3PE00**
• Type J for Japan (JIS8303)	**3PF00**
• Type K for US (NEMA 5-15P)	**3PG00**
• Type L for Switzerland (SEV1011)	**3PH00**
IP40 Portable meter charger	
• Type A for Europe (CEE7/7)	**4PC00**
• Type C for Australia (AS3112)	**4PD00**
• Type D for UK (BS1363)	**4PE00**
• Type J for Japan (JIS8303)	**4PF00**
• Type K for US (NEMA 5-15P)	**4PG00**
• Type L for Switzerland (SEV1011)	**4PH00**
Modbus system computer modules	
Communication Module W/VT100 RS232, BACnet MSTP / BACnet IP, Ethernet IP, Modbus RTU / TCPIP, Johnson N2	**A5E32589005**
Mounting kit (Meter functions) for Communication module	**CQO:1015N-5M-MK1**
Mounting kit (type 2) for Communication module	**CQO:1015N-5M-MK2**
Mounting kit (type 3) for Communication module	**CQO:1015N-5M-MK3**
Field configuration kit with manual, for Modbus converter module	**CQO:1015N-5M-FK1**
Pipe mounting brackets	
2 inch pipe mounting bracket for IP65 (NEMA 7) compact explosionproof	**CQO:1012XMB-1**
2 inch pipe mounting bracket for IP65 (NEMA 4X) wall mount	**CQO:1012NMB-1**

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Accessories/Spare parts

Selection and Ordering data	Article No.
Spare parts (Sensors)	
SITRANS F US clamp-on	
Meter type	
Dedicated (SITRANS FUS1010, FUG1010, FUH1010, FUE1010)	7ME3950- ■■■■■
Portable (SITRANS FUP1010 or FUE1010)	7ME3951-0■■■■
Approvals	
UL, ULc, CE (Portable only)[1]	0
FM/CSA hazardous (classified) locations[1]	1
ATEX Ex II 1G Ex ia IIC T5 (not for RTDs)[1]	2
Temperature range (High Precision Sensors)	
Standard temperature: -40 ... +65 °C (-40 ... 150 °F)	0
High temperature T2: -1 ... 104 °C (30 ... 220 °F)	2
High temperature T3: 32 ... 121 °C (90 ... 250 °F)	3
Spare sensor code	
For liquid flow sensors pipe ranges please refer to sensor selection chart in the SITRANS FUS1010 section	
Liquid flow sensors for use with mounting frames or tracks (including portable)	
A2 universal	LB00
B3 universal	LC00
C3 universal[3]	LD00
D3 universal[3]	LE00
E2 universal[3]	LF00
A1H (high precision)	LG00
A2H (high precision)	LH00
A3H (high precision)	LJ00
B1H (high precision)	LK 0
B2H (high precision)	LL 0
B3H (high precision)	LT 0
C1H (high precision)[3]	LM 0
C2H (high precision)[3]	LN 0
D1H (high precision)[3]	LP 0
D2H (high precision)[3]	LQ 0
D3H (high precision)[3]	LU 0
D4H (high precision)[3]	LR 0
Doppler, for up to 121 °C (250 °F)	LS00
High temperature universal liquid sensors	
High temp. sensor size 1 for up to 230 °C (12.7 to 100 mm diam.)	LA10
High temp. sensor size 2 for up to 230 °C (30 to 200 mm diam.)	LA20
High temp. sensor size 3 for up to 230 °C (150 to 600 diam.)	LA30
High temp. sensor size 4 for up to 230 °C (400 to 1200 diam.)	LA40

Selection and Ordering data	Article No.
Spare parts (Sensors)	
SITRANS F US clamp-on	
Meter type	
Dedicated (SITRANS FUS1010, FUG1010, FUH1010, FUE1010)	7ME3950- ■■■■■
Portable (SITRANS FUP1010 or FUE1010)	7ME3951-0■■■■
For gas flow sensors pipe ranges please refer to sensor selection chart in the SITRANS FUG1010 section	
High precision gas flow sensors for use with mounting frames or tracks	
B1H (high precision)[2]	GK 0
B2H (high precision)[2]	GL 0
B3H (high precision)[2]	GT 0
C1H (high precision)[2][3]	GM 0
C2H (high precision)[2][3]	GN 0
D1H (high precision)[2][3]	GP 0
D2H (high precision)[2][3]	GQ 0
D3H (high precision)[2][3]	GU 0
D4H (high precision)[2][3]	GR 0
Standard RTD sensors (not for energy systems)	
Standard clamp-on RTD	1TA00
Submersible clamp-on RTD (not for Portable)	1TB00
Insertion style RTD each (size 1), 140 mm (5.5 inch)	1TJ00
Insertion style RTD each (size 2), 216 mm (8.5 inch)	1TJ01
Insertion style RTD each (size 3), 292 mm (11.5 inch)	1TJ02
Insertion style RTD each (size 4), 368 mm (14.5 inch)	1TJ03
Standard for energy system (matched pair)	
Standard clamp-on RTD with mounting	1TA10
Insertion style RTD pair (size 1) for SITRANS FUE1010, 140 mm (5.5 inch)	1TJ10
Insertion style RTD pair (size 2) for SITRANS FUE1010, 216 mm (8.5 inch)	1TJ11
Insertion style RTD pair (size 3) for SITRANS FUE1010, 292 mm (11.5 inch)	1TJ12
Insertion style RTD pair (size 4) for SITRANS FUE1010, 368 mm (14.5 inch)	1TJ13

[1] Products are marked with CE as required by european directive.

[2] T3 range not available.

[3] Made with stainless steel construction.

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Selection and Ordering data	Article No.
Spare parts (Miscellaneous)	
SITRANS F US clamp-on	**7ME3960-** ■■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Meter design	
IP65 (NEMA 4X) wall mount or IP66 (NEMA 7) wall mount explosionproof	**0**
IP65 (NEMA 7) compact	**2**
IP67 weatherproof portable	**3**
IP40 (NEMA 1) Energy Portable	**4**
Dedicated sensor mounting hardware	
Sensor mounting tracks (aluminium with mounting straps) for pipes < 125 mm (5 inch)	
• Universal sensor size A or B	**0MA00**
• High precision sensor size A or B	**0MB00**
Sensor mounting frames for	
• Universal sensor size B (for pipes >125 mm (5 inch)	**CQO:1012FN-PB**
• Universal sensor size C	**0MC00**
• Universal sensor size D	**0MC01**
• Universal sensor size E	**0MC02**
• High precision sensor size B (for pipes >125 mm (5 inch)	**CQO:1012FNH-PB**
• High precision sensor size C	**0MD00**
• High precision sensor size D	**0MD01**
Mounting straps for mounting frames (slotted stainless steel)	
• For pipes from DN 50 to DN 150	**0SM00**
• For pipes from DN 50 to DN 300	**0SM10**
• For pipes from DN 300 to DN 600	**0SM20**
• For pipes from DN 600 to DN 1200	**0SM30**
• For pipes from DN 1200 to DN 1500	**0SM40**
• For pipes from DN 1500 to DN 2100	**0SM50**
• For pipes from DN 2100 to DN 3000	**0SM60**
Spacer bars (for indexing sensors on pipe)	
• Spacer bars for pipes to 200 mm/8 inch (liquid), 600 mm/24 inch (gas)	**0MS10**
• Spacer bars for pipes to 500 mm/20 inch (liquid), DN 1200/48 inch (gas)	**0MS20**
• Spacer bars for pipes to 800 mm/32 inch (liquid)	**0MS30**
• Spacer bars for pipes to 1200 mm/48 inch (liquid) Only use in conjunction with 7ME3960-0MS30	**0MS40**
High precision mounting enclosures for liquid and gas sensors	
• Stainless steel mounts for high precision size "C" sensors, single Enclosure	**0WS50**
• Stainless steel mounts for high precision size "D/E" sensors, single Enclosure	**0WS60**
• Stainless steel mounts for high precision size "C" sensors, dual Enclosure	**0WD50**
• Stainless steel mounts for high precision size "D/E" sensors, dual enclosure	**0WD60**

Selection and Ordering data	Article No.
Spare parts (Miscellaneous)	
SITRANS F US clamp-on	**7ME3960-** ■■■■■
Stainless steel straps for weld seal enclosure mounting (2 x required for dual enclosures)	
• Mounting strap for pipe diameter to 300 mm (13 inch)	**0SM01**
• Mounting strap for pipe diameter to 600 mm (24 inch)	**0SM11**
• Mounting strap for pipe diameter to 1200 mm (48 inch)	**0SM21**
• Mounting strap for pipe diameter to 1500 mm (60 inch)	**0SM31**
• Mounting strap for pipe diameter to 2130 mm (84 inch)	**0SM41**
• Mounting strap for pipe diameter to 3050 mm (120 inch)	**0SM51**
Stainless mounting tracks for high temp 991 sensors, with straps	
• Size 1 high temp sensor pair	**CQO:992MTNHMSH-1**
• Size 2 high temp sensor pair	**CQO:992MTNHMSH-2**
• Size 3 high temp sensor pair	**CQO:992MTNHMSH-3**
• Size 4 high temp sensor pair	**CQO:992MTNHMSH-4**
Clamp-on RTD mounting hardware for dedicated systems	
• RTD mounting hardware for dedicated system: 152 to 610 mm (6 to 24 inch)	**0MR00**
• RTD mounting hardware for dedicated system: 12.7 to 50.8 mm (0.5 to 2 inch)	**0MR01**
• RTD mounting hardware for dedicated system: 31.8 to 203.2 mm (1.25 to 8 inch)	**0MR02**
• RTD mounting hardware for dedicated system: 508 to 1219 mm (20 to 48 inch)	**0MR04**
• Junction box for clamp on RTD's	**CQO:992ECJ**
Portable sensor mounting hardware	
Sensor mounting tracks for portable sensors (aluminum with mounting chains) for pipes < 125 mm (5 inch) for	
• Universal sensor size A or B	**3MA00**
• High precision sensor size A or B	**3MB00**
Sensor mounting frames	
• Universal sensor size B (for pipes >125 mm (5 inch)	**CQO:1012FP-PB**
• Universal sensor size C	**3MC00**
• Universal sensor size D	**3MC01**
• Universal sensor size E	**3MC02**
• High precision sensor size B (for pipes > 125 mm (5 inch)	**CQO:1012FPH-PB**
• High precision sensor size C	**3MD00**
• High precision sensor size D	**3MD01**
Spacer bar (for indexing portable sensors	**3MS00**

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Accessories/Spare parts

Selection and Ordering data	Article No.
Spare parts (Miscellaneous)	
SITRANS F US clamp-on	**7ME3960-** ■■■■■
Mounting chain and EZ clamp hardware	
• EZ clamp hardware set for DN 25 to DN 600 (1 to 24 inch); handles all transducers except "D" size HP and "E" size univ.	**CQO:1012Z-1**
• EZ clamp hardware set for DN 25 to DN 600 (1 to 24 inch) for "D" size HP and "E" size universal	**CQO:1012Z-2**
• Mounting chain for portable sensors: 4 x 760 mm lengths	**3CM10**
• Mounting chain for portable sensors: 2 x 760 mm and 2 x 1500 mm lengths	**3CM20**
RTD mounting hardware for portable system	**3MR00**
Sensor connector adaptors	
• "F" connector to BNC adapter (order 2 per sensor set)	**CQO:1012NFPA**

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Selection and Ordering data	Article No.
Spare parts (Miscellaneous)	
SITRANS F US clamp-on	**7ME3960-■■■■■**
Insert RTD Thermowells	
• Thermowell std. duty uninsulated pipe 140 mm (5.5 inch)	**CQO:1012TW-1**
• Thermowell std. duty uninsulated pipe 216 mm (8.5 inch)	**CQO:1012TW-2**
• Thermowell std. duty uninsulated pipe 292 mm (11.5 inch)	**CQO:1012TW-3**
• Thermowell std. duty with lagging 140 mm (5.5 inch)	**CQO:1012TW-1L**
• Thermowell std. duty with lagging 216 mm (8.5 inch)	**CQO:1012TW-2L**
• Thermowell std. duty with lagging 292 mm (11.5 inch)	**CQO:1012TW-3L**
Sensor cables for (Use "Sensor cable selection chart" to complete Article No. with ##)	
• IP65 (NEMA 4X) wall mount or IP 66 (NEMA 7) wall mount explosionproof	**0CK##**
• IP65 (NEMA 7) compact explosionproof	**2CK##**
• IP67 Weatherproof portable	**3CK##**
• IP40 (NEMA 1) Portable	**4CK##**
RTD cables for (Use "Sensor cable selection chart" to complete Article No. with ##)	
• All dedicated systems	**0CR##**
• IP67 Weatherproof portable	**3CR##**
• IP40 (NEMA 1) Portable	**4CR##**
Dedicated cable termination kits	
• Standard, plenum and armored sensor cable (NEMA 4X wall mount and NEMA 7 wall mount explosionproof)	**0CT01**
• Submersible sensor cable (NEMA 4X wall mount and NEMA 7 wall mount explosionproof)	**0CT11**
• Standard and plenum sensor cable (SITRANS FST020)	**1CT01**
• Standard, plenum and armored sensor cable (NEMA 7 compact explosionproof)	**2CT01**
• Submersible sensor cable (NEMA 7 compact explosionproof)	**2CT11**
• Clamp-on RTD cable termination kit for standard RTD	**0CT21**
• Clamp-on RTD cable termination kit for submersible RTD	**0CT31**
• Insert RTD cable termination kit	**0CT41**
Cable gland kit for IP65 NEMA 4X enclosures	**A5E32834162**

Selection and Ordering data	Article No.
Spare parts (Miscellaneous)	
SITRANS F US clamp-on	**7ME3960-■■■■■**
Ultrasonic couplants	
• Temporary water based for portable systems: 350 ml (12 oz): -34 ... +38 °C (-30 ... +100 °F)	**0UC10**
• Permanent synthetic polymer based: 90 ml (3 oz) -40 ... +190 °C (-40 ... +375 °F)	**0UC20**
• Permanent high temp fluoroether: -40 ... +230 °C (-40 ... +450 °F)	**0UC30**
• Permanent vulcanizing silicone rubber couplant: 90 ml (3 oz): -40 …+120 °C (-40 …+250 °F)	**CQO:CC112**
• Permanent high temp silicone grease: 12 ml (0.4 oz): -40 ... +230 °C (-40 ... +450 °F)	**CQO:CC117**
• Permanent high temp silicone grease: 150 ml (5 oz): -40 ... +230 °C (-40 ... +450 °F)	**CQO:CC117A**
• Couplant for submersible sensor applications	**CQO:CC120**
• Dry coupling pads (qty of 10): -34 to +200 °C (-30 to +392 °F)	**0UC40**
Pipe damping films for SITRANS FUG gas systems (For one pair of sensors)	
• B1, B2, B3, C1 and C2 sensors	**0DM10**
• D1 and D3 sensors	**0DM20**
• D2 sensor	**0DM30**
• D4 sensor	**0DM40**
Serial RS 232 Cables and I/O Adapters	
• RS 232 Cable for all dedicated meters except FST020	**0CS00**
• RS 232 Cable for IP66 weatherproof portable meter	**3CS00**
• RS 232 Cable for FUP1010 IP40 Portable meter and FST020	**4CS00**
• I/O adapter for IP66 Weatherproof portable meter	**3AD00**
Universal Sensor Test Blocks	
• Test block for size A and B universal sensors	**0TB10**
• Test block for size C and D universal sensors	**0TB20**
Field Manuals	
• CD with documentation for SITRANS F US Clamp-on ultrasonic flowmeters (English)	**A5E02830664-03**

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Accessories/Spare parts

Sensor cable selection chart (Dedicated, pair)

Sensor cable codes for length and type options				
Cable length m (ft)	Standard	Submersible	Plenum	Armored
	-40 ... +80 °C (-40 ... +176 °F)	-40 ... +80 °C (-40 ... +176 °F)	-40 ...+200 °C (-40 ... +392 °F)	-40 ... +80 °C (-40 ... +176 °F)
	Order code			
6 (20)	K01	K11	K21	K31
15 (50)	K02	K12	K22	K32
30 (100)	K03	K13	K23	K33
46 (150)	K04	K14	K24	K34
61 (200)	K05	K15	K25	K35
91 (300)	K06	K16	K26	K36

Sensor cable selection chart (SITRANS FUP1010, FUE1010 Portable, pair)

Sensor cable codes for length and type options		
Cable length m (ft)	Standard -40 ... + 80 °C (-40 ... +176 °F)	Plenum -40 ... + 200 °C (-40 ... +392 °F)
	Order Code	
6 (20)	K01	K21
15 (50)	K02	K22
30 (100)	K03	K23

RTD cable selection chart (Dedicated, each)

RTD cable codes for length and type				
Cable length m (ft)	Standard	Submersible	for insert RTD	for submersible insert RTD
	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)
	Order code			
6 (20)	R01	R11	R21	R31
15 (50)	R02	R12	R22	R32
30 (100)	R03	R13	R23	R33
46 (150)	R04	R14	R24	R34
61 (200)	R05	R15	R25	R35
91 (300)	R06	R16	R26	R36

RTD cable selection chart

RTD cable codes for length and type options		
Cable length m (ft)	IP67, FUP1010 -40 ... + 200 °C (-40 ... +392 °F)	IP40, FUE1010 -40 ... + 200 °C (-40 ... +392 °F)
	Order Code	
6 (20)	R11	R01
15 (50)	R12	R02
30 (100)	R13	R03

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Overview

SITRANS F X vortex flowmeters provide accurate volumetric and mass flow measurement of steam, gases and liquids as an all-in-one solution with integrated temperature and pressure compensation.

Benefits

- 2-wire technology with HART communication
- Integrated temperature compensation for saturated steam as standard feature
- Integrated temperature and pressure compensation enabling direct measurement of mass, standard volume flow rate and energy
- One instrument for measuring pressure, temperature and flow. No additional installation of pressure and temperature sensors
- Maximum process reliability thanks to Intelligent Signal Processing (ISP) - stable readings, free of external disturbances
- Fully welded stainless steel construction with high corrosion, pressure and temperature resistance
- Maintenance-free design
- Ready to use due to plug & play feature
- Minimal pressure drop
- Compact or remote design
- Free Air Delivery (FAD) measurement of a compressor

Application

The SITRANS FX300 is a flowmeter in a single or dual transmitter version, suitable for measuring industrial steam, gases, as well as conductive and non-conductive liquids, e.g. steam (saturated steam, superheated steam), industrial gases (compressed air, nitrogen, liquefied gases, flue gases), and conductive and non-conductive liquids (demineralized water, boiler feed water, solvents, heat transfer oil).

The main applications of SITRANS FX300 can be found in the following sectors:

- Chemical
- Petrochemical
- Oil & Gas
- Power plants
  - Air
  - Heating
  - Cooling
  - Chilling
- Food & beverage
  - Pharmaceutical
  - Sugar refineries
  - Dairies
  - Breweries
  - Production of soft drinks
- Pulp & paper
- Water & waste water

System Overview

Version	Flange	Sandwich	Dual transmitter
Compact			
Remote			

Design

SITRANS FX300 vortex flowmeters are available in the following variants:

SITRANS FX300 Single transmitter

The single transmitter variant exists in flange or sandwich design. In flange design the SITRANS FX300 offers a sensor with integrated nominal diameter reduction up to two nominal diameter sizes. That ensures best results in accuracy and optimal measuring ranges even in pipelines with large diameters, designed for low pressure loss. By forgoing complex pipeline reduction installations, space and cost saving installations can be realized. At the same time the number of potential leakages is reduced to a minimum.

The flowmeters in sandwich design will be supplied with additional optimised centring rings. With installation of the centring rings the SITRANS FX300 can be aligned centrically and eliminates any offset between the sensor and the pipeline.

The SITRANS FX300 is also available as a remote version. This feature allows separating the transmitter from the sensor up to a distance of 15m (49 ft). The remote mounted transmitter allows easy operation and optimal readability.

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SITRANS FX300

The following configurations can be selected for the single transmitter variant:

- Basic version
  Suitable for liquids and gases, integrated temperature compensation included as standard for saturated steam
- With integrated pressure compensation
  Version with integrated temperature and pressure compensation for gases, wet gases, gas mixtures or steam (energy measurement optional)
- With integrated pressure compensation and isolation valve
  Allowing the pressure sensor to be shut off for the purpose of pressure and leak testing of the pipeline or for being exchanged without interrupting the process.
- Remote version
  With this version transmitter and sensor are locally seperated. In addition, it offers the same the features as the compact version (integrated temperature and pressure compensation, isolation valve).

SITRANS FX300 Dual transmitter

This is a genuine redundant system with two independent sensors and transmitters providing twofold functional reliability and availability of the measurement. This variant is optimally suited for measurements in multi-product pipelines.

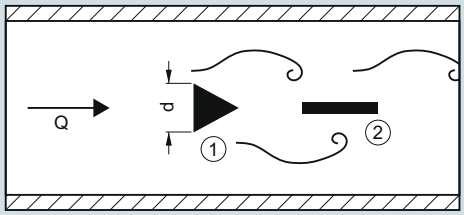
The dual transmitter version is available as:

- Basic version
  Suitable for liquids and gases, temperature compensation integrated as standard for saturated steam

Function

Operating Principle

SITRANS F X vortex flowmeters measure flow rate by detecting the frequency at which alternating vortices are shed from a bluff body inserted into the flow stream. This principle of measurement is derived from the Karman phenomenon of vortex shedding. The frequency of the alternating vortices is proportional to the flow rate.
The passage of a vortex causes a slight stress on a pick-up sensor placed downstream of the bluff body. The stress is detected by piezo-electric crystals placed inside the pick-up sensor.



① = Bluff Body, ② = Pick-up

The flowmeter calculates the flow velocity using the following equation:

$Q = A \cdot V = A \cdot d / St \cdot f = 101.93 \cdot f / K$ [m^3/h]

Where:

Q = flow rate [m^3/h]
f = vortex shedding frequency [Hz]
K = calibration constant [pulses/m^3]
d = width of the bluff body [m]
St = Strouhal Number
A = cross-section area [m^2]
V = flow velocity [m/s]

Requirements

In order to generate the vortex streets, the medium must have a minimum velocity:

- For steam and gases, the flow velocity must be 2 to 80 m/s (6.6 to 262 ft/s)
- For liquids the flow velocity must be 0.4 to 10 m/s (1.3 to 32.8 ft/s)

Technical specifications

Input	
Measuring range limits	See „Dimensional Drawings“
Media pressure	1 ... 100 bar (14.5 ... 1450 psi) (Higher pressures on request)
Output	
Current output	
• Measuring range	4 … 20 mA
• Over range	20.8 mA ± 1 % (105 % ± 1 %)
• Load	
- min.	100 Ω
- max.	$R_{max} = (U_{Power\ Supply} - 14\ V)/22\ mA$
• Error signal	NAMUR NE 43
• Maximum output	22 mA (112.5 %)
• Multidrop mode	4 mA
Digital output	
• Communication	HART
• Physical layer	FSK
• Device category	Transmitter
Pulse output	
Passive pulse output, setting pulse value (meter factor) for totalized flow or heat quantity (energy) with option Y47 (e.g.: 1 pulse/kg or 1 pulse/kWh)	
• Pulse frequency	Max. 0.5 Hz
• Power supply	Min. 24 V DC as NAMUR or
• Non-Ex version	open < 1 mA, max. 36 V, closed 100 mA, $U < 2$ V
• Ex version	open < 1 mA, max. 30 V, closed 100 mA, $U < 2$ V
Accuracy	
Standard version	
• For liquids	
- Re ≥ 20 000	± 0.75 %
• For steam and gases	
- Re ≥ 20 000	± 1 %
• For steam, gases and liquids	
- 10 000 < Re < 20 000	± 2 %
Pressure and temperature-compensated version	
• For liquids	
- 10 000 < Re < 20 000	± 2 %
- Re ≥ 20 000	± 0.75 %
• For gases and steam	
- 10 000 < Re < 20 000	± 2.5 %
- Re ≥ 20 000	± 1.5 %
Repeatability	± 0.1 %
Installation conditions	
(At different conditions, e.g. installation after control valve, bends or reductions, please refer to the operating instructions.)	
• Inlet run	≥ 20 x DN
• Outlet run	≥ 5 x DN

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Software	
Uncompensated for liquids and gases, density-compensated by temperature for saturated steam	Order option 1
Density-compensated by temperature and pressure for superheated steam	Order option 4
Gross heat meter	
When the thermal energy of steam is to be measured	Order option 5
Following information is required at option Y51 to Y56	• Y51 Variable current output: Flow rate, power • Y52 Power unit Select one of the following units: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom) • Y53 Fullscale value power • Y54 Variable pulse output: Totalized flow, energy • Y55 Totalizer on/off • Y56 Energy unit Select one of the following units: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special (custom).
Density compensated by temperature and pressure for gases, wet gases	Order option 7
Wet gases	Select Y49 and enter relative humidity of process medium in %
FAD - Free Air Delivery	
When the delivered air of a compressor is to be measured	Order option 8
In Y81 to Y87 add information regarding:	• Y81 Inlet suction temperature • Y82 Atmospheric pressure • Y83 Pressure drop at inlet suction filter • Y84 Inlet relative humidity • Y85 Actual compressor rotation (rpm) • Y86 Rated compressor rotation (rpm) • Y87 Relative humidity at compressor output
Mixed gases	When fluid is a gas mixture, specifiy the single gas components and their amount/concentration in %.
Rated operation conditions	
Ambient temperature	
• Non-Ex version	-40 … +85 °C (-40 … +185 °F)
• Ex version	-40 … +65 °C (-40 … +149 °F)
Storage temperature	-50 … +85 °C (-58 … +185 °F)
Media temperature	-40 … +240 °C (-40 … +464 °F)
Density	Taken into consideration when dimensioning
Viscosity	<10 cP
Reynolds number	10 000 … 2 300 000
Media pressure limit	Max. 100 bar (1450 psi) Higher pressure on request (contact your local Siemens representative)

Design	
Material	
• Sensor/Pick-up	AISI 316L (1.4404)/ AISI 316L (1.4435) Hastelloy C22/2.4602 available on request (contact your local Siemens representative)
• Transmitter housing	Aluminum
• Sensor gaskets (Pick-up/Pressure sensor)	AISI 316L (1.4435) / FPM or FFKM FPM (Viton) for steam and non-aggressive gases. FFKM (Kalrez) for chlorine and other aggressive gases. (The meter is fitted with FPM/FFKM gasket only when configured with pressure sensor)
Process connections	Flange norm EN 1092-1 form B1/B2 or ANSI B16.5 RF. Other flanges on request (contact your local Siemens representative)
• Flange version	DN 15 … 300 (½ … 12")
• Sandwich version	DN 15 … 100 (½ … 4")
Degree of protection	IP66/IP67
Dimensions and weights	See “Dimensional Drawings“
Display and operating interface	
Local display	2 lines, 10 characters per line
Languages	German, English, French
Power supply	
• Standard version	14 … 36 V DC
• Ex version	14 … 30 V DC
Certificates and approvals	
Explosion protection	
• ATEX	II 2G EEx d ia [ia] IIC T6
• FM US/C	Class I, II, III, Div. 1 and 2
Calibration	All flowmeters will be delivered with a 3 point calibration certificate
Material Certificate	Certificate of compliance, pressure test, material certificate, material in acc. of NACE and PMI of pressure bearing metal parts.
Cleaning	Choose Cleaning Class1 when fluid is oxygen or contains chloride.
Certificates	X-ray and dye penetration test on pressure bearing weldings

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SITRANS FX300

Valid combinations of sensor/connections size with flange norm/nominal pressure are shown in the following table.

Sensor size	Connection size	EN 1092-1, Form B1/B2, PN 10	EN 1092-1, Form B1/B2, PN 16	EN 1092-1, Form B1/B2, PN 25	EN 1092-1, Form B1/B2, PN 40	EN 1092-1, Form B1/B2, PN 63	EN 1092-1, Form B1/B2, PN 100	ANSI B16.5, class 150	ANSI B16.5, class 300	ANSI B16.5, class 600
SITRANS FX Flanged - Single transmitter (7ME2600-...)										
DN 15	DN 15	-	-	-	●	-	●	●	●	●
	DN 25	-	-	-	●	-	●	●	●	●
	DN 40	-	-	-	●	-	●	●	●	●
DN 25	DN 25	-	-	-	●	-	●	●	●	●
	DN 40	-	-	-	●	-	●	●	●	●
	DN 50	-	●	-	●	●	●	●	●	●
DN 40	DN 40	-	-	-	●	-	●	●	●	●
	DN 50	-	●	-	●	●	●	●	●	●
	DN 80	-	●	-	●	●	●	●	●	●
DN 50	DN 50	-	●	-	●	●	●	●	●	●
	DN 80	-	●	-	●	●	●	●	●	●
	DN 100	-	●	-	●	●	●	●	●	●
DN 80	DN 80	-	●	-	●	●	●	●	●	●
	DN 100	-	●	-	●	●	●	●	●	●
	DN 150	-	●	-	●	●	●	●	●	●
DN 100	DN 100	-	●	-	●	●	●	●	●	●
	DN 150	-	●	-	●	●	●	●	●	●
	DN 200	●	●	●	●	-	-	●	●	-
DN 150	DN 150	-	●	-	●	●	●	●	●	●
	DN 200	●	●	●	●	-	-	●	●	-
	DN 250	●	●	●	●	-	-	●	●	-
DN 200	DN 200	●	●	●	●	-	-	●	●	-
	DN 250	●	●	●	●	-	-	●	●	-
	DN 300	●	●	●	●	-	-	●	●	-
DN 250	DN 250	●	●	●	●	-	-	●	●	-
	DN 300	●	●	●	●	-	-	●	●	-
DN 300	DN 300	●	●	●	●	-	-	●	●	-

● available
- not available

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Selection and Ordering data		Article No.	Ord. code
SITRANS FX300 Flanged Single transmitter and T_{max} = 240 °C (464 °F)	↗	**7ME2600 -**	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size	**Connection size**		
DN 15 (½")	DN 15 (½")	**1A**	
	DN 25 (1")	**1B**	
	DN 40 (1½")	**1C**	
DN 25 (1")	DN 25 (1")	**2B**	
	DN 40 (1½")	**2C**	
	DN 50 (2")	**2D**	
DN 40 (1½")	DN 40 (1½")	**2K**	
	DN 50 (2")	**2L**	
	DN 80 (3")	**2M**	
DN 50 (2")	DN 50 (2")	**2R**	
	DN 80 (3")	**2S**	
	DN 100 (4")	**2T**	
DN 80 (3")	DN 80 (3")	**3L**	
	DN 100 (4")	**3M**	
	DN 150 (6")	**3R**	
DN 100 (4")	DN 100 (4")	**3S**	
	DN 150 (6")	**3T**	
	DN 200 (8")	**3Q**	
DN 150 (6")	DN 150 (6")	**4M**	
	DN 200 (8")	**4P**	
	DN 250 (10")	**4Q**	
DN 200 (8")	DN 200 (8")	**4T**	
	DN 250 (10")	**4U**	
	DN 300 (12")	**4V**	
DN 250 (10")	DN 250 (10")	**4W**	
	DN 300 (12")	**4Y**	
DN 300 (12")	DN 300 (12")	**5E**	
Flange norm and nominal pressure			
Form B1/B2	**EN 1092-1**		
PN 10	DN 200 ... 300	**A**	
PN 16	DN 50 ... 300	**B**	
PN 25	DN 200 ... 300	**C**	
PN 40	DN 15 ... 300	**D**	
PN 63	DN 50 ... 150	**E**	
PN 100	DN 15 ... 150	**F**	
RF	**ANSI B16.5**		
class 150	½ ... 12"	**J**	
class 300	½ ... 12"	**K**	
class 600	½ ... 6"	**L**	
Sensor material/Gasket			
St. steel AISI 316L (1.4404)/AISI 316L (1.4435)/ FPM		**1**	
St. steel AISI 316L (1.4404)/AISI 316L (1.4435)/ FFKM		**5**	
Transmitter design			
Compact version - no cable		**1**	
Remote version:			
5 m (16.4 ft)		**2**	
10 m (32.8 ft)		**3**	
15 m (49.2 ft)		**4**	

Selection and Ordering data	Article No.	Ord. code
SITRANS FX300 Flanged Single transmitter and T_{max} = 240 °C (464 °F)	**7ME2600 -**	
Approval and cable gland		
Non-Ex, M20 x 1.5	**1**	
Non-Ex, ½" NPT	**2**	
FM approval Class 1 Div. 2, M20 x 1.5	**3**	
ATEX, M20 x 1.5	**4**	
ATEX, ½" NPT	**5**	
FM approval Class 1 Div. 1, M20 x 1.5	**6**	
FM approval Class 1 Div. 1, 1/2" NPT	**7**	
FM approval Class 1 Div. 2, 1/2" NPT	**8**	
Further approvals and cable glands		
IEC Ex with M20 x 1.5	**9**	**N0A**
IEC Ex with ½" NPT	**9**	**N0B**
Transmitter, display and communication		
With display, HART	**A**	
Pressure sensor and isolation valve		
Without pressure sensor	**A**	
With pressure sensor, range:		
4 bar (58 psi)	**B**	
6 bar (87 psi)	**D**	
10 bar (145 psi)	**E**	
16 bar (232 psi)	**G**	
25 bar (363 psi)	**H**	
40 bar (580 psi)	**K**	
60 bar (870 psi)	**L**	
100 bar (1450 psi)	**N**	
With isolation valve and pressure sensor, range:		
4 bar (58 psi)	**P**	
6 bar (87 psi)	**Q**	
10 bar (145 psi)	**R**	
16 bar (232 psi)	**S**	
25 bar (363 psi)	**U**	
40 bar (580 psi)	**V**	
60 bar (870 psi)	**W**	
100 bar (1450 psi)	**Y**	
Software		
Uncompensated for liquids and gases, density compensated by temperature for saturated steam	**1**	
Density compensation for superheated steam	**4**	
Density compensated by temperature and pressure for superheated steam, gross heat meter - setting of energy metering at option Y51 ... Y56	**5**	
Density compensation for gases, wet gases and mixed gases - setting of relative humidity at option Y49	**7**	
Density compensation for gases, wet gases and mixed gases, Free air delivery (FAD) - setting of FAD at option Y81 ... Y87 and relative humidity at option Y49	**8**	

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Selection and Ordering data	Order code
Additional information Please add **"-Z"** to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.	
Input process data	
Medium: Specify medium (Liquid, gas, steam or customer-specific)	**Y40**
Temperature: Specify operating temperature with unit	**Y41**
Pressure: Specify operating pressure with unit	**Y42**
Density (only for customer-specified medium): Specify density with unit	**Y43**
Viscosity (only for customer-specified medium): Specify viscosity with unit	**Y44**
Flow rate: Specify max. flow rate with units	**Y45**
Setting of pulse output: Specify pulse value (meter factor) for totalized flow or energy (1 pulse/unit)	**Y47**
Relative humidity of process medium in %	**Y49**
Settings of gross heat	
Variable current output: Flow rate, power	**Y51**
Power unit (specify: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom))	**Y52**
Fullscale value power	**Y53**
Variable pulse output: Totalized flow, energy	**Y54**
Totalizer on/off	**Y55**
Energy unit (specify: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special (custom))	**Y56**
Settings of FAD	
Inlet suction temperature[1)]	**Y81**
Atmospheric pressure[1)]	**Y82**
Pressure drop at inlet suction filter[2)]	**Y83**
Inlet relative humidity[1)]	**Y84**
Actual compressor rotation (rpm)[2)]	**Y85**
Rated compressor rotation (rpm)[2)]	**Y86**
Relative humidity at compressor outlet[2)]	**Y87**

1) Required information from customer.
2) Required information from compressor manufacturer (data sheet).

Operating instructions

Description	Article No.
English	**A5E2100423**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Selection and Ordering data	Order code
Further designs Please add **"-Z"** to Article No. and specify Order code.	
Converter housing material	
Aluminum for increased requirement, color: petrol green	**A10**
Material certificate	
Certificate of compliance EN 10204-2.1	**C10**
Pressure test + 3.1 accordance EN 10204	**C11**
Material certificate of pressure bearing parts + certificate 3.1	**C12**
Material in accordance with NACE MR 0175-01	**C13**
PMI of pressure bearing metal parts + certificate 3.1	**C14**
Material certificate of pressure bearing parts + PMI + certificate 3.1	**C15**
Calibration certificate FX300 As standard the flow device has a 3-point calibration certificate.	
5-point calibration certificate	**D11**
Hardness test	
Hardness test on pressure bearing parts + certificate 3.1	**H30**
Cleaning	
Cleaning class 1	**K46**
Cleaning class 1 + certificate 3.1 acc. EN 10204	**K48**
Certificates	
X-ray test on pressure bearing weldings	**M56**
Dye penetration test on pressure bearing weldings	**M58**
Tag name plate	
Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)	**Y17**
Stainless steel tag with 2.5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)	**Y18**

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Selection and Ordering data		Article No.	Ord. code
SITRANS FX300 Sandwich Single transmitter and T_{max} = 240 °C (464 °F)		7ME2700 -	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size	**Connection size**		
DN 15 (½")	DN 15 (½")	1A	
DN 25 (1")	DN 25 (1")	2B	
DN 40 (1½")	DN 40 (1½")	2K	
DN 50 (2")	DN 50 (2")	2R	
DN 80 (3")	DN 80 (3")	3L	
DN 100 (4")	DN 100 (4")	3S	
Nominal pressure			
EN			
PN 16	DN 50 ... 100	B	
PN 40	DN 15 ... 100	D	
PN 63	DN 50 ... 100	E	
PN 100	DN 15 ... 100	F	
ANSI			
150 lb	½ ... 4"	J	
300 lb	½ ... 4"	K	
600 lb	½ ... 4"	L	
Sensor material/Gasket			
St. steel AISI 316L (1.4404)/AISI 316L (1.4435)/FPM		1	
St. steel AISI 316L (1.4404)/AISI 316L (1.4435)/FFKM		5	
Transmitter design			
Compact version - no cable		1	
Remote version:			
5 m (16.4 ft)		2	
10 m (32.8 ft)		3	
15 m (49.2 ft)		4	
Approval and cable gland			
Non-Ex, M20 x 1.5		1	
Non-Ex, ½" NPT		2	
FM approval Class 1 Div. 2, M20 x 1.5		3	
ATEX, M20 x 1.5		4	
ATEX, ½" NPT		5	
FM approval Class 1 Div. 1, M20 x 1.5		6	
FM approval Class 1 Div. 1, 1/2" NPT		7	
FM approval Class 1 Div. 2, 1/2" NPT		8	
Further approvals and cable glands			
IEC Ex with M20 x 1.5		9	N0A
IEC Ex with ½" NPT		9	N0B
Transmitter, display and communication			
With display, HART		A	

Selection and Ordering data	Article No.	Ord. code
SITRANS FX300 Sandwich Single transmitter and T_{max} = 240 °C (464 °F)	7ME2700 -	
Pressure sensor and isolation valve		
Without pressure sensor		A
With pressure sensor, range:		
4 bar (58 psi)		B
6 bar (87 psi)		D
10 bar (145 psi)		E
16 bar (232 psi)		G
25 bar (363 psi)		H
40 bar (580 psi)		K
60 bar (870 psi)		L
100 bar (1450 psi)		N
With isolation valve and pressure sensor, range:		
4 bar (58 psi)		P
6 bar (87 psi)		Q
10 bar (145 psi)		R
16 bar (232 psi)		S
25 bar (363 psi)		U
40 bar (580 psi)		V
60 bar (870 psi)		W
100 bar (1450 psi)		Y
Software		
Uncompensated for liquids and gases, density compensated by temperature for saturated steam		1
Density compensation for superheated steam		4
Density compensated by temperature and pressure for superheated steam, gross heat meter - setting of energy metering at option Y51 ... Y56		5
Density compensation for gases, wet gases and mixed gases - setting of relative humidity at option Y49		7
Density compensation for gases, wet gases and mixed gases, Free air delivery (FAD) - setting of FAD at option Y81 ... Y87 and relative humidity at option Y49		8

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Selection and Ordering data	Order code
Additional information Please add "**-Z**" to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.	
Input process data	
Medium: Specify medium (Liquid, gas, steam or customer-specific)	**Y40**
Temperature: Specify operating temperature with unit	**Y41**
Pressure: Specify operating pressure with unit	**Y42**
Density (only for customer-specified medium): Specify density with unit	**Y43**
Viscosity (only for customer-specified medium): Specify viscosity with unit	**Y44**
Flow rate: Specify max. flow rate with units	**Y45**
Setting of pulse output: Specify pulse value (meter factor) for totalized flow or energy (1 pulse/unit)	**Y47**
Relative humidity of process medium in %	**Y49**
Settings of gross heat	
Variable current output: Flow rate, power	**Y51**
Power unit (specify: kJ/h, MJ/h, GJ/h, Btu/h, kcal/h, kW, MW or special (custom))	**Y52**
Fullscale value power	**Y53**
Variable pulse output: Totalized flow, energy	**Y54**
Totalizer on/off	**Y55**
Energy unit (specify: kJ, MJ, GJ, Btu th, kcal, kWh, MWh or special (custom))	**Y56**
Settings of FAD	
Inlet suction temperature[1)]	**Y81**
Atmospheric pressure[1)]	**Y82**
Pressure drop at inlet suction filter[2)]	**Y83**
Inlet relative humidity[1)]	**Y84**
Actual compressor rotation (rpm)[2)]	**Y85**
Rated compressor rotation (rpm)[2)]	**Y86**
Relative humidity at compressor outlet[2)]	**Y87**

1) Required information from customer.
2) Required information from compressor manufacturer (data sheet).

Operating instructions

Description	Article No.
English	**A5E2100423**

This device is shipped with a Quick Start guide and a CD containing further SITRANS F literature.

All literature is also available for free at:
http://www.siemens.com/flowdocumentation

Selection and Ordering data	Order code
Further designs Please add **"-Z"** to Article No. and specify Order code.	
Converter housing material	
Aluminum for increased requirement, color: petrol green	**A10**
Material certificate	
Certificate of compliance EN 10204-2.1	**C10**
Pressure test + 3.1 accordance EN 10204	**C11**
Material certificate of pressure bearing parts + certificate 3.1	**C12**
Material in accordance with NACE MR 0175-01	**C13**
PMI of pressure bearing metal parts + certificate 3.1	**C14**
Material certificate of pressure bearing parts + PMI + certificate 3.1	**C15**
Calibration certificate FX300 As standard the flow device has a 3-point calibration certificate.	
5-point calibration certificate	**D11**
Hardness test	
Hardness test on pressure bearing parts + certificate 3.1	**H30**
Cleaning	
Cleaning class 1	**K46**
Cleaning class 1 + certificate 3.1 acc. EN 10204	**K48**
Certificates	
X-ray test on pressure bearing weldings	**M56**
Dye penetration test on pressure bearing weldings	**M58**
Tag name plate	
Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)	**Y17**
Stainless steel tag with 2.5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)	**Y18**

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Selection and Ordering data		Article No.	Ord. code
SITRANS FX300 Flanged Dual transmitter and T_{max} = 240 °C (464 °F)		7ME2800 -	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Sensor size	**Connection size**		
DN 40 (1½")	DN 40 (1½")	2K	
DN 50 (2")	DN 50 (2")	2R	
DN 80 (3")	DN 80 (3")	3L	
DN 100 (4")	DN 100 (4")	3S	
DN 150 (6")	DN 150 (6")	4M	
DN 200 (8")	DN 200 (8")	4T	
DN 250 (10")	DN 250 (10")	4W	
DN 300 (12")	DN 300 (12")	5E	
Flange norm and nominal pressure			
Form B1/B2	**EN 1092-1**		
PN 10	DN 200 ... 300	A	
PN 16	DN 50 ... 300	B	
PN 25	DN 200 ... 300	C	
PN 40	DN 40 ... 300	D	
PN 63	DN 50 ... 150	E	
PN 100	DN 40 ... 150	F	
RF	**ANSI B16.5**		
150 lb	1½ ... 12"	J	
300 lb	1½ ... 12"	K	
600 lb	1½ ... 6"	L	
Sensor material/Gasket			
Stainless steel AISI 316L (1.4404)/ AISI 316L (1.4435)/FPM		1	
Stainless steel AISI 316L (1.4404)/ AISI 316L (1.4435)/FFKM		5	
Transmitter design			
Compact version - no cable		1	
Remote version:			
5 m (16.4 ft)		2	
10 m (32.8 ft)		3	
15 m (49.2 ft)		4	
Approval and cable gland			
Non-Ex, M20 x 1.5		1	
Non-Ex, ½" NPT		2	
FM approval Class 1 Div. 2, M20 x 1.5		3	
ATEX, M20 x 1.5		4	
ATEX, ½" NPT		5	
FM approval Class 1 Div. 1, M20 x 1.5		6	
FM approval Class 1 Div. 1, 1/2" NPT		7	
FM approval Class 1 Div. 2, 1/2" NPT		8	
Further approvals and cable glands			
IEC Ex with M20 x 1.5		9	N0A
IEC Ex with ½" NPT		9	N0B
Transmitter, display and communication			
With display, HART		A	
Pressure sensor and isolation valve			
Without pressure sensor		A	
Software			
Uncompensated for liquids and gases, density-compensated by temperature for saturated steam		1	

Selection and Ordering data	Order code
Additional information Please add "**-Z**" to Article No. and specify as minimum Order code Y40, Y41, Y42 and Y45 and plain text.	
Input process data	
Specify medium (Liquid, gas, steam or customer-specific)	**Y40**
Temperature: Specify operating temperature with unit	**Y41**
Pressure: Specify operating pressure with unit	**Y42**
Density (only for customer-specified medium): Specify density with unit	**Y43**
Viscosity (only for customer-specified medium): Specify viscosity with unit	**Y44**
Flow rate: Specify max. flow rate with units	**Y45**
Setting of pulse output: Specify pulse value (meter factor) for totalized flow (1 pulse/unit)	**Y47**
Relative humidity of process medium in %	**Y49**

Operating instructions for SITRANS FX300

Description	Article No.
English	**A5E2100423**

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http://www.siemens.com/flowdocumentation

Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code.	
Converter housing material	
Aluminum for increased requirement, color: petrol green	**A10**
Material certificate	
Certificate of compliance EN 10204-2.1	**C10**
Pressure test + 3.1 accordance EN 10204	**C11**
Material certificate of pressure bearing parts + certificate 3.1	**C12**
Material in accordance with NACE MR 0175-01	**C13**
PMI of pressure bearing metal parts + certificate 3.1	**C14**
Material certificate of pressure bearing parts + PMI + certificate 3.1	**C15**
Calibration certificate FX300 As standard the flow device has a 3-point calibration certificate.	
5-point calibration certificate	**D11**
Hardness test	
Hardness test on pressure bearing parts + certificate 3.1	**H30**
Cleaning	
Cleaning class 1	**K46**
Cleaning class 1 + certificate 3.1 acc. EN 10204	**K48**
Certificates	
X-ray test on pressure bearing weldings	**M56**
Dye penetration test on pressure bearing weldings	**M58**
Tag name plate	
Stainless steel tag with 3 mm characters, max. 2 x 8 characters (40 x 20 mm, add plain text)	**Y17**
Stainless steel tag with 2.5 mm characters, max. 8 x 40 characters (120 x 46 mm, add plain text)	**Y18**

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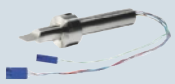
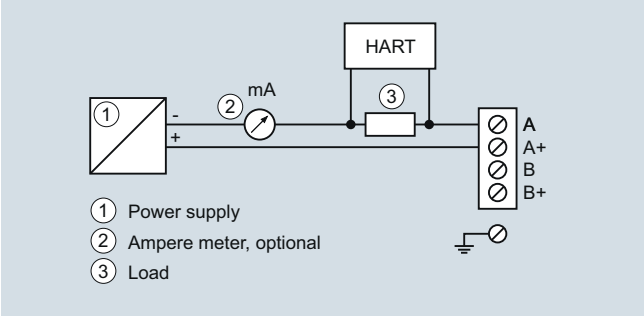
SITRANS FX300 spare parts

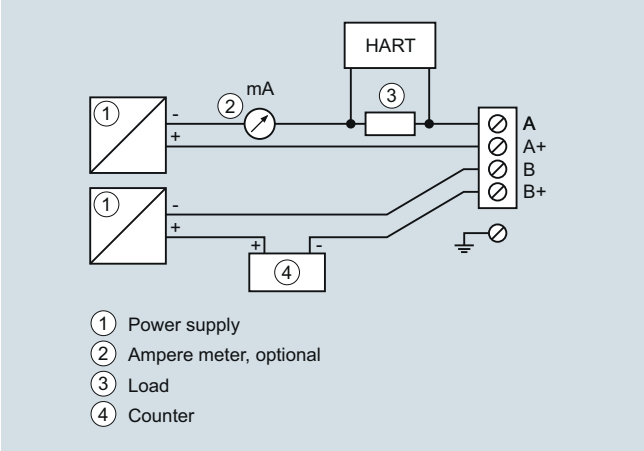
Description	Article No.	
Seal disc 21.8-12-0.1	**A5E02181439**	
O-ring pickup	**A5E02181464**	
O-ring for pressure screw 17.13 x 2.62-FPM-70	**A5E02181488**	
Cover gasket O-Ring 91.67 x 3.5	**A5E02181492**	
Converter housing gasket 59.35.5-2-N	**A5E02181495**	
O-ring DIN3771-20 x 1-FPM for sensor	**A5E02181515**	
O-ring 10 x 2-NBR for lead-through	**A5E02181525**	
DUBOX plug, 5-pole-RM2	**A5E02181527**	
Electronic		
• Basic D-HART	**A5E02181531**	
• Steam D-HART	**A5E02181541**	
• Gas D-HART	**A5E02181544**	
Display	**A5E02181558**	
Cable feedthrough 10-pole (non-Ex). O-ring for cable feedthrough 21.89 x 2.62 10-pole plug	**A5E02181562**	
Sensor replacement (incl. Seal disc, pickup, O-rings for pickup, and pressure screw		
• DN 15 (incl. ½" socket)	**A5E02181087**	
• DN 25 (incl. 1" socket)	**A5E02181116**	
• DN 40 ... 100	**A5E02181152**	
• DN 150 ... 300	**A5E02275105**	
Pressure sensor replacement (Incl. pressure sensor, DUBOX plug, 2 O-rings and calibration certificate)		
• 4 bar (58 psi)	**A5E02181157**	
• 6 bar (87 psi)	**A5E02181175**	
• 10 bar (145 psi)	**A5E02181180**	
• 16 bar (232 psi)	**A5E02181221**	
• 25 bar (363 psi)	**A5E02181307**	
• 40 bar (580 psi)	**A5E02181316**	
• 60 bar (870 psi)	**A5E02181322**	
• 100 bar (1450 psi)	**A5E02181437**	

Description	Article No.	
Service Toolbox for programming software (basic, steam and gas); for changing settings and diagnostics Note: Dedicated service training is required. Please contact Customer Support.	**A5E02375819**	

Schematics



Connection power supply and HART communication



Connection pulse output

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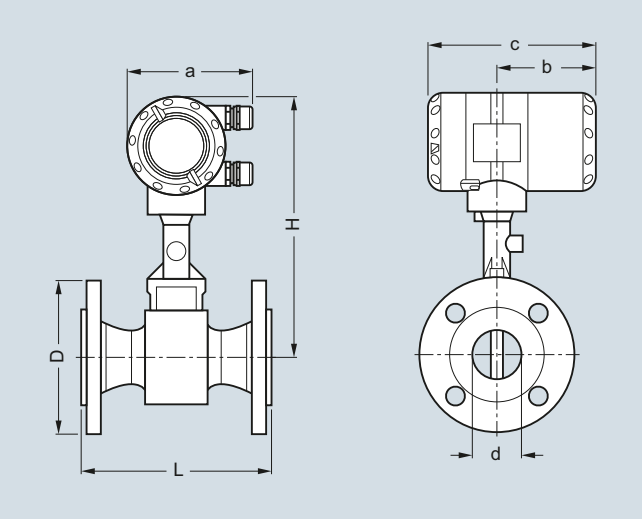
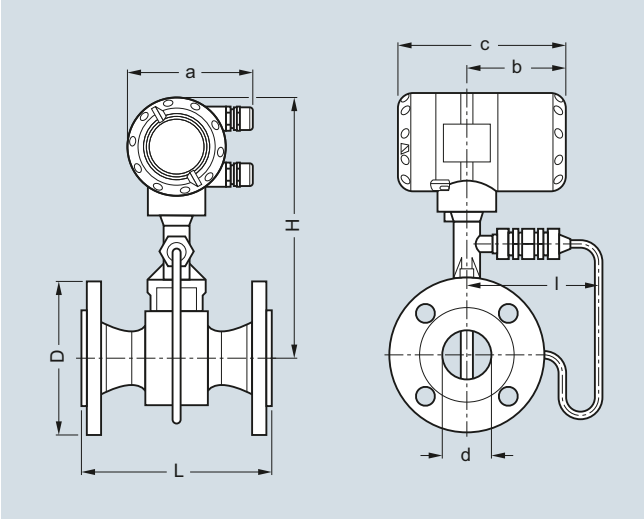
Dimensional drawings

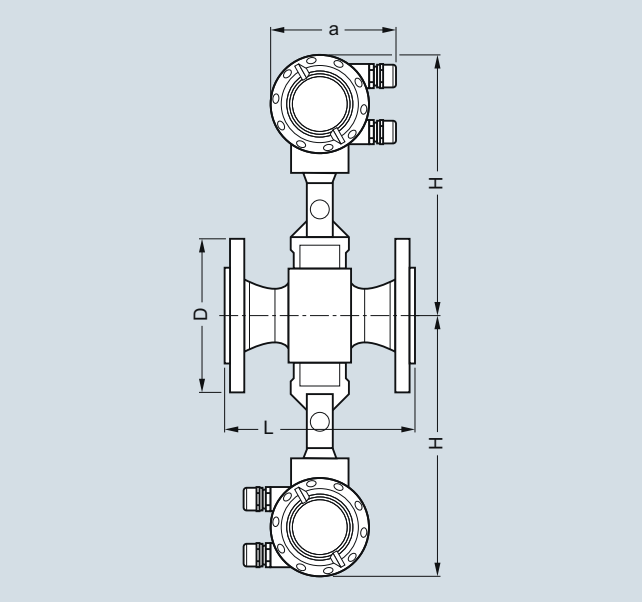
Compact version



Flange version



Flange version with pressure sensor



Flange version, dual converter

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SITRANS FX300

Flange version EN1092-1

Size	Pressure rating	Dimensions [mm (inch)] a = 135 (5.32), b = 108 (4.26), c = 184 (7.25)							Weight [kg (lb)][1]	
DN	PN	d	d FR[2]	d F2R[3]	D	L	H	l	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
15	40	17.3 (0.68)	-	-	95 (3.74)	200 (7.87)	315 (12.40)	144 (5.67)	5.5 (12.13)	6.1 (13.45)
15	100	17.3 (0.68)	-	-	105 (4.13)	200 (7.87)	315 (12.40)	144 (5.67)	6.5 (14.33)	7.1 (15.65)
25	40	28.5 (1.12)	17.3 (0.68)	-	115 (4.53)	200 (7.87)	315 (12.40)	144 (5.67)	7.3 (16.09)	7.9 (17.42)
25	100	28.5 (1.12)	17.3 (0.68)	-	140 (5.51)	200 (7.87)	315 (12.40)	144 (5.67)	9.3 (20.50)	9.9 (21.83)
40	40	43.1 (1.70)	28.5 (1.12)	17.3 (0.68)	150 (5.91)	200 (7.87)	320 (12.60)	144 (5.67)	10.2 (22.49)	10.8 (23.81)
40	100	42.5 (1.67)	28.5 (1.12)	17.3 (0.68)	170 (6.69)	200 (7.87)	320 (12.60)	144 (5.67)	14.2 (31.31)	14.8 (32.63)
50	16	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	12.1 (26.68)	12.7 (28.00)
50	40	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	12.3 (27.12)	12.9 (28.44)
50	63	54.5 (2.15)	42.5 (1.67)	28.5 (1.12)	180 (7.09)	200 (7.87)	325 (12.80)	144 (5.67)	16.3 (35.94)	16.9 (37.26)
50	100	53.9 (2.12)	42.5 (1.67)	28.5 (1.12)	195 (7.68)	200 (7.87)	325 (12.80)	144 (5.67)	17.8 (39.24)	18.4 (40.57)
80	16	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	340 (13.39)	154 (6.06)	16.8 (37.04)	17.4 (38.36)
80	40	82.5 (3.25)	54.5 (2.15)	42.5 (1.67)	200 (7.87)	200 (7.87)	340 (13.39)	154 (6.06)	18.8 (41.45)	19.4 (42.77)
80	63	81.7 (3.22)	54.5 (2.15)	42.5 (1.67)	215 (8.46)	200 (7.87)	340 (13.39)	154 (6.06)	22.8 (50.27)	23.4 (51.59)
80	100	80.9 (3.19)	54.5 (2.15)	42.5 (1.67)	230 (9.06)	200 (7.87)	340 (13.39)	154 (6.06)	26.8 (59.08)	27.4 (60.41)
100	16	107.1 (4.22)	80.9 (3.19)	54.5 (2.15)	220 (8.66)	250 (9.84)	360 (14.17)	164 (6.46)	21.4 (47.18)	22 (48.50)
100	40	107.1 (4.22)	80.9 (3.19)	54.5 (2.15)	235 (9.25)	250 (9.84)	360 (14.17)	164 (6.46)	24.4 (53.79)	25 (55.12)
100	63	106.3 (4.19)	80.9 (3.19)	54.5 (2.15)	250 (9.84)	250 (9.84)	360 (14.17)	164 (6.46)	29.4 (64.82)	30 (66.14)
100	100	104.3 (4.11)	80.9 (3.19)	54.5 (2.15)	265 (10.43)	250 (9.84)	360 (14.17)	164 (6.46)	35.4 (78.04)	36 (79.37)
150	16	159.3 (6.27)	107.1 (4.22)	80.9 (3.19)	285 (11.22)	300 (11.81)	375 (14.76)	174 (6.85)	35.2 (77.60)	35.8 (78.93)
150	40	159.3 (6.27)	107.1 (4.22)	80.9 (3.19)	300 (11.81)	300 (11.81)	375 (14.76)	174 (6.85)	41.2 (90.83)	41.8 (92.15)
150	63	157.1 (6.19)	107.1 (4.22)	80.9 (3.19)	345 (13.58)	300 (11.81)	375 (14.76)	174 (6.85)	59.2 (130.51)	59.8 (131.84)
150	100	154.1 (6.07)	107.1 (4.22)	80.9 (3.19)	355 (13.98)	300 (11.81)	375 (14.76)	174 (6.85)	67.2 (148.15)	67.8 (149.47)
200	10	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	340 (13.39)	300 (11.81)	400 (15.75)	194 (7.64)	37.8 (83.33)	38.4 (84.66)
200	16	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	340 (13.39)	300 (11.81)	400 (15.75)	194 (7.64)	37.8 (83.33)	38.4 (84.66)
200	25	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	360 (14.17)	300 (11.81)	400 (15.75)	194 (7.64)	46.8 (103.18)	47.4 (104.50)
200	40	206.5 (8.13)	159.3 (6.27)	107.1 (4.22)	375 (14.76)	300 (11.81)	400 (15.75)	194 (7.64)	54.8 (120.81)	55.4 (122.14)
250	10	260.4 (10.25)	206.5 (8.13)	159.3 (6.27)	395 (15.55)	380 (14.96)	420 (16.54)	224 (8.82)	57.4 (126.55)	58.0 (127.87)
250	16	260.4 (10.25)	206.5 (8.13)	159.3 (6.27)	405 (15.94)	380 (14.96)	420 (16.54)	224 (8.82)	58.4 (128.75)	59.0 (130.07)
250	25	258.8 (10.19)	206.5 (8.13)	159.3 (6.27)	425 (16.73)	380 (14.96)	420 (16.54)	224 (8.82)	74.4 (164.02)	75.0 (165.35)
250	40	258.8 (10.19)	206.5 (8.13)	159.3 (6.27)	450 (17.72)	380 (14.96)	420 (16.54)	224 (8.82)	92.4 (203.71)	93.0 (205.03)
300	10	309.7 (12.19)	260.4 (10.25)	206.5 (8.13)	445 (17.52)	450 (17.72)	445 (17.52)	244 (9.61)	75.7 (166.89)	76.3 (168.21)
300	16	309.7 (12.19)	260.4 (10.25)	206.5 (8.13)	460 (18.11)	450 (17.72)	445 (17.52)	244 (9.61)	82.2 (181.22)	82.8 (182.54)
300	25	307.9 (12.12)	260.4 (10.25)	206.5 (8.13)	485 (19.09)	450 (17.72)	445 (17.52)	244 (9.61)	98.7 (217.60)	99.3 (218.92)
300	40	307.9 (12.12)	260.4 (10.25)	206.5 (8.13)	515 (20.28)	450 (17.72)	445 (17.52)	244 (9.61)	127.5 (281.09)	128.1 (282.41)

1) For dual converter: specified weight + 2.80 kg (6.17 lb).
2) FR - single reduction
3) F2R - double reduction

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Flange version ANSI B16.5

Size	Pressure rating	Dimensions [mm (inch)] a = 135 (5.32), b = 108 (4.26), c = 184 (7.25)							Weight [kg (lb)][1]	
DN	Class	d	d FR[2]	d F2R[3]	D	L	H	I	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
½	150	15.8 (0.62)	-	-	90 (3.54)	200 (7.87)	315 (12.40)	144 (5.67)	4.5 (9.92)	5.1 (11.24)
½	300	15.8 (0.62)	-	-	95 (3.74)	200 (7.87)	315 (12.40)	144 (5.67)	4.9 (10.80)	5.5 (12.13)
½	600	13.9 (0.55)	-	-	95 (3.74)	200 (7.87)	315 (12.40)	144 (5.67)	5.1 (11.24)	5.7 (12.57)
1	150	26.6 (1.05)	15.8 (0.62)	-	110 (4.33)	200 (7.87)	315 (12.40)	144 (5.67)	6.2 (13.67)	6.8 (14.99)
1	300	26.6 (1.05)	15.8 (0.62)	-	125 (4.92)	200 (7.87)	315 (12.40)	144 (5.67)	7.2 (15.87)	7.8 (17.20)
1	600	24.3 (0.96)	15.8 (0.62)	-	125 (4.92)	200 (7.87)	315 (12.40)	144 (5.67)	7.5 (16.53)	8.1 (17.86)
1½	150	40.9 (1.61)	26.6 (1.05)	15.8 (0.62)	125 (4.92)	200 (7.87)	320 (12.60)	144 (5.67)	8.3 (18.30)	8.9 (19.62)
1½	300	40.9 (1.61)	26.6 (1.05)	15.8 (0.62)	155 (6.10)	200 (7.87)	320 (12.60)	144 (5.67)	10.4 (22.93)	11 (24.25)
1½	600	38.1 (1.50)	26.6 (1.05)	15.8 (0.62)	155 (6.10)	200 (7.87)	320 (12.60)	144 (5.67)	11.4 (25.13)	12 (26.46)
2	150	52.6 (2.07)	40.9 (1.61)	26.6 (1.05)	150 (5.91)	200 (7.87)	325 (12.80)	144 (5.67)	11 (24.25)	11.6 (25.57)
2	300	52.6 (2.07)	40.9 (1.61)	26.6 (1.05)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	12.4 (27.34)	13 (28.66)
2	600	49.3 (1.94)	40.9 (1.61)	26.6 (1.05)	165 (6.50)	200 (7.87)	325 (12.80)	144 (5.67)	13.9 (30.64)	14.5 (31.97)
3	150	78 (3.07)	52.6 (2.07)	40.9 (1.61)	190 (7.48)	200 (7.87)	340 (13.39)	154 (6.06)	19.8 (43.65)	20.4 (44.97)
3	300	78 (3.07)	52.6 (2.07)	40.9 (1.61)	210 (8.27)	200 (7.87)	340 (13.39)	154 (6.06)	22.8 (50.27)	23.4 (51.59)
3	600	73.7 (2.90)	52.6 (2.07)	40.9 (1.61)	210 (8.27)	200 (7.87)	340 (13.39)	154 (6.06)	23.8 (52.47)	24.4 (53.79)
4	150	102.4 (4.03)	78 (3.07)	52.6 (2.07)	230 (9.06)	250 (9.84)	360 (14.17)	164 (6.46)	23.4 (51.59)	24 (52.91)
4	300	102.4 (4.03)	78 (3.07)	52.6 (2.07)	255 (10.04)	250 (9.84)	360 (14.17)	164 (6.46)	31.4 (69.23)	32 (70.55)
4	600	97.2 (3.83)	78 (3.07)	52.6 (2.07)	275 (10.83)	250 (9.84)	360 (14.17)	164 (6.46)	40.4 (89.07)	41 (90.39)
6	150	154.2 (6.07)	102.4 (4.03)	78 (3.07)	280 (11.02)	300 (11.81)	375 (14.76)	174 (6.85)	36.2 (79.81)	36.8 (81.13)
6	300	154.2 (6.07)	102.4 (4.03)	78 (3.07)	320 (12.60)	300 (11.81)	375 (14.76)	174 (6.85)	51.2 (112.88)	51.8 (114.20)
6	600	146.3 (5.76)	102.4 (4.03)	78 (3.07)	355 (13.98)	300 (11.81)	375 (14.76)	174 (6.85)	46.2 (101.85)	76.8 (169.31)
8	150	202.7 (7.98)	154.2 (6.07)	102.4 (4.03)	345 (13.58)	300 (11.81)	400 (15.75)	194 (7.64)	50.0 (110.23)	50.6 (111.55)
8	300	202.7 (7.98)	154.2 (6.07)	102.4 (4.03)	380 (14.96)	300 (11.81)	400 (15.75)	194 (7.64)	74.8 (164.91)	75.4 (166.23)
10	150	254.5 (10.02)	202.7 (7.98)	154.2 (6.07)	405 (15.94)	380 (14.96)	420 (16.54)	224 (8.82)	74.4 (164.02)	75.0 (165.35)
10	300	254.5 (10.02)	202.7 (7.98)	154.2 (6.07)	455 (17.91)	380 (14.96)	420 (16.54)	224 (8.82)	106.4 (234.57)	107.0 (235.89)
12	150	304.8 (12.00)	254.5 (10.02)	202.7 (7.98)	485 (19.09)	450 (17.72)	445 (17.52)	244 (9.61)	106.3 (234.35)	106.9 (235.67)
12	300	304.8 (12.00)	254.5 (10.02)	202.7 (7.98)	520 (20.47)	450 (17.72)	445 (17.52)	244 (9.61)	151.3 (333.56)	151.9 (334.88)

1) For dual converter: specified weight + 2.80 kg (6.17 lb).
2) FR - single reduction
3) F2R - double reduction

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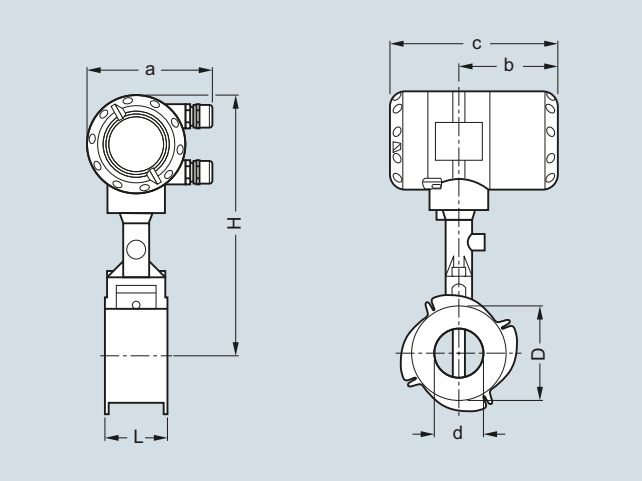
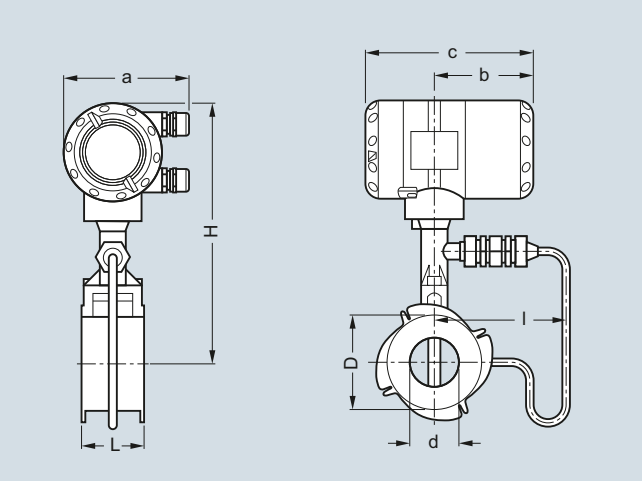


Sandwich version



Sandwich version with pressure sensor

Sandwich version EN

Size	Pressure rating	Dimensions [mm (inch)]								Weight [kg (lb)]	
DN	PN	a	b	c	d	D	L	H	l	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
15	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	16 (0.63)	45 (1.77)	65 (2.56)	265 (10.43)	144 (5.67)	3.5 (7.72)	4.1 (9.04)
25	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	24 (0.94)	65 (2.56)	65 (2.56)	265 (10.43)	144 (5.67)	4.3 (9.48)	4.9 (10.80)
40	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	38 (1.50)	82 (3.23)	65 (2.56)	270 (10.63)	144 (5.67)	4.9 (10.80)	5.5 (12.13)
50	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	50 (1.97)	102 (4.02)	65 (2.56)	275 (10.83)	144 (5.67)	6 (13.23)	6.6 (14.55)
80	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	74 (2.91)	135 (5.31)	65 (2.56)	290 (11.42)	155 (6.10)	8.2 (18.08)	8.8 (19.40)
100	16 ... 100	133 (5.24)	105 (4.13)	179 (7.05)	97 (3.82)	158 (6.22)	65 (2.56)	310 (12.20)	164 (6.46)	9.5 (20.94)	10.1 (22.27)

Sandwich version ANSI

Size	Pressure rating	Dimensions [inch]								Weight [lb]	
DN	Class	a	b	c	d	D	L	H	l	Flowmeter (without pressure sensor)	Flowmeter (with pressure sensor)
½"	150, 300, 600	5.24	4.13	7.05	0.63	1.77	2.56	10.43	5.67	7.72	9.04
1"	150, 300, 600	5.24	4.13	7.05	0.94	2.56	2.56	10.43	5.67	9.48	10.80
1½"	150, 300, 600	5.24	4.13	7.05	1.50	3.23	2.56	10.63	5.67	10.80	12.13
2"	150, 300, 600	5.24	4.13	7.05	1.97	4.02	2.56	10.83	5.67	13.23	14.55
3"	150, 300, 600	5.24	4.13	7.05	2.91	5.31	2.56	11.42	6.10	18.08	19.40
4"	150, 300, 600	5.24	4.13	7.05	3.82	6.22	2.56	12.20	6.46	20.94	22.27

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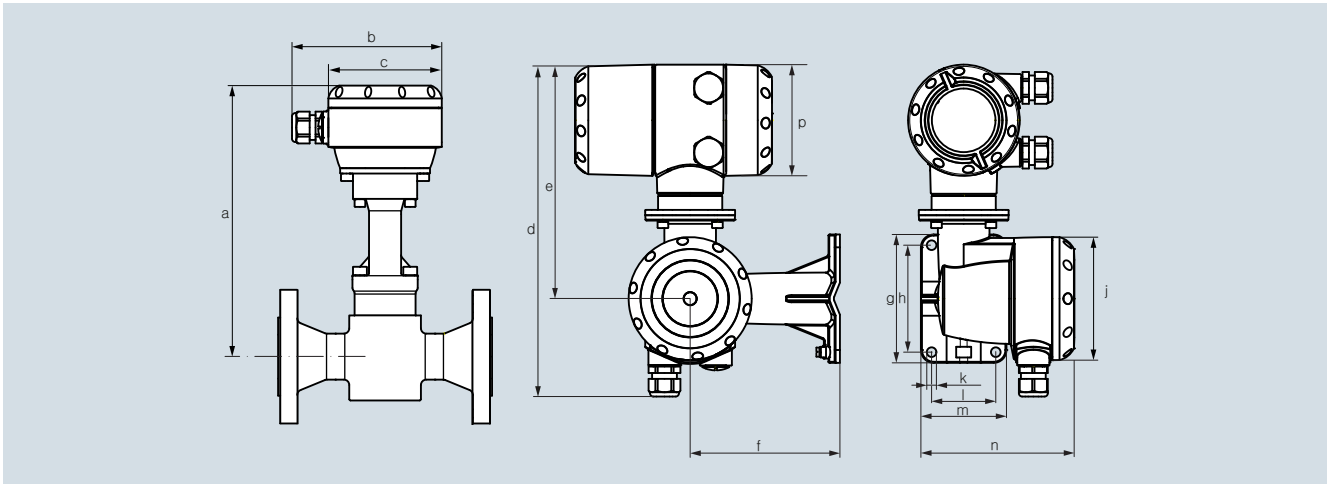
Remote version



Flanged version

DN	15	25	40	50	80	100	150	200	250	300
	½"	1"	1½"	2"	3 "	4 "	6"	8"	10"	12"
	a									
[mm]	248	248	253	258	273	293	308	333	353	378
[inch]	9.77	9.77	9.97	10.2	10.8	11.5	12.1	13.1	13.9	14.9

	b	c	d	e	f	g	h	j	k	l	m	n	p
[mm]	140	Ø106	310	219	140	120	100	Ø115	Ø9 (4x)	60	80	144	104
[inch]	5.52	Ø4.18	12.2	8.63	5.52	4.73	3.94	Ø4.53	Ø0.36 (4x)	2.36	3.15	5.67	4.09

Sandwich version

DN	15	25	40	50	80	100
	½"	1"	1½"	2"	3 "	4 "
	a					
[mm]	248	248	253	258	273	293
[inch]	9.77	9.77	9.97	10.2	10.8	11.5

	b	c	d	e	f	g	h	j	k	l	m	n	p
[mm]	140	Ø106	310	219	140	120	100	Ø115	Ø9 (4x)	60	80	144	104
[inch]	5.52	Ø4.18	12.2	8.63	5.52	4.73	3.94	Ø4.53	Ø0.36 (4x)	2.36	3.15	5.67	4.09

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Flow tables

Measuring Range Limits

Water

Size DN to EN 1092-1	DN to ANSI B16.5	Q_{min} EN 1092-1 [m^3/h]	Q_{max} EN 1092-1 [m^3/h]	Q_{min} ANSI B16.5 [m^3/h]	Q_{max} ANSI B16.5 [m^3/h]
15	½"	0.45	5.07	0.44	4.94
25	1"	0.81	11.40	0.81	11.40
40	1½"	2.04	28.58	2.04	28.58
50	2"	3.53	49.48	3.53	49.48
80	3"	7.74	108.37	7.74	108.37
100	4"	13.30	186.22	13.30	186.21
150	6"	30.13	421.86	30.13	421.86
200	8"	56.60	792.42	56.60	792.42
250	10"	90.48	1 266.8	90.48	1 266.8
300	12"	131.41	1 839.8	131.41	1 839.8

Values based on water at 20 °C (68 °F)

Air

Size DN to EN 1092-1	DN to ANSI B16.5	Q_{min} EN 1092-1 [m^3/h]	Q_{max} EN 1092-1 [m^3/h]	Q_{min} ANSI B16.5 [m^3/h]	Q_{max} ANSI B16.5 [m^3/h]
15	½"	6.80	25.33	6.72	24.70
25	1"	10.20	81.43	10.20	81.43
40	1½"	25.35	326.63	25.35	326.63
50	2"	43.89	565.49	43.89	565.49
80	3"	96.14	1 238.64	96.14	1 238.60
100	4"	165.19	2 128.27	165.19	2 128.27
150	6"	374.23	4 821.60	374.23	4 821.60
200	8"	702.95	9 056.8	702.95	9 056.8
250	10"	1 123.7	14 478.0	1 123.7	14 478.0
300	12"	1 632.1	21 028.0	1 632.1	21 028.0

Values based on air at 20 °C (68 °F) and 1.013 bar_{abs} (14.7 psi_{abs})

Flow rate limits

Product	Nominal diameters to EN	Nominal diameters to ANSI	Minimum flow rates [m/s]	Maximum flow rates [m/s]
Liquids	DN 15 … DN 300	DN ½"…DN 12"	$0.5 \times (998/\rho)^{0.5}$ 1)	$7 \times (998/\rho)^{0.47}$ 1)
Gas, steam/vapor	DN 15 … DN 300	DN ½"…DN 12"	$6 \times (1.29/\rho)^{0.5}$ 2)	$7 \times (998/\rho)^{0.47}$ 3)

ρ = operating density [kg/m^3]

1) Minimum flow rate 0.3 m/s (0.984 ft/s), maximum flow rate 7 m/s (23 ft/s)
2) Minimum flow rate 2 m/s (6.6 ft/s)
3) Maximum flow rate 80 m/s (262 ft/s); DN 15: 45 m/s (148 ft/s) and DN 25: 70 m/s (230 ft/s)

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Measuring range saturated steam: 1 to 7 bar

Overpressure [bar]		**1**		**3.5**		**5.2**		**7**	
Density [kg/m³]		**1.13498**		**2.4258**		**3.27653**		**4.16732**	
Temperature [°C]		**120.6**		**148.2**		**160.4**		**170.6**	
Flow [kg/h]		**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**
DN to EN 1092-1	**DN to ANSI B16.5**								
15	½"	5.87	28.75	7.68	61.46	8.93	83.01	10.06	105.57
25	1"	11.82	92.42	17.28	197.53	20.09	266.81	22.66	339.35
40	1½"	29.64	370.71	43.33	792.33	50.63	1 070.2	56.8	1 361.2
50	2"	51.31	641.82	75.02	1 371.8	87.19	1 852.8	98.33	2 356.6
80	3"	112.41	1 405.8	164.33	3 004.7	191	4 058.4	215.39	5 161.8
100	4"	193.14	2 415.5	282.36	5 162.7	328.16	6 973.3	370.09	8 869.2
150	6"	437.56	5 472.4	639.69	11 696	743.45	15 798	838.44	20 093
200	8"	821.9	10 279.0	1 201.6	21 970.0	1 396.5	29 675.0	1 574.9	37 743
250	10"	1 313.9	16 433.0	1 920.9	35 122.0	2 232.5	47 439.0	2 517.7	60 337
300	12"	1 908.3	23 866.0	2 789.8	51 010.0	3 242.4	68 899.0	3 656.6	87 630

Measuring range saturated steam: 10.5 to 20 bar

Overpressure [bar]		**10.5**		**14**		**17.5**		**20**	
Density [kg/m³]		**5.88803**		**7.60297**		**9.31702**		**10.5442**	
Temperature [°C]		**186.2**		**198.5**		**208.7**		**215**	
Flow [kg/h]		**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**
DN to EN 1092-1	**DN to ANSI B16.5**								
15	½"	12.78	149.17	16.51	192.61	20.23	236.04	22.89	267.12
25	1"	26.93	479.46	30.6	619.11	33.87	758.69	36.04	858.62
40	1½"	67.51	1 878.2	76.72	2 150.7	84.93	2 395.3	90.35	2 557.7
50	2"	116.89	3 251.7	132.82	3 723.4	147.03	4 147	156.42	4 428.1
80	3"	256.03	7 122.4	290.93	8 155.8	322.06	9 083.7	342.62	9 699.3
100	4"	439.91	12 238	499.9	14 013	553.38	15 608	588.69	16 666
150	6"	996.62	27 725	1 132.5	31 747	1 253.7	35 359	1 333.7	37 756
200	8"	1 872.1	52 079	2 127.3	59 634	2 354.9	66 419	2 505.2	70 921
250	10"	2 992.7	83 254	3 400.7	95 333	3 764.6	106 180	4 004.9	113 380
300	12"	4 346.5	120 920	4 939.1	138 460	5 467.5	154 210	5 816.5	164 660

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Measuring range saturated steam: 15 to 100 psig

Overpressure [psig]		**15**		**50**		**75**		**100**	
Density [lb/ft³]		**0.0719**		**0.1497**		**0.2036**		**0.2569**	
Temperature [°F]		**249.98**		**297.86**		**320.36**		**338.184**	
Flow [lb/h]		**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**
DN to EN 1092-1	**DN to ANSI B16.5**								
15	½"	12.95	64.35	16.83	133.87	19.62	182.02	22.04	229.63
25	1"	26.25	206.83	37.86	430.3	44.15	585.06	49.59	738.09
40	1½"	65.81	829.61	94.92	1 726	110.68	2 346.7	124.32	2 960.5
50	2"	113.94	1 436.3	164.34	2 988	191.63	4 062.9	215.23	5 125.6
80	3"	249.57	3 146.1	360	6 545.3	419.74	8 899.4	471.45	11 227
100	4"	428.81	5 405.7	618.51	11 246	721.21	15 291	810.06	19 291
150	6"	971.47	12 246	1 401.2	25 478	1 633.9	34 642	1 835.2	43 703
200	8"	1 824.8	23 004	2 632.1	47 859	3 069.1	65 072	3 447.2	82 092
250	10"	2 917.2	36 774	4 207.7	76 508	4 906.4	104 030	5 510.8	131 230
300	12"	4 236.8	53 410	6 111.1	111 120	7 125.8	151 080	8 003.6	190 600

Measuring range saturated steam: 150 to 300 psig

Overpressure [psig]		**150**		**200**		**250**		**300**	
Density [lb/ft³]		**0.3627**		**0.4681**		**0.5735**		**0.6792**	
Temperature [°F]		**366.08**		**388.04**		**406.22**		**422.06**	
Flow [lb/h]		**min.**	**max.**	**min.**	**max.**	**min.**	**max.**	**min.**	**max.**
DN to EN 1092-1	**DN to ANSI B16.5**								
15	½"	27.79	324.21	35.86	418.47	43.94	512.66	52.04	607.12
25	1"	58.93	1 042.1	66.94	1 345.1	74.1	1 647.8	80.63	1 951.5
40	1½"	147.72	4 107.2	167.83	4 702.8	185.76	5 237	202.15	5 728
50	2"	255.75	7 111.9	290.56	8 141.9	321.6	9 066.8	350	9 917
80	3"	560.19	15 578	636.44	17 834	704.43	19 860	766.6	21 722
100	4"	962.54	26 766	1 093.5	30 643	1 210.4	34 124	1 317.2	37 324
150	6"	2 180.6	60 639	2 477.4	69 421	2 742.1	77 307	2 984	84 556
200	8"	4 096.1	113 900	4 653.6	130 400	5 150.7	145 210	5 605.2	158 830
250	10"	6 548.1	182 090	7 439.3	208 460	8 234.1	232 140	8 960.6	253 910
300	12"	9 510.2	264 460	10 805	302 760	11 959	337 150	13 014	368 770

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Overview

SITRANS FVA250 variable area meter

Benefits

- Standard design available at short notice
- Robust all-metal fitting with impact-resistant housing cover
- Can also be used for corrosive and flammable media
- Use possible at high pressures and temperatures
- Product and percentage scales
- Can be optionally fitted with heating and cooling sheaths
- Contamination-insensitive guiding of float

Application

The devices are particularly suitable for measuring:

- Water
- Liquids
- Anti-corrosives and lubricants
- Solvents
- Saturated and superheated steam
- Food and beverages
- Industrial gases

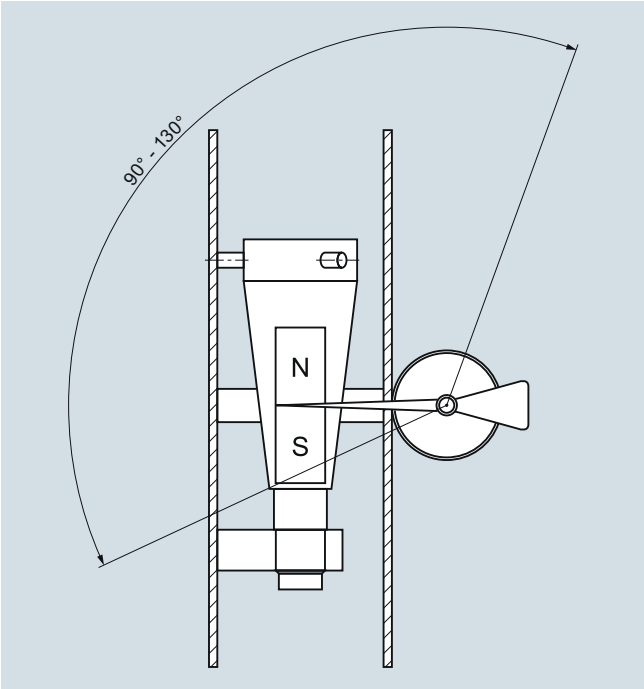
Design

Due to its full metal design, the SITRANS FVA250 variable area meter with a standard length of 250 mm (9.84 inch) can be used to measure many different types of liquids and gases passing through closed piping. The robust design means that it can also be used in harsh conditions. The various types of flange connections, linings and float materials satisfy the requirements of the pharmaceutical and chemical industries.

The measured value is displayed directly on the scale with the standard version. For process monitoring and control, the device can be equipped with a transmitter (MEM) as well as limit switches.

Function

Flow measurement with the SITRANS FVA250 is performed according to the float principle. The flowing medium lifts the conical float in the measuring ring. This increases the ring gap until an equilibrium is established between the buoyant force of the medium and the weight of the float. The height of the float is directly proportional to the flow rate. The movement of the float is transmitted from one magnet to another magnet in the display unit outside of the measuring tube.



Measuring cone/scale angle

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3

Technical specifications

Application	See page 3/411
Design and function	See page 3/411
Measuring principle	Variable area flowmeter
Input	
Measuring range	See table on page 3/413
Pressure rating	PN 16 ... PN 100 (232 ... 1450 psi) depending on version (see table on page 3/413)
Installation/flow direction	Vertical/from bottom to top
Rated operating conditions	
Ambient temperature	
• With local display	-40 ... +80 °C (-40 ... +176 °F)
• With limit switches	-40 ... +65 °C (-40 ... +149 °F)
• With electric remote encoder (MEM)	-40 ... +70 °C (-40 ... +156 °F)
Measuring accuracy	
• For liquids	± 1.6%
• For gases	± 2.0%
Reproducibility	0.5 % of the measuring range limit (URV)
Operating temperature	see page 3/413
Operating pressure	Min. operating pressure > 2x pressure drop (see table on page 3/413)
Design	
Flanges	EN 1092-1, ANSI B16.5
Material	
• Fitting	Stainless steel 1.4404/316L
• Float	Stainless steel 1.4404/316L, Hastelloy, PTFE
• Wetted parts materials	Stainless steel 1.4404/316L, PTFE, Hastelloy, depending on version
Degree of protection (display unit)	
• Display unit made of aluminum	IP65
• Display unit made of stainless steel	IP66
Electromagnetic immunity	
• EN 61000-6-2: 1999	Interference immunity industrial sector
• EN 50081-1	Emitted interference residential sector
• EN 55011: 1998 + A1: 1999	Group 1, Class B
• NAMUR recommendation	NE 21

Classification according to pressure equipment directive (DGRL 97/23/EG)

	Article No. 7ME5822-7ME5823-	Permissible media	Category
DN 15	xAxxx-xxxx	Gases of fluid group 1 and liquids of fluid group 1	Article 3.3
DN 20	xFxxx-xxxx		Article 3.3
DN 25	xBxxx-xxxx		Article 3.3
DN 32	xGxxx-xxxx		III
DN 40	xHxxx-xxxx		III
DN 50	xCxxx-xxxx		III
DN 65	xJxxx-xxxx		III
DN 80	xDxxx-xxxx		III
DN 100	xExxx-xxxx		III

Technical specifications of contacts

Limit switch	
Cable gland	M20x1.5
Auxiliary power supply	5 ... 25 V DC
Isolation (2 contacts)	Electrically isolated
Limit switch	SJ3.5-N-BU
• Switching function	NAMUR NC
Nominal voltage U_0	8.2 V DC (R_i approx. 1 kΩ)
Explosion protection	II 2G EEx ia IIC T6 - T4
EC-Type Examination Certificate for Directive 94/9/EG	PTB 99 ATEX 2219 X
Transmitter (MEM) with 4 ... 20 mA, pulse output and limit switch	
Cable gland	M20x1.5
Auxiliary power supply	14 ... 30 V DC
Analog output	4 ... 20 mA (2-wire technology)
Binary output	Pulses, limit switch
• Pulses	Max. pulse rate 10 Hz
• Limit switch	SJ3.5-N-BU (NAMUR, NC)
Temperature influence	≤ ± 0.5 % of the measuring range limit (URV)/10 K
Explosion protection	ATEX II 2G EEx ia IIC T6
EC-Type Examination Certificate for Directive 94/9/EG	DMT 00 ATEX E 075
Transmitter (MEM) PROFIBUS PA	
Cable gland	M20x1.5
Auxiliary power supply	10 ... 25 V DC
Basic current	< 16.5 mA
Fault current	< 18 mA
Transfer rate	31.25 kBaud
Temperature influence	≤ ± 0.5 % of the measuring range limit (URV)/10 K
Explosion protection	ATEX II 2G EEx ia IIC T6
EC-Type Examination Certificate for Directive 94/9/EG	DMT 00 ATEX E 075

Float damping

Float damping is recommended

- Generally for gas measurement
- When air bubbles in the medium cannot be avoided.
- When there are pressure surges in the lines caused by a delay in the flow, for example, due to rapid throttling or blocking
- When turbulence, pulsations or other instabilities cause the float to vibrate.
- When the flow pressure cannot be built up slowly
- When vibrations in the line cannot be avoided

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Technical specifications (continued)

Permitted measuring ranges

Version	CF-S	EF-H	FF-P
Wetted parts materials	Mat. no. 1.4404/316L	Hastelloy C	PTFE
Fitting	Mat. no. 1.4404/316L	≤ DN 25 (1“): Hastelloy > DN 25 (1“): Hastelloy/stainless steel 1.4404/316L	Mat. no. 1.4404/316L with PTFE lining
Flange	Mat. no. 1.4404/316L	≤ DN 25 (1“): Hastelloy > DN 25 (1“): Hastelloy/Edelstahl 1.4404/316L	Mat. no. 1.4404/316L
Float/flow tube	Mat. no. 1.4404/316L	Hastelloy	PTFE
Max. media temperature	-20 ... +200 °C (-4 ... +392 °F) (optional -80 ... +350 °C (-112 ... +662 °F))		-20 ... +125 °C (-4 ... +257 °F)
Nominal pressure	DN15 ... 80 (½ ... 3“): PN 40 (580 psi) DN100 (4“): PN 16 (232 psi) optional up to 400 bar (5800 psi)	DN15 ... 80 (½ ... 3“): PN 40 (580 psi) DN100 (4“): PN 16 (232 psi) optional up to 400 bar (5800 psi)	PN 16 (232 psi)
Reference data for measuring range specifications	Fluid in l/h with density: 1,0 kg/l, temperature 20 °C (68 °F), viscosity: 1 mPa·s Gas in m^3/h with density: 1.293 kg/m^3, temperature 0 °C (32 °F), viscosity: 0,0181 mPa·s, p_e = 0 bar (0 psi)		

Order code	Pressure loss [mbar]							Measuring ranges (dynamic 1:10)			
	Flow tube							Liquids		Gases	
	1	2	3	4	5	6	7	[l/h]	[USgpm]	[m³/h]	[scfm]
10	40[1]	40[2]	-	-	-	-	-	0.5 ... 5	0.0022 ... 0.022	0.015 ... 0.15	0.0088 ... 0.088
11	44[1]	44[2]	-	-	-	-	-	0 ... 10	0.0044 ... 0.044	0.03 ... 0.3	0.0177 ... 0.177
12	40[1]	40[2]	-	-	-	-	-	1.6 ... 16	0.007 ... 0.07	0.045 ... 0.48	0.0265 ... 0.283
13	40[1]	40[2]	-	-	-	-	-	2.5 ... 25	0.011 ... 0.11	0.075 ... 0.75	0.0441 ... 0.441
14	40[1]	40[2]	-	-	-	-	-	4 ... 40	0.018 ... 0.18	0.13 ... 1.3	0.0765 ... 0.765
15	-	40[2]	-	-	-	-	-	5 ... 50	0.022 ... 0.22	0.15 ... 1.5	0.0883 ... 0.883
16	-	40[2]	-	-	-	-	-	7 ... 70	0.031 ... 0.31	0.2 ... 2.1	0.12 ... 1.24
17	-	60	60[3]	-	-	-	-	10 ... 100	0.044 ... 0.44	0.3 ... 3	0.177 ... 1.77
20	-	60	60[3]	-	-	-	-	16 ... 160	0.07 ... 0.7	0.5 ... 4.6	0.29 ... 2.71
21	-	60	60[3]	-	-	-	-	25 ... 250	0.11 ... 1.1	0.7 ... 7	0.412 ... 4.12
22	-	70	70[3]	-	-	-	-	40 ... 400	0.176 ... 1.76	1.0 ... 11	0.589 ... 6.47
23	-	80	80[3]	-	-	-	-	60 ... 600	0.264 ... 2.64	1.7 ... 17	1 ... 10
24	-	-	60	-	-	-	-	100 ... 1 000	0.44 ... 4.4	2 ... 30	1.77 ... 17.66
25	-	-	70	-	-	-	-	160 ... 1 600	0.7 ... 7	3 ... 46	2.35 ... 27.07
26	-	-	100	50[2]	-	-	-	250 ... 2 500	1.1 ... 11	6 ... 70	4.12 ... 41.2
27	-	-	240[2]	120[2]	80	-	-	400 ... 4 000	1.76 ... 17.6	10 ... 110	6.47 ... 64.74
30	-	-	-	180[2]	90	-	-	600 ... 6 000	2.64 ... 26.4	16 ... 170	10 ... 100
31	-	-	-	-	110	-	-	1 000 ... 10 000	4.4 ... 44	28 ... 290	17.1 ... 170.7
32	-	-	-	-	230	70	-	1 600 ... 16 000	7 ... 70	45 ... 460	27.1 ... 270.7
33	-	-	-	-	230	70[2]	-	2 000 ... 20 000	8.8 ... 88	55 ... 550	32.4 ... 323.7
34	-	-	-	-	500[2]	100	-	2 500 ... 25 000	11 ... 110	69 ... 700	41.2 ... 412
35	-	-	-	-	-	350[2]	120	4 000 ... 40 000	17.6 ... 176	109 ... 1 100	64.7 ... 647.4
36	-	-	-	-	-	350[2]	120[2]	5 000 ... 50 000	22 ... 220	134 ... 1 350	79.5 ... 794.6
37	-	-	-	-	-	-	360[2]	6 000 ... 60 000	26.4 ... 264	169 ... 1 700	100 ... 1 000
40	-	-	-	-	-	-	600[2]	8 000 ... 80 000	35.2 ... 352	239 ... 2 400	141.3 ... 1 413
41	-	-	-	-	-	-	600[2]	10 000 ... 100 000	44 440	299 ... 3 000	176.6 ... 1 766

- Not available

1) Not available for EF-H and FF-P.

2) Not available for FF-P.

3) Not available for CF-S and EF-H.

Note: Female thread connection (DIN ISO 228. NPT ANSI B 1.20.1) not available for FF-P.

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SITRANS FVA250 variable area meter

Permitted nominal diameters

Order Code	Flange		Flow tube						
	EN 1092-1	ANSI B16.5	1	2	3	4	5	6	7
A	DN 15	½“	•[1]	•	•[2]	–	–	–	–
B	DN 20	¾“	•[1]	•[2]	•[2]	–	–	–	–
C	DN 25	1“	•[1]	•[2]	•	•[2]	–	–	–
D	DN 32	1¼“	•[1]	•[2]	•[2]	•[2]	–	–	–
E	DN 40	1½“	•[1]	•[2]	•[2]	•[2]	–	–	–
F	DN 50	2“	•[1]	•[2]	•[2]	•[2]	•	–	–
G	DN 65	2½“	–	–	•	•	•[2]	–	–
H	DN 80	3“	–	–	–	•	•[2]	•	–
J	DN 100	4“	–	–	–	–	•[2]	•[2]	•

Order Code	Female thread		Flow tube						
	DIN ISO 228	NPT ANSI B 1.20.1	1	2	3	4	5	6	7
Q	G ¼“	¼“ NPT	•	•	–	–	–	–	–
R	G 3/8“	3/8“ NPT	•	•	–	–	–	–	–
S	G ½“	½“ NPT	•	•	•	•	–	–	–
T	G ¾“	¾“ NPT	•	•	•	•	–	–	–
U	G 1“	1“ NPT	•	•	•	•	•	–	–
V	G 1¼“	1¼“ NPT	•	•	–	•	•	–	–
W	G 1½“	1½“ NPT	–	–	–	•	•	–	–
X	G 2“	2“ NPT	–	–	–	–	•	–	–

• Available
- Not available
[1] Not available for EF-H and FF-P.
[2] Not available for FF-P.
Note: Female thread connection (DIN ISO 228, NPT ANSI B 1.20.1) not available for FF-P.

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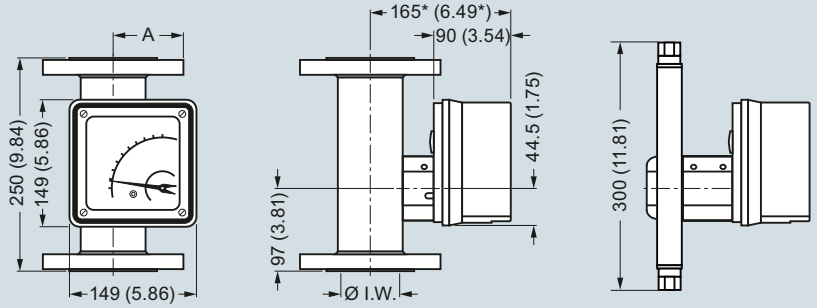
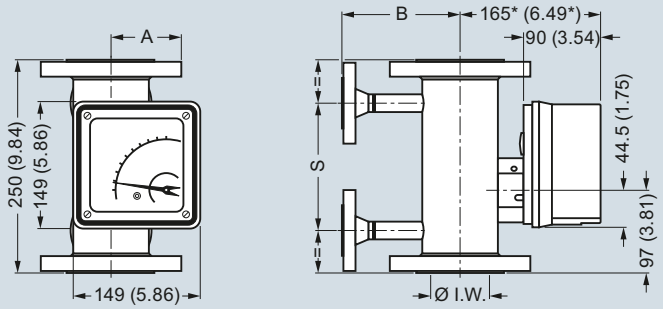
Dimensional drawings



EN 1092-1		ANSI B16.5		I. W.		A		Weight	
				mm	inch	mm	inch	kg	lb
DN 15	PN 40	½"	class 150	26	1.02	74	2.91	3.0	6.6
DN 20	PN 40	¾"	class 150	26	1.02	74	2.91	3.0	6.6
DN 25	PN 40	1"	class 150	32	1.26	77	3.03	4.2	9.3
DN 32	PN 40	1¼"	class 150	32	1.26	77	3.03	5.2	11.5
DN 40	PN 40	1½"	class 150	46	1.81	88	3.46	6.0	13.2
DN 50	PN 40	2"	class 150	70	2.76	97	3.82	7.5	16.5
DN 65	PN 16	2½"	class 150	70	2.76	97	3.82	8.5	18.7
DN 80	PN 16	3"	class 150	102	4.02	113	4.45	13	28.7
DN 100	PN 16	4"	class 150	125	4.92	126	4.96	18	39.7

* +100 mm (3.94 inch) with displaced display unit

SITRANS FVA250, enclosure of display unit made of aluminum, dimensions in mm (inch)



Nominal diameter		B (flange)		B (Ermeto)		S		Weight	
		mm	inch	mm	inch	mm	inch	kg	lb
DN 15	½"	110	4.33	53	2.09	150	5.91	3.0	6.6
DN 20	¾"	110	4.33	53	2.09	150	5.91	3.0	6.6
DN 25	1"	110	4.33	58.5	2.3	150	5.91	4.2	9.3
DN 32	1¼"	110	4.33	58.5	2.3	150	5.91	5.2	11.5
DN 40	1½"	130	5.12	63	2.48	150	5.91	6.0	13.2
DN 50	2"	140	5.51	77.5	3.05	150	5.91	7.5	16.5
DN 65	2½"	140	5.51	77.5	3.05	150	5.91	8.5	18.7
DN 80	3"	160	6.3	93.5	3.68	150	5.91	13	28.7
DN 100	4"	175	6.89	110	4.33	120	4.72	18	39.7

* +100 mm (3.94 inch) with displaced display unit

SITRANS FVA250, enclosure of dislay unit made of aluminum with heating connection, dimensions in mm (inch)

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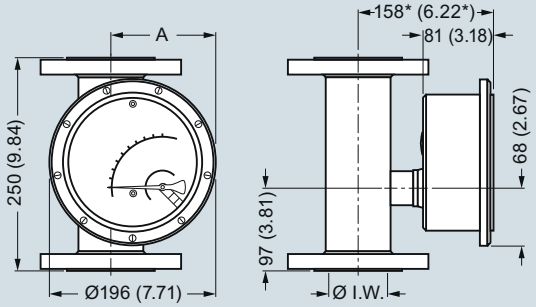
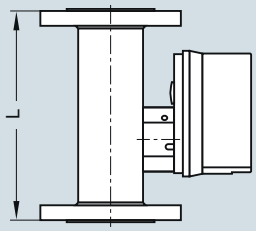
SITRANS FVA250 variable area meter



EN 1092-1		ANSI B16.5		I. W.		A		Gewicht	
				mm	inch	mm	inch	kg	lb
DN 15	PN 40	½"	class 150	26	1.02	103	4.06	3.0	6.6
DN 20	PN 40	¾"	class 150	26	1.02	103	4.06	3.0	6.6
DN 25	PN 40	1"	class 150	32	1.26	105	4.13	4.2	9.3
DN 32	PN 40	1¼"	class 150	32	1.26	105	4.13	5.2	11.5
DN 40	PN 40	1½"	class 150	46	1.81	115	4.53	6.0	13.2
DN 50	PN 40	2"	class 150	70	2.76	129	5.08	7.5	16.5
DN 65	PN 16	2½"	class 150	70	2.76	129	5.08	8.5	18.7
DN 80	PN 16	3"	class 150	102	4.02	145	5.71	13	28.7
DN 100	PN 16	4"	class 150	125	4.92	158	6.22	18	39.7

* +100 mm (3.94 inch) with displaced display unit

SITRANS FVA250, enclosure of display unit made of stainless steel, dimensions in mm (inch)



Nominal diameter	EN 1092-1				Nominal diameter	ANSI B16.5		
	PN 16	PN 40	PN63	PN100		class 150	class 300	class 600
DN 15	-	250 (9.84)	-	250 (9.84)	½"	250 (9.84)	250 (9.84)	250 (9.84)
DN 20	-	250 (9.84)	-	250 (9.84)	¾"	250 (9.84)	250 (9.84)	250 (9.84)
DN 25	-	250 (9.84)	-	250 (9.84)	1"	250 (9.84)	250 (9.84)	250 (9.84)
DN 32	-	250 (9.84)	-	250 (9.84)	1¼"	250 (9.84)	250 (9.84)	250 (9.84)
DN 40	-	250 (9.84)	-	250 (9.84)	1½"	250 (9.84)	250 (9.84)	250 (9.84)
DN 50	-	250 (9.84)	250 (9.84)	300 (11.81)	2"	250 (9.84)	250 (9.84)	300 (11.81)
DN 65	250 (9.84)	250 (9.84)	300 (11.81)	300 (11.81)	2½"	250 (9.84)	300 (11.81)	300 (11.81)
DN 80	250 (9.84)	250 (9.84)	300 (11.81)	300 (11.81)	3"	250 (9.84)	300 (11.81)	300 (11.81)
DN 100	250 (9.84)	250 (9.84)	300 (11.81)	300 (11.81)	4"	250 (9.84)	300 (11.81)	300 (11.81)

- not available

Build-in length of fitting in dependance of nominal diameter and pressure rating, dimensions mm (inch)

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Selection and ordering data		Article No.
SITRANS FVA250 Full metal variable area meter		↗ 7ME5 8 6 - ■■■■■ - ■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Flow tube		
Liquid	Gas	
5 ... 40 l/h	0.15 ... 1.3 m^3/h	1
50 ... 600 l/h	1.5 ... 17 m^3/h	2
1 000 ... 4 000 l/h	30 ... 110 m^3/h	3
2.5 ... 6 m^3/h	70 ... 170 m^3/h	4
4 ... 25 m^3/h	30 ... 700 m^3/h	5
16 ... 50 m^3/h	460 ... 1 350 m^3/h	6
60 ... 100 m^3/h	1 700 ... 3 000 m^3/h	7
Design		
Type: CF-S (standard) Fitting: Stainless steel 1.4404/316L, Flange: Stainless steel 1.4404/316L Float: Stainless steel 1.4404/316L		2
Type: EF-H Fitting: Stainless steel 1.4404/316L, Flange: Stainless steel 1.4404/316L with Hastelloy lining Float: Hastelloy		4
Type: FF-P Fitting: Stainless steel 1.4404/316L, Flange: Stainless steel 1.4404/316L with PTFE lining Float: PTFE		5
Nominal diameter		
DN 15/ANSI ½“		A
DN 20/ANSI ¾“		B
DN 25/ANSI 1“		C
DN 32/ANSI 1¼“		D
DN 40/ANSI 1½“		E
DN 50/ANSI 2“		F
DN 65/ANSI 2½“		G
DN 80/ANSI 3“		H
DN 100/ANSI 4“		J
Female thread ¼"		Q
Female thread 3/8"		R
Female thread ½"		S
Female thread ¾"		T
Female thread 1"		U
Female thread 1¼"		V
Female thread 1½"		W
Female thread 2"		X
Flange/thread standard - pressure rate		
EN 1092-1, PN 16, Form B1		B
EN 1092-1, PN 40, Form B1		D
EN 1092-1, PN 63, Form B2		E
EN 1092-1, PN 100, Form B2		F
ANSI B16.5, class 150 RF		J
ANSI B16.5, class 300 RF		K
ANSI B16.5, class 600 RF		L
Female thread G DIN ISO 228		T
Female thread NPT ANSI B1.20.1		N

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SITRANS FVA250 variable area meter

Selection and ordering data

Article No.

SITRANS FVA250 Full metal variable area meter — **7ME586 ■ - ■■■■ - ■■■■**

Measuring ranges

Liquids l/h	(USgpm)	Gases m^3/h	(scfm)	
0.5 ... 5	(0.0022 ... 0.022)	0.015 ... 0.15	(0.0088 ... 0.088)	1 0
0 ... 10	(0.0044 ... 0.044)	0.03 ... 0.3	(0.0177 ... 0.177)	1 1
1.6 ... 16	(0.007 ... 0.07)	0.045 ... 0.45	(0.0265 ... 0.283)	1 2
2.5 ... 25	(0.011 ... 0.11)	0.075 ... 0.75	(0.0441 ... 0.441)	1 3
4 ... 40	(0.018 ... 0.18)	0.13 ... 1.3	(0.0765 ... 0.765)	1 4
5 ... 50	(0.022 ... 0.22)	0.15 ... 1.5	(0.0883 ... 0.883)	1 5
7 ... 70	(0.031 ... 0.31)	0.2 ... 2	(0.12 ... 1.24)	1 6
10 ... 100	(0.044 ... 0.44)	0.3 ... 3	(0.177 ... 1.77)	1 7
16 ... 160	(0.07 ... 0.7)	0.5 ... 5	(0.29 ... 2.71)	2 0
25 ... 250	(0.11 ... 1.1)	0.7 ... 7	(0.412 ... 4.12)	2 1
40 ... 400	(0.176 ... 1.76)	1.0 ... 11	(0.589 ... 6.47)	2 2
60 ... 600	(0.264 ... 2.64)	1.7 ... 17	(1 ... 10)	2 3
100 ... 1 000	(0.44 ... 4.4)	2 ... 30	(1.77 ... 17.66)	2 4
160 ... 1 600	(0.7 ... 7)	3 ... 46	(2.35 ... 27.07)	2 5
250 ... 2 500	(1.1 ... 11)	6 ... 70	(4.12 ... 41.2)	2 6
400 ... 4 000	(1.76 ... 17.6)	10 ... 110	(6.47 ... 64.74)	2 7
600 ... 6 000	(2.64 ... 26.4)	16 ... 170	(10 ... 100)	3 0
1 000 ... 10 000	(4.4 ... 44)	28 ... 290	(17.1 ... 170.7)	3 1
1 600 ... 16 000	(7 ... 70)	45 ... 460	(27.1 ... 270.7)	3 2
2 000 ... 20 000	(8.8 ... 88	55 ... 550	(32.4 ... 323.7)	3 3
2 500 ... 25 000	(11 ... 110)	69 ... 700	(41.2 ... 412)	3 4
4 000 ... 40 000	(17.6 ... 176)	109 ... 1 100	(64.7 ... 647.4)	3 5
5 000 ... 50 000	(22 ... 220)	134 ... 1 350	(79.5 ... 794.6)	3 6
6 000 ... 60 000	(26.4 ... 264)	169 ... 1 700	(100 ... 1 000)	3 7
8 000 ... 80 000	(35.2 ... 352)	239 ... 2 400	(141.3 ... 1 413)	4 0
10 000 ... 100 000	(44 ... ... 440)	299 ... 3 000	(176.6 ... 1 766)	4 1

Display unit / process temperature

Standard (aluminum) - up to 200 °C with local display/150 °C with electrical output	0
Standard (aluminum) with displaced display - up to 350 °C with local display and electrical outputs	1
Stainless steel IP66 - up to 200 °C with local display/150 °C with electrical outputs	2
Stainless steel IP66 with displaced display - up to 350 °C with local display and electrical outputs	3

Heating/cooling sheath

Without (standard)	A
With flange connection EN1092-1 DN 15 PN 40	B
With flange connection ½ " ANSI B16.5 Class 150 RF	C

Display/outputs

With display	A
With display, 1 inductive contact (limit switch) SJ 3.5N	B
With display, 2 inductive contacts (limit switches) SJ 3.5N	C
With display, HART and 4 to 20 mA	D
With display, HART, 4 to 20 mA, 2 inductive contacts SJ 3.5N	E
With display, HART, 4 to 20 mA, 1 inductive contact, 1 pulse output	F
With display, PROFIBUS PA	G

Calibration

Standard calibration	
• Without calibration certificate	0
• With calibration certificate	1

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Selection and ordering data	Order code
Other types of liquid and gas measurement	
Please add "-Z" to Article No. and specify Order code.	
Marking of name plate	
Name plate in English	**B11**
Certificates	
Certificate of compliance EN 10204-2.1	**C10**
Factory inspection certificate EN 10204-2.2	**C11**
Acceptance test certificate 3.1 according to EN 10204	**C12**
Dye penetration test on pressure bearing weldings	**C13**
X-ray test of pressure bearing weldings	**C14**
Pressure test with acceptance test certificate 3.1 according to EN 10204	**C15**
PMI (positive material identification) test of pressure bearing metal parts	**C16**
Float damping	
With float damping	**D01**
Specification of medium process data (specify in plain text)	
Specification always required for each order: Medium Operating pressure Operating temperature Density (only for customer-specified medium) Viscosity (only for customer-specified medium) Measuring range	**Y01**
TAG plate	
TAG plate in stainless steel (add plain text)	**Y17**
Cleaning to company standard	
Cleaning Class 2, with identification free of oil and grease	**K46**
Cleaning Class 1, with identification free of oil, grease and silicon	**K48**
Approvals	
With ATEX approval	**M51**
Special version (specify in plain text)	**Y99**

Note:
For possible combinations of nominal diameters and flow tube, see table on page 3/414

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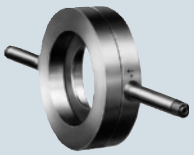
3

Primary differential pressure devices to DIN EN ISO 5167

		Nominal diameters	Nominal pressure
	Orifice plates with annular chambers	EN: DN 50 ... DN 1000 ASME: 2 inch … 40 inch	EN: PN 6 ... PN 100 ASME: Class 150 … 600
	Orifice plates with single tappings	EN: DN 50 ... DN 500 ASME: 2 inch … 20 inch	EN: PN 6 ... PN 315 ASME: Class 150 … 2500
	Metering pipe • Orifice plate with annular chambers, mounted between flanges	EN: DN 10 ... DN 50 ASME: ½ inch … 2 inch	EN: PN 10 ... PN 100 ASME: Class 150 … 600

Further products for the complete setup for flow measurements with a primary differential pressure device,	
e. g. an orifice plate	
+	
For **compensation vessels** (for steam), see chapter 1 For **threaded flange pairs**, see chapter 1	
+	
For **initial shut-off valves**, see chapter 1	
+	
For **valve manifolds**, see chapter 1 e. g.	
5-spindle valve manifold or	
Valve manifold combination DN 8 for vapor measurement	
+	
For **SITRANS P DS III differential pressure transmitter**, see chapter 1 Measuring cell options: 20, 60, 250, 600 and 1600 mbar	

Overview

Primary differential pressure devices are standardized mechanical flow sensors, often also referred to as differential pressure transducers. The primary differential pressure devices are calculated and manufactured according to DIN EN ISO 5167.

Through constriction of the line diameter in the pressure device, the flow rate creates a differential pressure that is converted with the help of a differential pressure transmitter into a proportional current signal or flow value. The assignment of differential pressure to flow is created by means of a "calculation of the primary differential pressure device".

Primary differential pressure devices are suitable for single-phase media such as gas, vapor and liquids without solid components.

Requirement when ordering a primary differential pressure device

Always quote the orifice plate calculation and the classification according to the pressure equipment directive 97/23/EC (PED) when placing an order.

Orifice plate calculation - calculation protocol

For the "orifice plate calculation" service, you need to fill out the "Questionnaire for calculation of a primary differential pressure device according to DIN EN ISO 5167". The intelligent "SITRANS F O questionnaire online" can be found in the PIA Life Cycle Portal at http://www.siemens.com/pia-portal.

For this purpose, you need to specify all the data of the measuring point, medium, process and pipe data, as well as details of installation conditions, flow conditions, permissible pressure losses and accuracy requirements.

We will be unable to carry out the calculation if there are any data missing. A calculation protocol with a consecutive number documents the calculation of the orifice plate. We require this calculation protocol from the customer for manufacturing purposes. It is to be included in the order for the orifice plate.

Important note:

The "Orifice Plate Calculation with Preparation of a Calculation Protocol" service is a separate process, and must be carried out before the orifice plate is ordered.

The calculation protocol issued by the customer is to be included in the order for the orifice plate.

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Classification in accordance with pressure equipment directive 97/23/EC (PED)

The pressure equipment directive must also be applied to the Orifice portfolio for use in Europe.

In compliance with the pressure equipment directive, equipment is divided into categories I to III or Article 3 paragraph 3 according to danger potential (medium/pressure/volume/nominal diameter).

Submission of this design data in accordance with pressure equipment directive 97/23/EC is mandatory for ordering and manufacture, and must be specified by customers in the orifice plate order.

The Article No. of the orifice plate contains the relevant Category I, II, III or Article 3 paragraph 3 in the Order code.

Detailed information is available under "Pressure equipment directive 97/23/EC".

How to order the "Orifice plate with appended calculation protocol" product

To order an orifice plate, you need to supply the following data:

- Complete Article No. of the orifice plate, including the respective Order code "Manufacture according to pressure equipment directive":
  - Category I, II, III or Article 3 paragraph 3 and the design data with Order Codes Y31 to Y35
  - Or without (only available outside Europe!)
- Appended "Calculation Protocol" issued by the customer with Order Code Y21 or Y22, or statement "Orifice plate without calculation" with Order Code Y01

The orifice plate can only be manufactured when it has been passed as a "clean order", i. e. it has been confirmed that the data of the Article No. match the data of the calculation protocol.

Benefits

- Primary differential pressure devices are suitable for universal use across the globe.
- Primary differential pressure devices are very robust and can be used in a wide range of nominal diameters.
- Suitable for high temperature and pressure ranges.
- No wet calibration required as they use an internationally standardized flow rate measurement procedure.
- The differential pressure transmitter can be used over a long distance from the measuring location.
- The differential pressure method is well known and has a large installed base.
- The SITRANS P differential pressure transmitter is easy to parameterize again if process data change. They are adapted by recalculating and assigning new parameters to the transmitter or, in the case of the version orifice plate with annular chamber, by using a new orifice disk.

Application

Power stations

Measurement of steam, condensate and water.

Petrochemical industry/Refineries

Measurement of water, steam and liquid and gas hydrocarbons.

Chemical industry

Measurement of various liquid and gas media.

Oil and gas industries

Measurement of liquid and gas hydrocarbons.

Design

Orifice plate with annular chambers

The version orifice plate with annular chambers comprises two support rings which are connected to the inside of the pipe over an annular chamber and an annular gap. Tapping sockets direct the differential pressure from the support rings to the differential pressure transmitter over shut-off fittings and differential pressure lines.

The orifice disk is inserted between the support rings together with a gasket.

Orifice plate with single tappings

In the version of the orifice plate with single tappings the orifice plate is a single unit. The inside of the tube is connected to the tapping sockets by two single tappings.

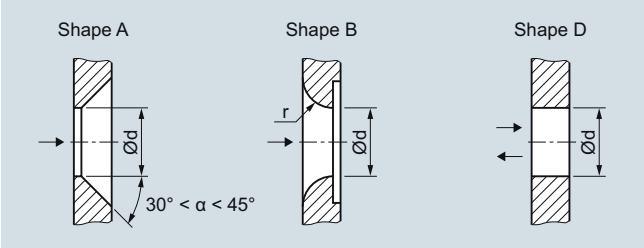
Both types of orifice plate are installed between two flanges in the pipeline.

Function

Mode of operation

The orifice plate creates a differential pressure. The pressure is transferred through the vertical columns of medium in the differential pressure lines to the measuring cell of the differential pressure transmitter. The transmitter converts the pressure signal with square-root characteristic into a flow-proportional current or into a digital signal, e. g. PROFIBUS.

Types of primary differential pressure devices



Shapes of the orifice disk aperture

The primary differential pressure devices are calculated and manufactured according to DIN EN ISO 5167. According to this, the application range of the standard orifice disk aperture form A is limited by the Reynolds number. The limits depend on the diameter ratio β = d/D. (D: internal diameter of pipe).

In the case of Reynolds numbers from approx. 500 to 2.5 x 10^5 and DN 40 to DN 150, the orifice disk aperture form B (quarter circle) can be used for slightly less accurate measurements. The profile radius r depends on the diameter ratio ß and results from the calculation of the diameter of the orifice disk aperture d.

The cylindrical orifice disk aperture form D is used for measurements in both flow directions.

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Tapping sockets

Type of threaded connections and welding connections dependent on the measured medium and the nominal pressure of the shut-off fitting

The type of socket connections depends on the measured medium and the nominal pressure of the shut-off fittings; the socket length depends on the nominal diameter (pipe diameter) of the primary differential pressure device and the operating temperature (because of the thermal insulation!). The socket position depends on the measured medium and the flow direction.

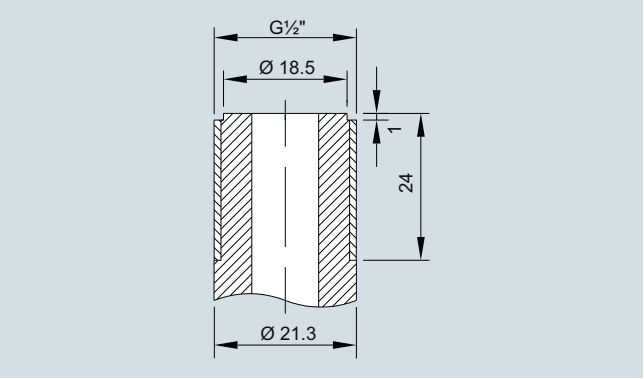
- With threaded connection G½ DIN ISO 228/1, connection dimensions to DIN 19207 Form V, for liquids and gases up to PN 160, for steam up to PN 100
- With threaded connection ½-14 NPT male, for version acc. to ASME up to class 600
- With Ø 12 mm pipe connection for pipe union with ferrule
- With Ø 21.3 mm welding connection for liquids and gases up to PN 400, and for steam up to PN 100, or Ø 24 mm for liquids and gases over PN 400, and for steam over PN 100

Other connections on request.

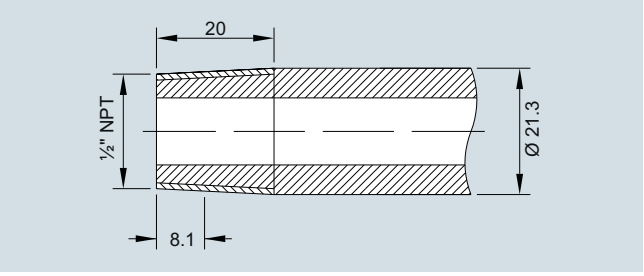
Length of tapping sockets

The length of the tapping sockets are specified in DIN 19205, Part 2.

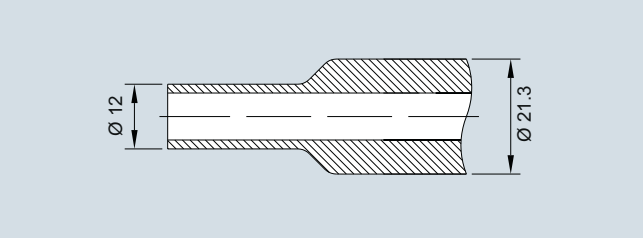
If using with high temperatures and stronger insulations, please quote the insulation thickness and the required length of the tapping sockets when placing an order.



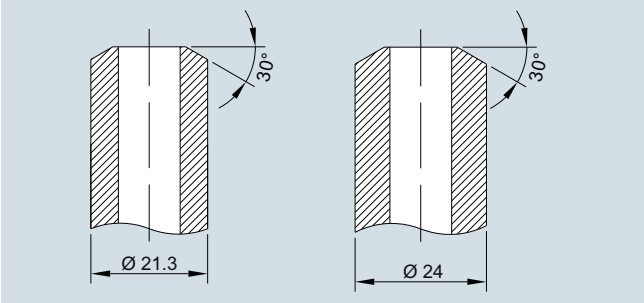
Threaded connections of tapping sockets for liquids and gases up to PN 160, for steam up to PN 100, dimensions in mm



Threaded connection ½-14 NPT male, dimensions in mm



With Ø 12 mm pipe for pipe union with ferrule, dimensions in mm

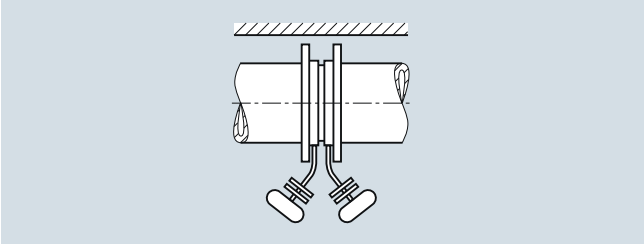


Welding connections of tapping sockets, dimensions in mm

Position of the tapping sockets

When measuring liquids and gases, the position of the tapping sockets must comply with the tables according to DIN 19205; when measuring steam, the compensation vessels must be at the same height.

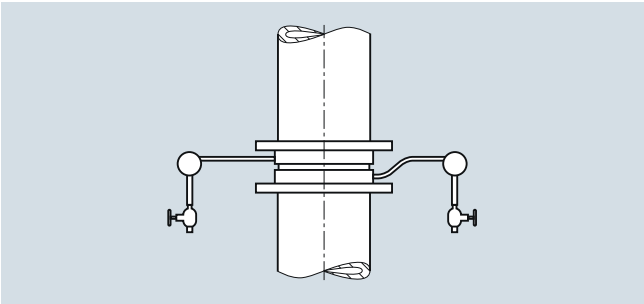
- Horizontal steam lines



Horizontal steam line in front of a wall with primary differential pressure device and valve combination; with annular chamber orifice plate or single part orifice plate with special length of 65 mm

In the case of horizontal steam lines, straight sockets are arranged opposite each other or, if the pipe is close to a wall, with bent sockets on one side.

- Vertical steam lines



Vertical steam line with primary differential pressure device and valve combination

In the case of vertical and inclined steam lines, the lower socket is bent upwards so that the connection flanges and compensation vessels are also at the same height.

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Extract from DIN 19205, Part 1, August 1988

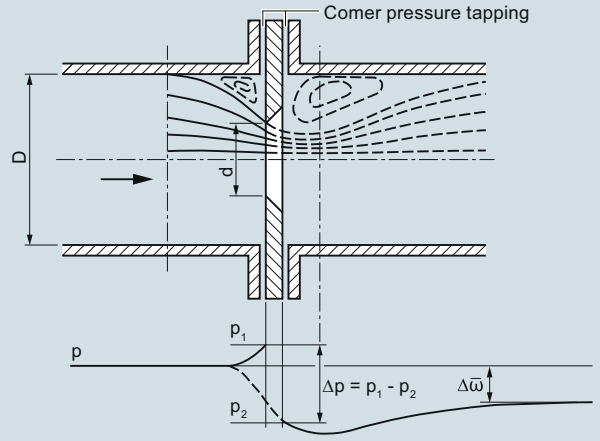
No.	Pipe position and flow direction			Position of the tapping sockets		Application
1	Horizontal		→	180°		With compensation vessels
2 [1)2)]				0°		
3 [1) 2)]						
4	Vertical	Rising	↑	90°		
5		Falling	↓			
6		Rising	↑	180°		
7		Falling	↓			
10	Horizontal		→	<γ [3)]		Without compensation vessels
11	Horizontal, vertical		→↓↑	180°		
13	Vertical		↓↑	90°		

[1)] Not possible with orifice plates with single tappings (overall length 40 mm). Special length of 65 mm is possible.

[2)] Only possible with orifice plates with annular chambers (overall length 65 mm) with bent tapping sockets.

[3)] Angle γ is dependent on the nominal pressure and nominal diameter in accordance with DIN 19 205.

Principle of the differential pressure method



D Internal diameter of pipe
d Diameter of orifice disk aperture
p Pressure in the pipe
p_1 Pressure immediately upstream of primary device
p_2 Pressure immediately downstream of primary device
Δp Differential pressure
$\Delta\bar{\omega}$ Remaining pressure loss

Principle of the differential pressure method: Pressure curve at a pipe restriction

A primary differential pressure device is installed at the measuring point to measure the flow. This restricts the pipe and has two connections for sampling the differential pressure. If the properties of the primary device and the medium are known such that the equation below can be evaluated, the differential pressure is a measure of the absolute flow. No reference measurements are required; the flow measurement can be checked independent of the device manufacturer.

The differential pressure method is based on the law of continuity and Bernoulli's energy equation.

According to the law of continuity, the flow of a moving medium in a pipeline is the same at all points. If the cross-section is reduced at one point, the flow velocity must increase at this point. According to Bernoulli's energy equation, the energy content of a flowing medium is constant and is the total of the static (pressure) and kinetic (movement) energies. An increase in the flow rate therefore results in a reduction in the static pressure (see the figure "Principle of the differential pressure method: Pressure curve at a pipe restriction"). This pressure difference Δp, the so-called differential pressure, is a measure of the flow.

In general the following equation applies: $q = c\sqrt{\Delta p}$

Where:

- q: flow (q_m, q_v) mass flow or volume flow
- Δp: Differential pressure
- c: Factor depending on the dimensions of the pipeline, the type of constriction, the density of the flowing medium etc.

According to this equation, the differential pressure created by the constriction is proportionally equal to the square of the flow (see the figure "Relationship between flow q and differential pressure Δp").

Integration

The orifice plate is installed between two flanges in the pipeline. Using compensation vessels (for steam) and initial shut-off valves, the differential pressure of the high-pressure side and low-pressure side is directed through differential pressure lines to a multiple valve manifold and on to the differential pressure transmitter. For media with extreme pressure and temperature fluctuations it makes sense to take an additional measurement of the pressure and temperature in order to correct the flow signal of the transmitter in a subsequent correction computer.

Selection of mounting point

The flow measuring regulations DIN EN ISO 5167 not only consider the design of primary differential pressure devices, but also assume that their installation is in accordance with the standard so that the specified tolerances can be retained. The required inlet and outlet pipe sections according to ISO 5167 can be found in the calculation protocol of the respective orifice plate. Configuration of the pipeline should allow for standardized installation (required inlet and outlet pipe section). Particular attention must be paid to ensure that the primary device can be fitted in a sufficiently long straight section of pipe. Bends, valves and similar should be fitted sufficiently far upstream of the primary device to prevent them having a detrimental effect. Primary devices with a large diameter ratio are particularly sensitive to interferences.

Design of measuring point

The design of the measuring point depends on the medium and on the spatial conditions. The designs for gas and water only differ with regard to the position of the tapping sockets (see the figure "Measuring setup"); compensation vessels must also be provided for steam.

Metering pipes

On lines with small nominal diameters (DN 10 to DN 50) the measurements are influenced by the wall roughness and diameter tolerances of the pipes, far more so than by large nominal diameters. These influences are counteracted by using metering pipes with fitting inlet and outlet pipe sections made of precision pipes. For exact measurements with metering pipes, the flow coefficient C needs to be determined by means of calibration.

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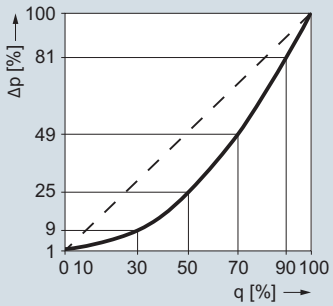
Options

Further versions that are available on request:

- Other types of primary differential pressure device: orifice plates without support rings, measurement flange orifice plates, venturi nozzles, classic venturi tubes etc.
- Other nominal diameters and nominal pressures to EN and ASME
- Other lengths, special lengths
- Other materials
- Sealing face with recess or groove
- Flushing rings
- Other tapping sockets, multiple tappings
- Material acceptance test certificates or cold water pressure tests

Characteristic curves

The orifice plate has a square-law relationship between differential pressure and flow. A square-root transmitter is required therefore to create a linear flow characteristic.



q	0	1	3	5	8	10	15	20	30	40	50	60	70	80	90	100 %
Δp	0	0,01	0,09	0,25	0,64	1	2,25	4	9	16	25	36	49	64	81	100 %

Setting range for application point of square-rooted characteristic for SITRANS P differential pressure transmitter

Relationship between flow q and differential pressure Δp

More information

- Standards
- Instruction Manual SITRANS P
- Installation Instructions

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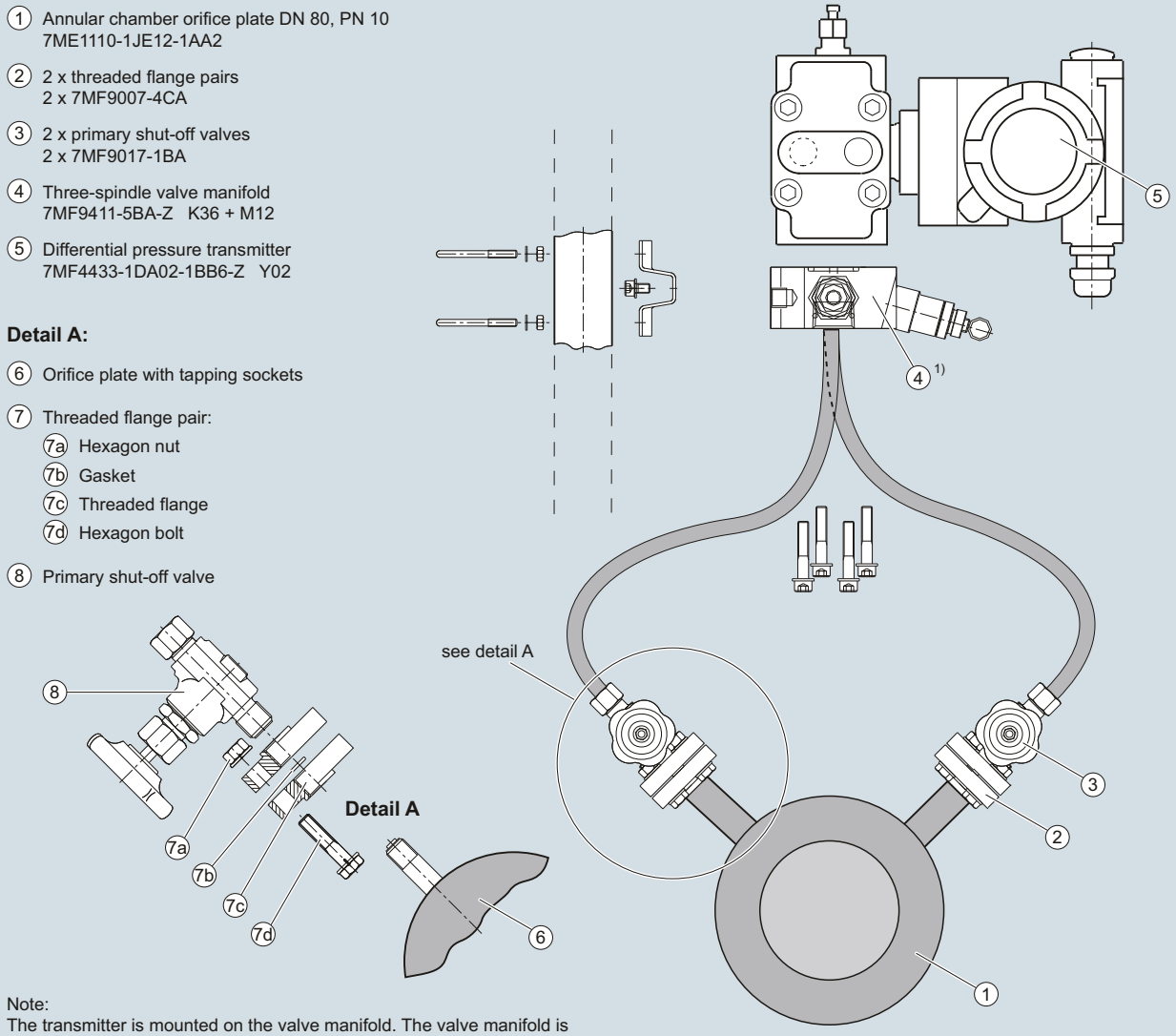
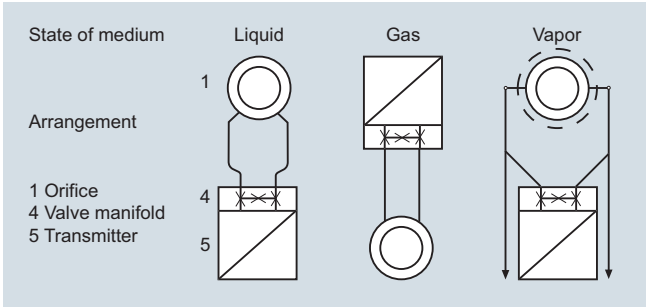


Design of measuring point, example: gas measurement (non-corrosive, non-hazardous)



Measuring setup

Technical specifications

The technical properties of the orifice plates depend on the device:

- Nominal diameters
- Nominal pressure
- Materials
- Mass
- Temperature limits

Accessories

- Compensation vessels
- Threaded flange pairs
- Primary shut-offs
- Valve manifold
- Differential pressure lines (to be provided by the plant owner)
- Gaskets, bolts, screws (to be provided by the plant owner)
- Differential pressure transmitter

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Pressure equipment directive 97/23/EC

Overview

The pressure equipment directive 97/23/EC applies to the alignment of the statutory orders of the European member states for pressure equipment used within its European area of validity. Equipment as defined by the directive includes vessels, pipelines and accessories with a maximum permissible pressure of more than 0.5 bar above atmospheric pressure.

Application of the pressure equipment directive was optional from November 29, 1999 onwards and has been mandatory since May 29, 2002.

Categorization according to danger potential

In compliance with the pressure equipment directive, equipment is divided into categories I to III or Article 3 paragraph 3 according to danger potential (medium/pressure/volume/nominal diameter).

The following criteria are decisive for assessment of the danger potential and are also shown in the diagrams (see "Characteristic curves").

Fluid group	Group 1 or 2
Aggregate state	Liquid or gaseous
Type of pressurized equipment	
• Pipeline	Nominal diameter, pressure or product of pressure and nominal diameter (PS * DN)

Note

Liquids according to Article 3 are those liquids whose steam pressure is not more than 0.5 bar above standard atmospheric pressure (1013 mbar) at the maximum permissible temperature.

The maximum permissible temperature for the liquids used is the user-defined maximum process temperature. This must be within the limits defined for the equipment.

Categorization of media (liquid/gaseous) into fluid groups

In compliance with Article 9, fluids are divided into the following fluid groups:

Group 1

	Explosive R phrases: e. g.: 2, 3 (1, 4, 5, 6, 9, 16, 18, 19, 44)		Very toxic R phrases: e. g.: 26, 27, 28, 39 (32)
	Extremely flammable R phrases: e. g.: 12 (17)		Toxic R phrases: e. g.: 23, 24, 25 (29, 31)
	Highly flammable R phrases: e. g.: 11, 15, 17 (10, 30)		Oxidizing R phrases: e. g.: 7, 8, 9 (14, 15, 19)

Flammable (where the maximum allowable temperature is above flashpoint).

Group 2

All fluids not belonging to Group 1.

Also applies to fluids which are e. g. dangerous to the environment, corrosive, dangerous to health, irritant or carcinogenic (if not highly toxic).

Conformity rating

Pressure equipment of categories I to IV must comply with the safety requirements of the directive and be assigned the CE symbol.

They must comply with a conformity rating procedure according to Appendix III of the directive.

Pressure equipment according to Article 3 paragraph 3 must be designed and manufactured in agreement with the sound engineering practice SEP applicable in a member country, and must not be assigned a CE symbol (CE symbols from other directives are not affected).

The manufacturer issues a declaration of conformity if the orifice plates are produced for use in the area covered by the PED and are assignable to the categories I, II or III. This declaration of conformity is given to the customer. Its contents depend on the design data of the customer's plant. The design data can only be provided by the operator/customer, and must be specified in the product order for the orifice plate.

Submission of the following design data is mandatory:

- Medium (name)
- Aggregate state (liquid or gas)
- Fluid group 1 or 2
- Max. permissible pressure (PS) of the plant (not PN)
- Max. permissible temperature TS of the plant (not operating temperature)
- Nominal diameter DN

Note

Equipment designed for media with a high danger potential (e.g. gases of fluid group 1) may also be used for media with a lower danger potential (e. g. gases of fluid group 2, or liquids of fluid groups 1 and 2).

The pressure equipment directive according to Article 1 paragraph 3 does not apply to equipment such as e. g. mobile offshore plants, ships, aircraft, water supply and waste water networks, nuclear plants, rockets and pipelines outside industrial plants.

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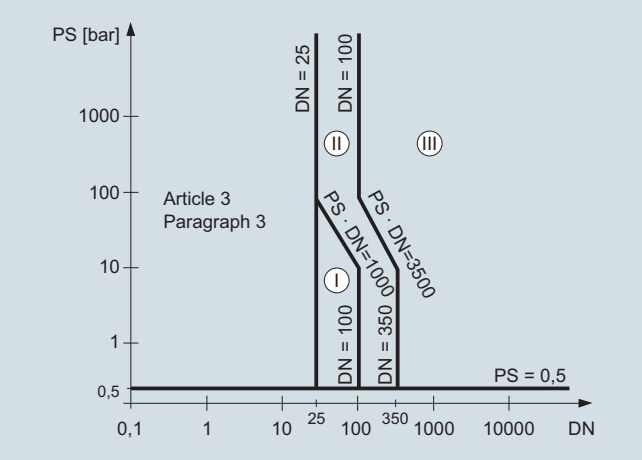
Characteristic curves

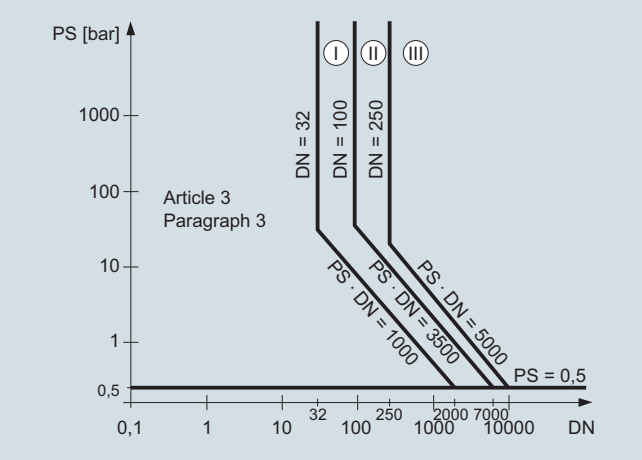
Gases of fluid group 1



Pipelines according to Article 3 Number 1.3 Letter a) First dash

Exception: Unstable gases (e.g. acetylene and ethylene) belonging to Categories I and II, must be included in Category III

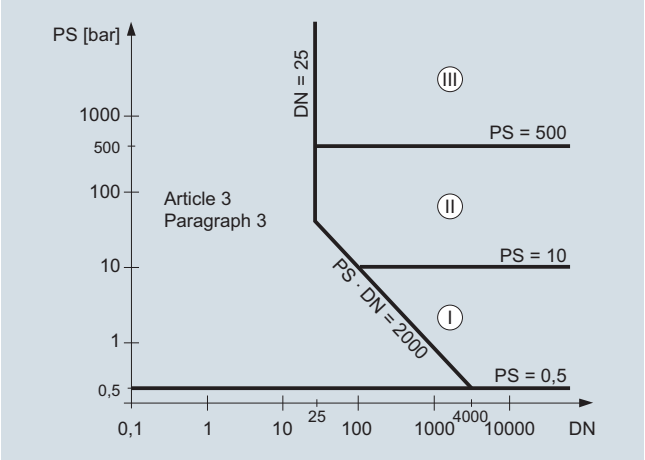
Gases of fluid group 2



Pipelines according to Article 3 Number 1.3 Letter a) Second dash

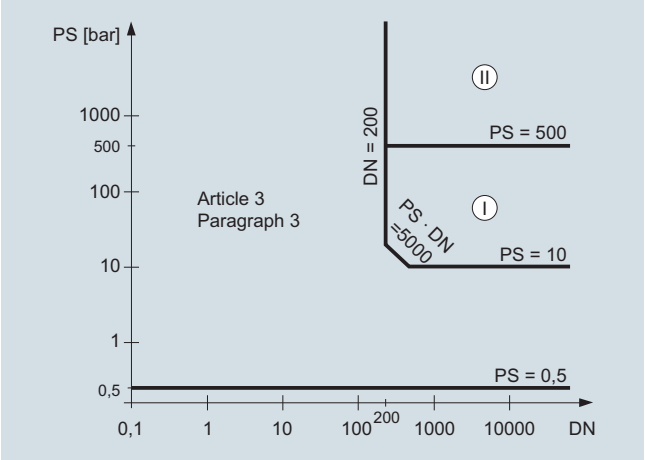
Exception: Liquids and steam, at temperatures > 350 °C belonging to Category II must be included in Category III.

Liquids of fluid group 1



Pipelines according to Article 3 Number 1.3 Letter b) First dash

Liquids of fluid group 2



Pipelines according to Article 3 Number 1.3 Letter b) Second dash

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Pressure equipment directive 97/23/EC

Design data and product order for orifice plate

If the orifice plate is used in Europe the orifice plate is produced in accordance with the Pressure Equipment Directive 97/23/EC.

In this case the design data are mandatory for the production of an orifice plate and must be specified when ordering.

The required design data are specified in the article number of an orifice plate with the Order code Y31 to Y35.

The following design data are mandatory; data can only be provided by the operator/customer:

Data for production according to Pressure Equipment Directive 97/23/EC - for use in Europe			
Order code for ordering	**Design data**		
Y31	• **Medium/measured medium**	**Name** _____	
Y32	• **Aggregate state**	Liquid ☐	Gaseous ☐
Y33	• **Fluid group** - Explosive - Highly, extremely flammable - Oxidizing - Toxic, highly toxic	Group 1 ☐	**All others** Group 2 ☐
Y34	• Maximum permissible pressure (*not PN*)	**PS**[1] _____	☐ bar ☐ psi
Y35	- at the **maximum permissible temperature**	**TS**[2] _____	☐ °C ☐ °F
	[1] PS: Setting pressure of the safety mechanism (valve, bursting disk) [2] TS: Range of the temperature limits		
The following are already defined by the article number:			
	• **Nominal diameter**	**DN** _____	
	• **Assignment of the category** Annex II of the Pressure Equipment Directive contains 4 diagrams with which the associated category of the primary differential pressure devices can be determined (see page 3/427). ☐ Article 3, Paragraph 3 ☐ Category II ☐ Category I ☐ Category III		

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Overview

SITRANS F O questionnaire online

For the calculation of a primary differential device in accordance with DIN EN ISO 5167 and for the production of primary differential devices in accordance with the Pressure Equipment Directive 97/23/EC the required data (measuring point and customer-specific data) can be entered in the "SITRANS F O questionnaire online".

The intelligent "SITRANS F O questionnaire online" can be found in the PIA Life Cycle Portal at:
http://www.siemens.com/pia-portal.

All the data required for calculating a primary differential device - orifice plates, nozzles, Venturi nozzles and the classic Venturi tube - can be entered here and attached to the order for calculation of an orifice plate as a Microsoft Excel file.

All the necessary data for calculating a primary differential device are requested menu-driven and can be verified by a check function.

Numerous new features provide the user with essential benefits when using the questionnaire online:

- Clear structure of all necessary parameters
- Menu-driven input of data and values through automatic specification of parameters and units, in accordance with the selected design, the given measured medium and the selected optimization criterion.
- Explanatory and in-depth notes as description and explanation of the parameter
- Numerous input options of customer and measuring point specific supplementary conditions
- Verification of all mandatory input boxes
- Safe data storage of entered customer-specific parameters
- Print preview and print template
- Immediate dispatch of the completed questionnaire online by e-mail

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Orifice plate with annular chamber

Application

Suitable for non-corrosive and corrosive gases, vapors and liquids; permissible operating temperature -10 to +400°C.

Design

- Two support rings with replaceable orifice disk form A, B or D (see types of primary differential pressure devices in "Technical description", "Function"); see Ordering data for materials
- Graphite gasket with noncorrosive metal foil insert between orifice disk and support ring outlet

Overall length

65 mm to DIN 19205

Nominal diameters

EN: DN 50 to DN 1000

ASME: 2 inch to 40 inch

Nominal pressure

EN: PN 6 to PN 100

ASME: class 150 to 600

Sealing face to the mating flanges

- Plane, sealing face turned, N10/N12 to DIN ISO 1302
- Plane, sealing face turned, N8 to DIN ISO 1302
- Plane, RF (raised faced) for version to ASME

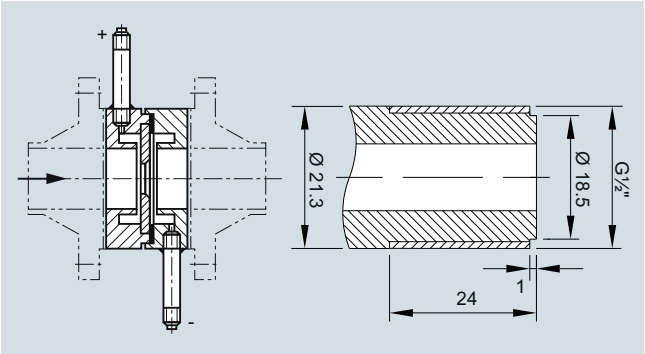
Tapping sockets

For the dimensions of the following tapping sockets, see "Function":

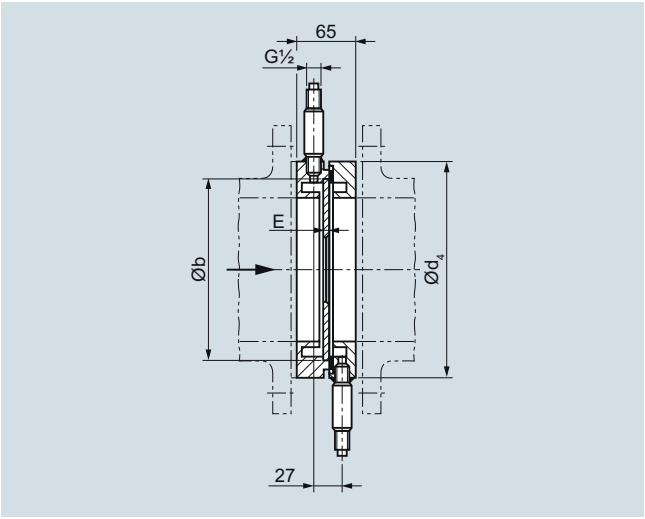
- With connection thread G½ DIN ISO 228/1, connection dimensions to DIN 19207 form V
- With threaded connection ½-14 NPT male, for version to ASME
- With Ø 12 mm pipe connection for pipe union with ferrule
- With welding connection Ø 21.3 mm

See "Technical description" and "Function" for position of the tapping sockets.

Dimensional drawings



Orifice plate with annular chamber (above); tapping socket with threaded connection (below), dimensions in mm



Tapping socket: Socket length is fixed in accordance with the pressure and nominal diameter (DIN 19 205, Part 2).

- Threaded connections of tapping sockets for liquids and gases up to PN 160, for steam up to PN 100, dimensions in mm

Versions for steam lines: See "Technical description", "Function" for position of the tapping sockets.

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Nominal diameter acc. to EN

DN	Inside diameter	External diameter d_4 / sealing face: plane, with recess or with groove.						
		PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100
50	43 ... 55	96	107	107	107	107	113	119
65	59 ... 71	116	127	127	127	127	138	144
80	73 ... 85	132	142	142	142	142	148	154
100	90 ... 108	152	162	162	168	168	174	180
125	114 ... 132	182	192	192	194	194	210	217
150	142 ... 160	207	218	218	224	224	247	257
200	185 ... 211	262	273	273	284	290	309	324
250	237 ... 262	317	328	329	340	352	364	391
300	285 ... 314	373	378	384	400	417	424	458
350	328 ... 362	423	438	444	457	474	486	512
400	380 ... 408	473	489	495	514	546	543	–
500	477 ... 514	578	594	617	624	628	–	–
600	581 ... 610	679	695	734	731	–	–	–
700	686 ... 710	784	810	804	833	–	–	–
800	776 ... 810	890	917	911	942	–	–	–
900	876 ... 910	990	1017	1011	1042	–	–	–
1000	976 ... 1010	1090	1124	1128	1154	–	–	–

Orifice plates with annular chambers for installation between EN flanges to EN 1092-1, dimensions in mm and weights

DN	L				E	Weight (approx. in kg)	
	PN 6	PN 10 ... 25	PN 40	PN 63 ... 100	PN 6 ... 100	With smallest nominal pressure	With largest nominal pressure
50	79	79	79	79	2 ± 0.2	2.5	4.5
65	96	96	96	96	2 ± 0.2	3.4	6.4
80	115	115	115	115	4 ± 0.2	4.3	6.9
100	137	137	137	137	4 ± 0.25	4.7	8.6
125	164	164	164	164	4 ± 0.25	6.3	12.4
150	193	193	193	193	4 ± 0.29	7.0	17.0
200	247	247	247	247	4 ± 0.29	10.3	26.2
250	302	302	302	302	4 ± 0.32	13.1	36.6
300	354	354	354	354	4 ± 0.36	17.3	49.0
350	403	403	403	403	4 ± 0.4	25.0	63.0
400	452	452	452	452	4 ± 0.4	28.0	73.8
500	553	563	563	–	6 ± 0.4	36.2	65.9
600	659	659	–	–	6 ± 0.4	42.5	75.6
700	757	762	–	–	8 ± 0.4	51.8	89.5
800	869	875	–	–	8 ± 0.4	61.7	109
900	969	975	–	–	8 ± 0.4	68.3	123
1000	1071	1079	–	–	10 ± 0.4	74.0	148

Orifice plates with annular chambers for installation between EN flanges to EN 1092-1. dimensions in mm and weights (contd.)

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Orifice plate with annular chamber

Nominal diameter acc. to ASME

ASME	External diameter d4 / sealing face: Plane. RF (raised faced)			L			E	Weight (approx. in kg)	
	Class 150	Class 300	Class 600	Class 150	Class 300	Class 600	Class 150 ... 600	With smallest nominal pressure	With largest nominal pressure
2 inch	105	111	111	79	79	79	2±0.2	2.5	4.5
2½ inch	124	130	130	96	96	96	2±0.2	3.4	6.4
3 inch	137	149	149	115	115	115	4±0.2	4.3	6.9
4 inch	175	181	194	137	137	137	4±0.2	4.7	8.6
5 inch	197	216	241	164	164	164	4±0.25	6.3	12.4
6 inch	222	251	267	193	193	193	4±0.29	7.0	17.0
8 inch	279	308	321	247	247	247	4±0.29	10.3	26.2
10 inch	340	362	400	302	302	302	4±0.32	13.1	36.6
12 inch	410	422	457	354	354	354	4±0.36	17.3	49.0
14 inch	451	486	492	403	403	403	4±0.4	25.0	63.0
16 inch	514	540	565	452	452	452	4±0.4	28.0	73.8
20 inch	549	597	613	553	563	563	6±0.4	36.2	65.9
24 inch	717	775	790	659	659	–	6±0.4	42.5	75.6

Orifice plates with annular chambers for installation between ASME flanges to ASME B16.5, dimensions in mm and weights

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Selection and ordering data	Article No.	Order code
Orifice plate with annular chambers ↗	7ME1110-	-1
for mounting between flanges		
Sealing faces to the mating flanges: plane.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Nominal diameter acc. to EN		
DN 50		
PN 6	1GA	
PN 10 ... PN 40	1GE	
PN 63	1GF	
PN 100	1GG	
DN 65		
PN 6	1HA	
PN 10 ... PN 40	1HE	
PN 63	1HF	
PN 100	1HG	
DN 80		
PN 6	1JA	
PN 10 ... PN 40	1JE	
PN 63	1JF	
PN 100	1JG	
DN 100		
PN 6	2AA	
PN 10 and PN 16	2AC	
PN 25 and PN 40	2AE	
PN 63	2AF	
PN 100	2AG	
DN 125		
PN 6	2BA	
PN 10 and PN 16	2BC	
PN 25 and PN 40	2BE	
PN 63	2BF	
PN 100	2BG	
DN 150		
PN 6	2CA	
PN 10 and PN 16	2CC	
PN 25 and PN 40	2CE	
PN 63	2CF	
PN 100	2CG	
DN 200		
PN 6	2EA	
PN 10 and PN 16	2EC	
PN 25	2ED	
PN 40	2EE	
PN 63	2EF	
PN 100	2EG	
DN 250		
PN 6	2FA	
PN 10	2FB	
PN 16	2FC	
PN 25	2FD	
PN 40	2FE	
PN 63	2FF	
PN 100	2FG	
DN 300		
PN 6	2GA	
PN 10	2GB	
PN 16	2GC	
PN 25	2GD	
PN 40	2GE	
PN 63	2GF	
PN 100	2GG	

Selection and ordering data	Article No.	Order code
Orifice plate with annular chambers	7ME1110-	-1
DN 350		
PN 6	2HA	
PN 10	2HB	
PN 16	2HC	
PN 25	2HD	
PN 40	2HE	
PN 63	2HF	
PN 100	2HG	
DN 400		
PN 6	2JA	
PN 10	2JB	
PN 16	2JC	
PN 25	2JD	
PN 40	2JE	
PN 63	2JF	
DN 500		
PN 6	2KA	
PN 10	2KB	
PN 16	2KC	
PN 25	2KD	
PN 40	2KE	
DN 600		
PN 6	3AA	
PN 10	3AB	
PN 16	3AC	
PN 25	3AD	
DN 700		
PN 6	3BA	
PN 10	3BB	
PN 16	3BC	
PN 25	3BD	
DN 800		
PN 6	3CA	
PN 10	3CB	
PN 16	3CC	
PN 25	3CD	
DN 900		
PN 6	3DA	
PN 10	3DB	
PN 16	3DC	
PN 25	3DD	
DN 1000		
PN 6	3EA	
PN 10	3EB	
PN 16	3EC	
PN 25	3ED	
Nomin. diameter acc. to ASME		
2 inch		
Class 150	5GA	
Class 300	5GB	
Class 600	5GC	
2½ inch		
Class 150	5HA	
Class 300	5HB	
Class 600	5HC	
3 inch		
Class 150	5JA	
Class 300	5JB	
Class 600	5JC	
4 inch		
Class 150	6AA	
Class 300	6AB	
Class 600	6AC	

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Orifice plate with annular chamber

Selection and ordering data	Article No.	Order code
Orifice plate with annular chambers	**7ME1110 -**	**- 1**
5 inch		
Class 150	**6BA**	
Class 300	**6BB**	
Class 600	**6BC**	
6 inch		
Class 150	**6CA**	
Class 300	**6CB**	
Class 600	**6CC**	
8 inch		
Class 150	**6EA**	
Class 300	**6EB**	
Class 600	**6EC**	
10 inch		
Class 150	**6FA**	
Class 300	**6FB**	
Class 600	**6FC**	
12 inch		
Class 150	**6GA**	
Class 300	**6GB**	
Class 600	**6GC**	
14 inch		
Class 150	**6HA**	
Class 300	**6HB**	
Class 600	**6HC**	
16 inch		
Class 150	**6JA**	
Class 300	**6JB**	
Class 600	**6JC**	
20 inch		
Class 150	**6KA**	
Class 300	**6KB**	
Class 600	**6KC**	
24 inch		
Class 150	**7AA**	
Class 300	**7AB**	
Class 600	**7AC**	
Special version		
Specify Order code and plain text Nominal diameter: ..., nominal pressure: ..., material no.: ... and material name: ...	**9AA00**	**H1Y**
Material for non-corrosive media		
Support rings made of P265GH, material no. 1.0425; tapping sockets made of P235GH, material no. 1.0345; orifice disk made of material no. 1.4404, permissible operating temperature -10 to +400 °C	**12**	
Material for corrosive media		
Support rings, tapping sockets and orifice disk made of X 2 CrNiMo 17-12-2, material No. 1.4404; permissible operating temp. -10 to +400 °C	**15**	

Selection and ordering data	Article No.	Order code
Orifice plate with annular chambers	**7ME1110 -**	**- 1**
Tapping sockets		
with threaded connection G½; for liquids and gases PN 160, for steam PN 100		
• Opposite one another, straight	**A**	
• Opposite one another, bent-up, for vertical pipelines	**B**	
• Arranged on one side, for horizontal pipelines	**C**	
With threaded connection ½-14 NPT male		
• Opposite one another, straight	**Q**	
• Opposite one another, bent-up, for vertical pipelines	**R**	
• Arranged on one side, for horizontal pipelines	**S**	
With pipe Ø 12 mm for pipe union with ferrule, max. 200 °C permissible		
• Opposite one another, straight	**J**	
• Opposite one another, bent-up, for vertical pipelines	**K**	
• Arranged on one side, for horizontal pipelines	**L**	
With welding connection ∅ 21.3 mm for liquids and gases PN 100 ... PN 400, for steam PN 100		
• Opposite one another, straight	**D**	
• Opposite one another, bent-up, for vertical pipelines	**E**	
• Arranged on one side, for horizontal pipelines	**F**	
Shape of orifice disk aperture		
For flow in one direction (see figure "Shapes of orifice disk aperture")		
• Orifice plate form A	**A**	
• Quarter-circle nozzle form B	**B**	
For flow in both directions		
• Cylindrical orifice plate form D	**D**	
Manufactured according to pressure equipment directive		
None[1)]	**0**	
According to Article 3, Paragraph 3 Design data Y31 to Y35 necessary	**1**	
According to category 1, 2, 3 with CE marking and EC declaration of conformity Design data Y31 to Y35 necessary	**5**	

[1)] Only possible outside Europe

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Selection and ordering data	Order code
Further designs Add "-**Z**" to Article No. and specify Order code(s) and plain text.	
With Siemens calculation protocol Specify in plain text: No.: ... e. g. no.: 110025240101, Attach calculation protocol to the order	**Y21**
With third-party calculation Specify in plain text: No.: ... Attach calculation protocol to the order	**Y22**
Orifice plate without calculation Specify in plain text: Diameter of orifice disk aperture **d = ... mm** Internal diameter of pipe **D=... mm** Radius of quarter-circle nozzle **r = ... mm**	**Y01**
Design data according to Pressure equipment directive 97/23/EC	
Name of medium Specify in plain text: Medium: ..... e. g. natural gas	**Y31**
Aggregate state Specify in plain text: Aggregate state: ..... Liquid or gaseous	**Y32**
Fluid group Specify in plain text: Fluid group: ..... Group 1: hazardous explosive fluid or Group 2: All other fluids	**Y33**
Max. permissible pressure Specify in plain text: PS = ... in bar or PSI	**Y34**
Max. permissible temperature Specify in plain text: TS = … in °C or °F	**Y35**
Orifice plate degreased for oxygen measurements	
• DN 50 (2") ... DN 150 (6")	**A12**
• DN 200 (8") ... DN 400 (16")	**A13**
• DN 500 (20") ... DN 1000 (40")	**A14**
Material certificate Acceptance test certificate to EN 10204-3.1	**C01**
Cold water pressure test 1.5 x PN, with acceptance test certificate EN 10204	**D11**
Orifice disk including gasket	**on request**
Sealing face of orifice plate with recess or groove	**on request**

Note on ordering
The "calculation protocol" released by the customer with Order code Y21 or Y22 must be attached to the order as an appendix or the statement "orifice plate without calculation" will be made with Order code Y01.

Scope of delivery
Two support rings with tapping sockets, one orifice disk, one gasket between orifice disk and support ring.
Graphite (99.85%) flat gasket with foil insert (1.4401, 0.1 mm). Application for liquids, steam, gases, liquid gases, acids, hydrocarbons, oils and oil products.

Accessories
See "SITRANS P measuring instruments for pressure".

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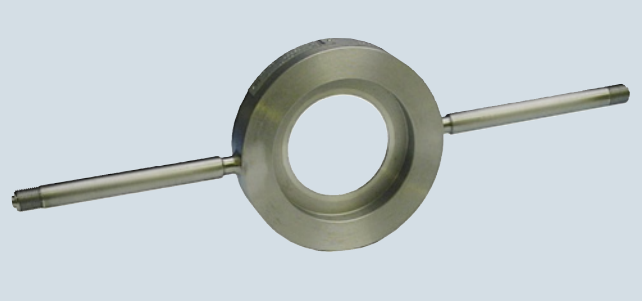
Orifice plate with single tapping

Application



Suitable for non-corrosive and corrosive gases, vapors and liquids; permissible operating temperature -10 to +570 °C.

Design

One-piece orifice plate, orifice disk form A, B or D (see types of primary differential pressure devices in "Technical description", "Function"); see Ordering data for materials.

Overall length

40 mm to DIN 19205

Nominal diameters

EN: DN 50 to DN 500

ASME: 2 inch to 20 inch

Nominal pressure

EN: PN 6 to PN 315

ASME: class 150 to 2500

Sealing face to the mating flanges

- Plane, sealing face turned, N10/N12 to DIN ISO 1302
- Plane, sealing face turned, N8 to DIN ISO 1302
- Plane, RF (raised faced) for versions to ASME

Tapping sockets

- With connection thread G½ DIN ISO 228/1, with connection dimensions to DIN 19207 form V
- With threaded connection ½-14 NPT male, for version to ASME
- With Ø 12 mm pipe connection for pipe union with ferrule
- With welding connection, Ø 21.3 mm

Connection size

The connection size depends on the operating pressure, the temperature of the medium (DIN 19 207 and 19 211) and the medium, e. g.

- For liquids and gases,
  - up to PN 160: Thread G½ or welding connection Ø 21.3 mm
  - from PN 6 and PN 400: Welding connection Ø 21.3 mm
  - > PN 400: Welding connection Ø 24 mm
- For steam
  - up to PN 100: Thread G½ or welding connection Ø 21.3 mm
  - > PN 100: Welding connection Ø 24 mm

See "Technical description" and "Function" for position of the tapping sockets.

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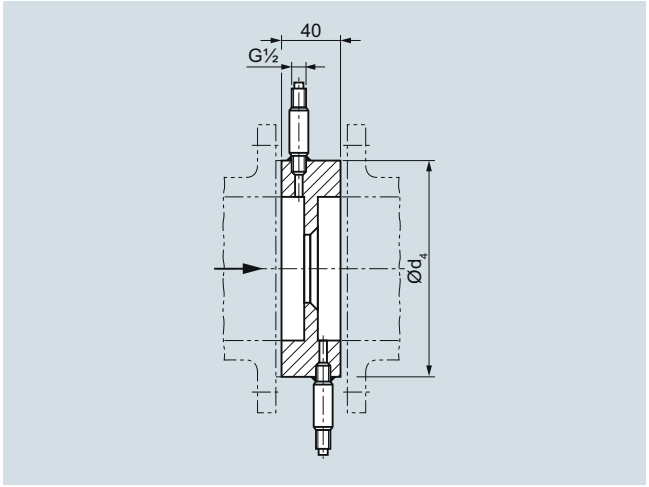
Dimensional drawings



Tapping socket: Socket length is fixed in accordance with the pressure and nominal diameter (DIN 19 205, Part 2), dimensions in mm

- Threaded connections of tapping sockets for liquids and gases up to PN 160, for steam up to PN 100,

Versions for steam lines: See "Technical description", "Function" for position of the tapping sockets.

Nominal diameter acc. to EN

DN	Inside diameter	External diameter d_4 / sealing face: plane, with recess or with groove.										Weight (approx. in kg)	
		PN 6	PN 10	PN 16	PN 25	PN 40	PN 63	PN 100	PN 160	PN 250	PN 315	With smallest nominal pressure	With largest nominal pressure
50	45 ... 55	96	107	107	107	107	113	119	119	124	134	1.6	4.0
65	61 ... 71	116	127	127	127	127	138	144	144	154	170	2.2	6.3
80	77 ... 85	132	142	142	142	142	148	154	154	170	190	2.9	7.8
100	94 ... 108	152	162	162	168	168	174	180	180	202	229	3.2	11.5
125	117 ... 132	182	192	192	194	194	210	217	217	242	274	4.3	15.9
150	144 ... 160	207	218	218	224	224	247	257	257	284	311	4.7	20.6
200	188 ... 211	262	273	273	284	290	309	324	324	358	398	7.0	33.7
250	240 ... 262	317	328	329	340	352	364	391	388	442	488	9.0	50.6
300	292 ... 314	373	378	384	400	417	424	458	458	538	–	12.3	37.3
350	331 ... 362	423	438	444	457	474	486	512	–	–	–	17.7	44.6
400	383 ... 408	473	489	495	514	546	543	–	–	–	–	19.8	43.1
500	480 ... 514	578	594	617	624	628	–	–	–	–	–	25.6	46.6

Orifice plates with single tappings for installation between EN flanges to EN 1092-1, dimensions in mm, weights

Nominal diameter acc. to ASME

ASME	External diameter d4 / sealing face: plane, with recess or with groove.			Weight (approx. in kg)	
	Class 150	Class 300	Class 600	With smallest nominal pressure	With largest nominal pressure
2 inch	105	111	111	1.6	4.0
2½ inch	124	130	130	2.2	6.3
3 inch	137	149	149	2.9	7.8
4 inch	175	181	194	3.2	11.5
5 inch	197	216	241	4.3	15.9
6 inch	222	251	267	4.7	20.6
8 inch	279	308	321	7.0	33.7
10 inch	340	362	400	9.0	50.6
12 inch	410	422	457	12.3	37.3
14 inch	451	486	492	17.7	44.6
16 inch	514	540	565	19.8	43.1
20 inch	549	597	613	25.6	46.6

Orifice plates with single tappings for installation between ASME flanges to ASME B 16.5, dimensions in mm and weights

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Orifice plate with single tapping

Selection and ordering data	Article No.	Order code
Orifice plate with single tappings ↗	7ME1120 - ■■■■■ - 1	■■■
for mounting between flanges		
Sealing faces to the mating flanges: plane.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Nominal diameter acc. to EN		
DN 50		
PN 6	1GA	
PN 10 ... PN 40	1GE	
PN 63	1GF	
PN 100 and PN 160	1GH	
PN 250	1GJ	
PN 315	1GK	
DN 65		
PN 6	1HA	
PN 10 ... PN 40	1HE	
PN 63	1HF	
PN 100 and PN 160	1HH	
PN 250	1HJ	
PN 315	1HK	
DN 80		
PN 6	1JA	
PN 10 ... PN 40	1JE	
PN 63	1JF	
PN 100 and PN 160	1JH	
PN 250	1JJ	
PN 315	1JK	
DN 100		
PN 6	2AA	
PN 10 and PN 16	2AC	
PN 25 and PN 40	2AE	
PN 63	2AF	
PN 100 and PN 160	2AH	
PN 250	2AJ	
PN 315	2AK	
DN 125		
PN 6	2BA	
PN 10 and PN 16	2BC	
PN 25 and PN 40	2BE	
PN 63	2BF	
PN 100 and PN 160	2BH	
PN 250	2BJ	
PN 315	2BK	
DN 150		
PN 6	2CA	
PN 10 and PN 16	2CC	
PN 25 and PN 40	2CE	
PN 63	2CF	
PN 100 and PN 160	2CH	
PN 250	2CJ	
PN 315	2CK	
DN 200		
PN 6	2EA	
PN 10 and PN 16	2EC	
PN 25	2ED	
PN 40	2EE	
PN 63	2EF	
PN 100 and PN 160	2EH	
PN 250	2EJ	
PN 315	2EK	

Selection and ordering data	Article No.	Order code
Orifice plate with single tappings	7ME1120 - ■■■■■ - 1	■■■
DN 250		
PN 6	2FA	
PN 10 and PN 16	2FC	
PN 25	2FD	
PN 40	2FE	
PN 63	2FF	
PN 100 and PN 160	2FH	
PN 250	2FJ	
PN 315	2FK	
DN 300		
PN 6	2GA	
PN 10	2GB	
PN 16	2GC	
PN 25	2GD	
PN 40	2GE	
PN 63	2GF	
PN 100 and PN 160	2GH	
DN 350		
PN 6	2HA	
PN 10	2HB	
PN 16	2HC	
PN 25	2HD	
PN 40	2HE	
PN 63	2HF	
PN 100	2HG	
DN 400		
PN 6	2JA	
PN 10	2JB	
PN 16	2JC	
PN 25	2JD	
PN 40	2JE	
PN 63	2JF	
DN 500		
PN 6	2KA	
PN 10	2KB	
PN 16	2KC	
PN 25	2KD	
PN 40	2KE	
Nominal diameter acc. to ASME		
2 inch		
Class 150	5GA	
Class 300	5GB	
Class 600	5GC	
2½ inch		
Class 150	5HA	
Class 300	5HB	
Class 600	5HC	
3 inch		
Class 150	5JA	
Class 300	5JB	
Class 600	5JC	
4 inch		
Class 150	6AA	
Class 300	6AB	
Class 600	6AC	
5 inch		
Class 150	6BA	
Class 300	6BB	
Class 600	6BC	

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Selection and ordering data	Article No.	Order code
Orifice plate with single tappings	**7ME1120-**	**-1**
6 inch		
Class 150	6CA	
Class 300	6CB	
Class 600	6CC	
8 inch		
Class 150	6EA	
Class 300	6EB	
Class 600	6EC	
10 inch		
Class 150	6FA	
Class 300	6FB	
Class 600	6FC	
12 inch		
Class 150	6GA	
Class 300	6GB	
Class 600	6GC	
14 inch		
Class 150	6HA	
Class 300	6HB	
Class 600	6HC	
16 inch		
Class 150	6JA	
Class 300	6JB	
Class 600	6JC	
20 inch		
Class 150	6KA	
Class 300	6KB	
Class 600	6KC	
Special version		
Specify Order code and plain text Nominal diameter: ..., nominal pressure: ... material no.: ... and material name: ...	9AA00	H1Y
Material for corrosive media		
Orifice plate and tapping socket made of X 2 CrNiMo 17-12-2, material no. 1.4404; permissible operating temp. -10 to +400 °C	23	
Material for non-corrosive media		
Orifice plate and tapping socket made of 13 CrMo 4-5, material no. 1.7335; permissible operating temp. -10 to +570, high temperature	24	
Orifice plate made of P265GH, material no. 1.0425; tapping sockets made of P235GHTC2, material no. 1.0345; metering edge with X 15 CrNiMn 18-8, material no. 1.4370, deposition welded; permissible operating temperature -10 to +400 °C	25	

Selection and ordering data	Article No.	Order code
Orifice plate with single tappings	**7ME1120-**	**-1**
Tapping sockets		
with threaded connection G½; for liquids and gases PN 160, for steam PN 100		
• Opposite one another, straight	A	
• Opposite one another, bent-up, for vertical pipelines	B	
• Any arrangement of tapping sockets (specify angle in plain text -Z Y02)	G	
With threaded connection ½-14 NPT male		
• Opposite one another, straight	Q	
• Opposite one another, bent-up, for vertical pipelines	R	
• Any arrangement of tapping sockets (specify angle in plain text -Z Y02)	T	
With pipe Ø 12 mm for pipe union with ferrule, max. 200 °C permissible		
• Opposite one another, straight	J	
• Opposite one another, bent-up, for vertical pipelines	K	
• Any arrangement of tapping sockets (specify angle in plain text -Z Y02)	M	
With welding connection ∅ 21.3 mm; for liquids and gases PN 100 ... 400, for steam PN 100 or ∅ 24 mm; for liquids and gases over PN 400, for steam over PN 100		
• Opposite one another, straight	D	
• Opposite one another, bent-up, for vertical pipelines	E	
• Any arrangement of tapping sockets (specify angle in plain text -Z Y02)	H	
Shape of orifice disk aperture (see figure "Shapes of orifice disk aperture")		
For flow in one direction		
• Orifice plate form A	A	
• Quarter-circle nozzle form B	B	
For flow in both directions		
• Cylindrical orifice plate form D	D	
Manufactured according to pressure equipment directive		
None[1]	0	
According to Article 3, Paragraph 3 Design data Y31 to Y35 necessary	1	
According to category 1, 2, 3 with CE marking and EC declaration of conformity Design data Y31 to Y35 necessary.	5	

[1] Only possible outside Europe.

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Orifice plate with single tapping

Selection and ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order code(s) and plain text.	
With Siemens calculation protocol Specify in plain text: No.: ... e. g. no.: 110025240101, Attach calculation protocol to the order	**Y21**
With third-party calculation Specify in plain text: No.: ... Attach calculation protocol to the order	**Y22**
Orifice plate without calculation Specify in plain text: Diameter of orifice disk aperture **d = ... mm** Internal diameter of pipe **D=... mm** Radius of quarter-circle nozzle **r = ... mm**	**Y01**
Angle between the tapping sockets Specify in plain text: Angle between the tapping sockets ...°	**Y02**
Design data according to Pressure equipment directive 97/23/EC	
Name of medium Specify in plain text: Medium: ..... e. g. natural gas	**Y31**
Aggregate state Specify in plain text: Aggregate state: ..... Liquid or gaseous	**Y32**
Fluid group Specify in plain text: Fluid group: ..... Group 1: hazardous explosive fluid or Group 2: All other fluids	**Y33**
Max. permissible pressure Specify in plain text: PS = ... in bar or PSI	**Y34**
Max. permissible temperature Specify in plain text: TS = … in °C or °F	**Y35**
Orifice plate degreased for oxygen measurements	
• DN 50 (2") ... DN 150 (6")	**A12**
• DN 200 (8") ... DN 400 (16")	**A13**
• DN 500 (20") ... DN 1000 (40")	**A14**
Material certificate Acceptance test certificate to EN 10204-3.1	**C01**
Cold water pressure test 1.5 x PN, with acceptance test certificate EN 10204	**D11**
Overall length 65 mm (required for tapping sockets arranged on one side)	**on request**
Orifice disk including gasket	**on request**
Sealing face of orifice plate with recess or groove	**on request**

Note on ordering
The "calculation protocol" released by the customer with Order code Y21 or Y22 must be attached to the order as an appendix or the statement "orifice plate without calculation" will be made with Order code Y01.

Scope of delivery:
One-part orifice plate with tapping sockets

Accessories:
See "SITRANS P measuring instruments for pressure".

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Application

Suitable for non-corrosive and corrosive gases, vapors and liquids; permissible operating temperature -10 to +400 °C.

Design

Orifice plate with annular chambers consisting of two support rings with replaceable orifice disk form A or B (see types of primary differential pressure devices in "Technical description", "Function"); flanged between inlet and outlet pipe sections with lengths according to DIN 19205.

Nominal diameters

- EN: DN 10 to DN 50
- ASME: ½ inch to 2 inch

Nominal pressure

- EN: PN 10 to PN 100
- ASME: class 150 to 600

Sealing face of the end flanges

- Plane, sealing face turned, N10/N12 to DIN ISO 1302
- Plane, sealing face turned, N8 to DIN ISO 1302
- Plane, RF (raised faced) for versions to ASME

Tapping sockets

(For the dimensions of the following tapping sockets, see page 3/422)

- With connection thread G½ DIN ISO 228/1, connection dimensions to DIN 19207 form V
- With threaded connection ½-14 NPT male, for version to ASME
- With Ø 12 mm pipe connection for pipe union with ferrule
- With welding connection, Ø 21.3 mm

For length of tapping sockets for all metering pipe L = 120 mm and position of tapping socket, see "Technical Description" and "Function".

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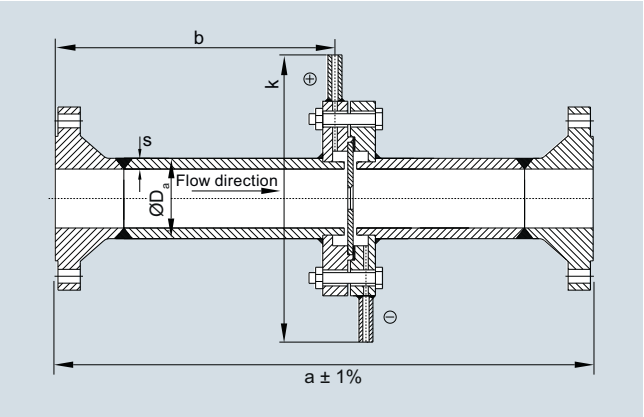
Metering pipe with orifice plate and annular chamber

Dimensional drawings



Nominal diameter acc. to EN

DN	PN	a	L	k	Pipe[1] D_a x s	Weight (approx. kg)
10	10 and 16 25 and 40 63 and 100	400	218	320 320 295	16 x 3	4.5 5 6.5
15	10 and 16 25 and 40 63 and 100	550	368	325 325 300	20 x 2.5	5 5.5 7.5
20	10 and 16 25 and 40	700	488	335	25 x 2.5	6.5 7
25	10 and 16 25 and 40 63 and 100	900	638	310	30 x 2.5	8 9 14
32	10 and 16 25 and 40	1100	788	320	38 x 3	11.5 12.5
40	10 and 16 25 and 40 63 and 100	1300	988	330 330 335	48.3 x 3.6 oder 50 x 5	13 15 25
50	10 and 16 25 and 40 63 100	1500	1188	340 340 345 345	60 x 5	20 22 34 34

Metering pipes with orifice plates and annular chambers for installation between EN flanges to EN 1092.1, dimensions in mm and weights

[1] The stated pipe dimensions may vary, depending on availability. The pipe dimensions used can be found in the calculation for primary differential pressure devices and/or in the order confirmation.

Nominal diameter acc. to ASME

ASME	PN	a	L	k	Pipe[1] D_a x s	Weight (approx. kg)
½ inch	Class 150 Class 300 Class 600	550	368	297 307 307	20 x 2.5	5 5.5 7.5
¾ inch	Class 150 Class 300 Class 600	700	488	297 307 307	25 x 2.5	6.5 7 8
1 inch	Class 150 Class 300 Class 600	900	638	307 313 313	30 x 2.5	8 9 14
1¼ inch	Class 150 Class 300 Class 600	1100	788	316 322 322	38 x 3	11.5 12.5 14
1½ inch	Class 150 Class 300 Class 600	1300	988	326 335 335	48.3 x 3.6 or 50 x 5	13 15 25
2 inch	Class 150 Class 300 Class 600	1500	1188	345 371 351	60 x 5	20 22 34

Metering pipes with orifice plates and annular chambers for installation between ASME flanges to ASME B 16.5, dimensions in mm and weights

[1] The stated pipe dimensions may vary, depending on availability. The pipe dimensions used can be found in the calculation for primary differential pressure devices and/or in the order confirmation.

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Selection and ordering data	Article No.	Order code
Metering pipe for mounting between flanges for non-corrosive media	7ME1310-	-1
Orifice plate with annular chambers mounted between flanges Sealing faces to the mating flanges: plane ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Nominal diameter acc. to EN		
DN 10		
• PN 10 and PN 16	1AC	
• PN 25 and PN 40	1AE	
• PN 63	1AF	
• PN 100	1AG	
DN 15		
• PN 10 and PN 16	1BC	
• PN 25 and PN 40	1BE	
• PN 63	1BF	
• PN 100	1BG	
DN 20		
• PN 10 and PN 16	1CC	
• PN 25 and PN 40	1CE	
DN 25		
• PN 10 and PN 16	1DC	
• PN 25 and PN 40	1DE	
• PN 63	1DF	
• PN 100	1DG	
DN 32		
• PN 10 and PN 16	1EC	
• PN 25 and PN 40	1EE	
DN 40		
• PN 10 and PN 16	1FC	
• PN 25 and PN 40	1FE	
• PN 63	1FF	
• PN 100	1FG	
DN 50		
• PN 10 and PN 16	1GC	
• PN 25 and PN 40	1GE	
• PN 63	1GF	
• PN 100	1GG	
Nominal diameter acc. to ASME		
½ inch		
• Class 150	5BA	
• Class 300	5BB	
• Class 600	5BC	
¾ inch		
• Class 150	5CA	
• Class 300	5CB	
• Class 600	5CC	
1 inch		
• Class 150	5DA	
• Class 300	5DB	
• Class 600	5DC	
1¼ inch		
• Class 150	5EA	
• Class 300	5EB	
• Class 600	5EC	
1½ inch		
• Class 150	5FA	
• Class 300	5FB	
• Class 600	5FC	
2 inch		
• Class 150	5GA	
• Class 300	5GB	
• Class 600	5GC	
Special version		
Specify Order code and plain text Nominal diameter: ..., nominal pressure: ... material no.: ... and material name: ...	9AA00	H1Y
Material for non-corrosive media		
Orifice disk made of material no. 1.4404; support ring and flange made of material no. 1.0460, pipes and tapping sockets made of material number 1.0345; permissible operating temperature -10 to +400 °C	32	
Material for corrosive media		
Orifice disk, support rings, pipes and flange made of material no. 1.4404; permissible operating temperature -10 to +400 °C	34	
Tapping sockets		
with threaded connection G½; for liquids and gases PN 160, for steam PN 100		
• Opposite one another, straight		A
• Opposite one another, bent-up, for vertical pipelines		B
• Arranged on one side, for horizontal pipelines		C
With threaded connection ½-14 NPT male; for liquids and gases PN 160, for steam PN 100		
• Opposite one another, straight		Q
• Opposite one another, bent-up, for vertical pipelines		R
• Arranged on one side, for horizontal pipelines		S
With pipe Ø 12 mm for pipe union with ferrule, max. 200 °C permissible		
• Opposite one another, straight		J
• Opposite one another, bent-up, for vertical pipelines		K
• Arranged on one side, for horizontal pipelines		L
With welding connection ∅ 21.3 mm for liquids and gases PN 100 ... PN 400, for steam PN 100		
• Opposite one another, straight		D
• Opposite one another, bent-up, for vertical pipelines		E
• Arranged on one side, for horizontal pipelines		F

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Metering pipe with orifice plate and annular chamber

Selection and ordering data	Article No.	Order code
Metering pipe for mounting between flanges for non-corrosive media	**7 M E 1 3 1 0 -** ■■■■■ **- 1**	■■■
Shape of orifice disk aperture		
For flow in one direction (see figure "Shapes of orifice disk aperture")		
• Orifice plate form A		**A**
• Quarter-circle nozzle form B		**B**
For flow in both directions		
• Cylindrical orifice plate form D		**D**
Manufactured according to pressure equipment directive		
None[1]		**0**
According to Article 3, Paragraph 3 Design data Y31 to Y35 necessary		**1**
According to category 1, 2 with CE marking and EC declaration of conformity Design data Y31 to Y35 necessary		**5**

[1] Only possible outside Europe.

Selection and ordering data	Order code
Further designs Add "**-Z**" to Article No. and specify Order code(s) and plain text.	
With Siemens calculation protocol Specify in plain text: No.: ... e. g. no.: 110025240101, Attach calculation protocol to the order	**Y21**
With third-party calculation Specify in plain text: No.: ... Attach calculation protocol to the order	**Y22**
Orifice plate without calculation Specify in plain text: Diameter of orifice disk aperture **d = ... mm** Internal diameter of pipe **D=... mm** Radius of quarter-circle nozzle **r = ... mm**	**Y01**
Design data according to Pressure equipment directive 97/23/EC	
Name of medium Specify in plain text: Medium: ..... e. g. natural gas	**Y31**
Aggregate state Specify in plain text: Aggregate state: ..... Liquid or gaseous	**Y32**
Fluid group Specify in plain text: Fluid group: ..... Group 1: hazardous explosive fluid or Group 2: All other fluids	**Y33**
Max. permissible pressure Specify in plain text: PS = ... in bar or PSI	**Y34**
Max. permissible temperature Specify in plain text: TS = … in °C or °F	**Y35**
Orifice plate degreased for oxygen measurements	
• DN 10 (½") ... DN 50 (2")	**A12**
Material certificate Acceptance test certificate to EN 10204-3.1	**C02**
Cold water pressure test 1.5 x PN, with acceptance test certificate EN 10204	**D11**

Note on ordering

The "calculation protocol" released by the customer with Order code Y21 or Y22 must be attached to the order as an attachment or the statement "orifice plate without calculation" will be made with Order code Y01.

Scope of delivery:

Orifice plate, comprising two support rings with tapping sockets and one orifice disk, with gaskets between orifice disk and support ring, including screws and bolts.
Graphite (99.85%) flat gasket with foil insert (1.4401, 0.1 mm).
Application for liquids, steam, gases, liquid gases, acids, hydrocarbons, oils and oil products.

Accessories:

See "SITRANS P measuring instruments for pressure".

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Overview

Note on calculation order and product ordering:

Before an orifice plate is ordered, the calculation of the orifice pate must be completed with a calculation protocol.

The calculation protocol issued by the customer is then included in the order for the orifice plate as an attachment.

When ordering the "Primary differential pressure device calculation" service, a completed questionnaire must be enclosed.

This online questionnaire can be found in the PIA Life Cycle Portal at www.siemens.com/pia-portal.

All the data required for the calculation are requested menu-driven and can be verified by a check function.

If the data entered in the questionnaire are incomplete, an extra charge will be made for the additional clarification and calculations required.

Selection and ordering data	Article No.
Calculation of orifice disk aperture an orifice plate, ISA-1932 nozzle, Venturi nozzle, Venturi tube and other primary differential pressure devices (without measuring sheet or sketch)	**7ME1910-0A**
Calculation of differential pressure or flow on an existing primary device	**7ME1910-0D**
Further designs Add "**-Z**" to Article No. and specify Order code(s) and plain text.	Order code
SITRANS F O - questionnaire online The completed online questionnaire should be attached to the order! (see Online Questionnaire in the PIA Life Cycle Portal)	**Y02**

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3

Overview

Mechanical registers, automatic batchmeters and digital registers with current and pulse output

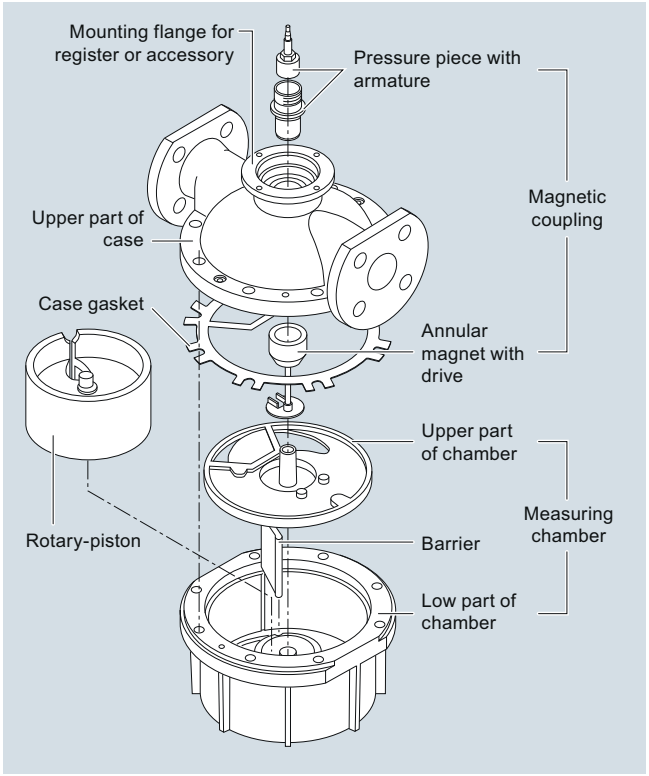
Rotary-piston meter DN 25 (1“) with single-pointer dial type 01

Rotary piston meter with electric flow register in compact form

Rotary-piston meter DN 50 (2") with mech. single-pointer dial type 01, with accessories (here: cooling attachment and pulser)

Automatic batch meter DN 50 (2“), with rotary-piston meter, quantity preset register and shut-off valve

Design



Metering mechanism of a rotary-piston meter DN 25/PN 10 (1“/MWP 145 psi) (industrial model)

The measuring chamber is inserted into the case for the rated pressure classes PN 25, PN 40 and PN 63 (MWP 363, 580 and 914 psi). The meters for rated pressures PN 4, PN 6 and PN 10 (MWP 58, 87 and 145 psi) have a measuring chamber machined to the lower part of the case.

All components of the meters are made of wear-resistant materials. Several materials are available for the parts which come into contact with the metered liquid (see Selection and Ordering data). The most suitable combination can be selected taking into account the corrosion resistance with respect to the liquid to be measured as well as the running characteristics and the permissible temperatures.

Benefits

- High measuring accuracy (approved for custody transfer)
- Suitable for flow rates up to 1000 l/min (264 USgpm)
- Wide flow rate range
- Low dependence on viscosity
- Low pressure drop
- Simple compact design
- High reliability
- Advantages with extremely high viscosity since pressure drops up to 3 bar (43.5 psi) permissible
- Advantages with very low viscosity (e.g. liquefied gas) since only low pressure drops occur because of the light-weight mechanism with good running characteristics
- Wide range of available materials, e.g. plastic lining for particularly corrosive liquids
- Easy service as a result of simple design
- Liquid temperatures up to 300 °C
- Also available with external heater
- Metering and dispensing without a power supply
- No inlet or outlet pipe sections required
- Independent of flow profile, conductivity and damping

Rotary-piston meters are characterized by:

- Accuracy
- Reliability
- Robust design

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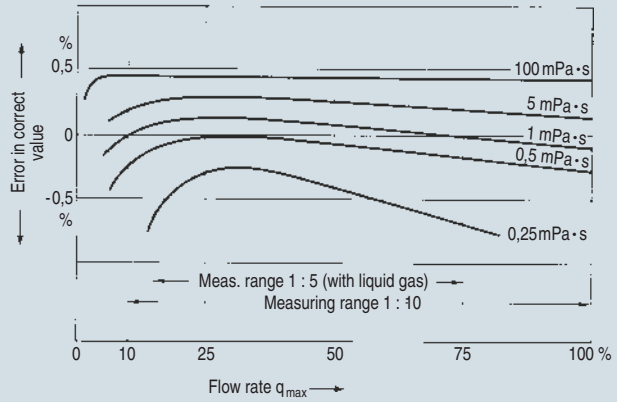
Configuration

Error curves of rotary-piston meters

The shape of the error curve is also affected by the viscosity of the metered liquid. The error in measurement increases with decreasing viscosity, especially at the beginning and towards the end of the flow rate range.

By appropriate regulation, i.e. changing a pair of gear-wheels between the meter mechanism and the register, the position of the error curve can be displaced parallel to the zero line and thus the meter can be optimally calibrated. The appropriate pair of replacement gears can be read off from a table or determined with the aid of a calculating disk.

The illustration “Error curves of volumetric meters” shows error curves without any regulation having been carried out.



Examples of rotary-piston meters DN 25 (1”) and DN 50 (2”)

Error curves of volumetric meters dependent in shape and location on the flow rate and the viscosity of the liquid

Note: 1 mPa·s = 1 cp

Measuring accuracy

The rotary-piston meters are approved in the European Community and in many other countries for the custody transfer.

The following error limits apply between 0.2 % and 0.5 % of the correct value (depending on the liquid, the measuring range and the relevant calibration specifications).

The stated error limits in % of the correct value apply to the whole flow rate and for any delivery quantity greater than the smallest permissible quantity.

This is an important difference compared to other measuring instruments whose errors are related to the full-scale value and thus only reach the stated accuracy at one point - full-scale deflection. The minimum flow rate should not fall below 10% of the maximum flow rate in order to remain within the stated accuracy limit. This explains why the usual flow rate range for volumetric meters is 1:10.

Note: The measuring system of the rotary-piston meter must always be filled with the liquid to be measured in order to achieve a high measuring accuracy.

Note

The material combinations which can be supplied are listed in the Selection and Ordering data.
The maximum permissible liquid temperature is determined by the “weakest link” in the particular combination (the PCTFE rotary-piston, for example, in a meter made of Cranium steel).

Service life (long-term accuracy)

The service life of a volumetric meter, i.e. the operating time until an overhaul or recalibration becomes necessary, is determined by the mechanical abrasion of the moving parts of the mechanisms which occurs because of forces from the metered liquid.

As well as the nature of the materials used (running characteristics), the service life is dependent on the lubricating properties of the metered liquid, the service is dependent on the lubricating properties of the metered liquid, the daily operating time and the cube of the flow rate (speed of rotation). The last factor is one of the reasons why only half of the maximum flow rate specified for the batch operation is permissible for continuous operation.

Since the above factors can hardly be determined exactly with industrial use of the meter, unequivocal statements on the service life (long-term accuracy) are not possible.

Recalibration is required every two years by law (in Germany) for meters used for custody transfer. On the basis of this regulation, it is recommended that meters which are not used for custody transfer be checked and recalibrated if necessary, at intervals of two to three years. Even this recommendation is based on average, “normal” operating conditions. A period of three years is too short, for example, for a meter used for the batch dispensing of lubricating oil, it will still work within the stated error limits even after five years or more.

Further technical specifications	
Materials and max. permissible liquid temperatures	
Housing (also lining with acid resistant meters) and measuring chamber	Temperature range
• Cast iron, spheroidal graphite, cast steel, Cranium steel	-30 ... +300 °C (-22 ... +572 °F)
General data	
Error limits	Between 0.2 % and 0.5 % of the correct value (depending on the metered fluid, the measuring range and the relevant calibration regulations) except for rotary-piston meters DN 15 (½“) and acid-resistant meters with PCTFE pistons; where 1% of the actual value applies.
Reproducibility	Within 0.05 %
Adjustment	In steps from 0.01 %
Pressure drop	Max. permissible 3 bar (43.5 psi), max. 0.5 bar (7.25 psi) for acid resistant meters
Transmission from wet to dry space	Gland-free, via permanent magnet coupling
Installation position (axis of meter mechanism)	
• Rotary-piston meter for industrial use	
- Automatic batchmeter	Vertical
• Special designs	
- Rotary-piston meter for oil fuels	Any
- Rotary-piston meter for liquid gas	Meter axis vertical
Special inlet and outlet pipe sections	Not necessary
Pipe connection	Flanges drilled to DIN 2501, DIN 2547 (PN 63 only)
Filter size (mesh width)	0.8 mm (0.031 inch) for rotary-piston meter

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3

Selection overview, rotary piston meters

Version	Rotary piston meters			
Nominal diameter	**DN 15**	**DN 25**	**DN 50**	**DN 80**
Article No.	7MR10..-...	7MR11..-...	7MR14..-...	7MR16..-...
Nominal pressure				
PN 6			●	
PN 10		●		
PN 16		●	●	
PN 25	●	●	●	●
PN 40		●	●	●
PN 63		●	●	
Flow variables				
Max. 20 l/min	●			
Max. 100 l/min		●		
Max. 500 l/min			●	
Max. 1 000 l/min				●
Flange standards				
Drilled acc. to EN	●	●	●	●
Drilled acc. to ASME	●	●	●	●
With raised faces	●	●	●	●
Approvals				
Custody transfer		●	●	●
Material acceptance test EN 10204-3.1	●	●	●	●
ATEX	**in preparation**			
Piston material				
Carbon	●	●	●	●
Cast iron	●	●	●	●
Ni-resist		●	●	●
Hard rubber	●	●	●	●
PTFE 40 °C		●	●	●
PTFE 90 °C		●	●	●
CrNiMo steel with carbon contact surface		●		
CrNiMo steel with PTFE contact surface		●		
PCTFE	●	●	●	
Designs				
Mechanical singe-pointer dial	●	●	●	●
Mechanical double-pointer dial	●	●	●	●
As automatic batchmeter (incl. shut-off valve)		●	●	
With electronic flow register	●	●	●	●
Remote or compact installation	●	●	●	●

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Rotary piston meters - Configurations

		Mechanical display			Digital displays	
		Compact design			As separate model	Compact design
		Without pulse and current output	With pulse and current output		With pulse and current output Incl. protective cover	With pulse and current output Incl. mounting bracket
Registers						
Single-pointer dial type 01		●	●	●		
Double-pointer dial type 11 und 12		●	●	●		
Quantity preset register		●	●	●		
SITRANS F RA110 electric flow registers (7MV1070-...)						
• Without mounting bracket					●	
• With mounting bracket						●
Pulser						
10 pulses/revolution 100 pulses/revolution					●	●
10 pulses/value per revolution 100 pulses/value per revolution			●			
Intermediate gear						
(Part of Article No. of the rotary piston meter)		●	●	●		
Pulser						
10 Impulse/measuring chamber volumes 100 Impulse/measuring chamber volumes (Selection with data position 14 of Article No. of the rotary piston meter)				●		
Cooling attachment						
Up to 80 °C: none (Article No. 7MR1...-.....-....) Up to 180 °C: one (Article No. 7MR1...-.....-....+ 7MV3001-1xx00) Upt to 260 °C: two (Article No. 7MR1...-.....-....+ 7MV3001-2xx00)		●	●	●	●	●
Rotary piston meters and automatic batchmeters						
Rotary piston meters DN 15 7MR10..-.....-.... DN 25 7MR11..-.....-.... DN 50 7MR14..-.....-.... DN 80 7MR16..-.....-.... **Automatic batchmeters** DN 25 7MR111.-.....-.... DN 50 7MR141.-.....-.... ≤ PN 16		●	●	●	●	●
PN 25 ... PN 63						

Measuring chamber volumes:

DN 15 (1/2")	0.033 l	(0.0087 USgpm)
DN 25 (1")	0.179 l	(0.0473 USgpm)
DN 50 (2")	1.5 l	(0.317 USgpm)
DN 80 (3")	4.32 l	(1.14 USgpm)

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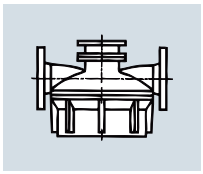
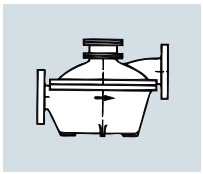
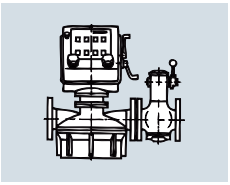
3

Technical specifications

Meter sizes (DN), pressure stages (PN) and permissible flow rates (q) for rotary-piston meters and automatic batchmeters

Design	DN		PN		Rated flow rate		Permissible flow rate						
							With viscosity[8]	Min.[1] with continuous[2] operation		Max. with intermittent[3][4] operation		Max. with continuous operation	
	mm	(inch)	bar	(psi)	l/min	(USgpm)	mPa·s (cp)	l/min	(USgpm)	l/min	(USgpm)	l/min	(USgpm)
Rotaty-piston meter for industrial use													
 up to PN 16 (MWP 232 psi)	15[5]	(½)[5]	25	(363)	20	(5.3)	≤ 1 < 5 800 2 000	1.5 1.0 0.2 0.2	(0.26) (0.2) (0.05) (0.03)	10[6] 20 20 10	(5.3) (5.3) (5.3) (1.3)	10 10 10 5	(2.6) (2.6) (2.6) (1.3)
	25	(1)	10 16 25 40 63	(145) (232) (363) (580) (914)	100	(26.4)	0.3 0.6 1 5 800	12 6 5 3 1	(3.2) (1.6) (1.3) (0.8) (0.26)	100 100 100 100 100	(26) (26) (26) (26) (26)	80 80 80 80 80	(13) (13) (13) (13) (13)
 up to PN 63 (MWP 914 psi)	50	(2)	6 16 25 40 63	(87) (232) (363) (580) (914)	500	(132)	0.3 0.6 1 5 800	40 20 18 10 2	(11) (5.3) (4.8) (2.6) (0.53)	500 500 500 500 500	(106) (132) (132) (132) (106)	350 350 350 350 350	(44) (44) (44) (44) (44)
	80	(3)	25 40	(363) (580)	1 000	(264)	0.3 0.6 1 5 800	60 35 25 10 5	(16) (9.3) (6.6) (2.6) (1.3)	1 000 1 000 1 000 1 000 1 000	(211) (264) (264) (264) (211)	700 700 700 700 500	(93) (93) (93) (93) (93)
Automatic batchmeter (Rotary-piston meter with quantity preset register and mechanical shut-off valve)													
	25	(1)	10	(145)	100	(26.4)	0.3 0.6 1 5 800[7]	12 6 5 3 1	(3.2) (1.6) (1.3) (0.8) (0.26)	100 100 100 100 100	(26) (26) (26) (26) (26)	–	–
	50	(2)	6 10	(87) (145)	500	132	0.3 0.6 1 5 800[7]	40 20 18 10 2	(11) (5.3) (4.8) (2.6) (0.53)	500 500 500 500 400	(106) (132) (132) (132) (106)	–	–

1) For metal rotary-pistons: increase by a factor of 2, for PCTFE and PTFE/graphite filling rotary-pistons: increase by a factor of 3.
2) Continuous operation: over 8 hours a day.
3) For metal pistons: reduce by a factor ≈0.8 to extend service life.
4) Intermittent operation: up to 8 hours a day
5) Note: When using pistons made of carbon, there is danger of break in the case of liquid hammers
6) When using pistons made of carbon.
7) Max. permissible viscosity for exact closing of the shut-off valve and for exact dispensing: viscosities up to 4 000 mPa·s (cp) possible.
8) Higher viscosity on request.

Note:
In order to extend the service life of the pulse sensor, rotary-piston meters with current and/or pulse output (without intermediate gear) should only be operated at max. 60 % of the permissible flow.

Piston materials

Piston material	Design	Permissible liquid temperature (°C/°F)	Max. perm. dyn. viscosity mPa·s (cp)	Article No. code
Carbon		-10 ... 300/ 14 ... 572	25	**K**
Cast iron (mat. No. GG 25)		-10 ... 300/ 14 ... 572		**E**
Cast iron (mat. No. GG 25)	with slotting	-10 ... 300/ 14 ... 572		**B**
Ni-Resist (mat. No. 0.6660)		-10 ... 300/ 14 ... 572		**N**
Ni-Resist (mat. No. 0.6660)	with slotting	-10 ... 300/ 14 ... 572		**C**
Hard rubber		-10 ... 40[1]/ 14 ... 104[1]	50	**G**
Hard rubber	with slotting	-10 ... 40[1]/ 14 ... 104[1]	50	**D**
PTFE/graphite filling		0 ... 40[2]/ 32 ... 104[2]	120	**F**
PTFE/ graphite filling	with slotting	0 ... 40[2]/ 32 ... 104[2]	120	**L**
PTFE/ graphite filling		0 ... 90[2]/ 32 ... 194[2]	120	**R**
PTFE/ graphite filling	with slotting	0 ... 90[2]/ 32 ... 194[2]	120	**M**
PCTFE		-10 ... +40[2]/ 14 ... 104[2]	120	**H**
PCTFE	with slotting	-10 ... +40[2]/ 14 ... 104[2]	120	**J**
CrNi steel with carbon contact surface (DN 25 (1“) only)	Collar piston	-10 ... +200/ 14 ... 392	> 10	**S**
CrNi steel with PTFE contact surface (DN 25 (1“) only)		-10 ... +40/ 14 ... 104	> 10	**T**

1) For 120 min max. 65 °C (149 °F); for 20 min max. 90 °C (194 °F), e. g. for cleaning procedures
2) Error limit max. 1%; at 90°C (194 °F) max. 2%

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Selection and Ordering data — Article No. — Order code

Rotary-piston meter DN 15 (½")

Nom. press.	Materials: Housing	Materials: Meas. chamber	Materials: Rotary piston	Casing gasket	Can be heated using 2 thread connections	Weight appr. kg (lb)	Article No.
PN 25 (363 psi)	Cast iron	Cast iron	• •	Flat gasket AFM 34	R $^{3}/_{4}$"	9.0 (19.8)	↗ 7MR1020- E ■■■ - ■■■■ ■■■
	CrNiMo steel	CrNiMo steel	• • • •		no	9.0 (19.8)	↗ 7MR1020- S ■■■ - ■■■■ ■■■

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Rotary piston material	Max. permissible liquid temperature	Article No.
Carbon	300 °C (572 °F)	K
Cast iron	300 °C (572 °F)	E
Hard rubber	40 °C (104 °F)	G
PCTFE	40 °C (104 °F)	H

Flow direction		Article No.
Mechanism shaft vertical	From left to right	1
	From right to left	2
	From front to back	3
	From back to front	4
Mechanism shaft horizontal	From left to right	5
	From right to left	6
	Upwards	7
	Downwards	0

Mechanical registers[1]	Article No.
Single- pointer dial	
• Type 01	0 1
Double-pointer dial	
• Type 11, vertical mounting	1 1
• Type12, horizontal mounting	1 2

Value per	Article No.
• 1 l (0.26 USg) Fastest pointer or fastest drum	1

Accessories (pulsers, cooling attachments)[1]	Article No.
• None	A
• Mounted	B
• Pulser already mounted above the intermediate gear:	
- 10 pulses/value per revolution	C
- 100 pulses/value per revolution	D
• Pulser already mounted below the intermediate gear:	
- 10 pulses/measuring chamber volume	G
- 100 pulses/measuring chamber volume	H

For Selection and Ordering data of „**Digital register with current and pulse output**", „**Tests**" und „**Flanges**" see page 3/455.
Heating systems on request.

[1] For measuring temperatures over 80 °C, it is always necessary to order one cooling attachment (7MV3001-1XX00).
For measuring temperatures over 180 °C, it is always necessary to order two cooling attachments (7MV3001-2XX00) as separate items.

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Rotary-piston meters – Ordering data - DN 25 (1"), rated flow rate 100 l/min (26.5 USgpm)

3

Selection and Ordering data

Article No. 7MR1110-[ ][ ][ ]-[ ][ ][ ][ ]-[ ][ ][ ]

Order code

Rotary-piston meter DN 25 (1")

Nom. press.	Materials Housing	Meas. chamber	Rotary piston						Casing gasket	Weight appr. kg (lb)	
PN 10 (145 psi)	Cast iron	Cast iron			•	•	•	•	Flat gasket AFM 34	10.5 (23.2)	↗ 7MR1110-**E**[ ][ ][ ]-[ ][ ][ ][ ]-[ ][ ][ ]
PN 16 (232 psi)	CrNiMo steel	CrNiMo steel	•	•	•	•	•				↗ 7MR1110-**S**[ ][ ][ ]-[ ][ ][ ][ ]-[ ][ ][ ]
PN 25 (363 psi)	Cast iron	Cast iron			•	•	•	•		20 (44.1)	↗ 7MR1120-**E**[ ][ ][ ]-[ ][ ][ ][ ]-[ ][ ][ ]
PN 40 (580 psi)	Cast steel	Cast iron			•	•	•	•	FKM (O-ring)	24 (52.9)	↗ 7MR1130-**E**[ ][ ][ ]-[ ][ ][ ][ ]-[ ][ ][ ]
PN 63 (914 psi)	Cast steel	Cast iron			•	•	•	•	Flat gasket AFM 34	30 (66.1)	↗ 7MR1140-**E**[ ][ ][ ]-[ ][ ][ ][ ]-[ ][ ][ ]

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Rotary piston material								Max. permissible liquid temperature	Weight appr. kg (lb)	
Carbon							•		0.15 (0.33)	**K**
Cast iron						•			0.55 (1.21)	**E**
Cast iron, grooved						•			0.5 (1.1)	**B**
Ni-resist					•				0.55 (1.21)	**N**
Ni-resist, grooved					•				0.5 (1.1)	**C**
Hard rubber				•				40 °C (104 °F)	0.1 (0.2)	**G**
Hard rubber, grooved				•				40 °C (104 °F)		**D**
PTFE with graphite filling			•					40 °C (104 °F)	0.3 (0.66)	**F**
PTFE with graphite filling, grooved			•					40 °C (104 °F)		**L**
PTFE with graphite filling			•					90 °C (194 °F)		**R**
PTFE with graphite filling, grooved			•					90 °C (194 °F)		**M**
CrNiMo steel with carbon bearing surface		•							0.45 (0.99)	**S**
CrNiMo steel with PTFE bearing surface		•							0.46 (1.01)	**T**
PCTFE	•								0.16 (0.35)	**H**
PCTFE, grooved	•									**J**

Flow direction		
Mechanism shaft vertical	From left to right	**1**
	From right to left	**2**
	From front to back	**3**
	From back to front	**4**
Mechanism shaft horizontal	From left to right	**5**
	From right to left	**6**
	Upwards	**7**
	Downwards	**0**

Mechanical registers/quantity preset registers[1)]	Weight approx. kg (lb)	
Single- pointer dial		
• Type 01	0.8 (1.76)	**0 1**
Double-pointer dial		
• Type 11, vertical mounting	1.5 (3.3)	**1 1**
• Type 12, horizontal mounting	2.5 (5.5)	**1 2**
Quantity preset register (only for vertical mechanism shaft, flow direction according to codes 1 ... 4)		
• Type 30	11 (24.3)	**3 0**
• Type 30, ex-protected switch	13.2 (29.1)	**5 4**

Value per revolution		
• 1 l (0.26 USg)	11 (24.3)	**1**
• 10 l (2.65 USg)	13.2 (29.1)	**2**

Accessories (pulsers, cooling attachments)[1)]	
• None	**A**
• Mounted	**B**
• Pulser already mounted above the intermediate gear:	
- 10 pulses/value per revolution	**C**
- 100 pulses/value per revolution	**D**
• Pulser already mounted below the intermediate gear:	
- 10 pulses/measuring chamber volume	**G**
- 100 pulses/measuring chamber volume	**H**

For Selection and Ordering data of „**Digital register with current and pulse output**“, „**Tests**“ und „**Flanges**“ see page 3/455.
Heating systems on request.

1) For measuring temperatures over 80 °C, it is always necessary to order one cooling attachment (7MV3001-1XX00).
For measuring temperatures over 180 °C, it is always necessary to order two cooling attachments (7MV3001-2XX00) as separate items.

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Selection and Ordering data — Article No. — Order code

Rotary piston meter DN 50 (2")

Nom. press.	Materials Housing	Meas. chamber	Rotary piston					Casing gasket	Weight appr. kg (lb)	Article No.
PN 6 (87 psi)	Cast iron	Cast iron		•	•	•	•	Flat gasket AFM 34	31 (68.3)	↗ 7MR1410-■E■■■-■■■■ ■■■
PN 16 (232 psi)	CrNiMo steel	CrNiMo steel	•	•	•	•		•		↗ 7MR1410-■S■■■-■■■■ ■■■
PN 25 (363 psi)	Spher. cast iron	Cast iron		•	•	•	•	•	45 (99.2)	↗ 7MR1420-■E■■■-■■■■ ■■■
PN 40 (580 psi)	Cast steel	Cast iron		•	•	•	•	•	60 (132)	↗ 7MR1430-■E■■■-■■■■ ■■■
PN 63 (914 psi)	Cast steel	Cast iron		•	•	•	•	•	94 (207)	↗ 7MR1440-■E■■■-■■■■ ■■■

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Rotary piston material	Max. permissible liquid temperature	Weight appr. kg (lb)	Order code
Carbon		0.9 (2.0)	K
Cast iron		3.5 (7.7)	E
Cast iron, grooved		3.4 (7.5)	B
Ni-resist		3.5 (7.7)	N
Ni-resist, grooved		3.4 (7.5)	C
Hard rubber	40 °C (104 °F)	0.7 (1.5)	G
Hard rubber, grooved	40 °C (104 °F)		D
PTFE with graphite filling	40 °C (104 °F)	0.5 (1.1)	F
PTFE with graphite filling, grooved	40 °C (104 °F)		L
PTFE with graphite filling	90 °C (194 °F)		R
PTFE with graphite filling, grooved	90 °C (194 °F)		M

Flow direction		Order code
Mechanism shaft vertical	From left to right	1
	From right to left	2
	From front to back	3
	From back to front	4
Mechanism shaft horizontal	From left to right	5
	From right to left	6
	Upwards	7
	Downwards	0

Mechanical registers/quantity preset registers[1]	Weight appr. kg (lb)	Order code
Single- pointer dial		
• Type 01	0.8 (1.76)	0 1
Double-pointer dial	1.5 (3.3)	1 1
• Type 11, vertical mounting		
• Type 12, horizontal mounting	2.5 (5.5)	1 2
Quantity preset register (only for vertical mechanism shaft, flow direction according to codes 1 ... 4)		
• Type 30	11 (24.3)	3 0
• Type 30, ex-protected switch	13.2 (29.1)	5 4

Value per revolution	Order code
• 10 l (2.65 USg)	2
• 100 l (26.5 USg)	3

Accessories (pulsers, cooling attachments)[1]	Order code
• None	A
• Mounted	B
• Pulser already mounted above the intermediate gear:	
- 10 pulses/value per revolution	C
- 100 pulses/value per revolution	D
• Pulser already mounted below the intermediate gear:	
- 10 pulses/measuring chamber volume	G
- 100 pulses/measuring chamber volume	H

For Selection and Ordering data of „**Digital register with current and pulse output**", „**Tests**" und „**Flanges**" see page 3/455.
Heating systems on request.

[1] For measuring temperatures over 80 °C, it is always necessary to order one cooling attachment (7MV3001-1XX00).
For measuring temperatures over 180 °C, it is always necessary to order two cooling attachments (7MV3001-2XX00) as separate items.

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Rotary-piston meters – Ordering data - DN 80 (3"), rated flow rate 1000 l/min (264 USgpm)

3

Selection and Ordering data									Article No.	Order code
Rotary piston meter DN 80 (3“)										
Nom. press.	**Materials**						**Casing gasket**	Weight appr. kg (lb)		
	Housing	Meas. chamber								
PN 25 (363 psi)	Spher. cast iron	Cast iron	•	•	•	•		108 (238)	↗ 7MR1620-	E -
PN 40 (580 psi)	Cast steel	Cast iron	•	•	•	•	FKM (O-ring)	150 (331)	↗ 7MR1630-	E -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.										
Rotary piston material							Max. permissible liquid temperature	Weight appr. kg (lb)		
Carbon						•		2 (4.4)		K
Cast iron					•			9.5 (21)		E
Cast iron, grooved					•			9.4 (20.7)		B
Ni-resist				•				10 (22)		N
Ni-resist, grooved				•				9.6 (21.2)		C
Hard rubber			•				40 °C (104 °F)	2 (4.4)		G
Hard rubber, grooved			•				40 °C (104 °F)	1.8 (4)		D
Flow direction										
Mechanism shaft vertical		From left to right								1
		From right to left								2
		From front to back								3
		From back to front								4
Mechanism shaft horizontal		From left to right								5
		From right to left								6
		Upwards								7
		Downwards								0
Mechanical registers/quantity preset registers[1]								Weight appr. kg (lb)		
Single- pointer dial										
• Type 01								0.8 (1.76)		0 1
Double-pointer dial										
• Type 11, vertical mounting								1.5 (3.3)		1 1
• Type 12, horizontal mounting								2.5 (5.5)		1 2
Quantity preset register (only for vertical mechanism shaft, flow direction according to codes 1 ... 4)										
• Type 30								11 (24.3)		3 0
• Type 30, ex-protected switch								13.2 (29.1)		5 4
Value per revolution										
• 100 l (26.5 USg)										3
• 1000 l (265 USg)										4
Accessories (pulsers, cooling attachments)[1]										
• None										A
• Mounted										B
• Pulser already mounted above the intermediate gear:										
- 10 pulses/value per revolution										C
- 100 pulses/value per revolution										D
• Pulser already mounted below the intermediate gear:										
- 10 pulses/measuring chamber volume										G
- 100 pulses/measuring chamber volume										H

For Selection and Ordering data of „**Digital register with current and pulse output**“, „**Tests**“ und „**Flanges**“ see page 3/455.
Heating systems on request.

[1] For measuring temperatures over 80 °C, it is always necessary to order one cooling attachment (7MV3001-1XX00).
For measuring temperatures over 180 °C, it is always necessary to order two cooling attachments (7MV3001-2XX00) as separate items.

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Selection and Ordering data	Article No.	Order code
Rotary piston meter DN 15 (½") to DN 80 (3")	**7MR1 ■■ 0 - ■■■■■ - ■■■■**	**■■■**
Digital register with current/pulse output		
As separate model: Pulser mounted on the rotary-piston meter and locked with protective cover; SITRANS F RA110 (order separately)		
10 pulses/revolution		
• max. material temperature 80 °C (176 °F), without cooling attachment	**4 1 0 B**	
• max. material temperature 180 °C (356 °F), one cooling attachment	**4 3 0 B**	
• max. material temperature 260 °C (500 °F), two cooling attachments	**4 5 0 B**	
100 pulses/revolution		
• max. material temperature 80 °C (176 °F), without cooling attachment	**4 6 0 B**	
• max. material temperature 180 °C (356 °F), one cooling attachment	**4 7 0 B**	
• max. material temperature 260 °C (500 °F), two cooling attachments	**4 8 0 B**	
Compact version: Pulser mounted on the rotary-piston meter and locked with mounting bracket; SITRANS F RA110 (order separately) mounted on mounting bracket.		
10 pulses/revolution		
• max. material temperature 80 °C (176 °F), without cooling attachment	**6 1 0 B**	
• max. material temperature 180 °C (356 °F), one cooling attachment	**6 3 0 B**	
• max. material temperature 260 °C (500 °F), two cooling attachments	**6 5 0 B**	
100 pulses/revolution		
• max. material temperature 80 °C (176 °F), without cooling attachment	**6 6 0 B**	
• max. material temperature 180 °C (356 °F), one cooling attachment	**6 7 0 B**	
• max. material temperature 260 °C (500 °F), two cooling attachments	**6 8 0 B**	
Tests		
Works test	**A**	
Works test certificate	**B**	
Preliminary official test (only for vertical mechanism shaft and mech. register and quantity preset register)	**D** [1]	
Preliminary official test (only for vertical mechanism shaft and mech. Register or quantity preset register and pulser (double pick-up) for current/pulse output); (not currently available in connection with SITRANS F RA110	**E** [1]	
Flanges		
Plane, drilled to EN 1092-1	**0**	
Plane, drilled to specification	**9**	**R 1 Y**
With sealing ridge to specification	**9**	**R 2 Y**

[1] Not with PTFE and PCTFE pistons.

Further designs	Order code
Article No. of the rotary-piston meter 7MR1■■■ - ■■■■■ - ■■■■ - Z	
Material acceptance test to EN 10 204-3.1	**E01**

Certificates and approvals

Classification according to pressure equipment directive (DGRL 97/23/EG):

- 7MR1020: for liquids of group 1; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP)
- 7MR1110, 7MR1020, 7MR1130 and 7MR1140: for liquids of group 1; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP)
- 7MR1410 and 7MR1420: for liquids of group 1; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP)
- 7MR1430 and 7MR1440: for liquids of group 2; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP);
  For liquids of fluid group 1 on request.
- 7MR1620 and 7MR1630: for liquids of fluid group 2; complies with requirements of article 3, para. 3 (SEP)

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Rotary-piston meters - Ordering data - Automatic batchmeter DN 25 (1") and DN 50 (2")

3

Selection and Ordering data

Article No. 7MR1 1 1 - E ■■■ - ■■■■ ■■■

Order code

Automatic batchmeter DN 25 (1“)
With mechanical shut-off valve **downstream** of metering mechanism

Nominal pressure	Materials Housing	Meas. chamber	Rotary piston							Weight appr. kg (lb)	Article No.
PN 10 (145 psi)	Cast iron	Cast iron	•			•	•	•	•	38 (83.8)	7MR1 1 1 ■ - ■ E ■■■ - ■■■■ ■■■
	CrNiMo steel	CrNiMo steel	•	•	•	•	•		•		7MR1 1 1 ■ - ■ S ■■■ ■■■■ ■■■

Automatic batchmeter DN 50 (2“)
With mechanical shut-off valve **downstream** of metering mechanism

Nominal pressure	Materials Housing	Meas. chamber	Rotary piston							Weight appr. kg (lb)	Article No.
PN 6 (87 psi)[1]	Cast iron	Cast iron			•	•	•	•		58.5 (129)	7MR1 4 1 ■ - ■ E ■■■ - ■■■■ ■■■
PN 10 (145 psi)	CrNiMo steel	CrNiMo steel	•	•	•	•		•			7MR1 4 1 ■ - ■ S ■■■ ■■■■ ■■■

Rotary piston material								Max. permissible liquid temperature	Weight appr. kg (lb)	Order code
Carbon							•		0.15 (0.3)	K
Cast iron						•			0.55 (1.2)	E
Cast iron, grooved						•			0.5 (1.1)	B
Ni-resist					•				0.55 (1.2)	N
Ni-resist, grooved					•				0.5 (1.1)	C
Hard rubber				•				40 °C (104 °F)	0.1 (0.2)	G
Hard rubber, grooved				•				40 °C (104 °F)		D
PTFE with graphite filling			•					40 °C (104 °F)	0.3 (0.7)	F
PTFE with graphite filling, grooved			•					40 °C (104 °F)		L
PTFE with graphite filling			•					90 °C (194 °F)		R
PTFE with graphite filling, grooved			•					90 °C (194 °F)		M
PCTFE (only DN 25)		•						40 °C (104 °F)	0.16 (0.4)	H
PCTFE, grooved (only DN 25)		•						40 °C (104 °F)		J
CrNiMo with carbon contact surface	•								0.4 (0.9)	S
CrNiMo with PTFE contact surface	•									T

	Order code
Tappet bushing	
• With maintenance-free sealed bushing	2
• With bellows[2)3)]	3
Flow direction	
Mechanism shaft always vertical • From left to right, valve right	1
Mechanism shaft always vertical • From right to left, valve left	2
Quantity preset register	
• Type 30	3 0
• Type 30, ex-protected switch	5 4
Value per revolution and adjustment step	
1 l/0.1 : 0.1 l (only DN 25)	1
10 l/1 : 1 l	2
100 l/10 : 1 l (only DN 50)	3
Accessories	
Without	A
Mounted	B
Tests	
Works test	A
Works test certificate	B
Preliminary official test	C
Flanges	
Plane, drilled to EN 1092-1	0
Plane, drilled to specification	9 R 1 Y
With sealing ridge to specification	9 R 2 Y

Note: If pressure impacts are likely, the valve should be before the automatic batchmeter in the direction of flow.

1) Flange connections drilled to PN 10/16 (MWP 145/232 psi)
2) Restricted operating conditions (max. 40 °C (104 °F), max. 3 bar (43.5 psi))
3) Separate Article No. required (see Selection and Ordering data table „Accessories“)

Certificates and approvals

Classification according to pressure equipment directive (DGRL 97/23/EG):
For liquids of fluid group 1; complies with requirements of article 3, paragraph 3 (sound engeneering practice SEP)

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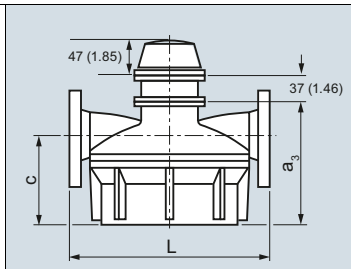
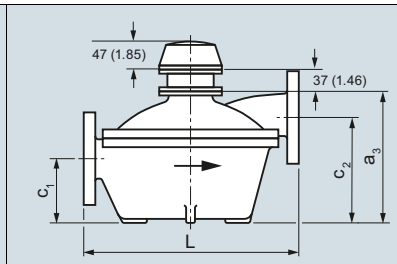
Dimensional drawings

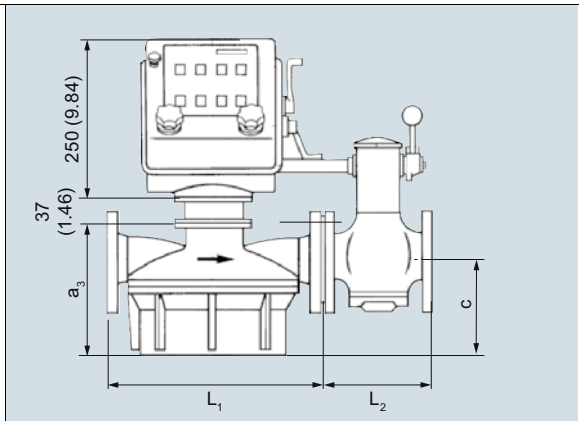
Rotary-piston meter with single pointer dial and intermediate gear





	DN 25	DN 50	DN 80	DN 15		DN 25		DN 50		DN 80	
				PN 25	PN 40	PN 25 and PN 40	PN 63	PN 25 and PN 40	PN 63	PN 25 and PN 40	PN 63
L	210 (8.27)	325 (12.80)	410 (16.14)	200 (7.87)	200 (7.87)	270 (10.63)	300 (11.81)	400 (15.75)	470 (18.50)	540 (21.26)	600 (23.62)
C	90 (3.54)	147 (5.79)	185 (7.28)	-	-	-	-	-	-	-	-
C_1	-	-	-	50 (1.97)	68 (2.68)	80 (3.15)	82 (3.23)	120 (4.72)	120 (4.72)	155 (6.10)	177 (6.97)
C_2	-	-	-	83.5 (5.67)	108 (4.25)	144 (5.67)	157 (6.18)	205 (8.07)	230 (9.06)	271 (10.67)	312 (12.28)
a_3	153 (6.02)	205 (8.07)	244 (9.61)	140 (8.19)	165 (6.50)	208 (8.19)	224 (8.82)	263 (10.35)	285 (11.22)	331 (13.03)	387 (15.24)

Automatic batchmeter with quantity preset register intermediate gear



	DN 25	DN 50
L_1	210 (8.27)	325 (12.80)
L_2	135 (5.31)	175 (6.89)
C	90 (3.54)	147 (5.79)
a_3	153 (6.02)	205 (8.07)

In addition to dimension a_3 the following dimensions need to be added for extra add-on components (dimensions in mm (inch))	
Addition of	**a_3 +**
Intermediate gear	37 (1.46)
Single-pointer dial type 01	47 (1.85)
Double-pointer dial type 11	58 (2.28)
Double-pointer dial type Typ 12	250 (9.84)
Pulser	82 (3.23)
Mounting bracket and electronic flow register	200 (7.87)
1 additional insulation attachment (up to 180°C (176°F))	159 (6.26)
2 additional insulation attachments	318 (12.52)
Quantity preset register	287 (11.30)

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SITRANS F RA110 electric flow register

Overview

Application

The display of the electric flow register is a universal LCD for converting the measured value and displaying the current value, total value and accumulated total. Depending on the design, the flow register can be provided with a scaleable pulse output for the total value and/or a current output of 0/4 to 20 mA.

Design

The electric flow register is fitted with a large, extremely clear LCD (90 x 40 mm in size), where the flow and total value are displayed with seven 17 mm digits and 8 mm digits respectively. Units, time units, flow trend and device status are displayed in addition.

The electronics is fitted in a rugged aluminum housing (IP67) with three large keys. The alphanumeric menu structure in English or German permits simple configuring and can be used for many applications.

Models 61, 63, 65 and 66, 67, 68 are supplied with the electric flow register already mounted on the pulser.

Function

The flow register of the SITRANS F RA110 receives, e.g. from a pulser, information on the current flow. This information is converted into the flow per second, minute, hour or day using a programmable 7-digit K-factor. Conversion is also carried out for the total values and accumulated totals. The units for the flow and accumulated total are completely independent.

The total value can be reset by pressing the "CLEAR" key twice. The accumulated total cannot be reset and is displayed with 11 digits.

The standard configuration displays the total value (17 mm digits) and the flow (8 mm digits) simultaneously. It is also possible to output the current value on the 17 mm digits. In this case, the total value is displayed by pressing "SELECT". The electric register has inputs for Namur sensors. Connection is possible to practically every available sensor system.

The active and passive 0/4 to 20 mA analog output has a resolution of 12 bits and can be connected to a load of 750 Ω.

The pulse output can be exactly defined, e.g. to generate one pulse per 3.5 liters. The pulse lengths can be set to 1 to 9 999 ms. The maximum output frequency is limited to 500 Hz. The transistor can switch max. 50 V DC/ 300 mA.

All configuration parameters are saved in an EEPROM. The total value and the accumulated total are saved once a minute, so that only a minimum amount of information is lost in the event of a power failure.

The SITRANS F RA110 can be ordered with powerful LED background lighting for use under unfavorable viewing conditions. The menu language of the displays can be set to German or English.

Technical specifications

Input	
Pulse input	NAMUR signal
Frequency	NAMUR: 0 ... 500 Hz
Sensor supply	8.2 V or 24 V DC
Output	
Pulse output	Max. frequency 500 Hz, pulse width 1 ... 9999 ms adjustable. Type: Transistor output, max. load 24 V DC/170 mA (active) and 50 V DC/300 mA (passive)
Analog output	Range 0/4 ... 20 mA, accuracy: < ± 0.1 %, resolution 12 bit, response time (10 ... 90 %): 100 ms, load max. 750 Ω, active or passive, function: flow 0/4 ... 20 mA freely adjustable
Functionality	
Operator	The total value and flow are displayed. The total value is deleted by double-pressing the "CLEAR" key. The total value and the accumulated total are displayed by pressing the "SELECT" key.
Total value	17 mm (0.67 inch) high, 7 digits, max. 3 decimal places; the total value can not be deleted. Units: l, m^3, gal, USg, kg, lb, bbl or none K-factor: 7-digit 0.000010 to 9 999 999 Settings independent of flow
Accumulated total	8 mm high (0.31 inch), max. 11 digits, max. 3 decimal places, the accumulated total cannot be reset
Flow rate	8 mm (0.31 inch) or 17 mm (0.65 inch) high, max. 7 digits, max. 3 decimal places Units: ml, l, m^3, mg, g, kg, ton, Nl, Nm^3, scf, ref, cf, lb, bbl, gal or none Time units: second, minute, hour, day
Rated conditions	
Operating temperature	-40 ... +80 °C (-40 ... +176 °F)
Degree of protection	IP67 (NEMA 4)
Design	
Material	Housing: aluminum, UV-resistant powder coating Window: Polycarbonate Gasket material: Silicone
Dimensions	See dimensional drawings
Power supply	
Power supply with	24 V AC/DC ± 10 % or 115/230 V AC ± 10 %
Power consumption	Max. 9 W
Certificate and approvals	
Ex protection	EEx ia IIB/IIC T4
For official calibration inspections	In preparation

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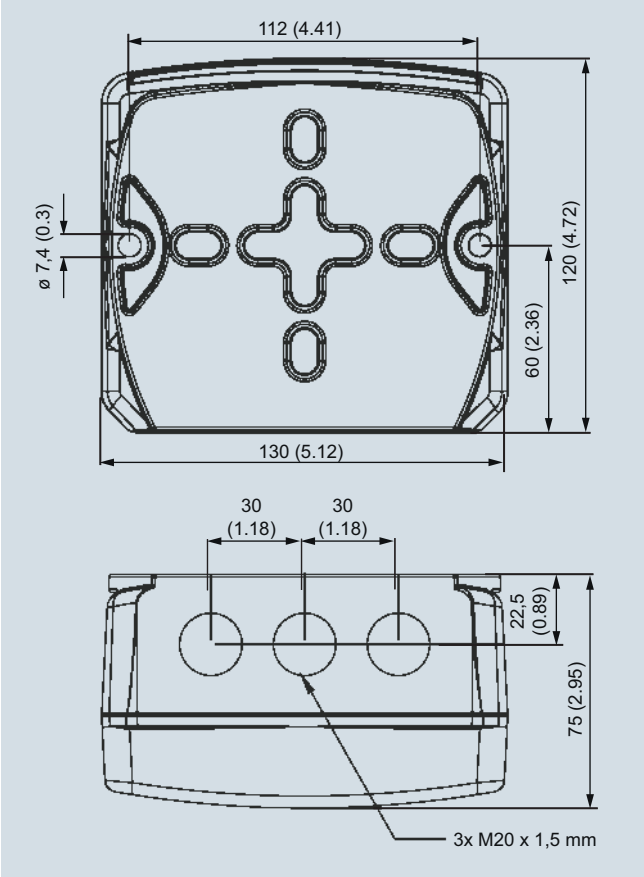
Selection and Ordering data	Article No.
Electric flow register SITRANS F RA110 ↗	**7MV1070-**
Electric register in aluminum housing for display of flow and total quantity, 7-digit LCD, IP67 (NEMA 4), without explosion protection, menu language German/English	- A 0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Signal input	
NAMUR signal	1
Power supply	
Incl. sensor supply 8.2 V DC	
24 V AC/DC[1]	A
230 V AC[1]	B
16 ... 30 V DC[2]	C
Function (output)	
Display of flow and total value	A 0
Additonal active pulse output[1]	B 1
Additonal passive pulse output	B 2
Additonal active pulse output and current output[1]	C 1
Additonal passive pulse output and current output	C 2
Installation	
For wall mounting	0
For additional mounting at compact version	1
Explosion protection	
without	0
EEx ia IIB/IIC T4 up to max. 100 °C	1
LED background lighting	
without	A
with background lighting	B

[1] Not for ATEX version
[2] For ATEX version only

Note:
Cable glands for M20 are not included in delivery.

Dimensional drawings



Electric flow register SITRANS F RA110, dimensions in mm (inch)

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Pulser with inductive pick-up

Overview

Pulser with inductive pick-up

The pulser is used for quantity metering in conjunction with electromechanical pulse counters as a transmitter with output signals for electronic data processing.

Using the pulser, quantity measurements from volumetric meters can be converted into electrical pulses for remote transmission.

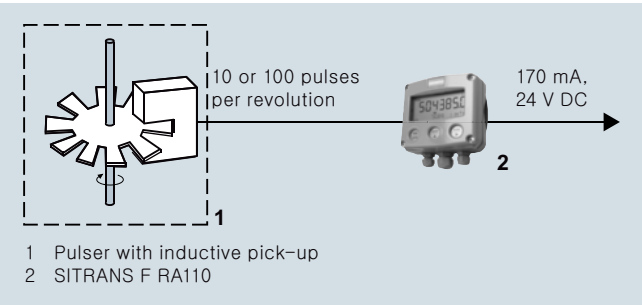
Design

- Electronic design
- High pulse frequency (≤ 3 000 Hz)
- Electronic output
  - 170 mA, 24 V DC (delivering current) for electromechanical pulse counters
  - 2 mA, 24 V DC (absorbing current) for electronic processing

Function

Pulse valence with quantity measurements

Conversion of metered quantities into electrical pulses



1 Pulser with inductive pick-up
2 SITRANS F RA110

Measuring system for remote metering and digital data processing

The metering shaft of the volumetric meter drives a pulse disk. The vanes of the pulse disk successively enter the air gap of an inductive pick-up, thus changing the coupling between two coils. This causes a change in resistance that is converted into a pulse by the subsequent pulse amplifier, which also powers the pick-up.

The pulser operates without contacts. No measurable force is exerted on the disk. Hence the system is free from feed-backs.

Depending on the design, 10 or 100 pulses are produced for each revolution of the drive. The pulse amplifier amplifies the incoming pulses. A timing circuit prevents a continuous output pulse.

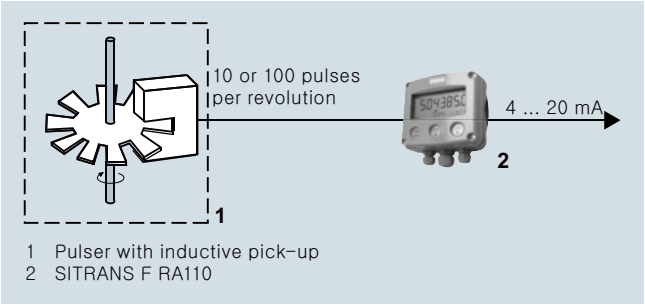
The quantitative value associated with one pulse depends on the value per revolution of the drive (pulses per liter or gallon) or on the respective volume of the measuring chamber of the drive.

The selection of the pulser – whether 10 or 100 pulses per drive revolution – is to be made according to the desired resolution.

Pulsers with two inductive pick-ups are available for systems for custody transfer since at present the PTB regulations specify a duplicated transmission system with pulse comparison.

Pulse valence with flow rate measurements

Conversion of metered quantities into electrical pulses



1 Pulser with inductive pick-up
2 SITRANS F RA110

Measuring system for flow-rate measurement

During flow measurements, the change in resistance is converted to pulses by SITRANS F RA110. Each pulse corresponds to a given quantity of metered liquid. The number of pulses per unit in time (the frequency) is a measure of the flow rate.

SITRANS F RA110 converts the incoming NAMUR signals into load-independent direct current.

The electric pulser is available for 10 or 100 pulses per revolution. The choice depends on the smallest flow rate still to be indicated.

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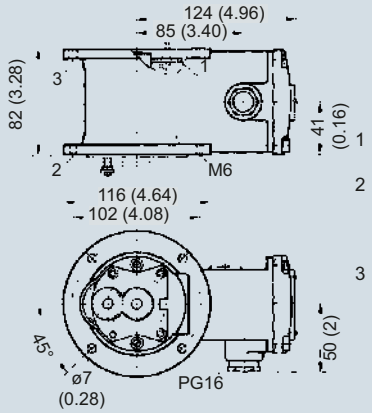
Technical specifications

Slot initiator	Sensor SJ 3,5 -N-K37
Power supply (from pulse amplifier)	8 V DC, R_i approx. 1 kΩ (DIN 19234) C_i = 40 nF; L_i = 160 µH
Change in current consumption on pulse	≤ 1 mA/≤ 3 mA (DIN 19234)
Permissible line impedance between pick-up and amplifier	≤ 50 Ω (DIN 19234)
Number of pulses per revolution of the drive	10 or 100
Phase position of the channels of the double pick-up	180° : 180° ± 30° Electrically offset 90° ± 30°
Duty factor	1 : 1 ± 17%
Max. pulse frequency	3000 Hz
Pulse valence	Dependent on value per revolution of the drive of the respective meter
Permissible ambient temperature	-25 ... +100 °C (-13 ... +212 °F)
Degree of protection	IP43 to EN 60529 with register
	P65 to EN 60529 with protective cover
	This pulser has the EC-Type Examination Certificate PTB 99 ATEX 2219X.
Mounting position	Any
Weight approx.	1.2 kg (2.65 lb)
Ex approval	IIG EEx ia IIC T6

Selection and Ordering data	Article No.
Pulser with inductive pick-up Weight approx. 1.2 kg (2.65 lb)	
Single pick-up	
• 10 pulses/revolution	**7MV1105-1AA00**
• 100 pulses/revolution	**7MV1105-2AA00**
Double pick-up[1] (for custody transfer installations)	
• 10 pulses/revolution	**7MV1105-3AA01**
• 100 pulses/revolution	**7MV1105-4AA01**
Instruction Manual German/English	**C73000-B5174-C25**

[1] Pulse channels electrically offset by 90°

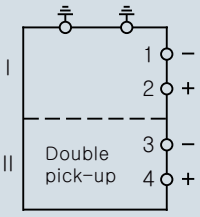
Dimensional drawings



1 Gear wheel supplied (brass)
2 Standard connection for measuring chamber cover, intermediate gear and cooling attachments
3 Standard connection for register, quantity preset register, protective cover or mounting bracket

Pulser with inductive pick-up, dimensions in mm (inch)

Schematics



Pulser with inductive pick-up, connection diagram for clockwise rotation; pick-up I to terminals 3 and 4 for counter-clockwise rotation

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Notes

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4/2 **Overview**

Point level measurement

4/9 RF Capacitance switches
4/12 – Pointek CLS100
4/18 – Pointek CLS200 – Standard
4/27 – Pointek CLS200 – Digital
4/36 – Pointek CLS200 – Standard and Digital
4/44 – Pointek CLS300 – Standard
4/51 – Pointek CLS300 – Digital
4/57 – Pointek CLS300 – Standard and Digital
4/64 – Pointek CLS500
4/80 – Pointek CLS Specials

Vibrating switches

4/82 – SITRANS LVL100
4/88 – SITRANS LVL200
4/104 – SITRANS LVS100
4/107 – SITRANS LVS200

Rotation paddle switches

4/116 – SITRANS LPS200

Ultrasonic non-contacting switch

4/127 – Pointek ULS200

Continuous level measurement

4/132 Ultrasonic

Ultrasonic transmitters

4/136 – SITRANS Probe LU
4/141 – The Probe

Ultrasonic controllers

4/144 – SITRANS LUT400 series
4/152 – MultiRanger 100/200
4/156 – HydroRanger 200
4/160 – SITRANS LU01 and LU02
4/164 – SITRANS LU10
4/168 – SITRANS LU AO

Ultrasonic transducers

4/171 – ST-H
4/174 – EchoMax XRS-5
4/178 – EchoMax XPS

Continuous level measurement (continued)

Accessories for ultrasonic

4/185 – EA aiming devices
4/187 – FMS mounting brackets
4/189 – TS-3 temperature sensor

4/191 Radar transmitters
4/194 – SITRANS Probe LR
4/198 – SITRANS LR200
4/207 – SITRANS LR200 Antennas
4/210 – SITRANS LR200 Specials
4/213 – SITRANS LR250 Horn Antenna
4/225 – SITRANS LR250 Specials
4/226 – SITRANS LR250 threaded PVDF antenna
4/232 – SITRANS LR250 threaded PVDF Specials
4/233 – SITRANS LR250 Flanged Encapsulated Antenna
4/242 – SITRANS LR250 Flanged Encapsulated Specials
4/243 – SITRANS LR250 Hygienic Encapsulated Antenna
4/268 – SITRANS LR250 Hygienic Encapsulated Specials
4/269 – SITRANS LR260
4/274 – SITRANS LR460
4/279 – SITRANS LR260/LR460 Specials
4/280 – SITRANS LR560
4/285 – SITRANS LR560 Specials
4/286 Guided wave radar transmitters
4/289 – SITRANS LG series

Capacitance transmitters

4/324 – SITRANS LC300
4/338 – SITRANS LC500
4/361 – SITRANS LC300 and LC500 Specials

Communication

4/362 SmartLinx module
4/363 Dolphin Plus Software

You can download all instructions, catalogs and certificates for SITRANS L free of charge: www.siemens.com/level

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Overview

	Application	Device description	Page	Programming Software
Point level measurement - RF Capacitance switches				
	Powerful range of level switches suitable for a variety of industries	**Pointek CLS100/CLS200/CLS300/CLS500**		
		• CLS100: compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries, and foam	4/12	SIMATIC PDM
		• CLS200: a versatile inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output, ideal for detection of liquids, solids, slurries, foam, and interfaces; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features	4/18	SIMATIC PDM
		• CLS300: inverse frequency shift capacitance level switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present; digital version (with PROFIBUS PA) includes a display and provides additional diagnostic features	4/44	SIMATIC PDM
		• CLS500: inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of high temperature and pressure; HART communication for remote commissioning	4/64	SIMATIC PDM
Point level measurement - Vibrating switches				
	Reliable vibrating point level switches for liquid and slurry applications across all industries	**SITRANS LVL100/LVL200**		
		• LVL100: compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low, and demand level applications. Also ideal for dry run protection	4/82	-
		• LVL200: advanced vibrating level switch for use in liquid and slurry applications. Suited for most hazardous area applications such as: overflow, high, low, demand, and dry run protection; can also be used for Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511	4/88	-
	Reliable vibrating point level switches for bulk solids in a wide variety of applications at a competitive price	**SITRANS LVS100/LVS200**		
		Vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications		
		• LVS100	4/104	-
		• LVS200	4/107	-
Point level measurement - Rotating paddle switch				
	Reliable rotating point level switches for bulk solids in a wide variety of applications at a competitive price	**SITRANS LPS200**	4/116	-
		• Rotating paddle switch for detection of high, low, and demand levels for a wide variety of bulk solids industries. Unique engineering provides long-lasting reliable performance		

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	Application	Device description	Page	Programming Software
Point level measurement - Ultrasonic switch				
	Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries	**Pointek ULS200** • Rugged design, no moving parts, and virtually maintenance-free • Transducer available in ETFE or PVDF copolymer and therefore inert to most chemicals	4/127	-
Continuous measurement - Ultrasonic transmitters				
	2-wire loop powered ultrasonic transmitter for level, volume, and flow monitoring of liquids in open channels, storage vessels and simple process vessels	**SITRANS Probe LU** • Continuous level measurement up to 12 m (40 ft) range • Sonic Intelligence signal processing • Auto False-Echo Suppression	4/136	-
	Compact level transmitter with integrated transducer for accurate level measurement for liquid applications	**The Probe** • Simple, compact and competitively priced ultrasonic level transmitter in several versions for maximum versatility: - Three-wire system with alarm relay - Two-wire system with current loop	4/141	SIMATIC PDM
Continuous measurement - Ultrasonic controllers				
	The Siemens SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.	**SITRANS LUT420/430/440** In addition to industry leading 1 mm (0.04 inch) accuracy, each of the three models in the series are compatible with our full range of EchoMax transducers and offer varying degrees of pump, alarm, and other control functionality, all from a very compact and easy-to-use interface. • 1 mm accuracy • HART communications • Next Generation Sonic Intelligence	4/144	SIMATIC PDM
	Versatile short- to medium-range ultrasonic single- and dual-vessel level controller for virtually any application in a wide range of industries	**MultiRanger 100/200** • Using non-contacting ultrasonic technology, the controller measures the level in short to medium range applications up to 15 m (50 ft) of solids, liquids, or slurries • Auto False-Echo Suppression of false echoes	4/152	SIMATIC PDM
	Ultrasonic level controller for up to six pumps - control, differential control, and open channel flow monitoring	**HydroRanger 200** • An economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards • Auto False-Echo Suppression of false echoes	4/156	SIMATIC PDM

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	Application	Device description	Page	Programming Software
	Ultrasonic long-range level monitoring system for liquids and solids	**SITRANS LU01/LU02** **SITRANS LU10** • Automatic conversion of level into volume for standard or custom tank shapes • Easy to install and program • Optional fieldbus card, e.g. PROFIBUS DP	4/160 4/164	Dolphin Plus Dolphin Plus
	Output module for SITRANS LU10	**SITRANS LU AO** • SITRANS LU AO analog output module provides remote analog outputs for the measurement points of the SITRANS LU10 transceiver	4/168	-
Continuous measurement - Ultrasonic transducers				
	ST-H: ETFE or PVDF transducer for chemicals XRS-5: Standard transducer for applications to 8 m (26 ft)	**ST-H/EchoMax XRS-5** • ST-H: The narrow design of the ST-H allows the sensor to be mounted using a 2 inch connection • XRS-5: narrow beam angle of only 10°, measuring range maximum 8 m (26 ft) for measurement of liquids, solids, and slurries	4/171 4/174	- -
	Transducers for liquids and bulk solids XPS series: Hermetically sealed PVDF enclosure for chemical immunity	**EchoMax XPS** • XPS series offers versions for various distances up to 30 m (100 ft) and up to a maximum temperature of 95 °C (203 °F)	4/178	-
Continuous measurement - Radar transmitters				
	2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft)	**SITRANS Probe LR** • Uni-Construction polypropylene rod antenna standard • Process Intelligence signal processing • Auto False-Echo Suppression of false echoes	4/194	SIMATIC PDM

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	Application	Device description	Page	Programming Software
	2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft)	**SITRANS LR200** • Program without opening the lid, even in hazardous areas, using patented infrared IS handheld programmer • Special Uni-Construction hermetically sealed polypropylene rod antenna has integrated threaded connection • Built-in alphanumeric display with support in four languages	4/198	SIMATIC PDM AMS SITRANS DTM
	2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft); antenna designs ideal for small vessels, low dielectric media, food & beverages and corsive/aggressive media	**SITRANS LR250** • Simple operation using the graphical local user interface (LUI) • Plug-and-play setup using the intuitive Quick Start Wizard • 25 GHz high frequency allows for small horn antennas and easy mounting in nozzles • Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions	4/213	SIMATIC PDM AMS SITRANS DTM
	2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids up to 30 m (98.4 ft); ideal for measurement in extreme dust and high temperatures	**SITRANS LR260** • Simple operation using the graphical local user interface (LUI) • Plug-and-play setup using the intuitive Quick Start Wizard • 25 GHz high frequency allows for small horn antennas and easy mounting in nozzles • Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions	4/269	SIMATIC PDM
	4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft); ideal for measurement in extreme dust	**SITRANS LR460** • Process Intelligence for advanced signal processing and quick and easy adjustment • Self-guided Quick Start Wizard for plug and play start-up • 100 m (328 ft) range for long-range and difficult applications	4/274	SIMATIC PDM
	2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft)	**SITRANS LR560** • Rugged stainless steel design • 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids • Aimer option to direct beam to area of interest, such as draw point of cone • Air purge connection is included for self-cleaning of extremely sticky solids • Lens antenna is highly resistant to product build-up • Local display interface (LDI) allows local programming and diagnostics	4/280	SIMATIC PDM AMS SITRANS DTM

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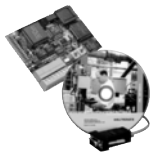
	Application	Device description	Page	Programming Software
Continuous measurement - Guided wave radar transmitters				
	Guided wave radar transmitters for short- and medium-range level, level/interface, and volume measurement of liquids, slurries, and solids. The four LG models are unaffected by changes in process conditions, high temperatures and pressures, and provide a wide range of hygienic options.	**SITRANS LG240/250/260/270** • Measures accurately on materials with dielectric (dK) as low as 1.4 • Guided wave radar measurement for up to 2 mm (0.08 inch) accuracy • Measures level, level/interface, and volume of solids, slurries, and liquids • 4 button programming for quick setup • Reliable level measurement on harsh applications with pressure up to 400 bar g (40 000 kPa) and temperatures as high as 450 °C (842 °F)	4/289	SIMATIC PDM
Continuous level – Capacitance transmitters				
	For liquids and solids applications, ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, and mining, aggregate and cement industries	**SITRANS LC300** • Sophisticated, but easy-to-adjust microprocessor combined with field-proven probes • Active shield technology ensures measurements are unaffected by vapors, product deposits, dust, and condensation	4/324	-
	Level and interface transmitter for extreme and critical process conditions, such as oil and liquid natural gas (LNG), toxic and aggressive chemicals and vapours	**SITRANS LC500** • Equipped with the HART Smart protocol for remote setup and calibration • Active shield technology ensures measurements are unaffected by vapors, product deposits, dust, and condensation	4/338	SIMATIC PDM
Communications				
		**SmartLinx Module, Dolphin Plus software** • Optional communication modules, SmartLinx, provide direct digital connection to popular industrial fieldbus systems • Dolphin Plus for quick and easy configuring, monitoring, tuning, and diagnostics of Siemens devices	4/362 4/363	- -

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Continuous Level						
Conditions	**Ultrasonic**	**Radar**	**Guided Wave Radar**	**Capacitance**	**Gravimetric**	**Hydrostatic pressure**
Measurement						
Level	■	■	■	■	◆	■
Interface (liquid/liquid)			■	◆		■
Interface (liquid/solid)	◆			◆		
Volume	■	■	◆	◆	◆	■
Mass					■	■
Flow (open channel)	■	◆				
Level Applications						
Changing density	■	■	■	■		
Changing dielectric	■	■	■	◆	■	■
Aggressive chemicals	■	■	■	■	■	■
Pressure/vacuum		■	■	■	■	■
High temperature		■	■	■	■	■
Cryogenic			■	■	■	
Turbulence	■	■	◆	◆	■	■
Steam		◆	■	◆	■	■
Hydrocarbon vapors/solvents		■	■	■	■	■
Foam	◆	◆	◆	◆	■	■
Build-up	◆	◆	◆	◆	■	◆
High viscosity	■	■	◆	◆	■	◆
Dust	◆	■	■	■	■	
Solids powders	◆	■	◆	◆	■	
Solids granules/pellets < 25 mm (1 inch)	■	■	◆	◆	■	
Solids > 25 mm (1 inch)	■	■			■	
High angle of repose	◆	■	■	◆	■	

■ preferred

◆ condition dependent

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Level Measurement Selector

Point Level				
Conditions	**Vibration**	**Capacitance**	**Paddle**	**Ultrasonic**
Measurement				
Level	■	■	■	■
Interface (liquid/liquid)		■		
Interface (liquid/solid)	◆	◆		
Volume				
Mass				
Flow (open channel)				
Level Applications				
Changing density	■	■	■	■
Changing dielectric	■	◆	■	■
Aggressive chemicals	■	■	◆	■
Pressure/vacuum	■	■	■	
High temperature	■	■	■	
Cryogenic		■		
Turbulence	◆	◆		■
Steam	■	◆	■	
Hydrocarbon vapors/solvents	■	◆		
Foam	◆	◆		◆
Build-up	◆	◆	■	◆
High viscosity	◆	◆	◆	■
Dust	■	■	■	◆
Solids powders	■	◆	■	◆
Solids granules/pellets < 25 mm (1 inch)	■	◆	■	■
Solids > 25 mm (1 inch)	◆	◆	■	■
High angle of repose	■	■	■	◆

■ preferred

◆ condition dependent

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Overview

Introduction

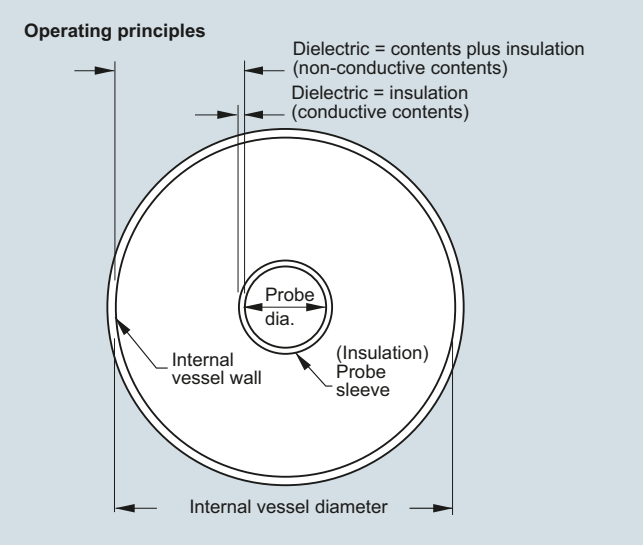
Inverse frequency shift capacitance point level and material detection switches are designed to withstand the harsh environments of high pressure and high temperature applications.

Inverse Frequency Technology

Siemens inverse frequency shift capacitance devices incorporate a unique frequency-based approach to level measurement. The capacitance units monitor the effect of capacitance based on frequency change. The relationship between capacitance and frequency is inverse. Because small level changes result in a large frequency change, the result is excellent resolution and accuracy.

Principle of Operation

Inverse frequency shift capacitance devices require two components: a reference electrode of a variable capacitor and the measurement electrode. In capacitive level measurement, the environment (typically the vessel wall) acts as the reference electrode, while the probe supplies the measurement electrode. The dielectric is composed of the vessel contents and, if the measurement electrode is insulated, the insulating layer.



Inverse frequency shift capacitance operation

Capacitance is affected by the surface area of the electrodes, the separation distance between the electrodes and the dielectric constant of the vessel contents. The dielectric constant is the measure of a material's ability to store energy. The relative dielectric constant of air (vacuum) is 1; all other materials have a higher value.

Mode of operation

Common Terms

Capacitance

The property of a system of conductors and dielectrics that permits the storage of electricity when a potential difference exists between the conductors. Its value is expressed as the ratio of a quantity of electricity to a potential difference and the unit is a Farad.

Capacitor

A device in a circuit that has the potential to store an electric charge. Typically a capacitor has two conductors or electrodes separated by a layer of a non-conducting material called a dielectric. With the conductors on opposite sides of the dielectric layer oppositely charged by a source of voltage, the electrical energy of the charged system is stored in the polarized dielectric.

Dielectric constant

The ability of a dielectric to store electrical potential energy under the influence of an electric field. This is measured by a ratio which compares the capacitance of a condenser with the material as dielectric to its capacitance with a vacuum/dry air as dielectric: the dielectric constant of air is 1.

Active shield

The portion of the probe isolated from the active measurement section. The sensor signal is connected to the active shield portion of the probe, eliminating the electrical potential difference between the shield and the measurement section. So, the shield portion of the probe near the process connection is not affected by changes in vapor concentration, material buildup, dust, or condensation.

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Technical specifications

	Point Level Measurement			
Criteria	**Pointek CLS100**	**Pointek CLS200**	**Pointek CLS300**	**Pointek CLS500**
Typical applications	Liquids, slurries, powders, granules, applications in constricted spaces	Liquids, slurries, powders, granules, foam, food, and pharmaceuticals, petrochemicals	Liquids, slurries, powders, granules, relatively high pressure and temperature, hazardous areas	Water in oil level, foam or liquid/ foam level, glycol regenerators, high-pressure coalescers
Max. length including sensor	100 mm (4 inch)	Rod: 5.5 m (18 ft) Cable: up to 30 m (98 ft)	Rod: 1 m (40 inch) Cable: 25 m (82 ft)	Rod: 1 m (40 inch)
Process temperature (Temperature ratings are pressure dependent. See Pressure/Temperature curves for respective product.)	• Stainless steel process connection: -30 ... +100 °C (22 ...+212 °F) • Fully Synthetic (PPS process connection): -10 ... +100 °C (14 ... 212 °F)	• -40 ... +85 °C (-40 ... +185 °F) • With thermal isolator: -40 ... +125 °C (-40 ... +257 °F)	• -40 ... +200 °C (-40 ... +392 °F) • HT version: -40 ... +400 °C (-40 ... +752 °F)	• -50 ... +200 °C (-58 ... +392 °F) • HT version: -60 ... +400 °C (-76 ... +752 °F)
Process pressure (Pressure ratings are temperature dependent. See Pressure/Temperature curves for respective product.)	Up to 10 bar g (146 psi g)	• Rod versions: Up to 25 bar g (365 psi g) • Cable version: Up to 10 bar g (146 psi g)	Up to 35 bar g (511 psi g)	• Up to 150 bar g (2 175 psi g)
Output	Stainless steel cable or enclosure version: • 4 ... 20/20 ... 4 mA 2-wire current loop • Solid-state output Fully-synthetic version (PPS) • Relay output	Standard: • 1 SPDT Form C relay, solid-state switch Digital: • Solid-state switch included	Standard: • 1 SPDT Form C relay, solid-state switch Digital: • Solid-state switch included	• 4 ... 20/20 ... 4 mA 2-wire current loop • Solid-state switch
Communications		Standard: • 3 LED indicators Digital: • PROFIBUS PA; SIMATIC PDM compatible	Standard: • 3 LED indicators Digital: • PROFIBUS PA; SIMATIC PDM compatible	HART, SIMATIC PDM compatible
Power Specifications	Standard: • 12 ... 33 V DC Intrinsically Safe (Stainless steel version only): • 10 ... 30 V DC	Standard: • 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max. Digital: • Bus voltage: 12 ... 30 V DC, IS version 12 ... 24 V DC • Current consumption: 12.5 mA	• Standard: 12 ... 250 V AC/DC, 0 ... 60 Hz, 2 W max. Digital: • Bus voltage: 12 ... 30 V DC, IS version 12 ... 24 V DC • Current consumption: 12.5 mA	• 12 ... 33 V DC • 3.6 ... 22 mA/ 22 ... 3.6 mA (2-wire current loop)
Approvals	Stainless steel cable or enclosure version: CE, CSA, FM, ATEX, RCM, Lloyds Register, WHG Fully-synthetic version (PPS): CSA, FM	CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlarem II	CSA, FM, CE, ATEX, RCM, Lloyds Register, WHG, Vlarem II	CE, CSA, FM, ATEX, RCM, Lloyds Register, Bureau Veritas, Current Signaling according to NAMUR NE 43

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Application

SIEMENS

Capacitance Application Questionnaire

Customer information

Contact: _____ Prepared By: _____
Company: _____ Date: _____
Address: _____ Notes on the Application: _____
City: _____ Country: _____
Zip/Postal Code: _____ Phone: ( )
E-mail: _____ Fax: ( )

Tank/Vessel Information *(Supply sketch where possible)* Sketch attached ☐

Type:
☐ Storage
☐ Process
☐ Separator
☐ FPSO (Floating Processing Storage and Offloading)

Tank construction:
☐ Metallic ☐ Non-metallic
☐ Agitated top, bottom or side

Pressure:
Normal: _____
Maximum (relief): _____

Dimensions:
Height: _____ m/ft
Width/Diameter: _____ m/ft

Critical Information
Nozzle Length: _____ cm/inch
Nozzle Diameter: _____ cm/inch

Tank top:
☐ Open
☐ Flat
☐ Conical
☐ Parabolic

Tank bottom:
☐ Sloped
☐ Flat
☐ Conical
☐ Parabolic

Mounting:
☐ Top Mount
☐ Side Mount
☐ Pipe Mount

Process Data

Material being measured: _____ ☐ Liquid ☐ Solid ☐ Slurry

Material temperature: Norm: _____ °C/°F Max: _____ °C/°F

Measurement type:
☐ Point level
☐ Continuous level
☐ Interface level

Constant dielectric: ☐ No ☐ Yes DK Value _____

Upper material: _____ DK Value _____
Lower material: _____ DK Value _____

Process pressure: _____ Min. _____ Max.

Atmospheric steam: ☐ No ☐ Yes

Coating build-up: ☐ No ☐ Yes

Conductive material: ☐ No ☐ Yes _____ DK Value

Installation *(indicate all that apply)*

Power available: _____

Outputs required:
☐ 4 ... 20 mA ☐ Relay ☐ Solid state

Communications
☐ HART / 4 ... 20 mA ☐ PROFIBUS PA

Products recommended:

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Capacitance Application Questionnaire

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Pointek CLS100

Overview

Pointek CLS100 is a compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out build-up on probe.

Benefits

- Easy installation with verification by built-in LED
- Low maintenance with no moving parts
- Sensitivity adjustment
- Integrated cable or PBT enclosure versions available
- Intrinsically Safe, Dust Ignition Proof, and General Purpose options available

Application

Pointek CLS100's short insertion length of 100 mm (4 inch) and versatility in various applications and in vessels or pipes makes it a good replacement for traditional capacitance sensors.

Its advanced tip-sensing technology provides accurate, repeatable switchpoint performance. The PPS (Polyphenylene sulfide) probe [optional PVDF (Polyvinylidene Fluoride)] is chemically resistant with an effective process operating temperature range from -30 to +100 °C (-22 to +212 °F) (7ML5501), and -10 to +100 °C (14 to 212 °F) (7ML5610). The fully potted design ensures reliability in a vibrating environment such as agitated tanks up to 4 g. When used with a SensGuard protection cover, the CLS100 is protected from shearing, impact, and abrasion in tough primary processes.

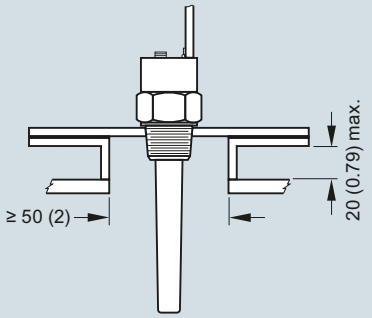
The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure version has a thermoplastic polyester enclosure with a stainless steel process connection in combination with a PPS or PVDF probe.

- Key Applications: liquids, slurries, powders, granules, food and pharmaceuticals, chemicals, hazardous areas

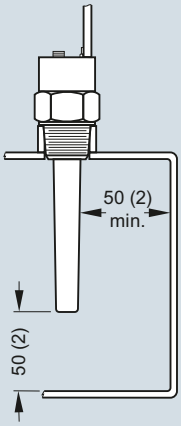
Configuration

Installation

Standpipes



Wall restriction



Pointek CLS100 installation, dimensions in mm (inch)

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Technical specifications

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Mode of operation		
Measuring principle	Inverse frequency shift capacitive level detection	Inverse frequency shift capacitive level detection
Input		
Measured variable	Change in picoFarad (pF)	Change in picoFarad (pF)
Output		
Output signal		
• Alarm output	4 ... 20/20 ... 4 mA 2-wire loop	4 ... 20/20 ... 4 mA 2-wire loop
• Switch output[1]	Solid-state: 30 V DC/30 V AC, max. 82 mA	Max. switching voltage: 60 V DC/30 V AC Max. switching current: 1 A
• Fail-safe mode	Min. or max.	Min. or max.
Accuracy		
Repeatability	2 mm (0.08 inch)	2 mm (0.08 inch)
Rated operating conditions[2]		
Installation conditions		
• Location	Indoor/outdoor	Indoor/outdoor
Ambient conditions		
• Ambient temperature	-30 ... +85 °C (-22 ... +185 °F)	-10 ... +85 °C (14 ... 185 °F)
• Installation category	I	I
• Pollution degree	4	4
Medium conditions		
• Relative dielectric constant ε_r	Min. 1.5	Min. 1.5
• Process temperature	-30 ... +100 °C (-22 ... +212 °F)	-10 ... +100 °C (14 ... 212 °F)
• Pressure (vessel)	-1 ... +10 bar g (-14.6 ... +146 psi g), nominal[2]	-1 ... +10 bar g (-14.6 ... +146 psi g), nominal
• Degree of protection		
- Enclosure version	IP68/Type 4/NEMA 4	IP68/Type 4/NEMA 4
- Integral cable version	IP65/Type 4/NEMA 4	Not applicable
• Cable inlet	½" NPT (M20x1.5 optional)	½" NPT (M20x1.5 optional)
Design		
	Enclosure/Integral cable version	Fully synthetic version
Material		
• Body (Enclosure version)	Thermoplastic polyester	Thermoplastic polyester
• Lid (Enclosure version)	Transparent thermoplastic polycarbonate (PC)	Transparent thermoplastic polycarbonate (PC)
• Integrated cable body (Integral cable version)	316L stainless steel	Not applicable

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
Sensor length (nominal)	100 mm (4 inch)	100 mm (4 inch)
Process connection material of probe/wetted parts[3]	Connection: 316L stainless steel; Process seal: FKM (optional FFKM); Sensor: PPS (optional PVDF)[4]	PPS process connection and PPS sensor (Uni-Construction)
Connection (Enclosure version)	Internal 5-point terminal block, ½" NPT wiring entrance, M20x1.5 optional	Removable internal 5-point terminal block, ½" NPT wiring entrance, M20 x 1.5 optional
Connection (Integral cable version)	4 conductors, 1 m (3.3 ft), 0.5 mm² (22 AWG), shielded, polyester jacket	Not applicable
Process connection	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	¾" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
Power supply		
Standard	12 ... 33 V DC	12 ... 33 V DC
Intrinsically Safe	10 ... 30 V DC (Intrinsically Safe barrier required)	Not applicable
Certificates and approvals	• General: CE, CSA, FM, RCM • Marine: Lloyds Register of Shipping, categories ENV1, ENV2, and ENV5 Dust Ignition Proof (barrier required): CSA/FM Class II and III, Div. 1, Groups E, F, G T4 • Intrinsically Safe (barrier required): CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G T4 ATEX II 1 GD 1/2GD EEx ia IIC T4 to T6 T107 °C • Overfill protection: WHG (Germany)	• General: CSA, FM

[1] When synthetic process connection version (7ML5610) is used in wet locations, switching voltage of the relay is limited to 35 V DC/16 V AC.

[2] When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.
See also Pressure/Temperature curves on page 5/13.

[3] For Caustic Materials please contact ceg.smpi@siemens.com http://www.siemens.com/automation/support-request for alternative O-rings

[4] When FFKM O-ring (Option A22) is selected, process temperature is restricted to -20 °C (-4 °F).

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Pointek CLS100

Selection and Ordering data		Article No.
Pointek CLS100, stainless steel process connection ↗		**7ML5501-**
Compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out build-up on probe.		**0** ■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**E**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**J**
Approvals		
General Purpose: CE, CSA, FM, RCM	⬟	**A**
CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G T4; ATEX II 1 GD 1/2GD EEx ia IIC T4 to T6 T107 °C [1]	⬟	**C**
CSA/FM Class II and III, Div. 1, Groups E, F, G[1]	⬟	**G**
Device version		
Integral cable version (PPS probe)	⬟	**1**
Enclosure version (PPS probe), ½" NPT cable inlet	⬟	**3**
Integral cable version with PVDF probe body	⬟	**5**
Enclosure version with PVDF probe body (½" NPT cable inlet)	⬟	**6**
Enclosure version (PPS probe), M20 x 1.5 cable inlet	⬟	**7**
Enclosure version with PVDF probe body, M20 x 1.5 cable inlet	⬟	**8**
Overfill protection		
Not required	⬟	**0**
Required	⬟	**1**

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 20 characters) specify in plain text	⬟	**Y17**
FFKM seal O-ring[1]	⬟	**A22**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Operating Instructions		Article No.
Quick start manual, multi-language Note: due to ATEX regulations one Quick start manual is included with every product. This device is shipped with the Siemens Milltronics manual DVD containing ATEX Quick Starts and Operating Instructions.		**A5E32146158**

[1] See Temperature restriction on page 4/16

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Article No.
Accessories	
SensGuard, ¾" NPT (PPS) Only available for CLS100 with ¾" NPT thread	**7ML1830-1DL**
SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with ¾" NPT thread	**7ML1830-1DM**
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	**7ML1930-1AC**
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	**7NG4124-0AA00**
½" NPT cable gland, nickel plated brass, fits cable diameter 6 ... 12 mm (0.24 ... 0.47 inch) -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose)	**7ML1830-1JA**
M20 x 1.5 cable gland, PA polyamide, ATEX II 2G EEx e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47 inch), -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)	**7ML1830-1JC**

Selection and Ordering data		Article No.
Pointek CLS100, PPS process connection ↗		**7ML5610-**
Compact 2-wire inverse frequency shift capacitance switch for level and material detection in constricted spaces, interfaces, solids, liquids, slurries and foam, with the ability to tune out build-up on foam.		**0** ■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection (PPS)		
¾" NPT [(Taper), ANSI/ASME B1.20.1] (PPS probe body)	⬟	**A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] (PPS probe body)	⬟	**B**
Approvals		
General Purpose: CSA, FM	⬟	**D**
Versions/Options		
Enclosure version, PPS process connection, ½" NPT cable inlet	⬟	**1**
Enclosure version, PPS process connection, M20 x 1.5	⬟	**2**
Overfill protection		
Not required	⬟	**0**
Required	⬟	**1**

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 20 characters) specify in plain text	⬟	**Y17**
FFKM seal O-ring[1]		**A22**
Inspection Certificate Type 3.1 per EN 10204		**C12**
Operating Instructions		Article No.
Quick start manual, multi-language Note: due to ATEX regulations one Quick start manual is included with every product. This device is shipped with the Siemens Milltronics manual DVD containing ATEX Quick Starts and Operating Instructions.		**A5E32146158**
Accessories		
SensGuard, ¾" NPT (PPS) Only available for CLS100 with ¾" NPT thread		**7ML1830-1DL**
SensGuard, R 1" (BSPT) (PPS) Only available for CLS100 with ¾" NPT thread		**7ML1830-1DM**
Tag, stainless steel, 12 x 45 mm, (0.47 x 1.77 inch) one text line, suitable for enclosures		**7ML1930-1AC**

[1] See Temperature restriction on page 4/16

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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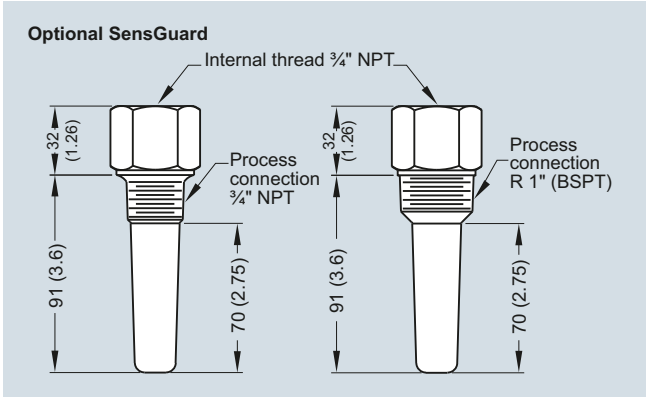
Options



Optional SensGuard, dimensions in mm (inch)

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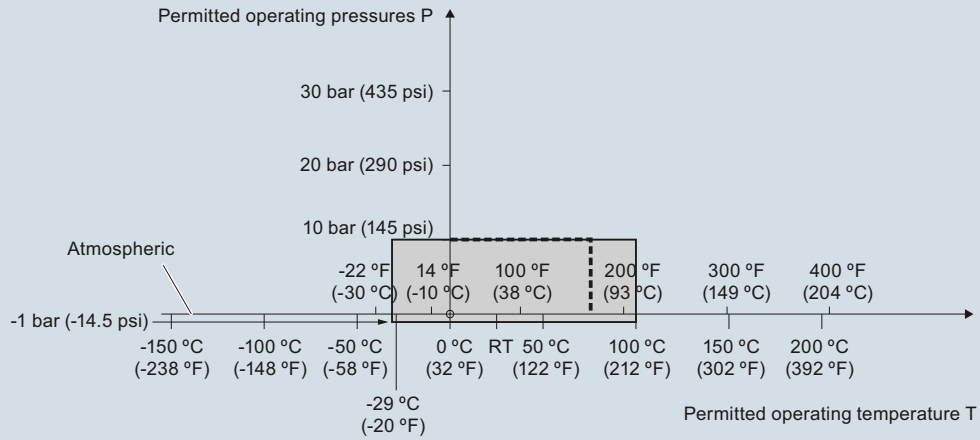
Pointek CLS100

4

Characteristic curves

Pressure/temperature curve
CLS100
Threaded process connections
(7ML5501)

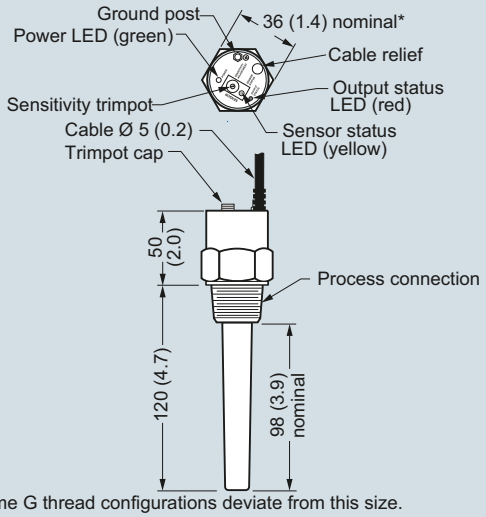


---- Example:
Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS100 Process Pressure/Temperature derating curves

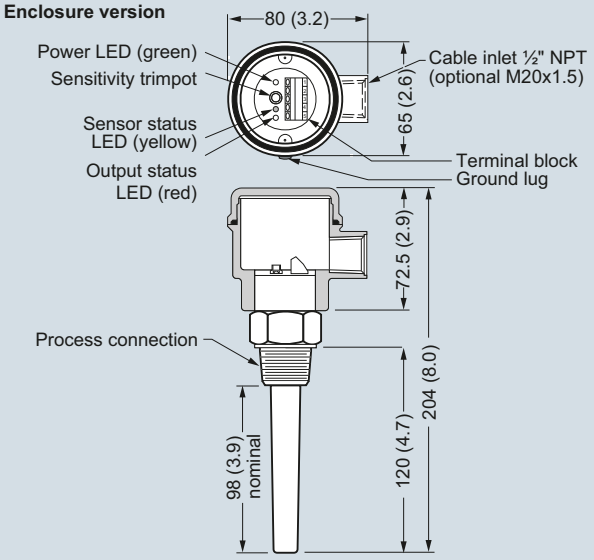
Dimensional drawings

Integral cable version



*Some G thread configurations deviate from this size.

Enclosure version



Pointek CLS100, dimensions in mm (inch)

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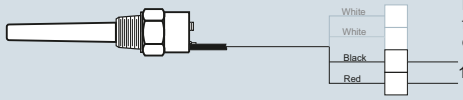
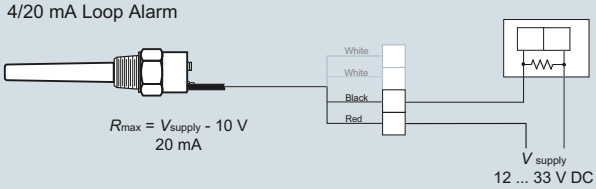
Schematics

Integral Cable Version - Non Intrinsically Safe only

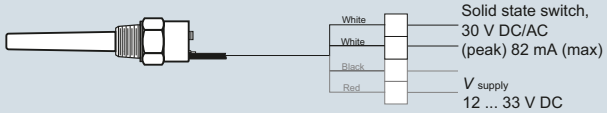
LOW/HIGH Alarm



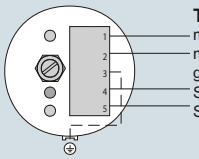
4/20 mA Loop Alarm



Solid State Switch Version



Enclosure and Fully Synthetic Version



Terminal operations	Cable equivalent
mA current loop (+V or -V)	Red wire
mA current loop (+V or -V)	Black wire
ground	Cable shield
Solid state switch/relay*	White wire
Solid state switch/relay*	White wire

* Switch/relay normally open in unpowered state
* Relay not available on Pointek CLS100 IS version (7ML5501)

Note:
When driving an inductive load (for example, an external relay), a protection diode must be connected in the correct polarity to prevent possible switch damage due to inductive spikes generated by switching the inductor (please refer to instruction manual). Intrinsically Safe Models - please follow local regulations and area classifications; refer to instruction manual for more details.

Pointek CLS100 connections

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Pointek CLS200 - Standard

Overview

Pointek CLS200 (standard version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam and interfaces and has the ability to tune out build-up on the probe.

Benefits

- Potted construction protects signal circuit from shock, vibration, humidity and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- 3 LED indicators for sensor status, output status, and power

Application

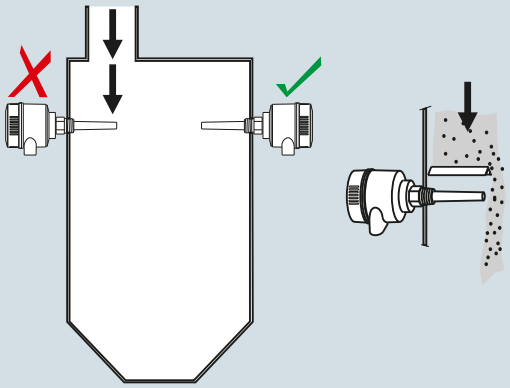
Pointek CLS200 standard version has 3 LED indicators with basic relay and solid-state switch alarms. Universal switch for solids/liquids and interface.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 250 V AC/DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

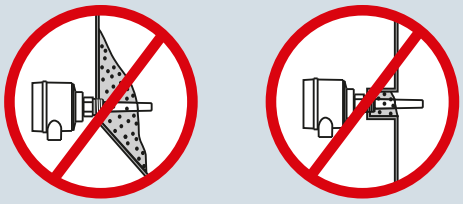
- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

Configuration

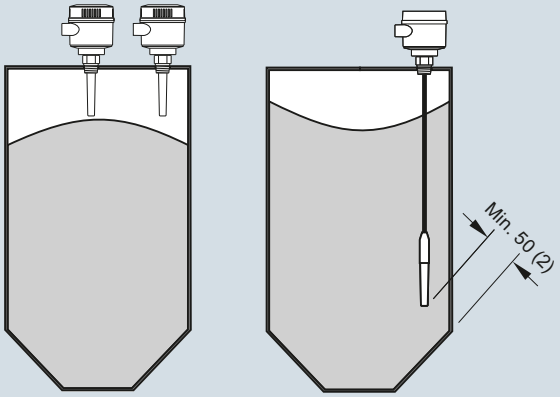
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Avoid areas where material build up occurs.



Install probe at least 50 (2) from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in picoFarad (pF)
Output	
Output signal	
• Relay output	1 SPDT Form C relay
- Max. contact voltage	• 30 V DC • 250 V AC
- Max. contact current	• 5 A DC • 8 A AC
- Max. switching capacity	150 W DC 2 000 VA AC
- Time delay (ON and/or OFF)	1 ... 60 s
• Solid-state output	
- Output	Galvanically isolated
- Protection	Against reversed polarity (bipolar)
- Max. switching voltage	• 30 V DC • 30 V peak AC
- Max. load current	82 mA
- Voltage drop	< 1 V, typical at 50 mA
- Time delay (pre or post switching)	1 ... 60 s
Rated operating conditions[1]	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)[2]
• Installation category	II
• Pollution degree	4
Medium conditions	Liquids, bulk solids, slurries and interfaces
• Relative dielectric constant ε_r	Min. 1.5
• Process temperature	
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F)[2]
- With thermal isolator	-40 ... +125 °C (-40 ... +257 °F)
• Process pressure (rod version)	-1 ... +25 bar g (-14.6 ... +365 psi g) (nominal)
• Process pressure (cable version)[3]	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
• Process pressure (sliding coupling version)	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
Electromagnetic Compatibility	To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction manual.

Design	
Material	
• Enclosure	Epoxy-coated aluminum with gasket
• Optional thermal isolator	316L stainless steel
Connection	Removable terminal block, max. 2.5 mm²
Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)
Cable inlet	2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
Power supply	12 ... 250 V AC/DC, 0 ... 60 Hz max. 2 W
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Dust Ignition Proof	ATEX II 1/2 D T100 °C
Flameproof Enclosure With IS Probe	ATEX II 1 G EEx d[ia] IIC T6 ... T4 ATEX II 1/2 D T100 °C
Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Explosion Proof Enclosure With IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Overfill Protection	WHG (Germany) VLAREM II
Others	Pattern Approval (China)

[1] When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.
See also Pressure/Temperature curves on page 4/37.

[2] Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

[3] Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/37.

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Pointek CLS200 - Standard

Design: Probe				
	Rod version	**Sanitary version**	**Cable version**	**Sliding Coupling version**
Max. length	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	30 000 mm (1 181.1 inch) liquids and slurries 5 000 mm (196.85 inch) solids (under loads)	5 500 mm (216.53 inch)
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1½", 2" sanitary fitting clamp 316L stainless steel	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated[1)]	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM)[2)]	FKM (optional FFKM)[2)]	FKM (optional FFKM)[2)]	FKM (optional FFKM)[2)]
Thermal isolator[3)]	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

1) PFA coating (7ML5634 and 7ML5644) has 120 micron thickness.
2) For Caustic Materials please contact ceg.smpi@siemens.com for alternative O-rings
3) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

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Selection and Ordering data		Article No.
Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection ↗		**7ML5630-** ■■■■ - ■■■ 0
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	0 A
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	0 B
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	0 C
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	0 D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	1 A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	1 B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	1 D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	3 B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	3 D
Welded flange, 316L stainless steel, raised face		
1" ASME, 150 lb	⬟	5 A
1" ASME, 300 lb		5 B
1" ASME, 600 lb		5 C
1½" ASME, 150 lb	⬟	5 D
1½" ASME, 300 lb		5 E
1½" ASME, 600 lb		5 F
2" ASME, 150 lb	⬟	5 G
2" ASME, 300 lb		5 H
2" ASME, 600 lb		5 J
3" ASME, 150 lb	⬟	5 K
3" ASME, 300 lb		5 L
3" ASME, 600 lb		5 M
4" ASME, 150 lb	⬟	5 N
4" ASME, 300 lb		5 P
4" ASME, 600 lb		5 Q
Welded flange, 316L stainless steel, Type A flat faced		
DN 25, PN 16	⬟	6 A
DN 25, PN 40		6 B
DN 40, PN 16	⬟	6 C
DN 40, PN 40		6 D
DN 50, PN 16	⬟	6 E
DN 50, PN 40		6 F
DN 80, PN 16	⬟	6 G
DN 80, PN 40		6 H
DN 100, PN 16	⬟	6 J
DN 100, PN 40		6 K
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)]	⬟	A
Extended rod, 250 mm (9.84 inch)	⬟	B
Extended rod, 350 mm (13.78 inch)	⬟	C
Extended rod, 500 mm (19.69 inch)	⬟	D
Extended rod, 750 mm (29.53 inch)	⬟	E
Extended rod, 1 000 mm (39.37 inch)	⬟	F
Extended rod, 1 250 mm (49.21 inch)	⬟	G
Extended rod, 1 350 mm (53.15 inch)	⬟	H
Extended rod, 1 500 mm (59.06 inch)	⬟	J
Extended rod, 1 750 mm (68.90 inch)	⬟	K
Extended rod, 2 000 mm (78.74 inch)	⬟	L

Selection and Ordering data		Article No.
Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection		**7ML5630-** ■■■■ - ■■■ 0
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, 210 ... 1 000 mm (8.27 ... 39.37 inch)	⬟	M
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	⬟	N
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	⬟	P
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	⬟	Q
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	⬟	R
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	⬟	S
Thermal isolator		
Without thermal isolator	⬟	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	1
Remote mount electronics and mounting bracket		
With 2 m (79 inch) of cable[1)]	⬟	2
With 5 m (197 inch) of cable[1)]	⬟	3
Wetted seals		
FKM	⬟	0
FFKM [for process temperatures above -20 °C (-4 °F)]	⬟	1
Probe material		
316L stainless steel with PPS probe body	⬟	0
316L stainless steel with PVDF probe body	⬟	1
Approvals		
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	⬟	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C	⬟	D
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C	⬟	E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	G
General Purpose (CSA, FM)	⬟	H
General Purpose (CE, RCM)	⬟	J
General Purpose (CSA, FM, CE, RCM) with WHG approval	⬟	K
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	A
2 x M20 x 1.5 cable inlet IP65	⬟	B
2 x ½" NPT via adapter - cable inlet, IP68	⬟	C
2 x M20 x 1.5 cable inlet IP68	⬟	D

[1)] Available with Approvals options F ... H

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Pointek CLS200 - Standard

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	**C20**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	**See page 4/36**
Accessories	**See page 4/36**

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol. For details see page 9/5 in the appendix.

Selection and Ordering data	Article No.
Pointek CLS200 - Standard - Cable Version with Threaded or Flanged process connection ↗ Versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7ML5631-** ■■■■■ - ■■■ **0**
Process connection	
Threaded, 316L stainless steel	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	**0 A**
1" NPT [(Taper), ANSI/ASME B1.20.1]	**0 B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	**0 D**
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	**1 A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	**1 B**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	**1 D**
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**3 A**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**3 B**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**3 D**
Welded flange, 316L stainless steel, raised face	
1" ASME, 150 lb	**5 A**
1" ASME, 300 lb	**5 B**
1" ASME, 600 lb	**5 C**
1½" ASME, 150 lb	**5 D**
1½" ASME, 300 lb	**5 E**
1½" ASME, 600 lb	**5 F**
2" ASME, 150 lb	**5 G**
2" ASME, 300 lb	**5 H**
2" ASME, 600 lb	**5 J**
3" ASME, 150 lb	**5 K**
3" ASME, 300 lb	**5 L**
3" ASME, 600 lb	**5 M**
4" ASME, 150 lb	**5 N**
4" ASME, 300 lb	**5 P**
4" ASME, 600 lb	**5 Q**
Welded flange, 316L stainless steel, Type A flat faced	
DN 25, PN 16	**6 A**
DN 25, PN 40	**6 B**
DN 40, PN 16	**6 C**
DN 40, PN 40	**6 D**
DN 50, PN 16	**6 E**
DN 50, PN 40	**6 F**
DN 80, PN 16	**6 G**
DN 80, PN 40	**6 H**
DN 100, PN 16	**6 J**
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	**6 K**
Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths	
Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly[1)]	**A**
Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly[1)]	**B**
Add Order code Y01 and plain text: "Insertion length ... mm"	
Extended cable, 500 ... 5 000 mm (19.69 ... 196.85 inch)	**C**
Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)	**D**
Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)	**E**
Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.4 inch)	**F**
Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)	**G**
Extended cable, 25 001 ... 30 000 mm (984.29 ... 1 181.1 inch)	**H**

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Selection and Ordering data		Article No.
Pointek CLS200 - Standard - Cable Version with Threaded or Flanged process connection Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		**7ML5631-** ■■■■■ - ■■■ **0**
Thermal isolator		
Without thermal isolator	⬟	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	**1**
Remote mount electronics and mounting bracket		
With 2 m (79 inch) of cable[2]	⬟	**2**
With 5 m (197 inch) of cable[2]	⬟	**3**
Wetted seals		
FKM and PTFE	⬟	**0**
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	⬟	**1**
Probe material		
FEP jacketed cable with PPS probe body	⬟	**0**
FEP jacketed cable with PVDF probe body	⬟	**1**
Approvals		
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	⬟	**C**
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	**D**
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	**E**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**F**
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
General Purpose (CSA, FM)	⬟	**H**
General Purpose (CE, RCM)	⬟	**J**
General Purpose (CSA, FM, CE, RCM) with WHG approval	⬟	**K**
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20 x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20 x1.5 cable inlet, IP68	⬟	**D**

1) Sensor detached to allow customer to set desired cable length

2) Available with Approvals options F ... H

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]		**C20**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/36**
Accessories		**See page 4/36**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Pointek CLS200 - Standard

Selection and Ordering data		Article No.
Pointek CLS200 - Standard - Rod with Sanitary process connection ↗		**7ML5632-** ■■■■■ - ■■■ **0**
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Sanitary 316L stainless steel		
1" sanitary fitting clamp	⬟	**8 A**
1½" sanitary fitting clamp		**8 B**
2" sanitary fitting clamp		**8 C**
2½" sanitary fitting clamp	⬟	**8 D**
3" sanitary fitting clamp		**8 E**
(Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard)		
Probe length (length from process connection face)		
Note: No Y01 needed in Order code for standard lengths		
Compact 98 mm (3.86 inch)	⬟	**A**
Extended rod, 250 mm (9.84 inch)	⬟	**B**
Extended rod, 350 mm (13.78 inch)	⬟	**C**
Extended rod, 500 mm (19.69 inch)	⬟	**D**
Extended rod, 750 mm (29.53 inch)	⬟	**E**
Extended rod, 1 000 mm (39.37 inch)	⬟	**F**
Extended rod, 1 250 mm (49.21 inch)	⬟	**G**
Extended rod, 1 350 mm (53.15 inch)	⬟	**H**
Extended rod, 1 500 mm (59.06 inch)	⬟	**J**
Extended rod, 1 750 mm (68.90 inch)	⬟	**K**
Extended rod, 2 000 mm (78.74 inch)	⬟	**L**
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, 110 ... 350 mm (4.3 ... 13.78 inch)	⬟	**M**
Extended rod, 351 ... 1 000 mm (13.78 ... 39.37 inch)	⬟	**N**
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	⬟	**P**
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	⬟	**Q**
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	⬟	**R**
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	⬟	**S**
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	⬟	**T**
Thermal isolator		
Without thermal isolator	⬟	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	**1**
Remote mount electronics and mounting bracket		
Remote mount electronics with 2 m (79 inch) of cable[1]	⬟	**2**
Remote mount electronics with 5 m (197 inch) of cable[1]	⬟	**3**
Wetted seals		
FKM	⬟	**0**
FFKM [for process temperatures above -20 °C (-4 °F)]	⬟	**1**
Probe material		
316L stainless steel with PPS probe body	⬟	**0**
316L stainless steel with PVDF probe body	⬟	**1**

Selection and Ordering data		Article No.
Pointek CLS200 - Standard - Rod with Sanitary process connection		**7ML5632-** ■■■■■ - ■■■ **0**
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
Approvals		
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	⬟	**C**
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C	⬟	**D**
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C	⬟	**E**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**F**
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
General Purpose (CSA, FM)	⬟	**H**
General Purpose (CE, RCM)	⬟	**J**
General Purpose (CSA, FM, CE, RCM) with WHG approval	⬟	**K**
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20x1.5 cable inlet, IP68	⬟	**D**

[1] Available with Approvals options F ... H

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]		**C20**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/36**
Accessories		**See page 4/36**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and Ordering data		Article No.
Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection	↗	**7ML5633-** ■■■■■ - ■■■ **0**
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 A**
1" NPT [(Taper), ANSI/ASME B1.20.1]		**0 B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]		**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 D**
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		**1 A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		**1 B**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		**1 D**
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		**3 A**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		**3 B**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		**3 D**
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Extended rod, 350 mm (13.78 inch)	⬟	**C**
Extended rod, 500 mm (19.69 inch)	⬟	**D**
Extended rod, 750 mm (29.53 inch)	⬟	**E**
Extended rod, 1 000 mm (39.37 inch)	⬟	**F**
Extended rod, 1 250 mm (49.21 inch)	⬟	**G**
Extended rod, 1 350 mm (53.15 inch)	⬟	**H**
Extended rod, 1 500 mm (59.06 inch)	⬟	**J**
Extended rod, 1 750 mm (68.90 inch)	⬟	**K**
Extended rod, 2 000 mm (78.74 inch)	⬟	**L**
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, 350 ... 1 000 mm (13.78 ... 39.37 inch)	⬟	**M**
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	⬟	**N**
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	⬟	**P**
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	⬟	**Q**
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	⬟	**R**
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	⬟	**S**
Thermal isolator		
Without thermal isolator	⬟	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	**1**
Remote mount electronics and mounting bracket		
With 2 m (79 inch) of cable[1)]	⬟	**2**
With 5 m (197 inch) of cable[1)]	⬟	**3**
Wetted seals		
FKM and PTFE	⬟	**0**
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	⬟	**1**
Probe material		
316L stainless steel with PPS probe body	⬟	**0**
316L stainless steel with PVDF probe body	⬟	**1**

Selection and Ordering data		Article No.
Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection		**7ML5633-** ■■■■■ - ■■■ **0**
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
Approvals		
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	⬟	**C**
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	**D**
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	**E**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**F**
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
General Purpose (CSA, FM)	⬟	**H**
General Purpose (CE, RCM)	⬟	**J**
General Purpose (CSA, FM, CE, RCM) with WHG approval	⬟	**K**
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20x1.5 cable inlet, IP68	⬟	**D**

[1)] Available with Approvals options F ... H

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]		**C20**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/36**
Accessories		**See page 4/36**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Pointek CLS200 - Standard

Selection and Ordering data	Article No.
Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection ↗	**7ML5634-** ■■■■■-■■■**0**
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Welded flange, 316L stainless steel, raised face	
1" ASME, 150 lb	**5 A**
1" ASME, 300 lb	**5 B**
1" ASME, 600 lb	**5 C**
1½" ASME, 150 lb	**5 D**
1½" ASME, 300 lb	**5 E**
1½" ASME, 600 lb	**5 F**
2" ASME, 150 lb	**5 G**
2" ASME, 300 lb	**5 H**
2" ASME, 600 lb	**5 J**
3" ASME, 150 lb	**5 K**
3" ASME, 300 lb	**5 L**
3" ASME, 600 lb	**5 M**
4" ASME, 150 lb	**5 N**
4" ASME, 300 lb	**5 P**
4" ASME, 600 lb	**5 Q**
Welded flange, 316L stainless steel, Type A flat faced	
DN 25, PN 16	**6 A**
DN 25, PN 40	**6 B**
DN 40, PN 16	**6 C**
DN 40, PN 40	**6 D**
DN 50, PN 16	**6 E**
DN 50, PN 40	**6 F**
DN 80, PN 16	**6 G**
DN 80, PN 40	**6 H**
DN 100, PN 16	**6 J**
DN 100, PN 40	**6 K**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
Probe length (length from flange face) (threaded lengths include process thread)	
Note: No Y01 needed in Order code for standard lengths	
Compact 98 mm (3.86 inch)	**A**
Extended rod, 250 mm (9.84 inch)	**B**
Extended rod, 350 mm (13.78 inch)	**C**
Extended rod, 500 mm (19.69 inch)	**D**
Extended rod, 750 mm (29.53 inch)	**E**
Extended rod, 1 000 mm (39.37 inch)	**F**
Extended rod, 1 250 mm (49.21 inch)	**G**
Extended rod, 1 350 mm (53.15 inch)	**H**
Extended rod, 1 500 mm (59.06 inch)	**J**
Extended rod, 1 750 mm (68.90 inch)	**K**
Extended rod, 2 000 mm (78.74 inch)	**L**
Add Order code Y01 and plain text: "Insertion length ... mm"	
Extended rod, 200 ... 1 000 mm (7.87 ... 39.37 inch)	**M**
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**N**
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	**P**
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	**Q**
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	**R**
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	**S**

Selection and Ordering data	Article No.
Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection	**7ML5634-** ■■■■■-■■■**0**
Versatile inverse frequency shift capacitance level and material detection switch with optional rod/ cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.	
Thermal isolator	
Without thermal isolator	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	**1**
Remote mount electronics and mounting bracket	
With 2 m (79 inch) of cable	**2**
With 5 m (197 inch) of cable	**3**
Wetted seals	
FKM	**0**
FFKM [for process temperatures above -20 °C (-4 °F)]	**1**
Probe material	
PFA Coated 316L stainless steel with PPS probe body	**0**
PFA Coated 316L stainless steel with PVDF probe body	**1**
Approvals	
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	**F**
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	**G**
General Purpose (CSA, FM)	**H**
Enclosure and lid Aluminum epoxy coated	
2 x ½" NPT via adapter - cable inlet, IP65	**A**
2 x M20x1.5 cable inlet, IP65	**B**
2 x ½" NPT via adapter - cable inlet, IP68	**C**
2 x M20x1.5 cable inlet, IP68	**D**

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
SIL/IEC 61508 Declaration of Conformity [SIL 2 (overspill)]	**C20**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	**See page 4/36**
Accessories	**See page 4/36**

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Overview

Pointek CLS200 (digital version) is a versatile inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam and interfaces and has the ability to tune out build-up on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

Benefits

- Potted construction protects signal circuit from shock, vibration, humidity and/or condensation
- High chemical resistance
- Level detection independent of tank or pipe earth reference
- Insensitive to product buildup due to high frequency oscillation
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

Application

Pointek CLS200 digital version provides an integral LCD display for stand-alone use, and also provides PROFIBUS PA communication (Profile version 3.0, Class B) for connection to a network.

The power supply is galvanically isolated and accepts a wide range of voltages (12 to 30 V DC). When used with thermal isolator, the stainless steel and PPS (PVDF optional) materials used in the probe construction provide a temperature rating up to 125 °C (257 °F) on the process wetted portion of the probe. The switch responds to any material with a dielectric constant of 1.5 or more by detecting a change in oscillating frequency, and it can be set to detect before contact or on contact with the probe. The menu-driven setup allows precise control of the switch point signal damping and alarm functions.

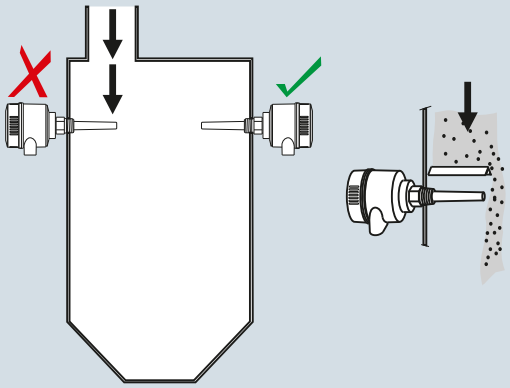
When connected to the PROFIBUS network, advanced diagnostics and set up using SIMATIC PDM are possible.

The CLS200 operates independently of the tank wall or pipe so it does not require an external reference electrode for level detection in a non-conductive vessel such as concrete or plastic (EMC regulations applicable in some regions).

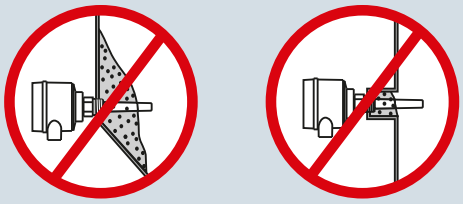
- Key Applications: liquids, slurries, powders, granules, pressurized applications, hazardous areas

Configuration

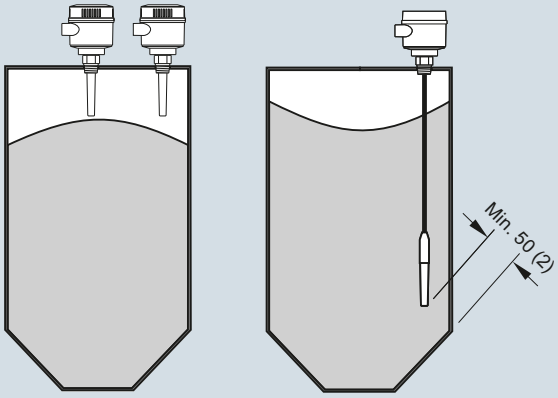
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Avoid areas where material build up occurs.



Install probe at least 50 (2) from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in picoFarad (pF)
Output	
Output signal	
• Solid-state output	
- Output	Galvanically isolated
- Protection	Against reversed polarity (bipolar)
- Max. switching voltage	• 30 V (DC) • 30 V peak (AC)
- Max. load current	82 mA
- Voltage drop	< 1 V, typical at 50 mA
- Time delay (ON and/or OFF)	Programmable by user (0 ... 100 s)
• Fail-safe mode	Min. or max.
• Connection	Removable terminal block
Rated operating conditions[1]	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)[2]
• Installation category	II
• Pollution degree	4
Medium conditions	Liquids, bulk solids, slurries and interfaces
• Relative dielectric constant ε_r	Min. 1.5
• Process temperature	
- Without thermal isolator	-40 ... +85 °C (-40 ... +185 °F)[2]
- With thermal isolator	-40 ... +125 °C (-40 ... +257 °F)
• Process pressure (rod version)	-1 ... +25 bar g (-14.6 ... +365 psi g) (nominal)
• Process pressure (cable version)[3]	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
• Process pressure (sliding coupling version)	-1 ... +10 bar g (-14.6 ... +150 psi g) (nominal)
Design	
Material	
• Enclosure	Epoxy-coated aluminum with gasket
• Optional thermal isolator	316L stainless steel
Connection	Removable terminal block, max. 2.5 mm²
Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)
Cable inlet	2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
Electromagnetic Compatibility	To comply with CE EMC regulations (where applicable); the CLS200 should be installed per the instruction manual.

Power supply	
Bus voltage	Standard: 12 ... 30 V DC Intrinsically Safe: 12 ... 24 V DC
Current consumption	12.5 mA
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Dust Ignition Proof	ATEX II 1/2 D T100 °C
Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6 ... T4 ATEX II 1/2 D T100 °C
Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Intrinsically Safe[4]	ATEX II 1 G EEx ia IIC T6 ... T4 ATEX II 1/2 D IP6X T100 °C CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Non-incendive	CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6
Non-Sparking	ATEX II 3 G Ex nA II T6 ... T4 ATEX II 2 D IP6X T100 °C
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Others	Pattern Approval (China)
Communication	PROFIBUS PA (IEC 61158 CPF3 CP3/2) Bus physical layer: IEC 61158-2 MBP (IS) Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B FISCO field device

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/37.

2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/37.

4) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

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Design: Probe				
	Rod version	**Sanitary version**	**Cable version**	**Sliding Coupling version**
Max. length	5 500 mm (216.53 inch)	5 500 mm (216.53 inch)	30 000 mm (1 181.1 inch) liquids and slurries 5 000 mm (196.85 inch) solids (under loads)	5 500 mm (216.53 inch)
Process connection	R ¾", 1" , 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	1½", 2" sanitary fitting clamp 316L stainless steel	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202] 316L stainless steel ASME/EN flange	R ¾", 1", 1¼", 1½ inch [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] ¾", 1", 1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] G ¾", 1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
Extension material	316L stainless steel optional PFA coated[1)]	316L stainless steel	Fluoroethylene propylene (FEP) cable with stainless steel core	316L stainless steel
Sensor wetted parts	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)	PPS (optional PVDF)
O-ring seal material	FKM (optional FFKM)[2)]	FKM (optional FFKM)[2)]	FKM (optional FFKM)[2)]	FKM (optional FFKM)[2)]
Thermal isolator[3)]	Optional	Optional	Optional	Optional
Extension	User selected length	User selected length	Cable extension	User selected length

1) PFA coating (7ML5634 and 7ML5644) has 120 micron thickness

2) For Caustic Materials, please contact ceg.smpi@siemens.com for alternative O-rings

3) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

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Pointek CLS200 - Digital

Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection	↗	**7ML5640-**
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 A**
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 D**
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 B**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 D**
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 A**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 B**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 D**
Welded flange, 316L stainless steel, raised face		
1" ASME, 150 lb	⬟	**5 A**
1" ASME, 300 lb		**5 B**
1" ASME, 600 lb		**5 C**
1½" ASME, 150 lb	⬟	**5 D**
1½" ASME, 300 lb		**5 E**
1½" ASME, 600 lb		**5 F**
2" ASME, 150 lb	⬟	**5 G**
2" ASME, 300 lb		**5 H**
2" ASME, 600 lb		**5 J**
3" ASME, 150 lb	⬟	**5 K**
3" ASME, 300 lb		**5 L**
3" ASME, 600 lb		**5 M**
4" ASME, 150 lb	⬟	**5 N**
4" ASME, 300 lb		**5 P**
4" ASME, 600 lb		**5 Q**
Welded flange, 316L stainless steel, Type A flat faced		
DN 25, PN 16	⬟	**6 A**
DN 25, PN 40		**6 B**
DN 40, PN 16	⬟	**6 C**
DN 40, PN 40		**6 D**
DN 50, PN 16	⬟	**6 E**
DN 50, PN 40		**6 F**
DN 80, PN 16	⬟	**6 G**
DN 80, PN 40		**6 H**
DN 100, PN 16	⬟	**6 J**
DN 100, PN 40		**6 K**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Compact [threaded 120 mm (4.72 inch), Flanged 98 mm (3.86 inch)]	⬟	**A**
Extended rod, 250 mm (9.84 inch)	⬟	**B**
Extended rod, 350 mm (13.78 inch)	⬟	**C**
Extended rod, 500 mm (19.69 inch)	⬟	**D**
Extended rod, 750 mm (29.53 inch)	⬟	**E**
Extended rod, 1 000 mm (39.37 inch)	⬟	**F**
Extended rod, 1 250 mm (49.21 inch)	⬟	**G**
Extended rod, 1 350 mm (53.15 inch)	⬟	**H**
Extended rod, 1 500 mm (59.06 inch)	⬟	**J**
Extended rod, 1 750 mm (68.90 inch)	⬟	**K**
Extended rod, 2 000 mm (78.74 inch)	⬟	**L**

Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection		**7ML5640-**
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, 210 ... 1 000 mm (8.27 ... 39.37 inch)	⬟	**M**
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	⬟	**N**
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	⬟	**P**
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	⬟	**Q**
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	⬟	**R**
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	⬟	**S**
Thermal isolator		
Without thermal isolator	⬟	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	**1**
Remote mount electronics and mounting bracket		
With 2 m (79 inch) of cable	⬟	**2**
With 5 m (197 inch) of cable	⬟	**3**
Wetted seals		
FKM	⬟	**0**
FFKM [for process temperatures above -20 °C (-4 °F)]	⬟	**1**
Probe material		
316L stainless steel with PPS probe body	⬟	**0**
316L stainless steel with PVDF probe body	⬟	**1**
Approvals		
Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	⬟	**B**
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	⬟	**C**
Intrinsically Safe:[1] CE, RCM, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	⬟	**D**
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	**E**
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	⬟	**F**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
Intrinsically Safe:[1] CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**H**
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**J**
General Purpose (CSA, FM)	⬟	**K**
General Purpose (CE, RCM)	⬟	**L**

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Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Rod with Threaded or Flanged process connection		**7ML5640-** ■■■■■ - ■■■ 0
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
Enclosure and lid Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20x1.5 cable inlet, IP68	⬟	**D**

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/36**
Accessories		**See page 4/36**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection	↗	**7ML5641-** ■■■■■ - ■■■ 0
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection Threaded, 316L stainless steel		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 A**
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 D**
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 B**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 D**
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 A**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 B**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 D**
Welded flange, 316L stainless steel, raised face		
1" ASME, 150 lb	⬟	**5 A**
1" ASME, 300 lb		**5 B**
1" ASME, 600 lb		**5 C**
1½" ASME, 150 lb	⬟	**5 D**
1½" ASME, 300 lb		**5 E**
1½" ASME, 600 lb		**5 F**
2" ASME, 150 lb	⬟	**5 G**
2" ASME, 300 lb		**5 H**
2" ASME, 600 lb		**5 J**
3" ASME, 150 lb	⬟	**5 K**
3" ASME, 300 lb		**5 L**
3" ASME, 600 lb		**5 M**
4" ASME, 150 lb	⬟	**5 N**
4" ASME, 300 lb		**5 P**
4" ASME, 600 lb		**5 Q**
Welded flange, 316L stainless steel, Type A flat faced		
DN 25, PN 16	⬟	**6 A**
DN 25, PN 40		**6 B**
DN 40, PN 16	⬟	**6 C**
DN 40, PN 40		**6 D**
DN 50, PN 16	⬟	**6 E**
DN 50, PN 40		**6 F**
DN 80, PN 16	⬟	**6 G**
DN 80, PN 40		**6 H**
DN 100, PN 16	⬟	**6 J**
DN 100, PN 40		**6 K**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		

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Pointek CLS200 - Digital

Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection		**7ML5641-** ■■■■■ - ■■■ 0
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Extended cable, 3 000 mm (118.11 inch), length can be determined by customer on assembly	⬟	A
Extended cable, 6 000 mm (236.22 inch), length can be determined by customer on assembly	⬟	B
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended cable, 500 ... 5 000 mm (19.69 ... 196.85 inch)	⬟	C
Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)	⬟	D
Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)	⬟	E
Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch)	⬟	F
Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)	⬟	G
Extended cable, 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)	⬟	H
Thermal isolator		
Without thermal isolator	⬟	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	1
Remote mount electronics and mounting bracket		
With 2 m (79 inch) of cable	⬟	2
With 5 m (197 inch) of cable	⬟	3
Wetted seals		
FKM and PTFE	⬟	0
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	⬟	1
Probe material		
FEP jacketed cable with PPS probe body	⬟	0
FEP jacketed cable with PVDF probe body	⬟	1
Approvals		
Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	⬟	B
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	⬟	C
Intrinsically Safe:[1] CE, RCM, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	⬟	D
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	E
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	⬟	F
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	G
Intrinsically Safe:[1] CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	H
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	J
General Purpose (CSA, FM)	⬟	K
General Purpose (CE, RCM)	⬟	L

Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection		**7ML5641-** ■■■■■ - ■■■ 0
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
Enclosure and lid Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	A
2 x M20x1.5 cable inlet, IP65	⬟	B
2 x ½" NPT via adapter - cable inlet, IP68	⬟	C
2 x M20x1.5 cable inlet, IP68	⬟	D

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/36**
Accessories		**See page 4/36**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Rod with Sanitary process connection ↗ Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		**7ML5642-** ■■■■■ - ■■■ **0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Sanitary 316L stainless steel		
1" sanitary fitting clamp	⬟	**8 A**
1½" sanitary fitting clamp		**8 B**
2" sanitary fitting clamp		**8 C**
2½" sanitary fitting clamp	⬟	**8 D**
3" sanitary fitting clamp		**8 E**
(Note: Sanitary connection dimensionally corresponds to the applicable ISO 2852 standard.)		
Probe length (length from process connection face)		
Note: No Y01 needed in Order code for standard lengths		
Compact, 98 mm (3.86 inch)	⬟	**A**
Extended rod, 250 mm (9.84 inch)	⬟	**B**
Extended rod, 350 mm (13.78 inch)	⬟	**C**
Extended rod, 500 mm (19.69 inch)	⬟	**D**
Extended rod, 750 mm (29.53 inch)	⬟	**E**
Extended rod, 1 000 mm (39.37 inch)	⬟	**F**
Extended rod, 1 250 mm (49.21 inch)	⬟	**G**
Extended rod, 1 350 mm (53.15 inch)	⬟	**H**
Extended rod, 1 500 mm (59.06 inch)	⬟	**J**
Extended rod, 1 750 mm (68.90 inch)	⬟	**K**
Extended rod, 2 000 mm (78.74 inch)	⬟	**L**
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, 110 ... 350 mm (4.3 ... 13.78 inch)	⬟	**M**
Extended rod, 351 ... 1 000 mm (13.82 ... 39.37 inch)	⬟	**N**
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	⬟	**P**
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	⬟	**Q**
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	⬟	**R**
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	⬟	**S**
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	⬟	**T**
Thermal isolator		
Without thermal isolator	⬟	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	**1**
Remote mount electronics and mounting bracket		
With 2 m (79 inch) of cable	⬟	**2**
With 5 m (197 inch) of cable	⬟	**3**
Wetted seals		
FKM	⬟	**0**
FFKM [for process temperatures above -20 °C (-4 °F)]	⬟	**1**
Probe material		
316L stainless steel with PPS probe body	⬟	**0**
316L stainless steel with PVDF probe body	⬟	**1**
Approvals		
Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	⬟	**B**
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	⬟	**C**
Intrinsically Safe:[1] CE, RCM, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	⬟	**D**
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	**E**

Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Rod with Sanitary process connection Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		**7ML5642-** ■■■■■ - ■■■ **0**
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	⬟	**F**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
Intrinsically Safe:[1] CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**H**
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**J**
General Purpose (CSA, FM)	⬟	**K**
General Purpose (CE, RCM)	⬟	**L**
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20x1.5 cable inlet, IP68	⬟	**D**

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/36**
Accessories		**See page 4/36**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Pointek CLS200 - Digital

4

Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection	↗	**7ML5643-** ■■■■■ - ■■■ **0**
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 A**
1" NPT [(Taper), ANSI/ASME B1.20.1]		**0 B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]		**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 D**
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		**1 A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		**1 B**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		**1 D**
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		**3 A**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		**3 B**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		**3 D**
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Extended rod, 350 mm (13.78 inch)	⬟	**C**
Extended rod, 500 mm (19.69 inch)	⬟	**D**
Extended rod, 750 mm (29.53 inch)	⬟	**E**
Extended rod, 1 000 mm (39.37 inch)	⬟	**F**
Extended rod, 1 250 mm (49.21 inch)	⬟	**G**
Extended rod, 1 350 mm (53.15 inch)	⬟	**H**
Extended rod, 1 500 mm (59.06 inch)	⬟	**J**
Extended rod, 1 750 mm (68.90 inch)	⬟	**K**
Extended rod, 2 000 mm (78.74 inch)	⬟	**L**
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, 350 ... 1 000 mm (13.82 ... 39.37 inch)	⬟	**M**
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	⬟	**N**
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	⬟	**P**
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	⬟	**Q**
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	⬟	**R**
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	⬟	**S**
Thermal isolator		
Without thermal isolator	⬟	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	**1**
Remote mount electronics and mounting bracket		
With 2 m (79 inch) of cable	⬟	**2**
With 5 m (197 inch) of cable	⬟	**3**
Wetted seals		
FKM and PTFE	⬟	**0**
FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]	⬟	**1**
Probe material		
316L stainless steel with PPS probe body	⬟	**0**
316L stainless steel with PVDF probe body	⬟	**1**
Approvals		
Non-Sparking: CE, RCM, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	⬟	**B**
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D T100 °C	⬟	**C**
Intrinsically Safe:[1] CE, RCM, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	⬟	**D**

Selection and Ordering data		Article No.
Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection		**7ML5643-** ■■■■■ - ■■■ **0**
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.		
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	**E**
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	⬟	**F**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
Intrinsically Safe:[1] CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**H**
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**J**
General Purpose (CSA, FM)	⬟	**K**
General Purpose (CE, RCM)	⬟	**L**
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20x1.5 cable inlet, IP68	⬟	**D**

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/36**
Accessories		**See page 4/36**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and Ordering data	Article No.
Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection ↗	**7ML5644-** ■■■■■ - ■■■ **0**
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Welded flange, PFA coated, 316L stainless steel, raised face	
1" ASME, 150 lb	**5 A**
1" ASME, 300 lb	**5 B**
1" ASME, 600 lb	**5 C**
1½" ASME, 150 lb	**5 D**
1½" ASME, 300 lb	**5 E**
1½" ASME, 600 lb	**5 F**
2" ASME, 150 lb	**5 G**
2" ASME, 300 lb	**5 H**
2" ASME, 600 lb	**5 J**
3" ASME, 150 lb	**5 K**
3" ASME, 300 lb	**5 L**
3" ASME, 600 lb	**5 M**
4" ASME, 150 lb	**5 N**
4" ASME, 300 lb	**5 P**
4" ASME, 600 lb	**5 Q**
Welded flange, PFA coated, 316L stainless steel, Type A flat faced	
DN 25, PN 16	**6 A**
DN 25, PN 40	**6 B**
DN 40, PN 16	**6 C**
DN 40, PN 40	**6 D**
DN 50, PN 16	**6 E**
DN 50, PN 40	**6 F**
DN 80, PN 16	**6 G**
DN 80, PN 40	**6 H**
DN 100, PN 16	**6 J**
DN 100, PN 40	**6 K**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
Probe length (length from process connection face)	
Note: No Y01 needed in Order code for standard lengths	
Compact, 98 mm (3.86 inch)	**A**
Extended rod, 250 mm (9.84 inch)	**B**
Extended rod, 350 mm (13.78 inch)	**C**
Extended rod, 500 mm (19.69 inch)	**D**
Extended rod, 750 mm (29.53 inch)	**E**
Extended rod, 1 000 mm (39.37 inch)	**F**
Extended rod, 1 250 mm (49.21 inch)	**G**
Extended rod, 1 350 mm (53.15 inch)	**H**
Extended rod, 1 500 mm (59.06 inch)	**J**
Extended rod, 1 750 mm (68.90 inch)	**K**
Extended rod, 2 000 mm (78.74 inch)	**L**
Add Order code Y01 and plain text: "Insertion length ... mm"	
Extended rod, 200 ... 1 000 mm (7.87 ... 39.37 inch)	**M**
Extended rod, 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**N**
Extended rod, 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	**P**
Extended rod, 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	**Q**
Extended rod, 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	**R**
Extended rod, 5 001 ... 5 500 mm (196.89 ... 216.53 inch)	**S**
Thermal isolator	
Without thermal isolator	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	**1**

Selection and Ordering data	Article No.
Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection	**7ML5644-** ■■■■■ - ■■■ **0**
Versatile inverse frequency shift capacitance level and material detection switch with optional process connection choices and configurable output. CLS200 is ideal for detection of liquids, solids, slurries, foam, and interfaces, and has the ability to tune out build-up on the probe.	
Remote mount electronics and mounting bracket	
With 2 m (79 inch) of cable	**2**
With 5 m (197 inch) of cable	**3**
Wetted seals	
FKM	**0**
FFKM [for process temperatures above -20 °C (-4 °F)]	**1**
Probe material	
PFA Coated 316L stainless steel with PPS probe body	**0**
PFA Coated 316L stainless steel with PVDF probe body	**1**
Approvals	
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6	**F**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	**G**
Intrinsically Safe:[1] CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	**H**
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	**J**
General Purpose (CSA, FM)	**K**
Enclosure and lid Aluminum epoxy coated	
2 x ½" NPT via adapter - cable inlet, IP65	**A**
2 x M20x1.5 cable inlet, IP65	**B**
2 x ½" NPT via adapter - cable inlet, IP68	**C**
2 x M20x1.5 cable inlet, IP68	**D**

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	**See page 4/36**
Accessories	**See page 4/36**

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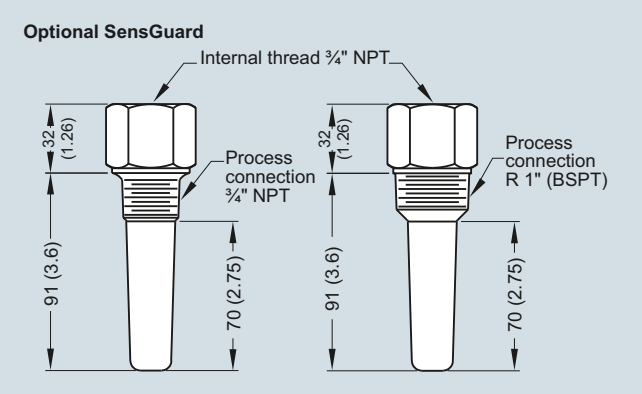
Selection and Ordering data	Article No.
Operating Instructions - Standard	
English	**7ML1998-5JH04**
German	**7ML1998-5JH34**
Functional Safety manual, English	**A5E35637149**
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	**A5E32221251**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Operating Instructions - Digital	
English	**7ML1998-5JJ05**
German	**7ML1998-5JJ34**
French	**7ML1998-5JJ11**
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	**A5E32221496**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
SensGuard, ¾" NPT (PPS) Only available for CLS200 with ¾" NPT thread	**7ML1830-1DL**
SensGuard, R 1" (BSPT) (PPS) Only available for CLS200 with ¾" NPT thread	**7ML1830-1DM**
One metallic cable gland M20x1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	**7ML1930-1AQ**
General Purpose	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 6 ... 12 mm (0.236 ... 0.472 inch)	**7ML1830-1JA**
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6,-40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472 inch)	**7ML1830-1JC**
Hazardous Locations	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA,IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	**7ML1830-1JB**
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA, IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	**7ML1830-1JD**
Blind threaded flanges are available. Please contact ceg.smpi@siemens.com **with a completed application data sheet on page 4/11**	
Pointek Specials	**See page 4/80**

Options



Optional SensGuard, dimensions in mm (inch)

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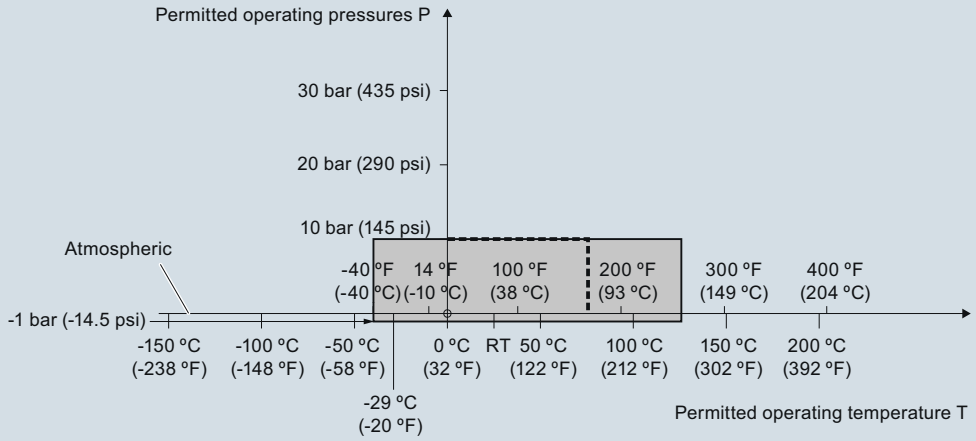
Characteristic curves

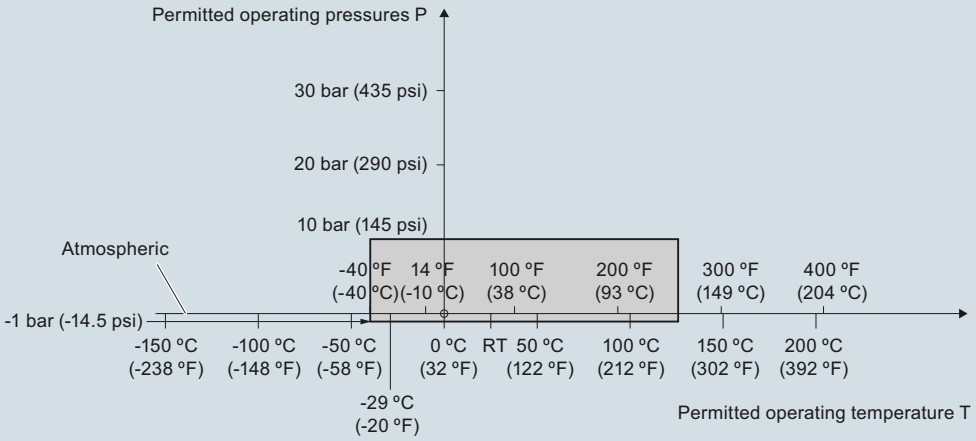
**Pressure/temperature curve
CLS200 sliding coupling
threaded process connections
(7ML5633 and 7ML5643)**



---- Example:
Permitted operating pressure = 10 bar (145 psi) at 75 °C

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5633 and 7ML5641)

**Pressure/temperature curve
CLS200 cable
Threaded process connections
(7ML5631 and 7ML5641)**



Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)

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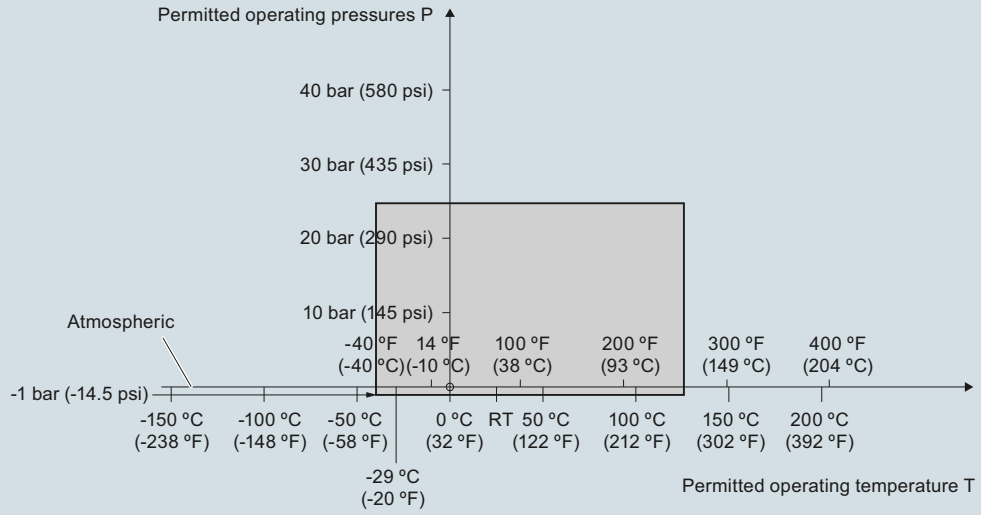
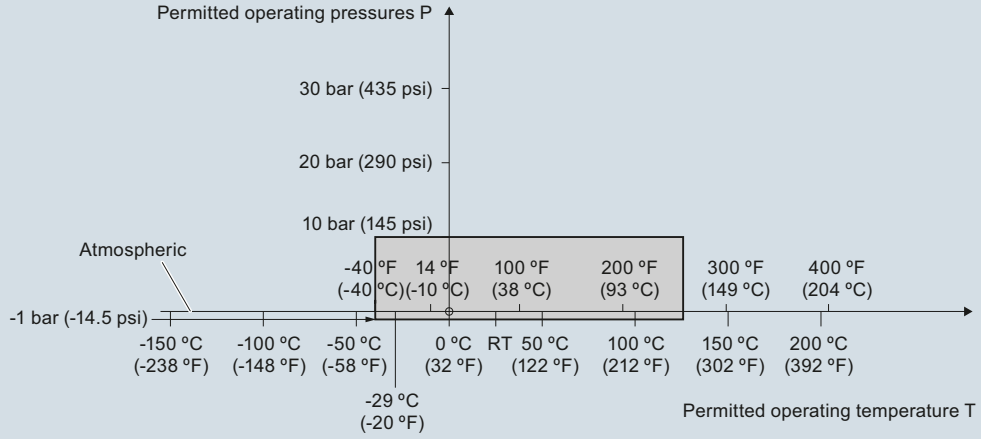
Pressure/temperature curve
CLS200 compact and extended rod
Threaded process connections
(7ML5630 and 7ML5640)



Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 or 7ML5640)

Pressure/temperature curve
CLS200 compact and extended sanitary type
Sanitary process connections
(7ML5632 and 7ML5642)



Pointek CLS200 Process Pressure/Temperature derating curves (7ML5632 and 7ML5642)

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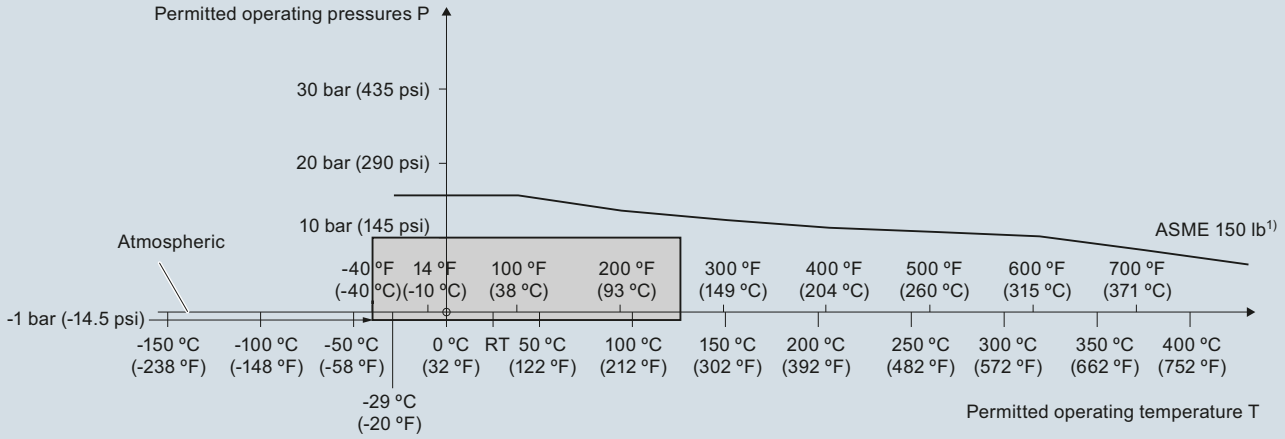
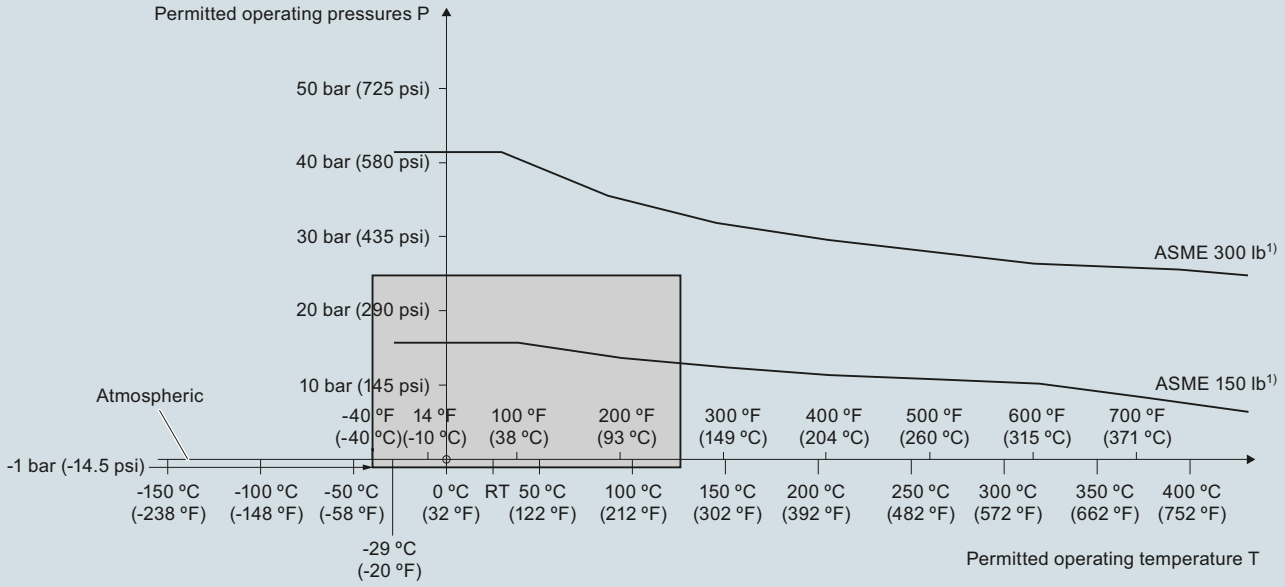
Pressure/temperature curve
CLS200 cable
ASME flanged process connections
(7ML5631 and 7ML5641)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)

Pressure/temperature curve
CLS200 compact and extended rod
ASME flanged process connections
(7ML5630 and 7ML5640)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 and 7ML5640)

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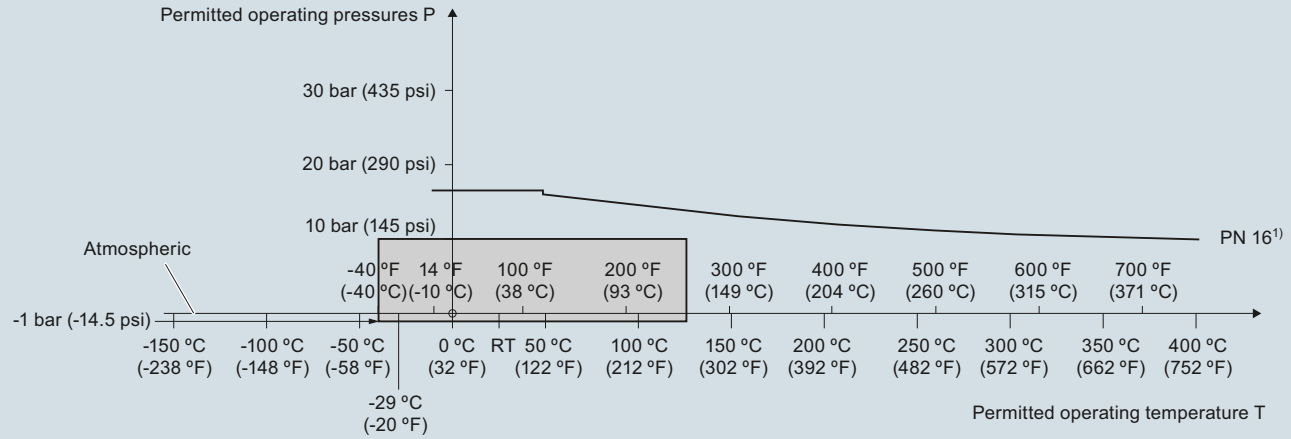
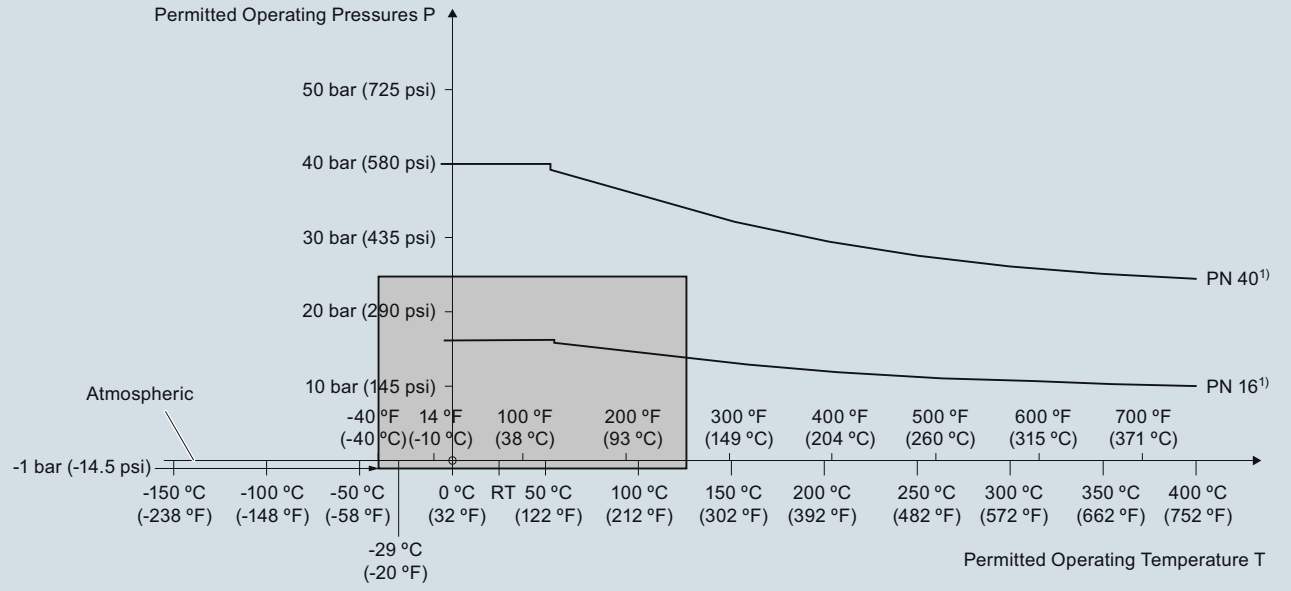
Pressure/temperature curve
CLS200 cable
EN flanged process connections
(7ML5631 and 7ML5641)



[1)] The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)

Pressure/Temperature Curve
CLS200 Compact and Extended Rod
EN Flanged Process Connections
(7ML5630 and 7ML5640)



[1)] The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 and 7ML5640)

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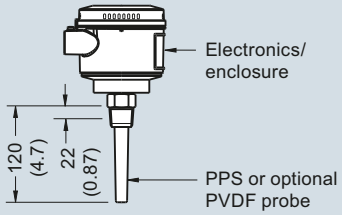
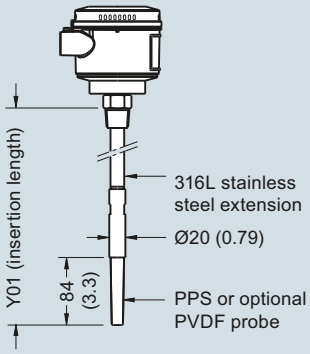
Dimensional drawings

Compact version
Threaded
(7ML5630 and 7ML5640)

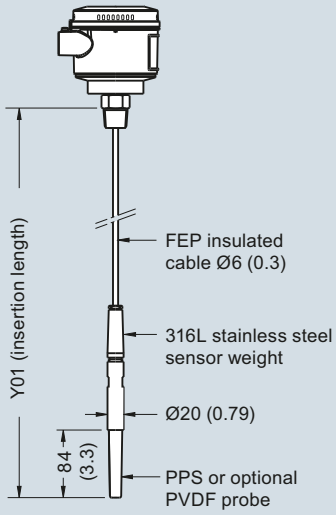


Extended rod version
Threaded
(7ML5630 and 7ML5640)



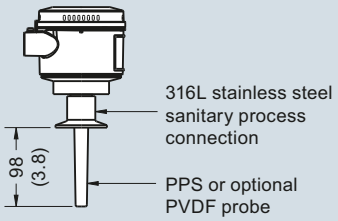
Min. insertion length = 200 (7.87)
Max. insertion length = 5 500 (216)

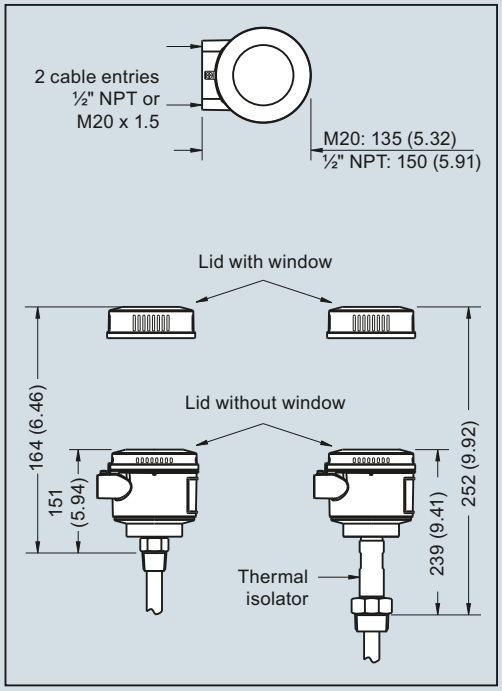
Extended cable version
Threaded
(7ML5631 and 7ML5641)



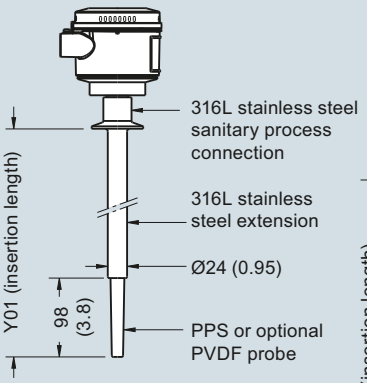
Min. insertion length = 500 (19.69)
Max. insertion length = 30 000 (1 181)
Applicable for liquids and solids applications. Cable can be shortened on site.

Sanitary compact version
Sanitary fitting
(7ML5632 and 7ML5642)



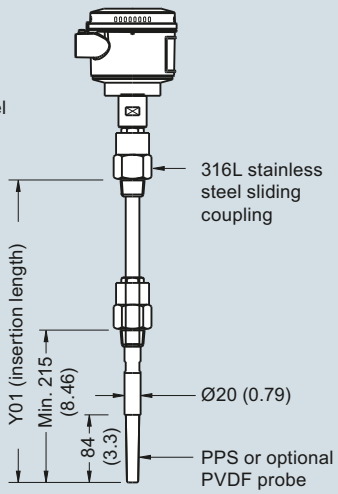


Sanitary extended version
Sanitary fitting
(7ML5632 and 7ML5642)



Min. insertion length = 110 (4.3)
Max. insertion length = 5 500 (216)

Sliding coupling version
Threaded
(7ML5633 and 7ML5643)



Min. insertion length = 350 (13.82)
Max. insertion length = 5 500 (216)

Pointek CLS200 - Threaded/sanitary process connections, dimensions in mm (inch)

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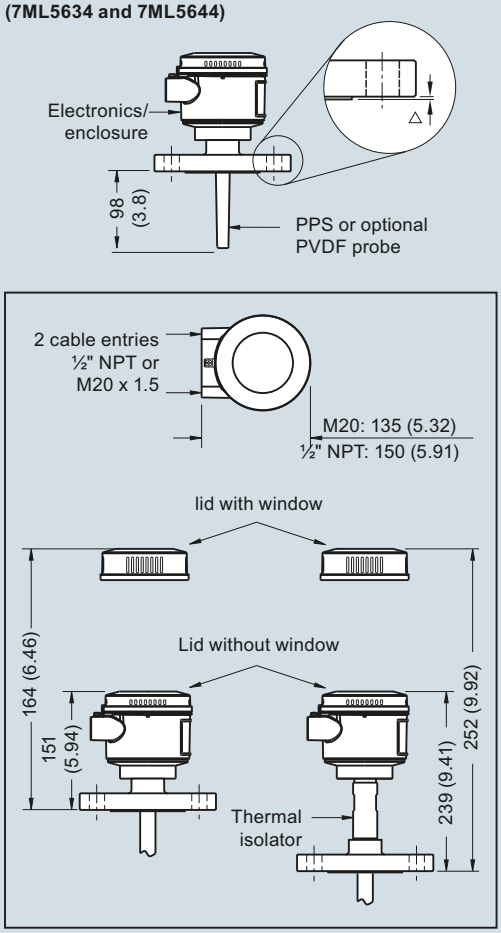
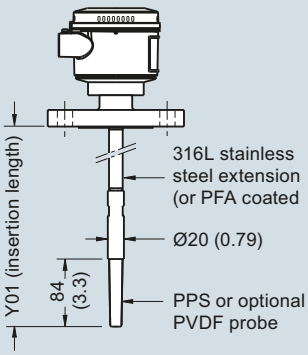
Pointek CLS200 – Standard and Digital

Compact version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)

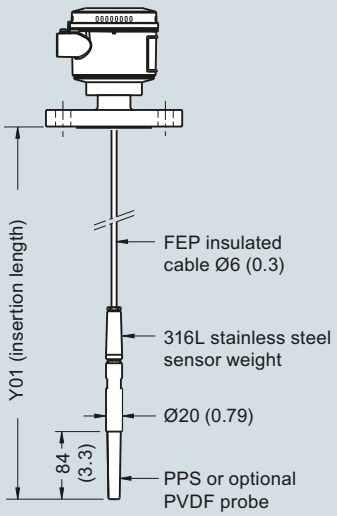


Extended rod version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)



Min. insertion length = 200 (7.87)
Max. insertion length = 5 500 (216)

Extended cable version
Welded Flange
(7ML5631 and 7ML5641)



Min. insertion length = 500 (19.69)
Max. insertion length = 30 000 (1 181)
Applicable for liquids and solids applications. Cable can be shortened on site.

Flange Facing (raised face)	
Flange Class	**Facing thickness**
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS200 - Flanged Process Connections, dimensions in mm (inch)

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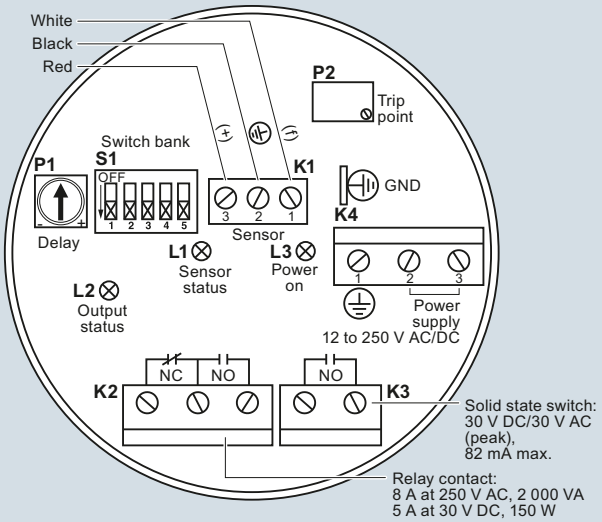
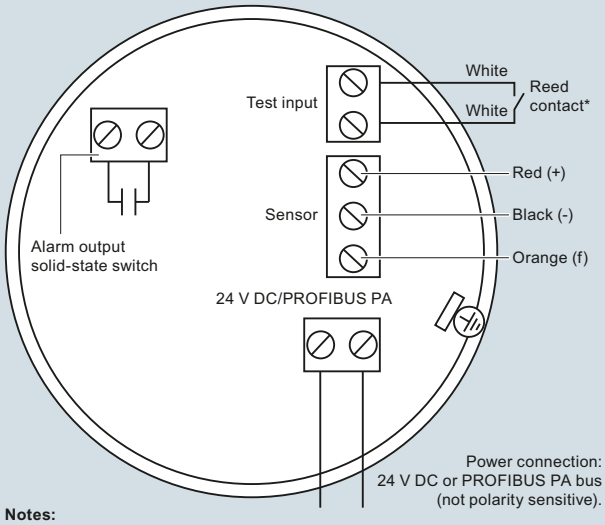
Schematics

Wiring: Pointek CLS200 standard



Notes:
- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction Manual or contact Siemens representative for detailed wiring information.

Wiring: Pointek CLS200 Digital



Notes:
Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor Test**
A magnet can be used to test the sensor without opening the lid of the Pointek CLS200 Digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.

Pointek CLS200 connections

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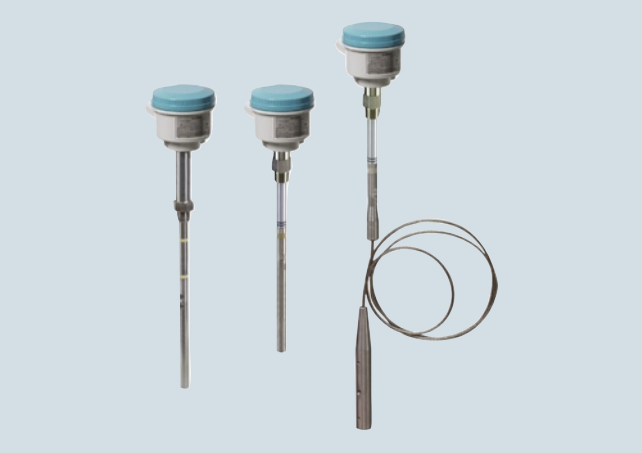
Pointek CLS300 - Standard

Overview



Pointek CLS300 (standard version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Three LED indicators for adjustment control, output status and power
- High-temperature version up to 400 °C (752 °F)

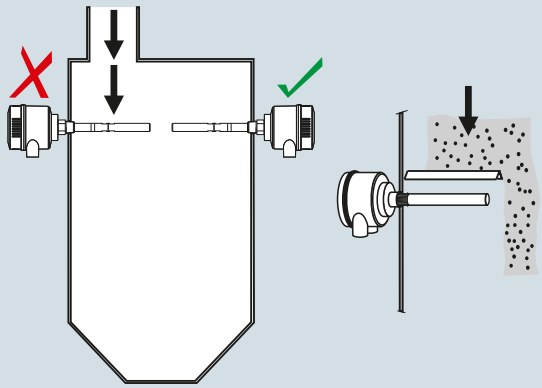
Application

Pointek CLS300 standard version has three LED indicators with basic relay and solid-state switch alarms.
The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry.
The fully potted electronics are unaffected by condensation, dust or vibration.
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.
The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

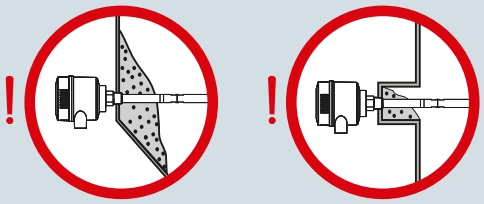
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration

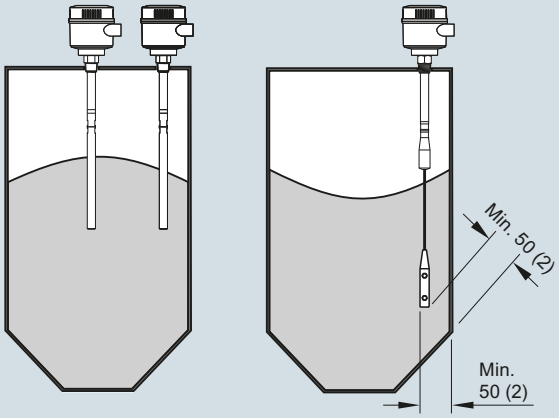
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 (2) from tank wall.
Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in picoFarad (pF)
Output	
Output signal	
• Relay output	1 SPDT Form C relay
- Max. contact voltage	• 30 V DC • 250 V AC
- Max. contact current	• 5 A (DC) • 8 A (AC)
- Max. switching capacity	• 150 W (DC) • 2 000 VA (AC)
- Time delay (ON and/or OFF)	1 ... 60 s
• Solid-state output	
- Output	Galvanically isolated
- Protection	Against reversed polarity (bipolar)
- Max. switching voltage	• 30 V (DC) • 30 V peak (AC)
- Max. load current	82 mA
- Voltage drop	< 1 V, typical at 50 mA
- Time delay (pre or post switching)	1 ... 60 s
Accuracy	
Resolution	
• Min. sensitivity (pF)	1 % change in actual capacitance
• Max. temperature error	0.2 % of actual capacitance value
Rated operating conditions[1]	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)[2]
Medium conditions	Liquids, bulk solids, slurries and interfaces, and applications with viscous materials
• Relative dielectric constant ε_r	Min. 1.5
• Process temperature	
- Rod/Cable version	-40 ... +200 °C (-40 ... +392 °F)[2]
- High-temperature version	-40 ... +400 °C (-40 ... +752 °F)
• Process pressure[3]	-1 ... +35 bar g (-14.6 ... +511 psi g)

Design	
Material (enclosure)	Powder-coated aluminum with gasket
Degree of Protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Cable inlet	2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
Controls and displays	
Displays	3 LEDs, for probe status, output status and power supply
Potentiometers	2 potentiometers for time delay and sensitivity
Switches	5 DIP switches for delay on/off, fail-safe high/low, time delay test/adjust, high/low sensitivity, test delay settings
Power supply	
Supply	12 ... 250 V AC/DC, 0 ... 60 Hz, galvanically isolated, 2 W
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6...T1 ATEX II 1/2 D T100 °C
Dust Ignition Proof with IS Probe	ATEX II 1/2 D T100 °C CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Explosion Proof Enclosure with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Overfill Protection	WHG (Germany) VLAREM II (Belgium)
Others	Pattern Approval (China)

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 4/58.

2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves starting on page 4/58.

Design: Probe			
	Rod version	**High Temperature version**	**Cable version**
Length	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO_2[1]) isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM)[2]	Graphite[2]	FKM (optional FFKM)[2]
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

1) Zirconium Oxide

2) For Caustic Materials, please contact ceg.smpi@siemens.com for alternative O-rings.

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Pointek CLS300 - Standard

Selection and Ordering data		Article No.
Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection ↗		**7ML5650-** ■■■■■ - ■■■■
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	0 A
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	0 B
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	0 C
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	0 D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	1 A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	1 B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	1 D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	3 B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	3 D
Welded flange, 316L stainless steel, raised face		
1" ASME, 150 lb	⬟	5 A
1" ASME, 300 lb		5 B
1" ASME, 600 lb		5 C
1½" ASME, 150 lb	⬟	5 D
1½" ASME, 300 lb		5 E
1½" ASME, 600 lb		5 F
2" ASME, 150 lb	⬟	5 G
2" ASME, 300 lb		5 H
2" ASME, 600 lb		5 J
3" ASME, 150 lb	⬟	5 K
3" ASME, 300 lb		5 L
3" ASME, 600 lb		5 M
4" ASME, 150 lb	⬟	5 N
4" ASME, 300 lb		5 P
4" ASME, 600 lb		5 Q
Welded flange, 316L stainless steel, Type A flat faced		
DN 25, PN 16	⬟	6 A
DN 25, PN 40		6 B
DN 40, PN 16	⬟	6 C
DN 40, PN 40		6 D
DN 50, PN 16	⬟	6 E
DN 50, PN 40		6 F
DN 80, PN 16	⬟	6 G
DN 80, PN 40		6 H
DN 100, PN 16	⬟	6 J
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		6 K
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Standard version, rod 350 mm (13.78 inch)	⬟	A
Extended rod, length 500 mm (19.69 inch)	⬟	B
Extended rod, length 750 mm (29.53 inch)	⬟	C
Extended rod, length 1 000 mm (39.37 inch)	⬟	D

Selection and Ordering data		Article No.
Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection		**7ML5650-** ■■■■■ - ■■■■
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.		
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)	⬟	E
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)	⬟	F
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)	⬟	G
Thermal isolator		
Without thermal isolator	⬟	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	1
Wetted seals		
FKM	⬟	0
FFKM [for process temperatures above -20 °C (-4 °F)]	⬟	1
Probe material		
316L stainless steel with PFA lining and PEEK isolators	⬟	0
Approvals		
Dust Ignition Proof with IS Probe: CE, RCM, ATEX II 1/2 D T100 °C	⬟	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C	⬟	D
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C	⬟	E
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	G
General Purpose (CSA, FM)	⬟	H
General Purpose (CE, RCM)	⬟	J
General Purpose with WHG approval (CSA, FM, CE, RCM)	⬟	K
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	A
2 x M20x1.5 cable inlet, IP65	⬟	B
2 x ½" NPT via adapter - cable inlet, IP68	⬟	C
2 x M20x1.5 cable inlet, IP68	⬟	D
Active shield length		
Standard length - (125 mm threaded, 105 mm flanged)	⬟	0
Extended shield - (250 mm threaded, 230 mm flanged)[1]	⬟	1
Extended shield - (400 mm threaded, 380 mm flanged)[2]	⬟	2

[1] Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)]

[2] Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	**See page 4/57**
Accessories	**See page 4/57**

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol. For details see page 9/5 in the appendix.

Selection and Ordering data		Article No.
Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection	↗	**7ML5651-** ■■■■■ - ■■■■
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
1¼" NPT [(Taper), ANSI/ASME B1.20.1]		**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]		**0 D**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		**1 D**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		**3 D**
Welded flange, 316L stainless steel, raised face		
1½" ASME, 150 lb		**5 D**
1½" ASME, 300 lb		**5 E**
1½" ASME, 600 lb		**5 F**
2" ASME, 150 lb		**5 G**
2" ASME, 300 lb		**5 H**
2" ASME, 600 lb		**5 J**
3" ASME, 150 lb		**5 K**
3" ASME, 300 lb		**5 L**
3" ASME, 600 lb		**5 M**
4" ASME, 150 lb		**5 N**
4" ASME, 300 lb		**5 P**
4" ASME, 600 lb		**5 Q**
Welded flange, 316L stainless steel, Type A flat faced		
DN 40, PN 16		**6 C**
DN 40, PN 40		**6 D**
DN 50, PN 16		**6 E**
DN 50, PN 40		**6 F**
DN 80, PN 16		**6 G**
DN 80, PN 40		**6 H**
DN 100, PN 16		**6 J**
DN 100, PN 40		**6 K**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer		**A**
Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer		**B**
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended cable, 500 ... 1 000 mm (19.69 ... 39.37 inch)		**E**
Extended cable, 1 001 ... 5 000 mm (39.41 ... 196.85 inch)		**F**
Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)		**G**
Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)		**H**
Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch)		**J**
Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)		**K**

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Pointek CLS300 - Standard

Selection and Ordering data		Article No.
Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection		**7ML5651-** ■■■■■ - ■■■■
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.		
Thermal isolator		
Without thermal isolator	⬟	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	**1**
Wetted seals		
FKM	⬟	**0**
FFKM [for process temperatures above -20 °C (-4 °F)]	⬟	**1**
Probe material		
Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight	⬟	**0**
PFA coated cable, PEEK isolators and 316L stainless steel cable weight	⬟	**1**
Approvals		
Dust Ignition Proof with IS Probe: CE, RCM, ATEX II 1/2 D T100 °C	⬟	**C**
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C	⬟	**D**
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C	⬟	**E**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**F**
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
General Purpose (CSA, FM)	⬟	**H**
General Purpose (CE, RCM)	⬟	**J**
General Purpose with WHG approval (CSA, FM, CE, RCM)	⬟	**K**
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20x1.5 cable inlet, IP68	⬟	**D**
Active shield length		
Standard length - (125 mm threaded, 105 mm flanged)	⬟	**0**
Extended shield - (250 mm threaded, 230 mm flanged)[1)]	⬟	**1**
Extended shield - (400 mm threaded, 380 mm flanged)[1)]	⬟	**2**

[1)] Available with Probe version options A, B, F ... K, only [≥ 1 000 mm (39.7 inch)]

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/57**
Accessories		**See page 4/57**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and Ordering data		Article No.
Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection ↗		**7ML5652-** **0** **-**
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 A**
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 D**
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 B**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 D**
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 A**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 B**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 D**
Welded flange, 316L stainless steel, raised face		
1" ASME, 150 lb	⬟	**5 A**
1" ASME, 300 lb		**5 B**
1" ASME, 600 lb		**5 C**
1½" ASME, 150 lb	⬟	**5 D**
1½" ASME, 300 lb		**5 E**
1½" ASME, 600 lb		**5 F**
2" ASME, 150 lb	⬟	**5 G**
2" ASME, 300 lb		**5 H**
2" ASME, 600 lb		**5 J**
3" ASME, 150 lb	⬟	**5 K**
3" ASME, 300 lb		**5 L**
3" ASME, 600 lb		**5 M**
4" ASME, 150 lb	⬟	**5 N**
4" ASME, 300 lb		**5 P**
4" ASME, 600 lb		**5 Q**
Welded flange, 316L stainless steel, Type A flat faced		
DN 25, PN 16	⬟	**6 A**
DN 25, PN 40		**6 B**
DN 40, PN 16	⬟	**6 C**
DN 40, PN 40		**6 D**
DN 50, PN 16	⬟	**6 E**
DN 50, PN 40		**6 F**
DN 80, PN 16	⬟	**6 G**
DN 80, PN 40		**6 H**
DN 100, PN 16	⬟	**6 J**
DN 100, PN 40		**6 K**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Standard version rod 350 mm (13.78 inch)	⬟	**A**
Extended rod, length 500 mm (19.69 inch)	⬟	**B**
Extended rod, length 750 mm (29.53 inch)	⬟	**C**
Extended rod, length 1 000 mm (39.37 inch)	⬟	**D**

Selection and Ordering data		Article No.
Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection		**7ML5652-** **0** **-**
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. CLS300 is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present, and has the ability to tune out build-up on the probe.		
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)	⬟	**E**
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)	⬟	**F**
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)	⬟	**G**
Wetted seals		
Graphite	⬟	**0**
Probe material		
316L stainless steel with ceramic (ZrO_2) isolators	⬟	**0**
Approvals		
Dust Ignition Proof with IS Probe: CE, RCM, ATEX II 1/2 D T100 °C	⬟	**C**
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEXII 1/2 D T100 °C	⬟	**D**
Flameproof Enclosure with IS Probe, with WHG approval: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C	⬟	**E**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**F**
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
General Purpose (CSA, FM)	⬟	**H**
General Purpose (CE, RCM)	⬟	**J**
General Purpose with WHG approval (CSA, FM, CE, RCM)	⬟	**K**
Enclosure and lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20x1.5 cable inlet, IP68	⬟	**D**
Active shield length		
Standard length - (125 mm threaded, 105 mm flanged)	⬟	**0**
Extended shield - (250 mm threaded, 230 mm flanged)[1]	⬟	**1**
Extended shield - (400 mm threaded, 380 mm flanged)[2]	⬟	**2**

[1] Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)]

[2] Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Pointek CLS300 - Standard

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description ⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ⬟ Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 ⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204 ⬟	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	**See page 4/57**
Accessories	**See page 4/57**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Overview

Pointek CLS300 (digital version) is an inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup or nozzle interference in active shield section
- Performs in extremely abrasive conditions because of solid rod construction
- Push-button calibration, full-function diagnostics
- High sensitivity allows installation in a wide range of liquids, solids or slurry applications
- Integral LCD display allows for easy menu-driven setup
- PROFIBUS PA communication (SIMATIC PDM compatible)

Application

Pointek CLS300 digital version provides an integral LCD display for stand-alone use, with PROFIBUS PA communication (Profile version 3.0, Class B) when required. Solid-state switch alarm is standard.

The robust design of CLS300 makes it specifically applicable for heavy solids applications where abrasive materials occur as in the mining industry.

The fully potted electronics are unaffected by condensation, dust or vibration.

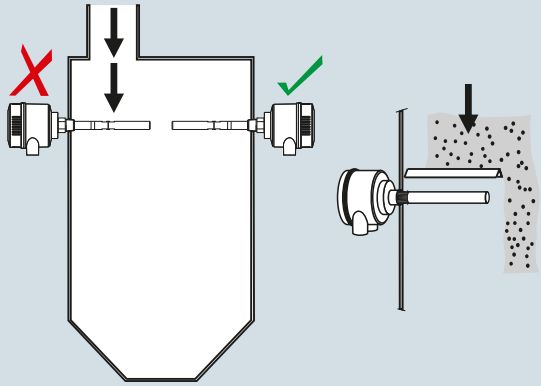
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup or long installation nozzles.

The unique modular design of the Pointek CLS300 provides a wide range of configurations, process connections, extensions and approvals to meet the temperature and pressure requirements of specific applications. The modular design makes ordering easier and reduces stocking requirements. A wide range of probe configurations are available, including rod and cable versions.

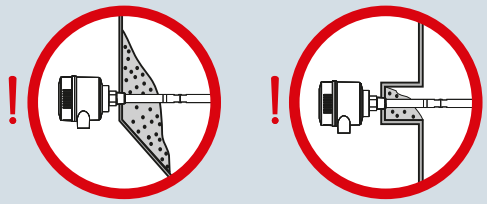
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration

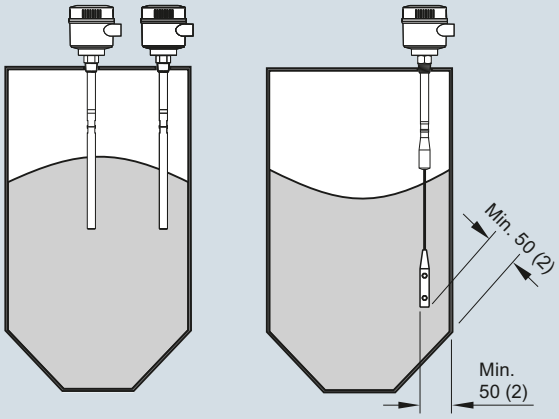
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 (2) from tank wall.
Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Inverse frequency shift capacitive level detection
Input	
Measured variable	Change in picoFarad (pF)
Output	
Solid-state output	
• Output	Galvanically isolated
• Protection	Against reversed polarity (bipolar)
• Max. switching voltage	• 30 V (DC) • 30 V peak (AC)
• Max. load current	82 mA
• Voltage drop	< 1 V, typical at 50 mA
• Time delay (pre or post switching)	Programmable by user (0 ... 100 s)
Fail-safe mode	Min. or max.
Connection	Removable terminal block
Accuracy	
Resolution	
• Min. sensitivity (pF)	1 % change in actual capacitance
• Max. temperature error	0.2 % of actual capacitance value
Rated operating conditions[1]	
Installation conditions	
Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)[2]
Medium conditions	Liquids, bulk solids, slurries and interfaces, and applications with viscous materials
• Relative dielectric constant ε_r	Min. 1.5
• Process temperature	
- Rod/Cable version	-40 ... +200 °C (-40 ... +392 °F)[2]
- High Temperature version	-40 ... +400 °C (-40 ... +752 °F)
• Process pressure[3]	-1 ... +35 bar g (-14.6 ... +511 psi g)
Design	
Material (enclosure)	Powder-coated aluminum with gasket
Degree of protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Cable inlet	2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
Controls and displays	
Local display	LCD
Configuration	• Locally, using 3 button keypad (for standalone operation) • Remotely, using SIMATIC PDM (for installation on a network)

Power supply	
Bus voltage (at process connection)	• Standard: 12 ... 30 V DC • Intrinsically Safe: 12 ... 24 V DC
Current consumption	12.5 mA
Certificates and approvals	
General Purpose	CSA, FM, CE, RCM
Dust Ignition Proof	ATEX II 1/2 D, 2 D IP6X T100 °C
Flameproof Enclosure With IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6...T4 ATEX II 1/2 D T100 °C
Dust Ignition Proof With IS Probe	CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Intrinsically Safe[4]	ATEX II 1 G EEx ia IIC T6...T4 ATEX II 1/2 D, 2 D IP6X T100 °C CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Non-incendive	CSA/FM Class I, Div. 2, Groups A, B, C, D CSA/FM Class II, Div. 2, Groups F, G CSA/FM Class III T4 or T6
Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Others	Pattern Approval (China)
Communication	PROFIBUS PA (IEC 61158 CPF3 CP3/2) Bus physical layer: IEC 61158-2 MBP-(IS) Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B FISCO field device

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 4/58.

2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves starting on page 4/58.

4) Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

Design: Probe			
	Rod version	**High Temperature version**	**Cable version**
Length	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 250 mm (9.8 inch), max. 1 000 mm (40 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA (no insulation on active probe), 316L stainless steel, PEEK isolators	Ceramic (ZrO_2[1]) isolators (no insulation on active probe), 316L stainless steel	316 stainless steel, optional PFA, PEEK isolators
O-ring seal material	FKM (optional FFKM)[2]	Graphite[2]	FKM (optional FFKM)[2]
Thermal isolator	Optional	Standard	Optional
Extension	User selectable length	User selectable length	User selectable cable length

1) Zirconium Oxide

2) For Caustic Materials, please contact ceg.smpi@siemens.com for alternative O-rings

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Selection and Ordering data		Article No.
Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection	↗	**7ML5660-** ■■■■■ - ■■■■
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 A**
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 D**
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 B**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 D**
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 A**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 B**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 D**
Welded flange, 316L stainless steel, raised face		
1" ASME, 150 lb	⬟	**5 A**
1" ASME, 300 lb		**5 B**
1" ASME, 600 lb		**5 C**
1½" ASME, 150 lb	⬟	**5 D**
1½" ASME, 300 lb		**5 E**
1½" ASME, 600 lb		**5 F**
2" ASME, 150 lb	⬟	**5 G**
2" ASME, 300 lb		**5 H**
2" ASME, 600 lb		**5 J**
3" ASME, 150 lb	⬟	**5 K**
3" ASME, 300 lb		**5 L**
3" ASME, 600 lb		**5 M**
4" ASME, 150 lb	⬟	**5 N**
4" ASME, 300 lb		**5 P**
4" ASME, 600 lb		**5 Q**
Welded flange, 316L stainless steel, Type A flat faced		
DN 25, PN 16	⬟	**6 A**
DN 25, PN 40		**6 B**
DN 40, PN 16	⬟	**6 C**
DN 40, PN 40		**6 D**
DN 50, PN 16	⬟	**6 E**
DN 50, PN 40		**6 F**
DN 80, PN 16	⬟	**6 G**
DN 80, PN 40		**6 H**
DN 100, PN 16	⬟	**6 J**
DN 100, PN 40		**6 K**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Standard version, rod 350 mm (13.78 inch)	⬟	**A**
Extended rod, length 500 mm (19.69 inch)	⬟	**B**
Extended rod, length 750 mm (29.53 inch)	⬟	**C**
Extended rod, length 1 000 mm (39.37 inch)	⬟	**D**

Selection and Ordering data		Article No.
Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection		**7ML5660-** ■■■■■ - ■■■■
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.		
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)	⬟	**E**
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)	⬟	**F**
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)	⬟	**G**
Thermal isolator		
Without thermal isolator	⬟	**0**
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	**1**
Wetted seals		
FKM	⬟	**0**
FFKM [for process temperatures above -20 °C (-4 °F)]	⬟	**1**
Probe material		
316L stainless steel with PFA lining and PEEK isolators	⬟	**0**
Approvals		
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D, 2 D IP6X T100 °C	⬟	**B**
Intrinsically Safe[1)] CE, RCM, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D, 2 D IP6X T100 °C	⬟	**C**
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	**D**
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**E**
Intrinsically Safe[1)] CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**F**
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
General Purpose (CSA, FM)	⬟	**H**
General Purpose (CSA, FM, CE, RCM)	⬟	**J**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Pointek CLS300 - Digital

Selection and Ordering data		Article No.
Pointek CLS300 - Digital - Rod with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.		**7ML5660-** ■■■■■ - ■■■■
Enclosure and Lid Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20x1.5 cable inlet, IP68	⬟	**D**
Active shield length		
Standard length - (125 mm threaded, 105 mm flanged)	⬟	**0**
Extended shield - (250 mm threaded, 230 mm flanged)[2]	⬟	**1**
Extended shield - (400 mm threaded, 380 mm flanged)[3]	⬟	**2**

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

[2] Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)]

[3] Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/57**
Accessories		**See page 4/57**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Article No.
Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		↗ **7ML5661-** ■■■■■ - ■■■■
Process connection Threaded, 316L stainless steel		
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 D**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 D**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 D**
Welded flange, 316L stainless steel, raised face		
1½" ASME, 150 lb	⬟	**5 D**
1½" ASME, 300 lb		**5 E**
1½" ASME, 600 lb		**5 F**
2" ASME, 150 lb	⬟	**5 G**
2" ASME, 300 lb		**5 H**
2" ASME, 600 lb		**5 J**
3" ASME, 150 lb	⬟	**5 K**
3" ASME, 300 lb		**5 L**
3" ASME, 600 lb		**5 M**
4" ASME, 150 lb	⬟	**5 N**
4" ASME, 300 lb		**5 P**
4" ASME, 600 lb		**5 Q**
Welded flange, 316L stainless steel, Type A flat faced		
DN 40, PN 16	⬟	**6 C**
DN 40, PN 40		**6 D**
DN 50, PN 16	⬟	**6 E**
DN 50, PN 40		**6 F**
DN 80, PN 16	⬟	**6 G**
DN 80, PN 40		**6 H**
DN 100, PN 16	⬟	**6 J**
DN 100, PN 40 (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		**6 K**
Probe length (length from flange face) (threaded lengths include process thread) Note: No Y01 needed in Order code for standard lengths		
Extended cable, 3 000 mm (118.11 inch), length can be shortened by customer	⬟	**A**
Extended cable, 6 000 mm (236.22 inch), length can be shortened by customer	⬟	**B**
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended cable, 500 ... 1 000 mm (19.69 ... 39.37 inch)	⬟	**E**
Extended cable, 1 001 ... 5 000 mm (39.41 ... 196.85 inch)	⬟	**F**
Extended cable, 5 001 ... 10 000 mm (196.89 ... 393.70 inch)	⬟	**G**
Extended cable, 10 001 ... 15 000 mm (393.74 ... 590.55 inch)	⬟	**H**
Extended cable, 15 001 ... 20 000 mm (590.59 ... 787.40 inch)	⬟	**J**
Extended cable, 20 001 ... 25 000 mm (787.44 ... 984.25 inch)	⬟	**K**

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Selection and Ordering data		Article No.
Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection		**7ML5661-** ■■■■■ - ■■■■
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.		
Thermal isolator		
Without thermal isolator	⬟	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	⬟	1
Wetted seals		
FKM	⬟	0
FFKM [for process temperatures above -20 °C (-4 °F)]	⬟	1
Probe material		
Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight	⬟	0
PFA coated cable, PEEK isolators and 316L stainless steel cable weight	⬟	1
Approvals		
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D, 2 D IP6X T100 °C	⬟	B
Intrinsically Safe[1] CE, RCM, ATEX II 1 G EEx ia IIC T6 ... T4, ATEX II 1/2 D, 2 D IP6X T100 °C	⬟	C
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6 ... T4, ATEX II 1/2 D T100 °C	⬟	D
Intrinsically Safe[1] CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	G
General Purpose (CSA, FM)	⬟	H
General Purpose (CSA, FM, CE, RCM)	⬟	J
Enclosure and Lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	A
2 x M20x1.5 cable inlet, IP65	⬟	B
2 x ½" NPT via adapter - cable inlet, IP68	⬟	C
2 x M20x1.5 cable inlet, IP68	⬟	D
Active shield length		
Standard length - (125 mm threaded, 105 mm flanged)	⬟	0
Extended shield - 250 mm threaded, 230 mm flanged)[2]	⬟	1
Extended shield - (400 mm threaded, 380 mm flanged)[2]	⬟	2

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

[2] Available with Probe version options A, B and, F ... K only [≥ 1 000 mm (39.7 inch)]

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Total insertion length: enter the total insertion length in plain text description	⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Operating Instructions		
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.		**See page 4/57**
Accessories		**See page 4/57**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Pointek CLS300 - Digital

Selection and Ordering data		Article No.
Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection ↗		**7ML5662-**
		■■■ **0** ■ **-** ■■■■
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
Threaded, 316L stainless steel		
¾" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 A**
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0 D**
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 A**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 B**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	⬟	**1 D**
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		**3 A**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 B**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	⬟	**3 D**
Welded flange, 316L stainless steel, raised face		
1" ASME, 150 lb	⬟	**5 A**
1" ASME, 300 lb		**5 B**
1" ASME, 600 lb		**5 C**
1½" ASME, 150 lb	⬟	**5 D**
1½" ASME, 300 lb		**5 E**
1½" ASME, 600 lb		**5 F**
2" ASME, 150 lb	⬟	**5 G**
2" ASME, 300 lb		**5 H**
2" ASME, 600 lb		**5 J**
3" ASME, 150 lb	⬟	**5 K**
3" ASME, 300 lb		**5 L**
3" ASME, 600 lb		**5 M**
4" ASME, 150 lb	⬟	**5 N**
4" ASME, 300 lb		**5 P**
4" ASME, 600 lb		**5 Q**
Welded flange, 316L stainless steel, Type A flat faced		
DN 25, PN 16	⬟	**6 A**
DN 25, PN 40		**6 B**
DN 40, PN 16	⬟	**6 C**
DN 40, PN 40		**6 D**
DN 50, PN 16	⬟	**6 E**
DN 50, PN 40		**6 F**
DN 80, PN 16	⬟	**6 G**
DN 80, PN 40		**6 H**
DN 100, PN 16	⬟	**6 J**
DN 100, PN 40		**6 K**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)		
Probe length (length from flange face) (threaded lengths include process thread)		
Note: No Y01 needed in Order code for standard lengths		
Standard version, rod 350 mm (13.78 inch)	⬟	**A**
Extended rod, length 500 mm (19.69 inch)	⬟	**B**
Extended rod, length 750 mm (29.53 inch)	⬟	**C**
Extended rod, length 1 000 mm (39.37 inch)	⬟	**D**

Selection and Ordering data		Article No.
Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection		**7ML5662-**
		■■■ **0** ■ **-** ■■■■
Inverse frequency shift capacitance level and material detection switch with optional rod/cable choices and configurable output. It is ideal for detecting liquids, solids, slurries, foam, and interfaces in demanding conditions where high pressure and temperatures are present and has the ability to tune out build-up on the probe.		
Add Order code Y01 and plain text: "Insertion length ... mm"		
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65 inch)	⬟	**E**
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49 inch)	⬟	**F**
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3 inch)	⬟	**G**
Wetted seals		
Graphite	⬟	**0**
Probe material		
316L stainless steel with ceramic (ZrO_2) isolators	⬟	**0**
Approvals		
Dust Ignition Proof: CE, RCM, ATEX II 1/2 D, 2 D IP6X T100 °C	⬟	**B**
Intrinsically Safe[1] CE, RCM, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D, 2 D IP6X T100 °C	⬟	**C**
Flameproof Enclosure with IS Probe: CE, RCM, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	⬟	**D**
Intrinsically Safe[1] CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**F**
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	⬟	**G**
General Purpose (CSA, FM)	⬟	**H**
General Purpose (CSA, FM, CE, RCM)	⬟	**J**
Enclosure and Lid		
Aluminum epoxy coated		
2 x ½" NPT via adapter - cable inlet, IP65	⬟	**A**
2 x M20x1.5 cable inlet, IP65	⬟	**B**
2 x ½" NPT via adapter - cable inlet, IP68	⬟	**C**
2 x M20x1.5 cable inlet, IP68	⬟	**D**
Active shield length		
Standard length - (125 mm threaded, 105 mm flanged)	⬟	**0**
Extended shield - (250 mm threaded, 230 mm flanged)[2]	⬟	**1**
Extended shield - (400 mm threaded, 380 mm flanged)[3]	⬟	**2**

[1] Barrier or Intrinsically Safe power supply required for Intrinsically Safe protection

[2] Available with Probe version options B ... D, F, G only [≥ 500 mm (19.69 inch)]

[3] Available with Probe version options C, D, and, G only [≥ 750 mm (29.53 inch)]

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description ⬟	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ⬟ Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 ⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204 ⬟	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	**See page 4/57**
Accessories	**See page 4/57**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Article No.
Operating Instructions - Standard	
English	**7ML1998-5JH04**
German	**7ML1998-5JH34**
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	**A5E32221251**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Operating Instructions - Digital	
English	**7ML1998-5JJ05**
French	**7ML1998-5JJ11**
German	**7ML1998-5JJ34**
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	**A5E32221496**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
One metallic cable gland M20x1.5, -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)	**7ML1930-1AQ**
General Purpose	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 6 ... 12 mm (0.236 ... 0.472 inch)	**7ML1830-1JA**
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472 inch)	**7ML1830-1JC**
Hazardous Locations	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA,IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	**7ML1830-1JB**
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA,IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	**7ML1830-1JD**
Blind threaded flanges are available. Please contact ceg.smpi@siemens.com **with a completed application data sheet on page 4/11**	
Pointek Specials	**See page 4/80**

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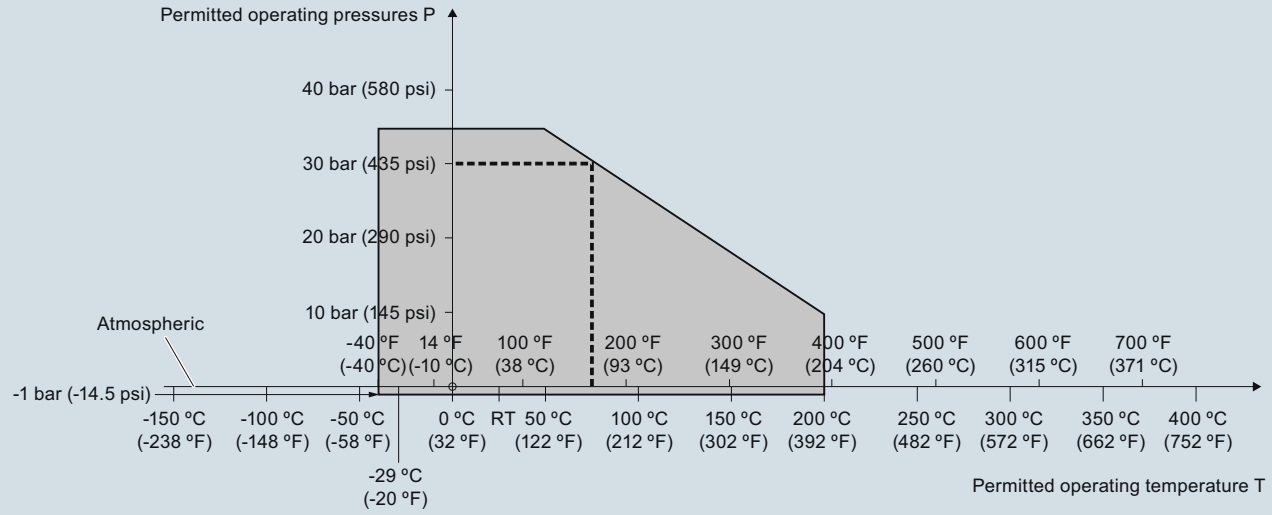
Characteristic curves

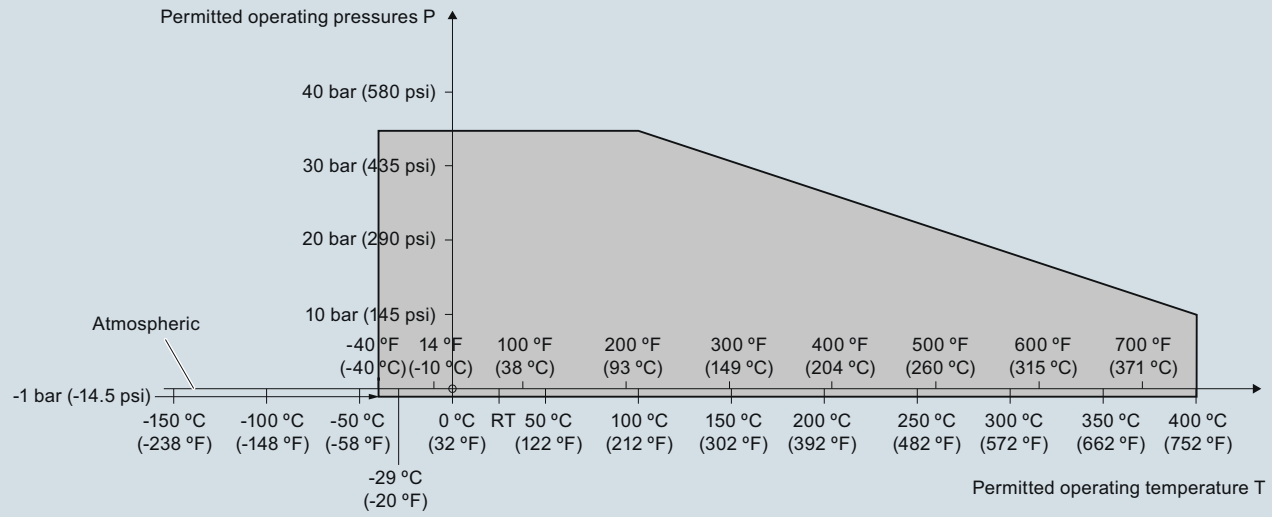
Pressure/temperature curve
CLS300 extended rod and cable probes
Threaded process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



Example:
Permitted operating pressure = 30 bar (435 psi) at 75 °C

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

Pressure/temperature curve
CLS300 high temperature rod probes
Threaded process connections
(7ML5652 and 7ML5662)



Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

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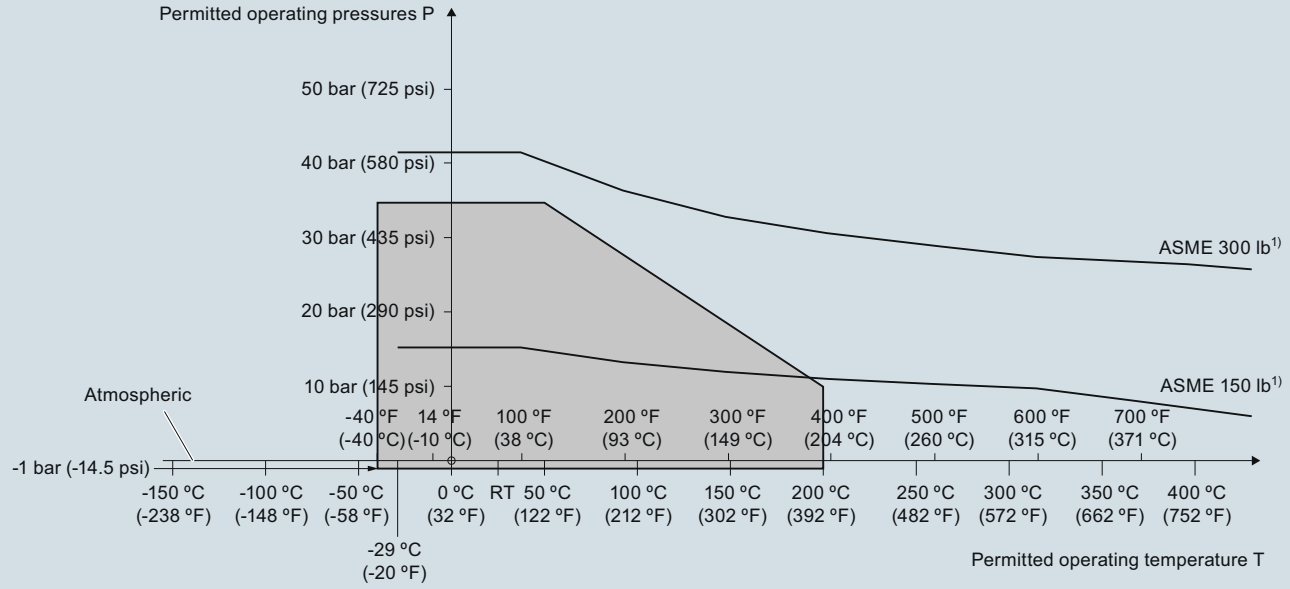
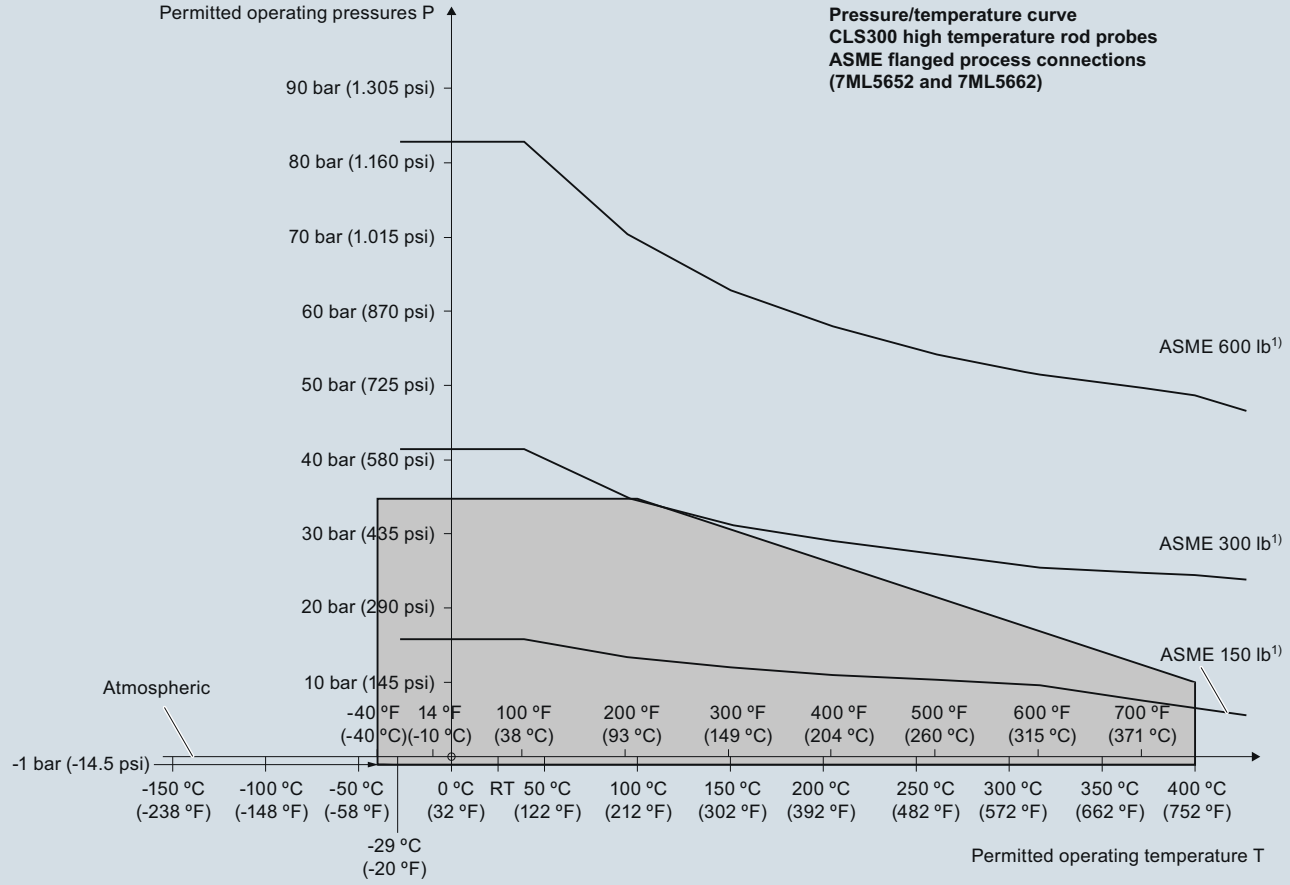
Pressure/temperature curve
CLS300 extended rod and cable probes
ASME flanged process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)

Pressure/temperature curve
CLS300 high temperature rod probes
ASME flanged process connections
(7ML5652 and 7ML5662)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

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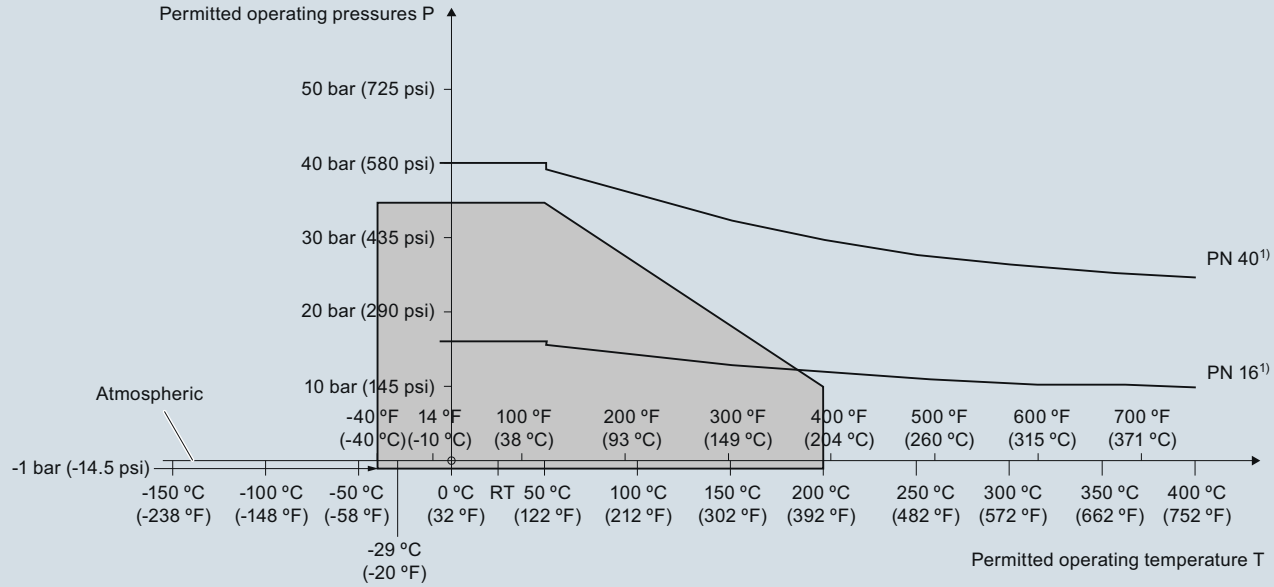
4

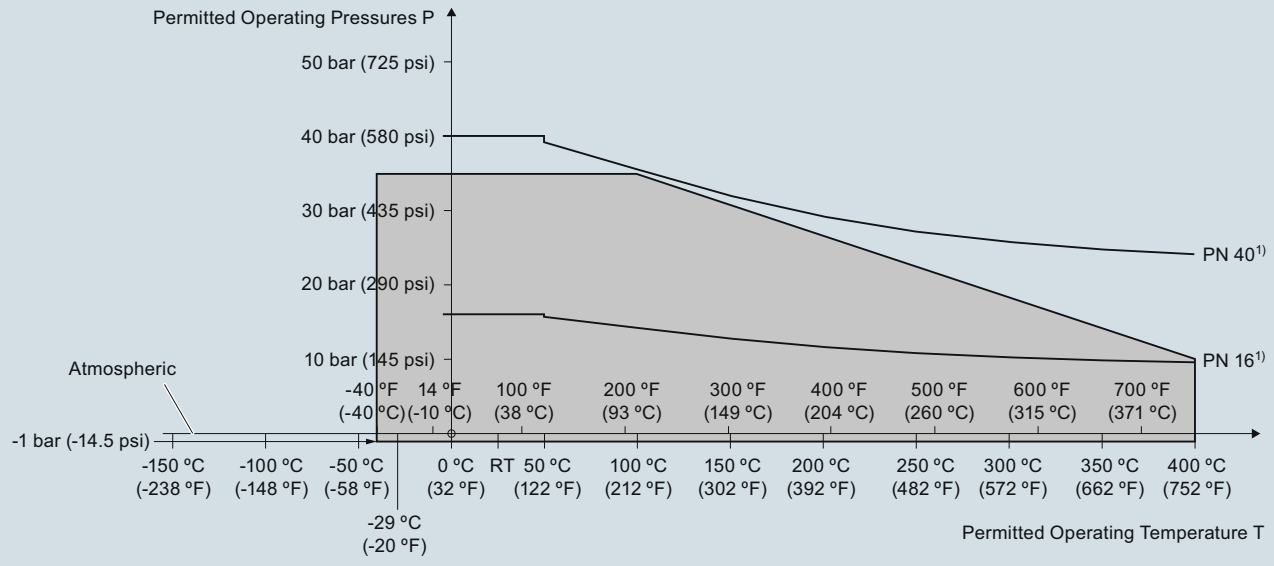
Pressure/temperature curve
CLS300 extended rod and cable probes
EN flanged process connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660 and 7ML5661)

Pressure/Temperature Curve
CLS300 High Temperature Rod Probes
EN Flanged Process Connections (7ML5652 and 7ML5662)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

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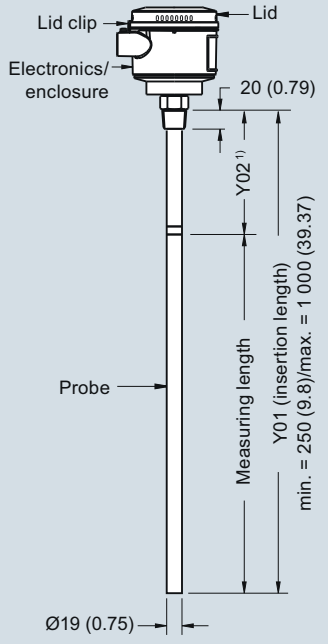
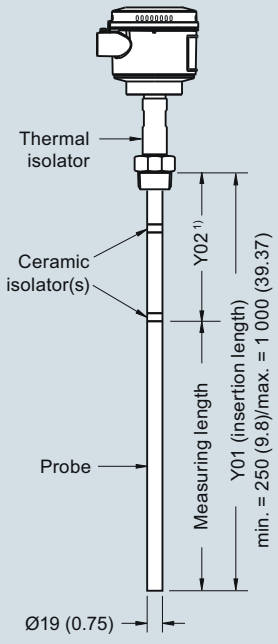
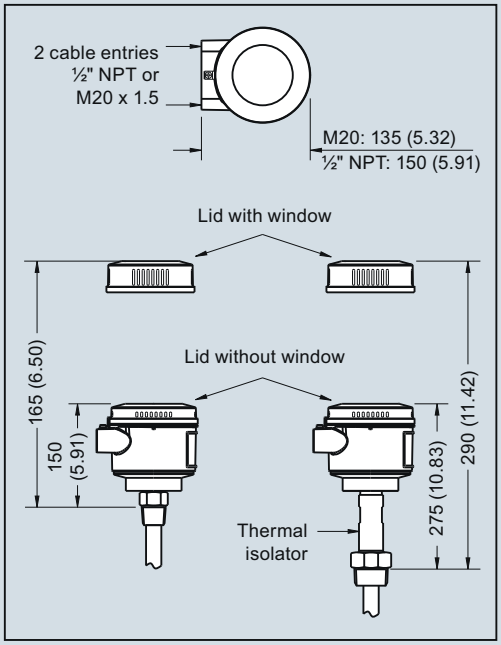
Dimensional drawings

Rod version
Threaded (7ML5650 and 7ML5660)

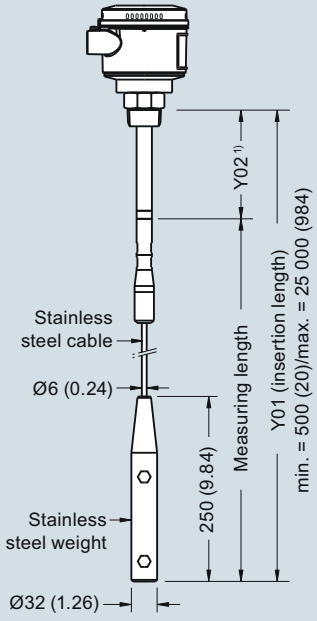


High temperature rod version
Threaded (7ML5652 and 7ML5662)

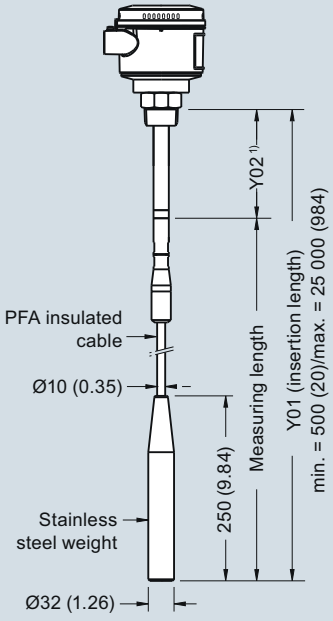




Cable version, non-insulated
Threaded (7ML5651 and 7ML5661)



Cable version, insulated
Threaded (7ML5651 and 7ML5661)



Note:

1) Extended Active Shield (Y02): standard length 125 (4.92). Optional active shield lengths: 250 (9.84) or 400 (15.75).

Pointek CLS300 - Threaded Process Connections, dimensions in mm (inch)

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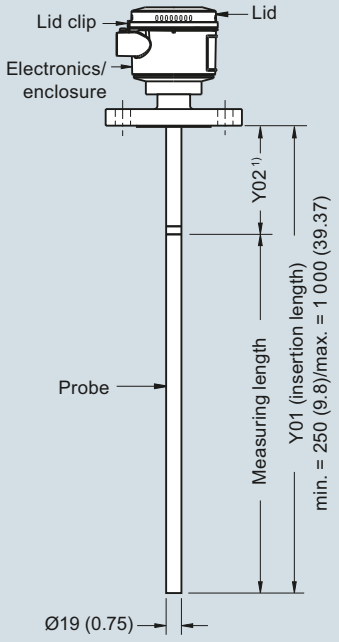
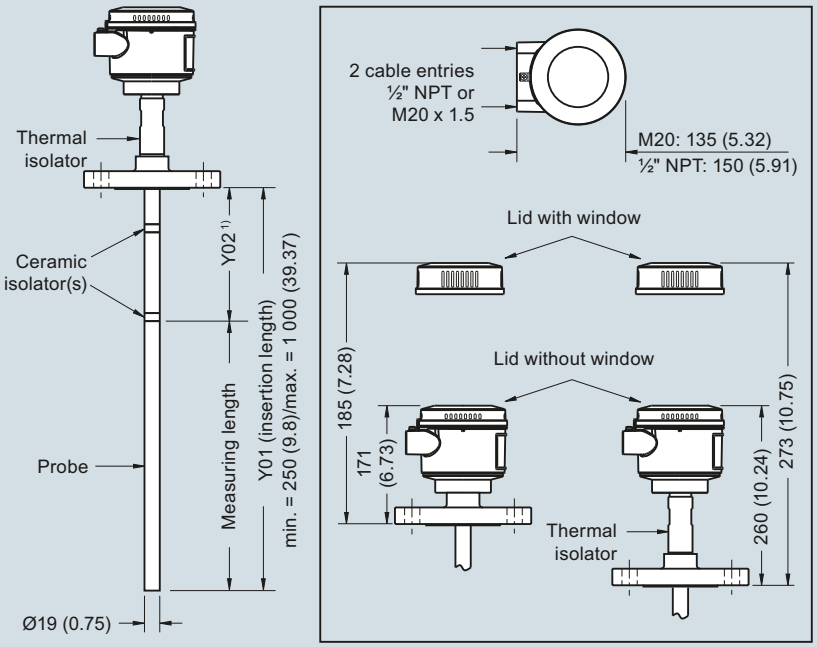
Pointek CLS300 – Standard and Digital

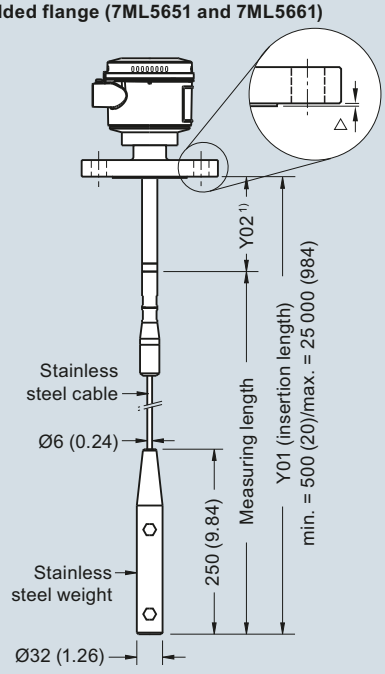
Rod version
Welded flange (7ML5650 and 7ML5660)



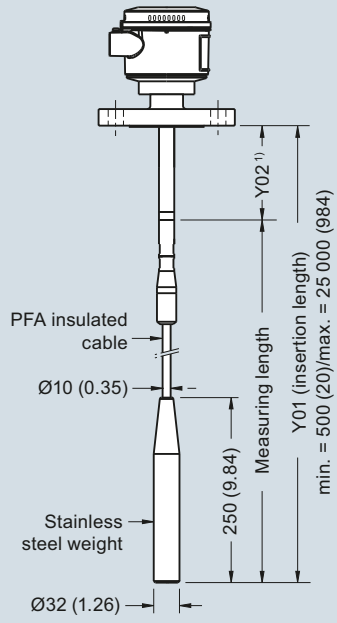
High temperature rod version
Welded flange (7ML5652 and 7ML5662)



Cable version, non-insulated
Welded flange (7ML5651 and 7ML5661)



Cable version, insulated
Welded flange (7ML5651 and 7ML5661)



Flange Facing (raised face)	
Flange Class	**Facing thickness**
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

Note:

1) Extended Active Shield (Y02): standard length 105 (4.13). Optional active shield lengths: 230 (9.06) or 380 (14.96). Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS300 - Flanged Process Connections, dimensions in mm (inch)

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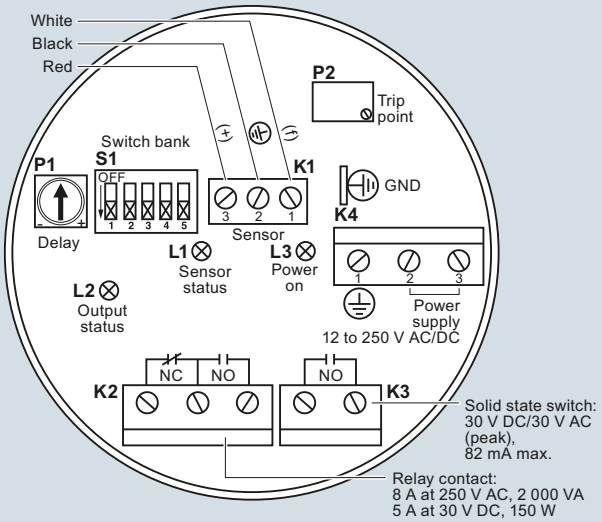
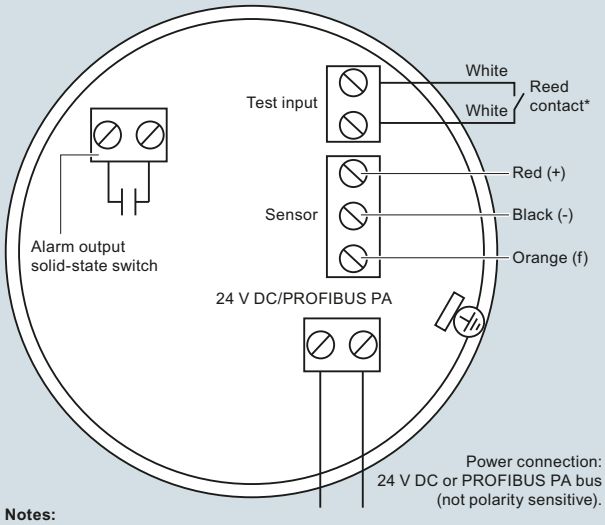
Schematics

Wiring: Pointek CLS300 standard



Notes:
- Identification label is on underside of lid. Switch and potentiometer settings are for illustration purposes only (refer to operation/setup in manual).
- All field wiring must have insulation suitable for at least 250 V.
- Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
- Maximum working voltage between adjacent relay contacts shall be 250 V.
- Refer to the Instruction manual or contact Siemens representative for detailed wiring information.

Wiring: Pointek CLS300 digital



Notes:
Refer to the instruction manual or contact a Siemens representative for detailed wiring information.

***Magnet activated sensor test**
A magnet can be used to test the sensor without opening the lid of the Pointek CLS300 digital version. Bring the magnet close to the test area indicated on the enclosure. The sensor test starts and finishes automatically after 10 seconds.

Pointek CLS300 connection

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Pointek CLS500

Overview

Pointek CLS500 is an inverse frequency shift capacitance level and material detection switch ideal for detecting interfaces, solids, liquids, toxic, and aggressive chemicals in critical conditions of high temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup in active shield section
- 2-wire loop powered with solid-state switch or 4 to 20/20 to 4 mA output
- Simple push-button calibration and integrated local display
- Full function diagnostics
- HART communications for remote commissioning and inspection

Application

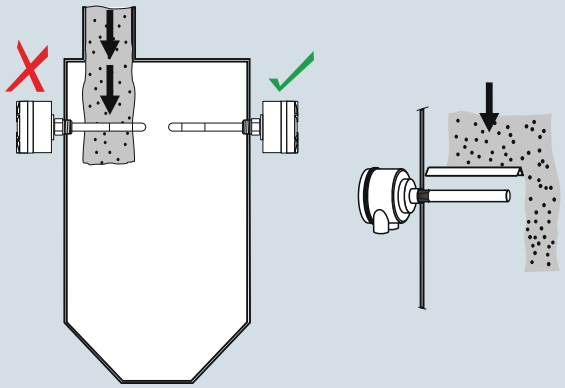
Active-Shield technology ensures that measurement is unaffected by vapors, product deposits, dust and condensation. The unique mechanical probe design coupled with a high performance transmitter gives superior performance in a wide range of level detection applications.

Pointek CLS500's microprocessor-based electronics provide one-point calibration, making setup possible without shutting down your production process.

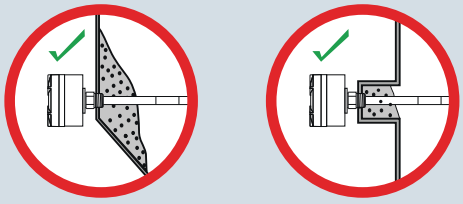
- Key Applications: foam or liquid/foam level, glycol regenerators, high-pressure coalescers, LNG applications

Configuration

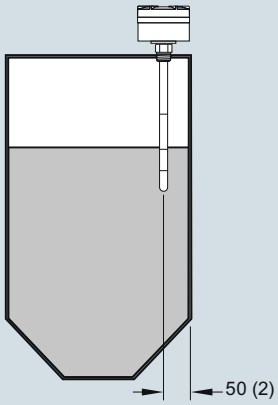
Installation



Keep unit out of path of falling material, or protect probe from falling material.



Build up of material in active shield area does not affect switch operation.



Install probe at least 50 (2) from tank wall.

Pointek CLS500 installation, dimensions in mm (inch)

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Technical specifications

Input	
Measuring range	0 ... 330 pF
Span	Min. 1 pF
Output	
Solid-state switch	
• Output	Galvanically isolated
• Protection	Against reversed polarity (bipolar)
• Max. switching voltage	• 30 V (DC) • 30 V peak (AC)
• Max. load current	82 mA
• Voltage drop	< 1 V, typical at 50 mA
• Time delay (pre or post switching)	1 ... 60 s
Current loop	4 ... 20 mA/20 ... 4 mA
Accuracy (transmitter)	
Temperature stability	0.15 pF (0 pF) or < 0.25 % (typical < 0.1 %) of actual measurement value, whichever is greater over the full temperature range
Non-linearity and repeatability	0.1 % of full scale and actual measurement respectively
Accuracy	Deviation < 0.1 % of measured value
Rated operating conditions[1]	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature (transmitter)	-40 ... +85 °C (-40 ... +185 °F)[2]
• Installation category	I
• Pollution degree	4
Medium conditions	
• Relative dielectric constant ε_r	Min. 1.5
• Process temperature	Temperature ratings are pressure dependent. See Pressure/Temperature curves on page 4/72.
- Standard (PFA)	-50 ... +200 °C (-58 ... +392 °F)
- High temperature stainless steel version with thermal isolator	-60 ... +400 °C (-76 ... +752 °F)
- Cryogenic version	-200 ... +200 °C (-328 ... +392 °F) Contact ceg.smpi@siemens.com for details.
Process pressure	Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/72.
• Standard (PFA)	-1 ... +150 bar g (-14.6 ... +2 175 psi g)
• High temperature version (Stainless steel)	-1 ... +35 bar g (-14.6 ... +507.6 psi g)

Design	
Material	
• Wetted parts material	
- Standard rod	316L stainless steel
• Probe isolation (rod)	PFA
Probe diameter	
• Standard rod version (PFA)	16 mm (0.63 inch)
• High temperature rod version (Stainless steel)	19 mm (0.75 inch)
Probe length	
• Standard rod version (PFA)	Max. 1 000 mm (39.4 inch) with 16 mm (0.63 inch) diameter probe
• High temperature rod version (Stainless steel)	Max. measuring length 1 000 mm (39.4 inch) with 19 mm (0.75 inch) diameter probe
Process connection of probe	
• Threaded mounting	NPT [(Taper), ANSI/ASME B1.20.1] R [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Flange mounting	ASME, EN 1092-1
Enclosure	
• Material	Aluminum, epoxy-coated (Stainless steel option available. Contact ceg.smpi@siemens.com)
• Cable inlet	2 x ½" NPT
• Degree of protection	Type 4X/NEMA4X/IP65, IP68
Power supply	Max. 33 V DC
Features	
Measurement current signaling	NAMUR NE 43
Safety	• Inputs/outputs fully galvanically isolated • Polarity-insensitive current loop • Fully potted • Integrated safety barrier
• Diagnostics with fault alarm when:	Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility
• Function rotary switch	Positions 0 ... 9, A ... F
• SMART communication	Conforming to HART Communication Foundation (HCF)
Certificates and approvals	
General Purpose	CE, CSA/FM, RCM
Non incendive/Non sparking	CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 ... T4 T100 °C
Dust Ignition Proof	CSA/FM Class II and III, Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] T6 ... T1 T100 °C
Explosion Proof	FM Class 1, Div. 1, Groups A, B, C, D T4 ATEX II 1/2 GD EEx d [ia] IIC T6 ... T1 T100 °C
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, ENV3, ENV5, Bureau Veritas

[1] When operation is in areas classified as hazardous, observe restrictions according to relevant certificate.
See also Pressure/Temperature curves on page 4/72.

[2] Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

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Pointek CLS500

Pointek CLS500 probe version	**Standard**	**HT Series**
Process connection types	**Standard (PFA) (7ML5601, 7ML5602, 7ML5603)**	**High Temperature (Stainless steel) (7ML5604)**
Threaded	Available as standard	–
Flange	Available as standard	Available as standard
Process connection materials		
316L stainless steel	Available as standard	Available as standard
Probe insulation		
None	–	HT Stainless: available as standard
PFA	Available as standard	–
Length parameters		
Max. rod length	1 000 mm (40 inch)	1 000 mm (40 inch)
Process condtitions[1)]		
Max. process pressure	150 bar g (2 175 psi g)	Stainless steel:[2)] 35 bar g (507 psi g)
Max. process temperature	200 °C (392 °F)	400 °C (752 °F)

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/72. Pressure rating of process seal is temperature dependent.

2) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 4/72.

– Not available as standard

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Selection and Ordering data	Article No.
Pointek CLS500, threaded ↗ Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7ML5601-** ■■■■■ - ■■ **A 0**
Electronic transmitter	
No transmitter supplied	**0**
MSP 2002-1 (330 pF)	**1**
Process connection	
¾"	**A**
1"	**B**
1¼"	**C**
1½"	**D**
2"	**E**
Threaded connection and rating	
NPT [(Taper), ANSI/ASME B1.20.1]	**A**
R [(BSPT), EN 10226/PT (JIS-T) JIS B 0203]	**B**
G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**D**
Probe insulation/material of process connection	
PFA insulation/316L stainless steel	**1**
Approvals	
General Purpose: CE, CSA/FM, RCM	**1**
CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4	**2**
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	**4**
FM Class I, Div. 1, Groups A, B, C, D T4	**6**
Probe/electrode diameter	
16 mm (0.63 inch) rigid rod, minimum insertion length 200 mm (7.9 inch), maximum insertion length 1 000 mm (39.4 inch)[1]	**1**
Thermal isolator/remote version	
Rigid thermal isolator [for process connection temperature over 85 °C (185 °F)]	**A**
No thermal isolator	**B**

[1] Add Order code Y01 and Y02 in plain text: "Insertion/active shield length to mm"

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description Note: The difference between Y01 and Y02 must be a minimum of 150 mm	**Y01**
Active Shield length - minimum length is 50 mm Y02: to mm[1]	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	**See page 4/71**
Pointek Specials	**See page 4/80**

[1] See dimension drawings on page 4/77 for further explanation of Y02

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Pointek CLS500

Selection and Ordering data	Article No.
Pointek CLS500, welded flange ↗ Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.	**7ML5602-** ■■■■■ - ■■ **A 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Electronic transmitter	
MSP 2002-1 (330 pF)	**1**
Process connection and pressure rating	
Welded flange, 316L stainless steel, raised face	
2" ASME, 150 lb	**A A**
2" ASME, 300 lb	**A B**
3" ASME, 150 lb	**B A**
3" ASME, 300 lb[1]	**B B**
4" ASME, 150 lb[1]	**C A**
4" ASME, 300 lb[1]	**C B**
6" ASME, 150 lb[1]	**D A**
6" ASME, 300 lb[1]	**D B**
Welded flange, 316L stainless steel, Type A flat faced	
DN 50 PN 16	**E C**
DN 50 PN 40	**E D**
DN 80 PN 16	**F C**
DN 80 PN 40	**F D**
DN 100 PN 16[1]	**G C**
DN 125 PN 16[1]	**H C**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	
Probe insulation/material of process connection	
PFA insulation/316L stainless steel	**1**
Approvals	
General Purpose	**1**
CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4	**2**
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	**4**
FM Class I, Div. 1, Groups A, B, C, D T4	**6**
Probe/electrode diameter	
16 mm (0.63 inch) rigid rod, min. length 200 mm (7.9 inch), max. length 1 000 mm (39.4 inch)	**1**
Thermal isolator	
Rigid thermal isolator [for process temperature over 85 °C (185 °F)]	**A**
No thermal isolator	**B**

[1] Custom shipping methods required. Contact factory for more details.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Active Shield length - minimum length is 50 mm. Y02: to mm[1]	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	**See page 4/71**
Pointek Specials	**See page 4/80**

[1] See dimensional drawings on page 4/77 for further explanation of Y02

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Selection and Ordering data	Article No.
Pointek CLS500, single piece flange ↗	**7ML5603-** ■■■■■ - ■■ **A 0**
Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Electronic transmitter	
MSP 2002-1 (330 pF)	**1**
Process connection and pressure rating	
Single piece flange, 316L stainless steel, raised face	
2" ASME, 150 lb	**A A**
2" ASME, 300 lb	**A B**
3" ASME, 150 lb	**B A**
3" ASME, 300 lb[1)]	**B B**
4" ASME, 150 lb[1)]	**C A**
4" ASME, 300 lb[1)]	**C B**
6" ASME, 150 lb[1)]	**D A**
6" ASME, 300 lb[1)]	**D B**
Single piece flange, 316L stainless steel, Type B1 raised faced	
DN 50 PN 16	**E C**
DN 50 PN 25	**E D**
DN 80 PN 16	**F C**
DN 80 PN 25	**F D**
DN 100 PN 16[1)]	**G C**
DN 100 PN 25[1)]	**G D**
DN 125 PN 16[1)]	**H C**
DN 125 PN 25[1)]	**H D**
Probe insulation/material of process connection	
PFA insulation/316L stainless steel	**1**
Approvals	
General Purpose: CE, CSA/FM, RCM	**1**
CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4	**2**
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	**4**
FM Class I, Div. 1, Groups A, B, C, D T4	**6**
Probe/electrode diameter	
16 mm (0.63 inch) rigid rod, maximum length 1 000 mm (39.4 inch) (Y01)	**1**
Thermal isolator	
Rigid thermal isolator [for process connection temperature over 85 °C (185 °F)]	**A**
No thermal isolator	**B**

[1)] Custom shipping methods required. Contact factory for more details

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Active Shield length - minimum length is 50 mm. Y02: to mm[1)]	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and manual library.	**See page 4/71**
Accessories	**See page 4/80**

[1)] See dimensional drawings on page 4/77 for further explanation of Y02

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Pointek CLS500

Selection and Ordering data	Article No.
Pointek CLS500 High temperature ↗	**7ML5604-**
Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.	**A** -
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Electronic transmitter	
MSP 2002-1 (330 pF)	**1**
Process connection and pressure rating	
316L stainless steel, raised face[1]	
2" ASME, 150 lb	**A 1**
2" ASME, 300 lb	**A 2**
2" ASME, 600 lb	**A 3**
2" ASME, 900 lb	**A 4**
3" ASME, 150 lb	**B 1**
3" ASME, 300 lb[2]	**B 2**
3" ASME, 600 lb[2]	**B 3**
3" ASME, 900 lb[2]	**B 4**
4" ASME, 150 lb[2]	**C 1**
4" ASME, 300 lb[2]	**C 2**
4" ASME, 600 lb[2]	**C 3**
4" ASME, 900 lb[2]	**C 4**
6" ASME, 150 lb[2]	**D 1**
6" ASME, 300 lb[2]	**D 2**
6" ASME, 600 lb[2]	**D 3**
6" ASME, 900 lb[2]	**D 4**
316L stainless steel, Type B1 flat faced	
DN 50 PN 16	**E 1**
DN 50 PN 25	**E 2**
DN 50 PN 40	**E 3**
DN 50 PN 63	**E 4**
DN 80 PN 16	**F 1**
DN 80 PN 25	**F 2**
DN 80 PN 40[2]	**F 3**
DN 80 PN 63[2]	**F 4**
DN 100 PN 16[2]	**G 1**
DN 100 PN 25[2]	**G 2**
DN 100 PN 40[2]	**G 3**
DN 100 PN 64[2]	**G 4**
DN 125 PN 16[2]	**H 1**
DN 125 PN 25[2]	**H 2**
DN 125 PN 40[2]	**H 3**
DN 125 PN 64[2]	**H 4**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)	

Selection and Ordering data	Article No.
Pointek CLS500 High temperature	**7ML5604-**
Inverse frequency shift capacitance level and material detection switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure. CLS500 also has the ability to tune out build-up on the probe.	**A** -
Probe material of process connection	
No insulation/316L stainless steel[3][4]	**1**
Stilling well	
No stilling well	**0**
Approvals	
General Purpose	**A**
CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3GD 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4	**B**
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C	**D**
FM Class I, Div. 1, Groups A, B, C, D T4	**F**
Probe/electrode diameter	
Maximum length 1 000 mm (39.37 inch)[4]	**A**
Thermal isolator	
Rigid thermal isolator [for process connection temperature over 85 °C (185 °F)]	**1**

[1] Welded flange for no insulation option only

[2] Custom shipping methods required

[3] Non-conductive material only, stainless steel non-insulated probe diameter 19 mm (0.75 inch)

[4] Add Order code Y01 and Y02 in plain text:
"Insertion/active shield length to mm"
Minimum insertion length depends on probe version selected.
See dimensional drawings on page 4/77 for more details.

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: enter the total insertion length in plain text description	**Y01**
Active Shield length - minimum length is 50 mm. Y02: to mm[1)]	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	Article No.
English	**7ML1998-5GG03**
German	**7ML1998-5GG32**
French	**7ML1998-5GG11**
Dutch Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5GG41**
Quick Start manual, multi-language	**A5E32243995**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
General Purpose	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 6 ... 12 mm (0.236 ... 0.472 inch)	**7ML1830-1JA**
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472 inch)	**7ML1830-1JC**
Transmitter, MSP 2002-1, 330 PF	**7ML1830-1JP**
Hazardous Locations	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA,IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	**7ML1830-1JB**
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA,IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	**7ML1830-1JD**
Pointek Specials	**See page 4/80**

[1)] See dimensional drawings on page 4/77 for further explanation of Y02

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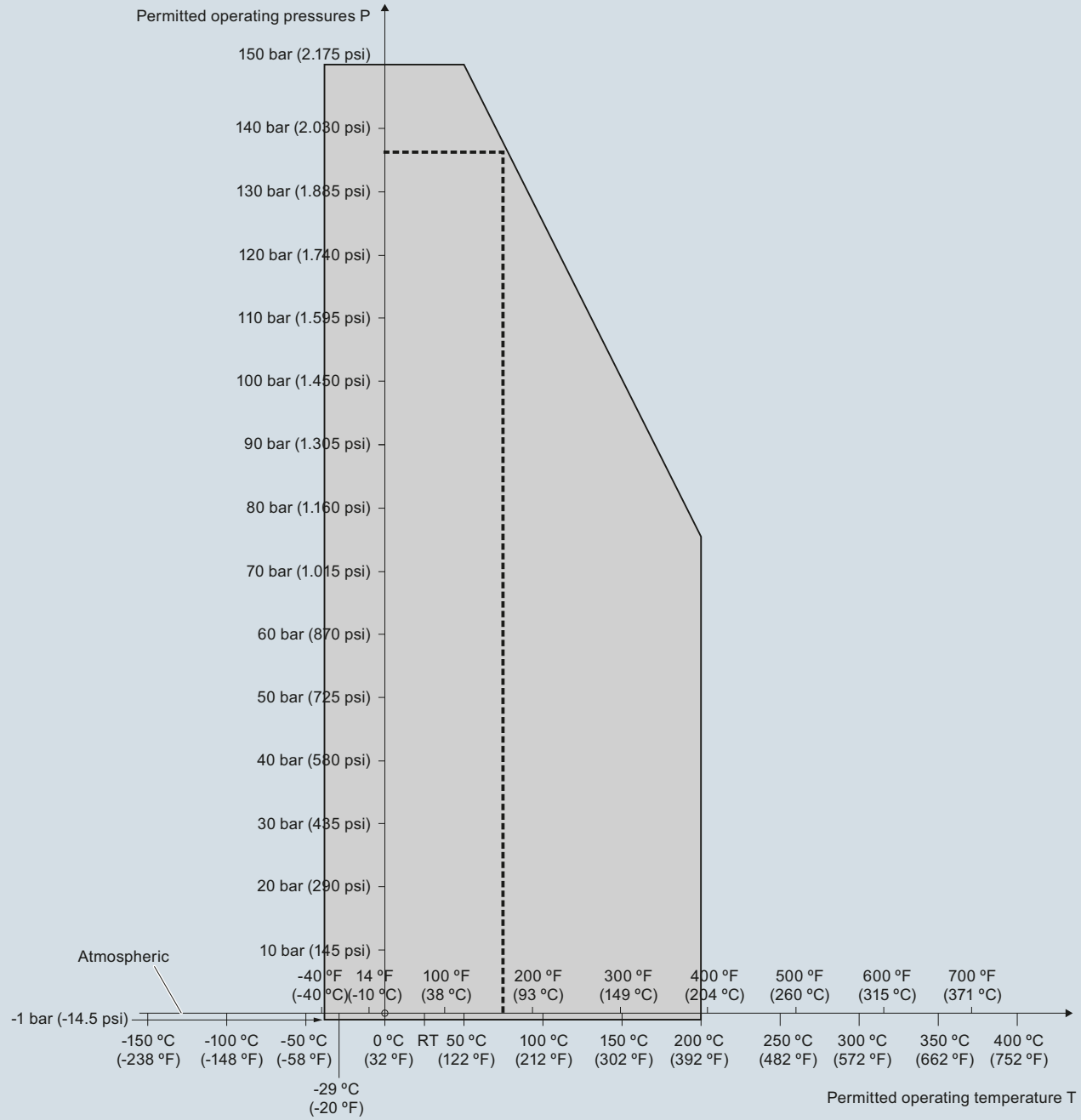
Characteristic curves

Pressure/temperature curve
CLS500 rod probes
Threaded process connections
(7ML5601)



Pointek CLS500 Process Pressure/Temperature derating curves (7ML5601)

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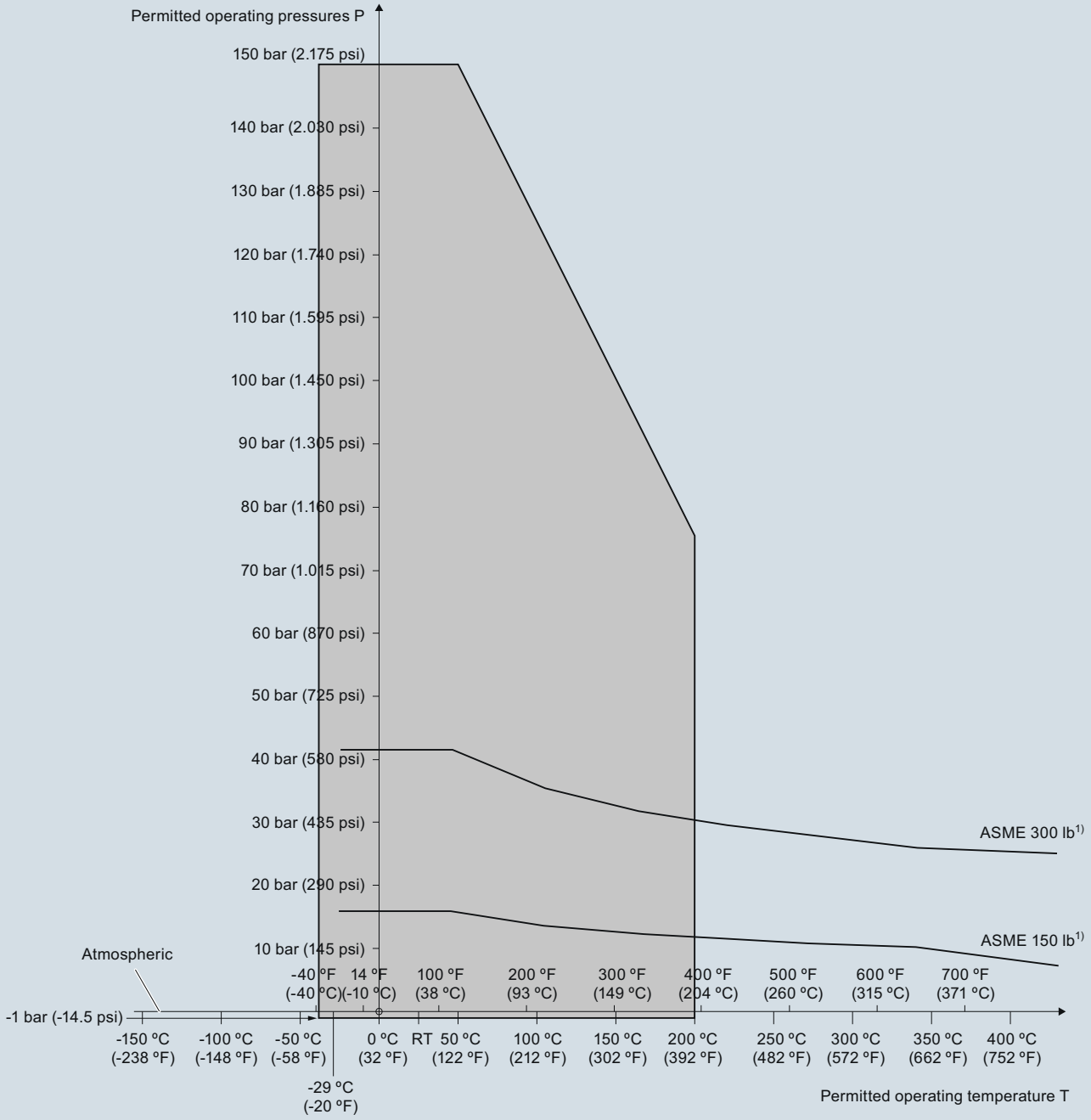
Pressure/temperature curve
CLS500 rod probes
ASME flanged process connections
(7ML5602 and 7ML5603)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

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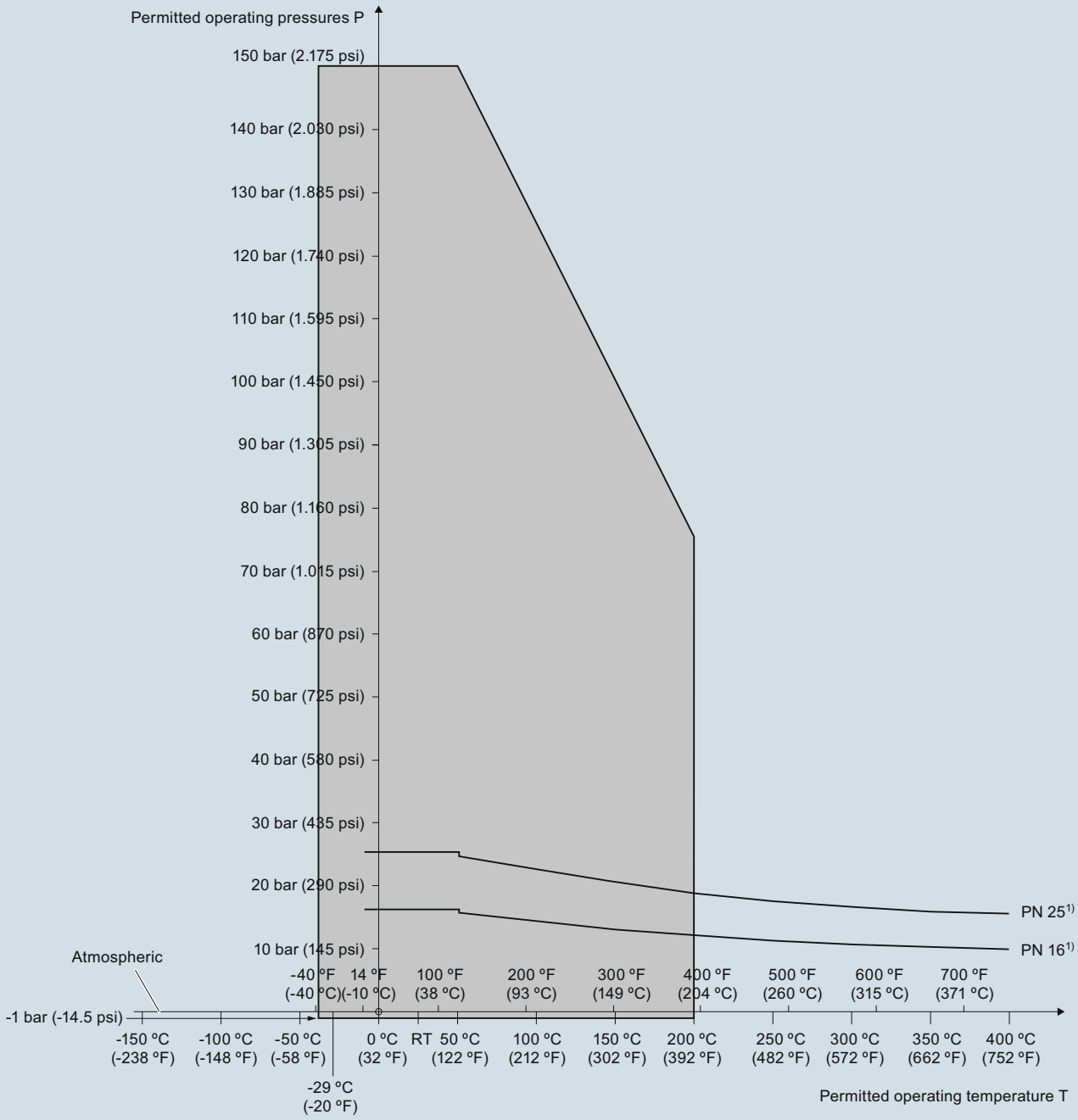
Pointek CLS500

Pressure/temperature curve
CLS500 rod probes
EN flanged process connections
(7ML5602 and 7ML5603)



[1)] The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

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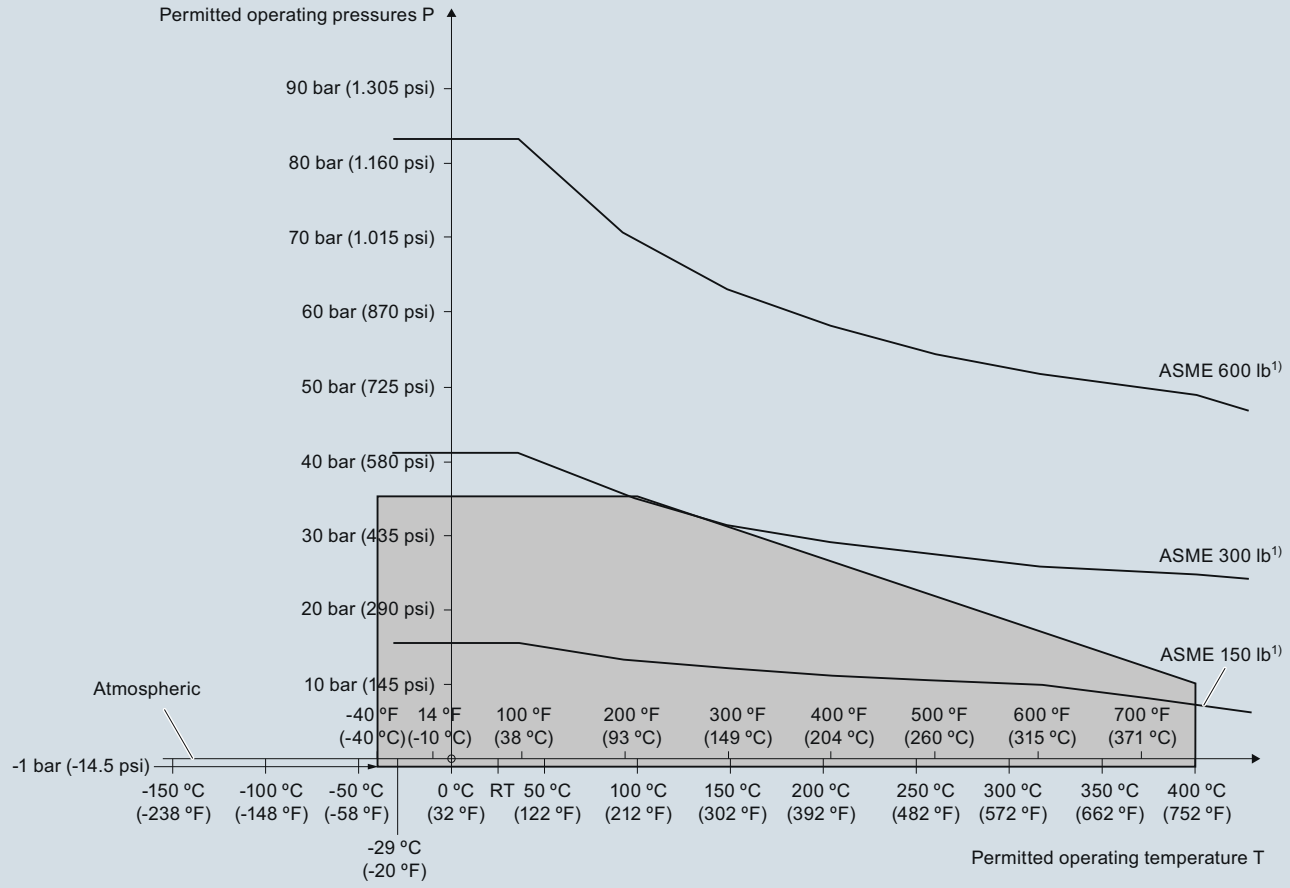
Pressure/temperature curve
CLS500 high temperature (no insulation)
ASME flanged process connections
(7ML5604)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

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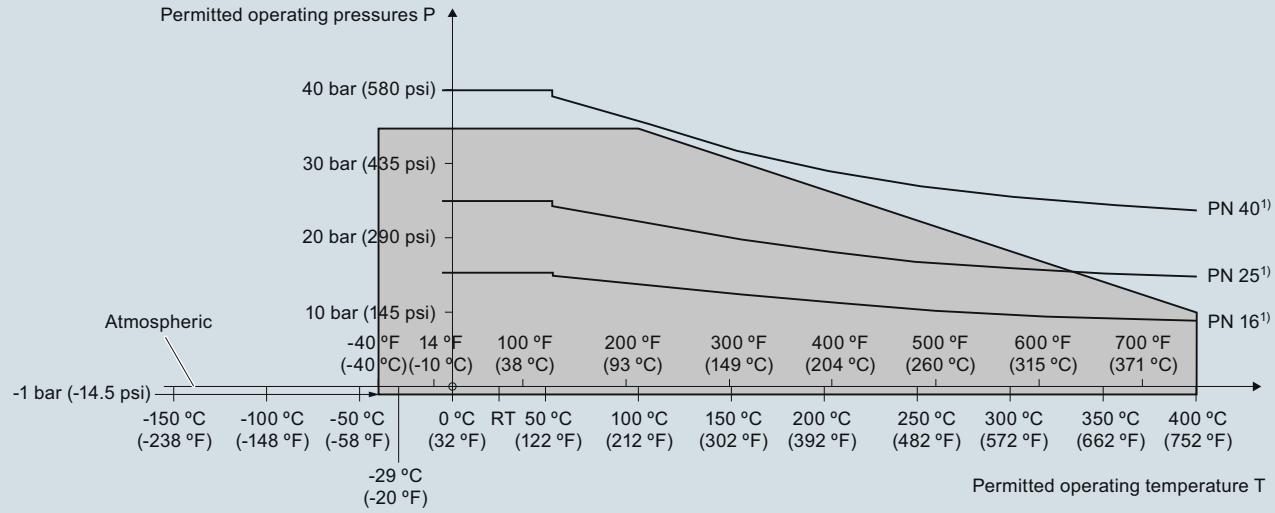
Pointek CLS500

Pressure/temperature curve
CLS500 high temperature (no insulation)
EN flanged process connections
(7ML5604)



1) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

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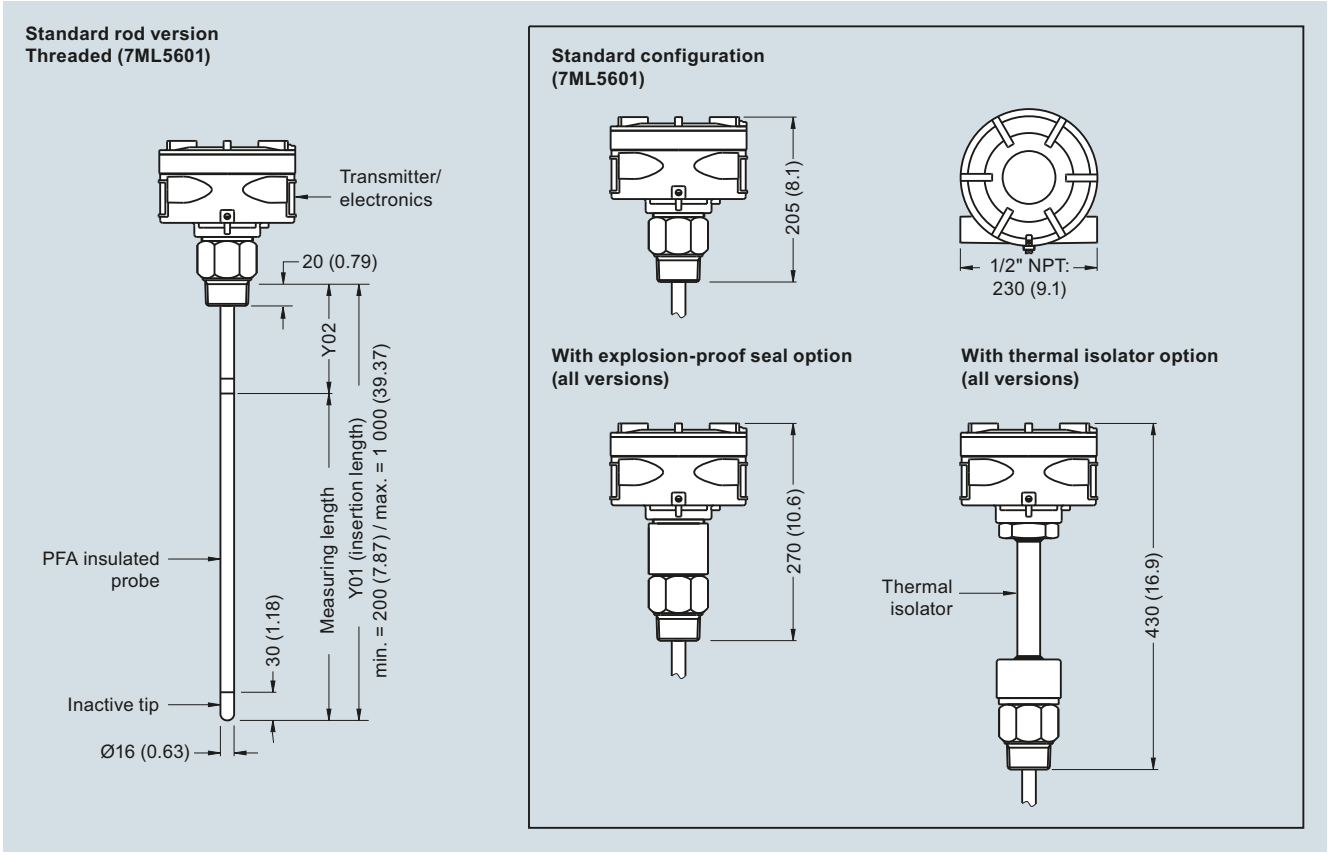
Dimensional drawings



Pointek CLS500 - Threaded Process Connections, dimensions in mm (inch)

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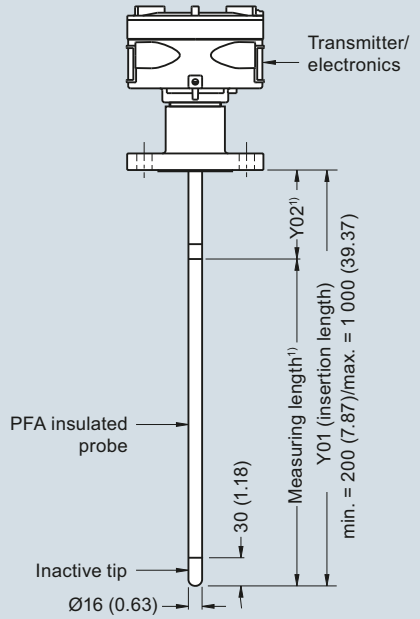
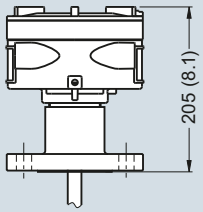
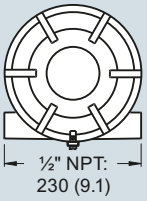
Pointek CLS500

Standard Rod version
Welded Flange (7ML5602)
Single Piece Flange (7ML5603)

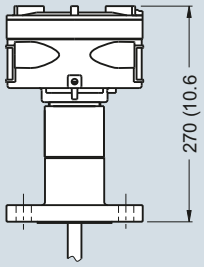


Standard configuration
(7ML5602, 7ML5603)

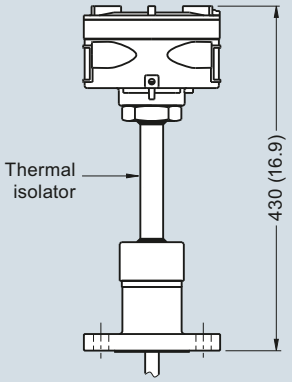




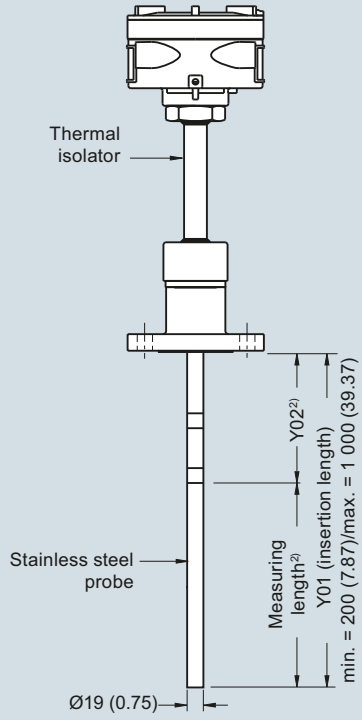
With explosion-proof seal option
(all versions)



With thermal isolator option
(all versions)



High temperature rod version
Welded Flange (7ML5604), Stainless steel rod[4]



Flange Facing (raised face)	
Flange Class	**Facing thickness**
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/25/40/64	2 (0.08)

Notes:

[1] Min. Y02 (active shield length) = 50 (1.96)
[2] Min. Y02 (active shield length) = 105 (4.13)
[3] Min. Y02 (active shield length) = 100 (3.94)
[4] Non conductive materials only

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

Pointek CLS500 - Flanged Process Connections, dimensions in mm (inch)

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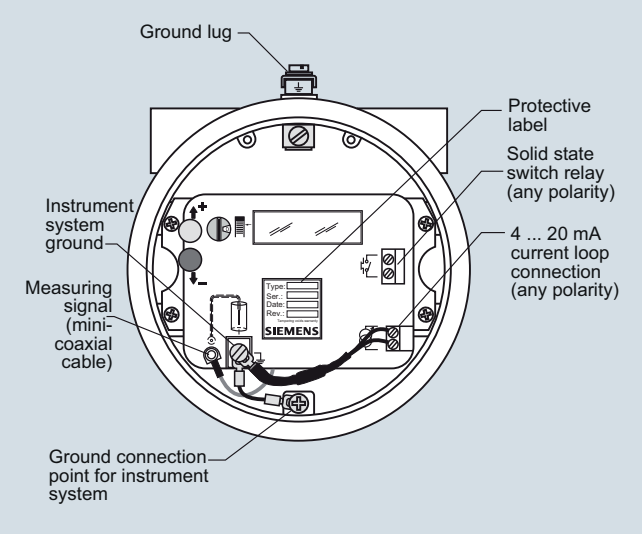
Schematics



Pointek CLS500 connections

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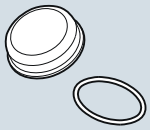
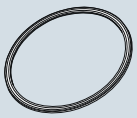
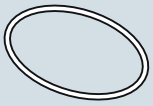
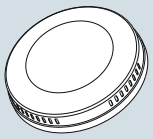
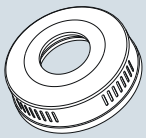
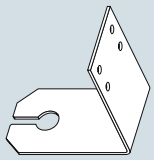
Selection and ordering data

Pointek Specials[1]	Article No.
CLS100 Polycarbonate Lid and Gasket, FKM 	
Kit, Lid and gasket, CLS100 enclosure version	**A5E01163671**
CLS100 Miscellaneous Parts	
Custom length of cable is available only for 7ML5501-xxx1x and 7ML5501-xxx5x[2]	
CLS200 Gasket (IP65), Synprene 	
Spare gasket, enclosure version (IP65 versions only)	**A5E01163672**
CLS200 Gasket (IP68), Silicone 	
Spare gasket, enclosure version (IP68 versions)	**A5E01163673**
CLS200 Blind Lid 	
Spare aluminum blind lid (for standard versions only)	**A5E01163674**
CLS200 Lid with window 	
Spare aluminum lid with window	**A5E01163676**
CLS200 Sensor Kit for cable units	
Kit, Sensor for cable units, PPS, Standard, FKM	**A5E01163677**

Pointek Specials[1]	Article No.
Kit, Sensor for cable units, PPS, Digital, FKM	**A5E01163678**
Kit, Sensor for cable units, PPS, Standard, FFKM	**A5E01163679**
Kit, Sensor for cable units, PPS, Digital, FFKM	**A5E01163680**
Kit, Sensor for cable units, PVDF, Standard, FKM	**A5E01163681**
Kit, Sensor for cable units, PVDF, Digital, FKM	**A5E01163682**
Kit, Sensor for cable units, PVDF, Standard, FFKM	**A5E01163683**
Kit, Sensor for cable units, PVDF, Digital, FFKM	**A5E01163684**
CLS200 Mounting Bracket, 316L stainless steel 	
Spare mounting bracket	**A5E01163685**
CLS200 PROFIBUS Connector (IP65)	
Spare, PROFIBUS connector (IP65 versions only)	**A5E01163686**
CLS200 Miscellaneous Parts	
CLS200 with FFKM O-rings (any version)[2]	
CLS200 Electronics	
Test magnet, digital version	**7ML1830-1JE**
Amplifier/power supply kit, standard version	**A5E03251681**
Amplifier/power supply, digital version	**7ML1830-1JF**
LCD display, digital version	**7ML1830-1JK**
CLS300 Cable Extensions, 316L stainless steel	
Kit, stainless steel cable extension, 1 m, adjustable by customer	**A5E01163688**
Kit, stainless steel cable extension, 3 m, adjustable by customer	**A5E01163689**
Kit, stainless steel cable extension, 5 m, adjustable by customer	**A5E01163690**
Kit, stainless steel cable extension, 10 m, adjustable by customer	**A5E01163691**
Kit, stainless steel cable extension, 15 m, adjustable by customer	**A5E01163693**
Kit, stainless steel cable extension, 20 m, adjustable by customer	**A5E01163695**

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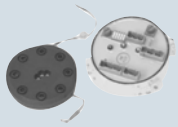
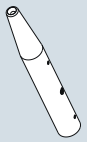
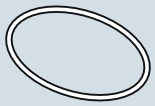
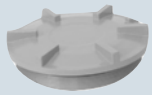
Pointek Specials[1]	Article No.
CLS300 Cable Extensions, 316 stainless steel with PFA coating	
Kit, PFA cable extension, 1 m, adjustable by customer	**A5E01163697**
Kit, PFA cable extension, 3 m, adjustable by customer	**A5E01163698**
Kit, PFA cable extension, 5 m, adjustable by customer	**A5E01163699**
Kit, PFA cable extension, 10 m, adjustable by customer	**A5E01163700**
Kit, PFA cable extension, 15 m, adjustable by customer	**A5E01163701**
Kit, PFA cable extension, 20 m, adjustable by customer	**A5E01163702**
CLS300 Rod Kits, 316L stainless steel	
Kit, stainless steel rod 180 mm (7.09 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78 inch).	**A5E01163719**
Kit, stainless steel rod 330 mm (12.99 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69 inch).	**A5E01163720**
Kit, stainless steel rod 580 mm (22.83 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 750 mm (29.53 inch).	**A5E01163721**
Kit, stainless steel rod 830 mm (32.68 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 000 mm (39.37 inch).	**A5E01163722**
Kit, stainless steel rod 1 330 mm (52.36 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1 500 mm (59.06 inch).[2]	
Kit, stainless steel rod 1 830 mm (72.05 inch) to be used with CLS300 units only (with standard active shield). Insertion length after installation is 2 000 mm (78.74 inch).[2]	
Kit, stainless steel rod customized length up to 1 m[2]	
Kit, stainless steel rod customized length up to 2 m[2]	

Pointek Specials[1]	Article No.
CLS300 Electronics Kits with drivers (for rod or cable versions)	
Kit, Electronics with driver, standard CLS300. To be used in rod or cable versions with length less than 5 m.[3][4]	**A5E01163723**
Kit, Electronics with driver, digital CLS300. To be used in rod or cable versions with length less than 5 m.[3][4]	**A5E01163725**
CLS300 Electronics Kits with drivers (for cable versions)	
Kit, Electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m.[3][4]	**A5E01163724**
Kit, Electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m.[3][4]	**A5E01163726**
CLS300 Electronics	
Test magnet, digital version	**7ML1830-1JE**
Amplifier/power supply kit, standard version	**A5E03251683**
Amplifier/power supply, digital version	**7ML1830-1JF**
LCD display, digital version	**7ML1830-1JK**
CLS300 Weight Kit, 316L stainless steel	
Kit, Spare stainless steel weight. To be used in any cable version of CLS300	**A5E01163727**
CLS500 Gasket (IP65), Silicone	
Spare gasket, CLS500 enclosure version, IP65	**A5E01163728**
CLS500 Blind Lid	
Spare CLS500 aluminum blind lid	**A5E01163729**
CLS500 Electronics Kit	
Transmitter, MSP 2002-1, 330 PF	**7ML1830-1JP**

[1] Special flange sizes and facings are available. Please contact ceg.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 4/11.

[2] Please contact ceg.smpi@siemens.com for part number and pricing.

[3] For General Purpose approvals only.

[4] To maintain approvals, qualified trained Siemens personnel required for part replacement.

Please contact ceg.smpi@siemens.com for special requests.

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SITRANS LVL100

4

Overview

SITRANS LVL100 is a compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low and demand applications, as well as pump protection. It is ideal for use in confined spaces.

Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Fault monitoring for corrosion, loss of vibration, or line break to the piezo drive
- Integrated test function to confirm correct operation

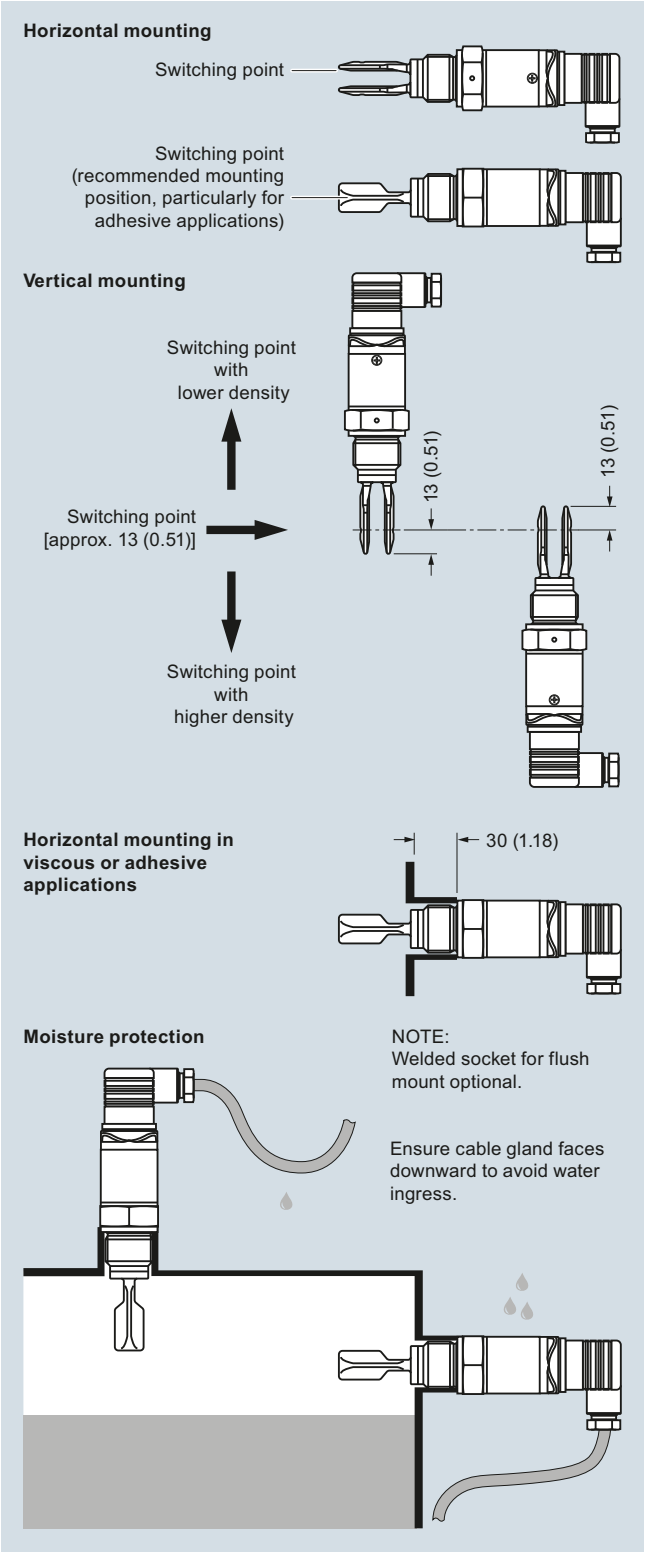
Application

SITRANS LVL100 is a compact level switch designed for industrial use in all areas of process technology and can be used for material detection with liquids and slurries. With an insertion length of only 40 mm (1.57 inch), SITRANS LVL100 can be mounted in small pipes and confined space applications. It is virtually unaffected by the chemical and physical properties of the liquid. The LVL100 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

The tuning fork is piezoelectrically energized and vibrates at a mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal to connected devices.

- Key Applications: For use in liquids and slurries, for level measurement, overfill, and dry run protection

Configuration



SITRANS LVL100 Installation, dimensions in mm (inch)

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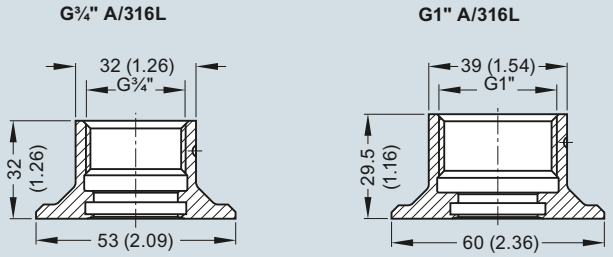
Technical specifications

Mode of operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High and low and demand
Output	
Output options	• Contactless electronic switch • Transistor output PNP
Measuring Accuracy	
Hysteresis	Approx. 2 mm (0.08 inch) with vertical installation
Switching delay	Approx. 500 ms (on/off)
Frequency	Approx. 1 200 Hz
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +70 °C (-40 ... +158 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	
• Temperature	
- Standard	-40 ... +100 °C (-40 ... +212 °F)
- High temperature option	-40 ... +150 °C (-40 ... +302 °F)
• Pressure (vessel)	-1 ... 64 bar g (-14.5 ... 928 psi g)
• Density	0.7 ... 2.5 g/cm³ (0.025 ... 0.09 lb/in³)
Design	
Material	
• Enclosure	316L and Plastic PEI
• Tuning fork	316L (1.4404 or 1.4435)
• Process connection (threaded)	316L (1.4404 or 1.4435)
• Process seal	Klingersil C-4400
Process connection	
• Pipe thread, cylindrical (ISO 228 T1)	G ½" A, G ¾" A or G 1" A
• Pipe thread, tapered	½" NPT, ¾" NPT or 1" NPT
• Hygienic fittings	Bolting DN 40 PN 40 Tri-clamp 1", 1½", 2" PN 10
Degree of protection	IP65/Type 4/NEMA 4 (with DIN 43650 valve plug), IP66/67 or IP68 (with M12 connector)
Conduit entry	1 x M12 [IP66/IP67 or IP68 (0.2 bar)]
Weight (housing)	250 g (9 oz)
Power supply	
Supply voltage	20 ... 253 V AC, 50/60 Hz 20 ... 253 V DC
Power consumption	Max. 0.5 W
Certificates and approvals	• Overfill protection (WHG) • Shipping approvals

Options

LVL100 threaded welded socket



SITRANS LVL100 welded socket, dimensions in mm (inch)

4

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SITRANS LVL100

Selection and Ordering data		Article No.
SITRANS LVL100	↗	**7ML5745-** ■■■■■ - ■■ **A 0**
Compact vibrating level switch for use in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. Ideal for use in confined spaces.		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
Without approvals	⬟	**1**
Shipping approvals[5]	⬟	**2**
Overfill protection (WHG)[1]	⬟	**3**
Process temperature		
Standard -40 ... +100 °C (-40 ... +212 °F)[2]	⬟	**A**
Extended -40 ... +150 °C (-40 ... +302 °F)[2]	⬟	**B**
Hygienic applications -40 ... +150 °C (-40 ... +302 °F)[3]		**C**
Process connection		
Thread G¾" A PN 64/316L	⬟	**A 0**
Thread G¾" A PN 64/316L Ra < 0.8 µm		**A 1**
Thread ¾" NPT PN 64/316L	⬟	**A 2**
Thread ¾" NPT PN 64/316L Ra < 0.8 µm		**A 3**
Thread G1" A PN 64/316L	⬟	**A 4**
Thread G1" A PN 64/316L Ra < 0.8 µm		**A 5**
Thread 1" NPT PN 64/316L	⬟	**A 6**
Thread 1" NPT PN 64/316L Ra < 0.8 µm		**A 7**
Tri-Clamp 1" PN 16 DIN 32676/316L Ra < 0.8 µm		**A 8**
Tri-Clamp 1½" PN 16 DIN 32676/316L Ra < 0.8 µm		**B 0**
Tri-Clamp 2 " PN 16 DIN 32676/316L Ra < 0.8 µm		**B 1**
Bolting DN25 PN 40 DIN 11851/316L Ra < 0.8 µm		**B 2**
Bolting DN40 PN 40 DIN 11851/316L Ra < 0.8 µm		**B 3**
Bolting DN50 PN 25 DIN 11851/316L Ra < 0.8 µm		**B 4**
SMS DN38 PN 6 316L Ra < 0.8 µm		**B 5**
Hygienic fitting with compression nut F40 PN 25/316L Ra < 0.8 µm		**B 6**
Thread G½" (DIN 3852-A) PN64 / 316L		**C 0**
Thread G½" (DIN 3852-A) PN64 / 316L Ra < 0.8 µm		**C 1**
Thread ½" NPT (ASME B1.20.1) PN 64/316L		**C 2**
Thread ½" NPT (ASME B1.20.1) PN 64/316L Ra < 0.8 µm		**C 3**
Electronics		
Contactless electronic switch 20 ... 250 V AC/DC[4]	⬟	**1**
Transistor output PNP 10 ... 55 V DC	⬟	**2**
Housing		
316L	⬟	**1**
Electrical connection/Protection		
M12x1/IP67	⬟	**A**
According to DIN 43650 including plug/IP65		**B**
Acc. to DIN 43650 incl. plug with QuickOn connection/IP65		**C**
M12x1 incl. 5 m cable/IP68 (0.2 bar)		**D**

1) Available with process connection A0, A2, A4, and A6 only

2) Available with process connection A1, A3, A5, and A7 ... B6 only

3) Available with Electrical connection/Protection option B and C only

4) Available with Process Temperature option A only

5) Available with Process Temperature option A only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Cleaning including certificate (oil, grease and silicone free)		**W01**
Identification Label, foil laser marking	⬟	**Y16**
Acceptance test certificate 3.1 for instrument	⬟	**C12**
Acceptance test Certificate 2.2 for material EN10204	⬟	**C15**
3.1-Inspection Certificate for instrument with test data (EN 10204)		**C25**
Additional Operating Instructions		Article No.
LVL100 (Contactless electronic switch)		
• English		**7ML1998-5KN01**
• French		**7ML1998-5KN11**
• Spanish		**7ML1998-5KN21**
• German		**7ML1998-5KN31**
LVL100 (Transistor PNP)		
• English		**7ML1998-5KP01**
• French		**7ML1998-5KP11**
• Spanish		**7ML1998-5KP21**
• German This device is shipped with the Siemens Milltronics manual DVD containing the Operating Instructions library.		**7ML1998-5KP31**
Spare Parts		
LVL100 Threaded Welded Socket		
G¾" A/316L with FKM Seal		**7ML1930-1EE**
G1" A/316L with FKM Seal		**7ML1930-1EF**
M27x1.5/316L with FKM Seal		**7ML1930-1EG**
G¾" A/316L with EPDM Seal		**7ML1930-1EH**
G1" A/316L with EPDM Seal		**7ML1930-1EJ**
M27x1.5/316L with EPDM Seal		**7ML1930-1EK**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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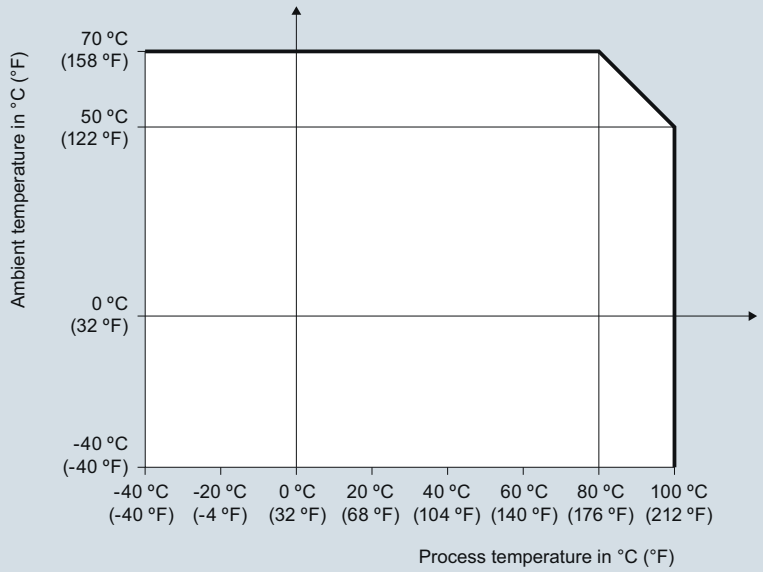
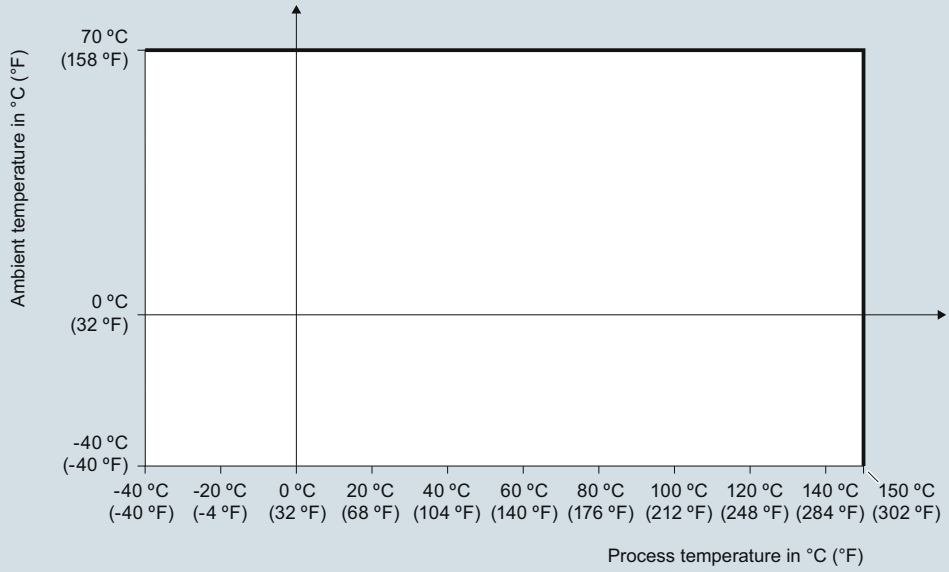
Characteristic curves

Ambient temperature to process temperature dependency (standard version)



Ambient temperature to process temperature dependency (high temperature version)



SITRANS LVL100 Ambient Temperature/Process Temperature derating curves

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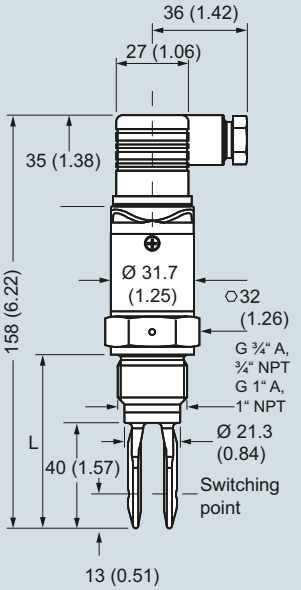
Dimensional drawings

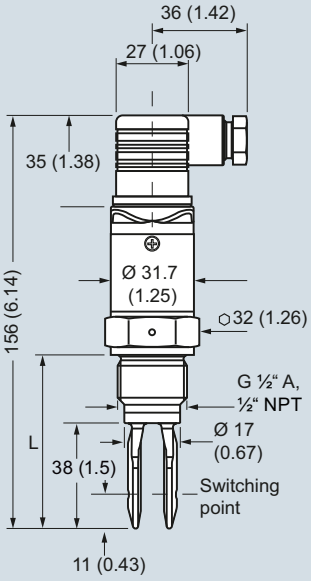
SITRANS LVL100 (standard)

Thread G ¾“, G 1“ A
(DIN ISO 228/1),
¾” NPT or 1” NPT
(valve plug ISO 4400)



L =
Length with G ¾” A, ¾” NPT: 66 (2.6)
Length with G 1“ A, 1” NPT: 69 (2.7)

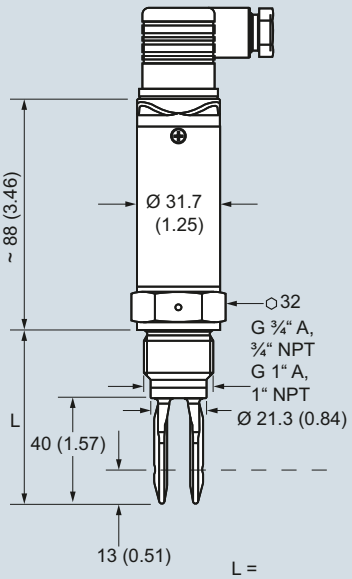
Thread G ½“ A
(DIN ISO 228/1),
½“ NPT
(valve plug ISO 4400)



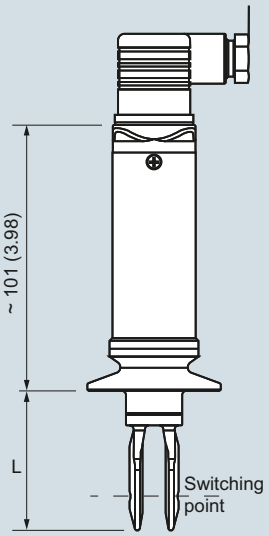
L =
Length with G ½” A, ½” NPT: 62 (2.4)

SITRANS LVL100 (extended high temperature)

Thread G ¾” A, G 1“ A
(DIN ISO 228/1),
¾” NPT or 1” NPT
(valve plug DIN 43650)

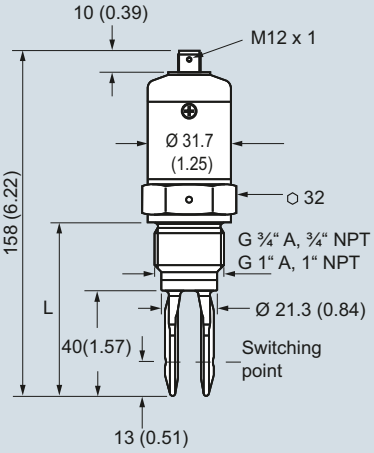


Tri-clamp (valve plug DIN 43650)

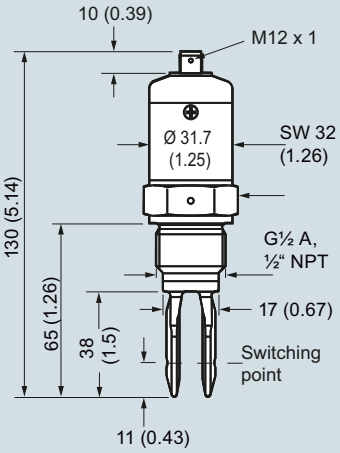


L =
Length with G ¾” A, ¾” NPT: 66 (2.6)
Length with G 1“ A, 1” NPT: 69 (2.7)
Length with Tri-clamp: 53 (2.1)

SITRANS LVL100 (standard with M12 connector)



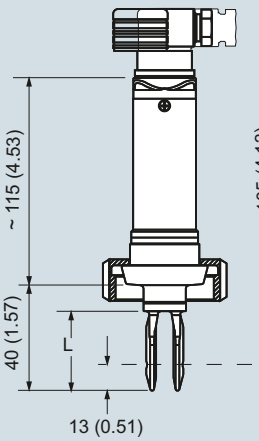
L =
Length with G ¾” A, ¾” NPT: 66 (2.6)
Length with G 1“ A, 1” NPT: 69 (2.7)



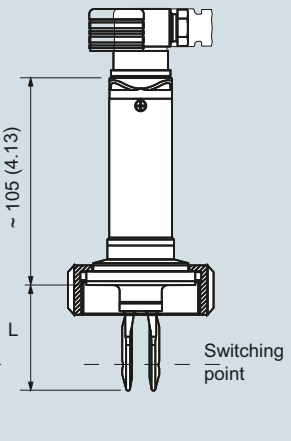
L =
Length with G ½” A, ½” NPT: 62 (2.4)

SITRANS LVL100 (extended, high temperature)

Bolting DIN 11851
(valve plug DIN 43650)



SMS 1145
(valve plug DIN 43650)



L =
Length with bolting: 53 (2.1)
Length with SMS 1145: 53 (2)

SITRANS LVL100, dimensions in mm (inch)

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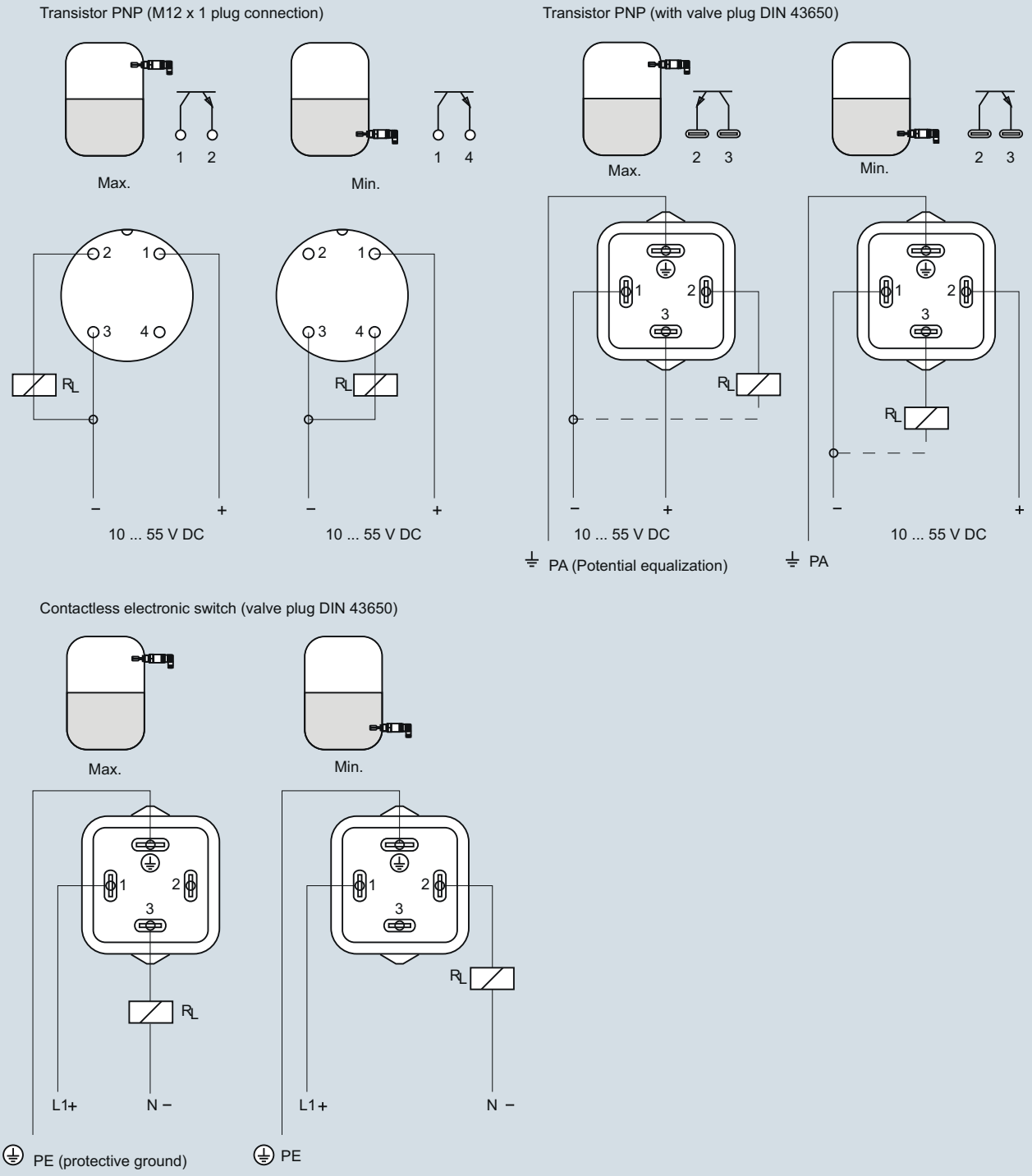
Schematics



SITRANS LVL100, connections

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SITRANS LVL200

Overview

SITRANS LVL200 is a standard vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL 2 applications.

Benefits

- Proven vibrating level switch technology for liquids
- Compact insertion length of 40 mm (1.57 inch) for confined space applications
- Fault monitoring for corrosion, loss of vibration or line break to the piezo drive
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- Hygienic process connections

Application

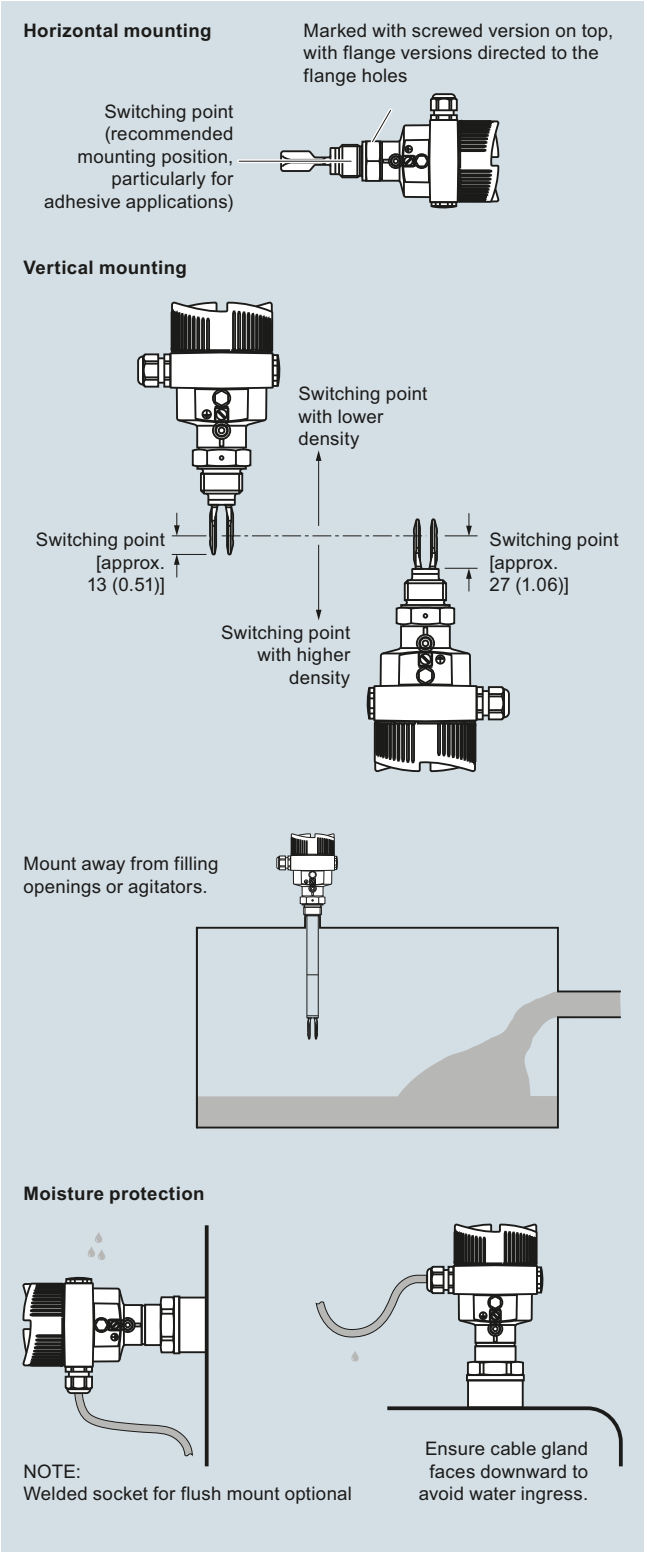
SITRANS LVL200 is a level switch designed for industrial use in all areas of process technology and can be used with liquids and slurries. With a tuning fork insertion length of only 40 mm (1.57 inch), SITRANS LVL200 can be mounted in small pipes and applications with confined space. The LVL200 can be used to measure products with a minimum density of > 0.5 g/cm^3 (0.018 lb/in^3). The LVL200 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or external vibration.

SITRANS LVL200 continuously monitors faults via frequency evaluation, providing early detection of strong corrosion or damage on the tuning fork, loss of vibration, or a line break to the piezo drive.

The tuning fork is piezoelectrically energized and vibrates at its mechanical resonance frequency of approximately 1 200 Hz. The vibration frequency changes when the tuning fork is covered by the medium. This change is detected by the integrated oscillator and converted into a switching command. The integrated electronics evaluate the level signal and output a switching signal, directly operating connected devices.

- Key Applications: For use in liquids and slurries, for level measurement, overfill, and dry run protection

Configuration



SITRANS LVL200 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High and low and demand (via mode switch)
Output	
Output options	• Relay output (DPDT), 2 floating SPDTs • Contactless electronic switch • 2 wire Namur signal output
Measuring Accuracy	
Repeatability	0.1 mm (0.004 inch)
Hysteresis	Approx. 2 mm (0.08 inch) with vertical installation
Switching delay	Approx. 500 ms (on/off)
Frequency	Approx. 1 200 Hz
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +70 °C (-40 ... +158 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	
• Temperature	
- LVL200S Standard	-50 ... +150 °C (-58 ... +302 °F)
- LVL200S High temperature option	-50 ... +250 °C (-58 ... +482 °F)
- LVL200E Standard: with 316L/Hastelloy	-50 ... +150 °C (-58 ... +302 °F)
- LVL200E High temperature option: with 316L/Hastelloy	-50 ... +250 °C (-58 ... +482 °F)
• Pressure (vessel)	-1 ... 64 bar g (-14.5 ... 928 psi g)
• Density	0.7 ... 2.5 g/cm³ (0.025 ... 0.09 lb/in³); 0.5 ... 2.5 g/cm³ (0.018 ... 0.09 lb/in³) by switching over
Design	
Material	
• Enclosure	Aluminum die-cast AlSi10Mg, powder-coated, basis: Polyester Stainless steel housing, electropolished 316L
• Tuning fork	316L (1.4404 or 1.4435), Hastelloy
• Extension tube [ø 21.3 mm (0.839 inch)]	316L (1.4404 or 1.4435), Hastelloy
• Process connection: threaded	316L (1.4404 or 1.4435), Hastelloy
• Process connection: flange	316L (1.4404 or 1.4435), 316L with Hastelloy, ECTFE, or PFA coating
• Process seal	Klingersil C-4400
Process connection	
• Pipe thread, cylindrical (ISO 228 T1)	G ¾" A, G 1" A
• Pipe thread, tapered	¾" NPT, 1" NPT, 1½" NPT
• Flanges	DIN from DN25, ANSI from 1"
• Hygienic fittings	Bolting DN 40 PN 40, 1, 1½, 2, 2½" Tri-Clamp PN 10, conus DN 25 PN 40, Tuchenhagen Varivent DN 50 PN 10, SMS

Degree of protection	Type 4X/NEMA 4X/IP66/IP67
Conduit entry	• 1 x M20x1.5 (cable: ø5 ... 9 mm), 1 x blind stopper M20x1.5; attached 1 x M20x1.5 cable entry • 1 x ½" NPT cable entry, 1 x blind stopper ½" NPT, 1 x ½" NPT cable entry • 1x M12x1; 1 x blind stopper M20x1.5
Weight	
• Device weight (dependent on process fitting)	Approx. 0.8 ... 4 kg (0.18 ... 8.82 lb)
• Tube extension (extended version)	Approx. 920 g/m (10 oz/ft)
Power supply	
Supply voltage	
• Relay DPDT	20 ... 253 V AC, 50/60 Hz, 20 ... 72 V DC [at U>60 V DC]
• Contactless	20 ... 253 V AC, 50/60 Hz, 20 ... 253 V DC
• 2 wire NAMUR	
Operating voltage (characteristics according to standard) for connection to an amplifier according to NAMUR	IEC 60947-5-6, approx. 8.2 V Off-load voltage U_0 approx. 8.2 V Short-circuit current I_U approx. 8.2 mA
Power consumption	1 ... 8 VA (AC), approx. 1.3 W (DC)
• Relay DPDT	1 ... 8 VA (AC), approx. 1.3 W (DC)
• Contactless	Domestic current requirement approx. 3 mA (via load circuit) Load current - Min. 10 mA - Max. 400 mA [with I > 300 mA the ambient temperature can be max. 60 °C (140 °F)] - Max. 4 A up to 40 ms (not WHG specified)
• 2 wire Namur	Current consumption - Falling characteristics ≥ 2.6 mA uncovered/≤ 0.6 mA covered - ≤ 0.6 mA uncovered/ ≥ 2.6 mA covered - Failure message ≤ 0.6 mA
Certificates and approvals	• CE, CSA • Overfill Protection WHG and VLAREM II • FM (Non-Incendive) Class I, Div. 2, Groups A, B, C, D • FM (Explosion-Proof) Class I, Div. 1, Groups A, B, C, D; (Dust Ignition-Proof) Class II, III, Div. 1, Groups E, F, G1) • IECEx d IIC T6...T2 Ga/Gb EHEDG • ATEX II 1/2G, 2G EEx d IIC T6 • ATEX II 1G, 1/2G, 2G EEx ia IIC T6 Shipping approvals • BR-Ex d IIC T6 ... T2 • FDA, 3A, Ehedge • SIL/IEC61508 Declaration of Conformity [SIL-2 (min/max detection)]

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SITRANS LVL200

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Selection and Ordering data	Article No.
SITRANS LVL200, Standard ↗ Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5746-** ■■■■■ - ■■ **A 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Electronics	
Contactless electronic switch 20...250 V AC/DC	**1**
Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC	**2**
NAMUR signal[1]	**4**
Approvals	
Without approvals	**A**
Overfill protection (WHG)	**B**
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG [2]	**C**
ATEX II 1/2G, 2G EEx d IIC T6 + WHG [3]	**D**
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + shipping approvals[2]	**E**
ATEX II 1/2G, 2G EEx d IIC T6 + shipping approvals[3]	**F**
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + ATEX II 1/2 D IP6X T[2]	**G**
IECEx Ex ia IIC T6[2]	**H**
Shipping approvals	**K**
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G [2][4]	**N**
FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G[3][4]	**P**
FM (NI) Class I, Div. 2, Groups A, B, C, D[4]	**Q**
IECEx d IIC T6...T2 Ga/Gb	**R**
CSA(XP)CL I, II, III Div. 1,Groups A,,B, C, D, E, F, G	**S**
CSA(NI)CL I, II, III, Div. 2, Groups A, B, C, D, E, F, G	**T**
BR-Ex d IIC T6...T2	**U**
CSA (IS) CL I, II, III Div. 1, Groups A, B, C, D, E, F, G[2]	**V**
Process connection	
Thread G¾" A, PN 64/316L	**A 0 0**
Thread G¾" A, PN 64/316L Ra < 0.8 µm	**A 0 1**
Thread ¾" NPT, PN 64/316L	**A 0 2**
Thread ¾" NPT, PN 64/316L Ra < 0.8 µm	**A 0 3**
Thread ¾" NPT, PN 64/Monel	**A 0 4**
Thread G¾" A, PN 64/Hastelloy	**A 0 5**
Thread ¾" NPT, PN 64/Hastelloy	**A 0 6**
Thread G1" A, PN 64/316L	**A 0 7**
Thread G1" A, PN 64/316L ECTFE coated MB1982[5]	**A 0 8**
Thread G1" A, PN 64/316L PFA coated[5]	**A 1 0**
Thread G1" A, PN 64/Monel	**A 1 1**
Thread G1" A, PN 64 / 316L Ra<0.8µm	**A 1 2**
Thread G1" A, PN 64/316L Ra < 0.8 µm	**A 1 3**
Thread 1" NPT, PN 64/316L[5]	**A 1 4**
Thread 1" NPT, PN 64/316L ECTFE coatedMB1982[5]	**A 1 5**
Thread 1" NPT, PN 64/316L PFA-coated	**A 1 6**
Thread 1" NPT, PN 64/Monel	**A 1 7**
Thread 1" NPT, PN 64/316L Ra < 0.8 µm	**A 1 8**
Thread G1" A, PN 64/Hastelloy	**A 2 0**
Thread G1½" A, PN 64/316L	**A 2 1**
Thread G1½" A, PN 64/316L Ra<0,8µm	**A 2 2**
Thread G1½" A, PN 64/Hastelloy	**A 2 3**
Thread 1" NPT, PN 64/Hastelloy	**A 2 4**
Thread 1½" NPT, PN 64/316L	**A 2 5**
Thread 1½" NPT, PN 64/316L Ra<0,8µm	**A 2 6**
Thread 1½" NPT, PN 64/Hastelloy	**A 2 7**
Thread G2" A, PN 64/316L	**A 2 8**

Selection and Ordering data	Article No.
SITRANS LVL200, Standard Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5746-** ■■■■■ - ■■ **A 0**
Thread M27x1.5, PN 64/316L	**A 3 0**
Conus DN 25, PN 40/316L Ra < 0.3 µm	**A 3 1**
Conus DN 25, PN 40/316L Ra < 0.8 µm	**A 3 2**
Conus DN 25, PN 40/ECTFE (ZB3033)[5]	**A 3 3**
Conus M52, PN 40/316L	**A 3 4**
Conus M52, PN 40/316L Ra < 0.3 µm	**A 3 5**
Conus M52, PN 40/316L Ra < 0.8 µm	**A 3 6**
Tri-Clamp 1", PN 16/316L Ra < 0.3 µm	**A 3 7**
Tri-Clamp 1", PN 16/Hastelloy	**A 3 8**
Tri-Clamp 1", PN 16/316L Ra < 0.8 µm	**A 4 0**
Tri-Clamp 1½", PN 16/316L Ra < 0.3 µm	**A 4 1**
Tri-Clamp 1½", PN 16/Hastelloy	**A 4 2**
Tri-Clamp 1½", PN 16/316L Ra < 0.8 µm	**A 4 3**
Tri-Clamp 2", PN 16/316L Ra < 0.3 µm	**A 4 4**
Tri-Clamp 2", PN 16/Hastelloy	**A 4 5**
Tri-Clamp 2", PN 16/316L Ra < 0.8 µm	**A 4 6**
Tri-Clamp 2½", PN 10/316L Ra < 0.3 µm	**A 4 7**
Tri-Clamp 2½", PN 10/316L Ra < 0.8 µm	**A 4 8**
Tri-Clamp 3", PN 10/316L Ra < 0.3 µm	**A 5 0**
Tri-Clamp 3", PN 10/316L Ra < 0.8 µm	**A 5 1**
Bolting DN 32, PN 40 DIN11851/316L Ra < 0.3 µm	**A 5 2**
Bolting DN 32, PN 40 DIN11851/316L Ra < 0.8 µm	**A 5 3**
Bolting DN 25, PN 40 DIN11851/316L Ra < 0.3 µm	**A 5 4**
Bolting DN 25, PN 40 DIN11851/316L Ra < 0.8 µm	**A 5 5**
Bolting DN 40, PN 40 DIN11851/316L Ra < 0.3 µm	**A 5 6**
Bolting DN 40, PN 40 DIN11851/316L Ra < 0.8 µm	**A 5 7**
Bolting DN 40, PN 40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	**A 5 8**
Bolting DN 50, PN 25 DIN11851/316L Ra < 0.3 µm	**A 6 0**
Bolting DN 50, PN 25 DIN11851/316L Ra < 0.8 µm	**A 6 1**
Bolting DN 50, PN 25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	**A 6 2**
Hygienic w. compr. nut F40, PN 25/316L	**A 6 3**
Hygienic w. compr. nut F40, PN 25/316L Ra < 0.3 µm	**A 6 4**
Hygienic w. compr. nut F40, PN 25/316L Ra < 0.8 µm	**A 6 5**
Varivent N50-40/316L Ra < 0.3 µm	**A 6 6**
Varivent N50-40/316L Ra < 0.8 µm	**A 6 7**
Varivent N125/100/316L Ra < 0.8 µm	**A 6 8**
DRD flange, PN 40/316L ZB3007	**A 7 0**
SMS DN 38/316L Ra < 0.8 µm[5]	**A 7 1**
SMS DN 51, PN 6/316L Ra < 0.8 µm[5]	**A 7 2**
Swagelok VCR screwing ZG2579, PN 64/316L	**A 7 3**
Neumo biocontrol size 25, PN 16/316L Ra < 0.8 µm	**A 7 4**
Neumo biocontrol size 50, PN 16/316L Ra < 0.8 µm[5]	**A 7 5**
Neumo biocontrol size 65, PN 16/316L Ra < 0.8 µm	**A 7 6**
Neumo biocontrol size 80, PN 16/316L Ra < 0.8 µm	**A 7 7**
SÜDMO DN 50, PN 10/316L Ra<0,8µm	**A 7 8**
Small flange DN 25, PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm	**A 8 0**
Small flange DN 40, PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm	**A 8 1**
Ingold connection, PN 16/316L Ra < 0.8 µm	**A 8 2**
Ingold connection, PN 16/Hastelloy	**A 8 3**
Terminal DN 33.7 PN 40 DIN11864-3-A-/316L BN2 Ra < 0.8 µm[5]	**A 8 4**
Hygienic fl. DN 50 PN 16 DIN11864-2-A-/316L Ra < 0.8 µm	**A 8 5**

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SITRANS LVL200, Standard Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5746-** ■■■■■ - ■■ **A 0**
Flange DN 25, PN 6 Form C, DIN 2501/316L	**A 8 6**
Flange DN 25, PN 6 Form C, DIN 2501/PFA[5]	**A 8 7**
Flange DN 25, PN 40 Form C, DIN 2501/316L	**A 8 8**
Flange DN 25, PN 40 Form C, DIN 2501/Hastelloy	**B 0 0**
Flange DN 25, PN 40 Form C, DIN 2501/ECTFE[5]	**B 0 1**
Flange DN 25, PN 40 Form C, DIN 2501/PFA[5]	**B 0 2**
Flange DN 25, PN 40 Form C, DIN 2501/Enamelled	**B 0 3**
Flange DN 25, PN 40 Form D, DIN 2501/316L	**B 0 4**
Flange DN 25, PN 40 Form F, DIN 2501/316L	**B 0 5**
Flange DN 25, PN 40 Form N, DIN 2501/316L	**B 0 6**
Flange DN 25, PN 40 Form N, DIN 2501/Hastelloy	**B 0 7**
Flange DN 25, PN 40 Form N, DIN 2501/Monel solid	**B 0 8**
Flange DN 25, PN 40 V13, DIN 2501/316L	**B 1 0**
Flange DN 32, PN 40 Form C, DIN 2501/316L	**B 1 1**
Flange DN 32, PN 40 Form C, DIN 2501/ECTFE[5]	**B 1 2**
Flange DN 40, PN 6 Form C, DIN 2501/316L	**B 1 3**
Flange DN 40, PN 6 Form C, DIN 2501/ECTFE[5]	**B 1 4**
Flange DN 40, PN 40 Form C, DIN 2501/316L	**B 1 5**
Flange DN 40, PN 40 Form C, DIN 2501/Hastelloy	**B 1 6**
Flange DN 40, PN 40 Form C, DIN 2501/ECTFE[5]	**B 1 7**
Flange DN 40, PN 40 Form C, DIN 2501/PFA[5]	**B 1 8**
Flange DN 40, PN 40 Form C, DIN 2501/ Enamelled[6]	**B 2 0**
Flange DN 40, PN 40 Form F, DIN 2501/316L	**B 2 1**
Flange DN 40, PN 40 Form N, DIN 2501/316L	**B 2 2**
Flange DN 40, PN 40 Form E, DIN 2501/316L	**B 2 3**
Flange DN 40, PN 40 V13, DIN 2501/316L	**B 2 4**
Flange DN 50, PN 40 Form C, DIN 2501/316L	**B 2 5**
Flange DN 50, PN 40 Form C, DIN 2501/Hastelloy	**B 2 6**
Flange DN 50, PN 40 Form C, DIN 2501/ECTFE[5]	**B 2 7**
Flange DN 50, PN 40 Form C, DIN 2501/ ECTFE (ZB3108)[5]	**B 2 8**
Flange DN 50, PN 40 Form C, DIN 2501/PFA[5]	**B 3 0**
Flange DN 50, PN 40 Form D, DIN 2501/316L	**B 3 1**
Flange DN 50, PN 40 Form D, DIN 2501/Hastelloy	**B 3 2**
Flange DN 50, PN 40 Form F, DIN 2501/316L	**B 3 3**
Flange DN 50, PN 40 Form N, DIN 2501/316L	**B 3 4**
Flange DN 50, PN 40 Form N, DIN 2501/Hastelloy	**B 3 5**
Flange DN 50, PN 40 Form E, DIN 2501/316L	**B 3 6**
Flange DN 50, PN 40 V13, DIN 2501/316L	**B 3 7**
Flange DN 50, PN 40 R13, DIN 2501/316L	**B 3 8**
Flange DN 50, PN 64 Form F, DIN 2501/316L	**B 4 0**
Flange DN 50, PN 64 Form N, DIN 2501/Hastelloy	**B 4 1**
Flange DN 50, PN 64 Form C, DIN 2501/316L	**B 4 2**
Flange DN 50, PN 64 Form L, DIN 2501/316L	**B 4 3**
Flange DN 50, PN 100 Form E, DIN 2501/316L	**B 4 4**
Flange DN 50, PN 100 Form L, DIN 2501/316L	**B 4 5**
Flange DN 65, PN 40 Form C, DIN 2501/316L	**B 4 6**
Flange DN 65, PN 40 Form C, DIN 2501/Hastelloy	**B 4 7**
Flange DN 65, PN 40 Form C, DIN 2501/ECTFE[5]	**B 4 8**
Flange DN 65, PN 40 Form C, DIN 2501/PFA[5]	**B 5 0**
Flange DN 65, PN 40 Form F, DIN 2501/316L	**B 5 1**
Flange DN 65, PN 64 Form E, DIN 2501/316L	**B 5 2**
Flange DN 80, PN 40 Form C, DIN 2501/316L	**B 5 3**
Flange DN 80, PN 40 Form C, DIN 2501/ Hastelloy	**B 5 4**
Flange DN 80, PN 40 Form C, DIN 2501/ECTFE[5]	**B 5 5**

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SITRANS LVL200, Standard Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5746-** ■■■■■ - ■■ **A 0**
Flange DN 80, PN 40 Form C, DIN 2501/PFA[5]	**B 5 6**
Flange DN 80, PN 40 Form C, DIN 2501/ Enamelled[6]	**B 5 7**
Flange DN 80, PN 40 Form F, DIN 2501/316L	**B 5 8**
Flange DN 80, PN 40 Form N, DIN 2501/316L	**B 6 0**
Flange DN 100, PN 16 Form C, DIN 2501/316L	**B 6 2**
Flange DN 100, PN 16 Form C, DIN 2501/Hastelloy	**B 6 3**
Flange DN 100, PN 16 Form C, DIN 2501/ECTFE[5]	**B 6 4**
Flange DN 100, PN 16 Form C, DIN 2501/PFA[5]	**B 6 5**
Flange DN 100, PN 16 Form C, DIN 2501/ Enamelled[6]	**B 6 6**
Flange DN 100, PN 16 Form D, DIN 2501/316L	**B 6 7**
Flange DN 100, PN 16 Form F, DIN 2501/316L	**B 6 8**
Flange DN 100, PN 16 Form N, DIN 2501/316L	**B 7 0**
Flange DN 100, PN 40 Form C, DIN 2501/316L	**B 7 1**
Flange DN 100, PN 40 Form C, DIN 2501/ECTFE[5]	**B 7 2**
Flange DN 100, PN 40 Form C, DIN 2501/PFA[5]	**B 7 3**
Flange DN 100, PN 40 Form C, DIN 2501/ Enamelled[6]	**B 7 4**
Flange DN 100, PN 40 Form F, DIN 2501/316L	**B 7 5**
Flange DN 100, PN 40 Form N, DIN 2501/316L	**B 7 6**
Flange DN 100, PN 40 V13, DIN 2501/316L	**B 7 7**
Flange DN 100, PN 64 Form E, DIN 2501/316L	**B 7 8**
Flange DN 100, PN 100 Form E, DIN 2501/316L	**B 8 0**
Flange DN 100, PN 100 Form L, DIN 2501/316L	**B 8 1**
Flange DN 125, PN 16 Form F, DIN 2501/316L	**B 8 2**
Flange DN 125, PN 40 Form C, DIN 2501/316L	**B 8 3**
Flange DN 125, PN 40 Form N, DIN 2512/ 316L	**B 8 4**
Flange DN 150, PN 16 Form C, DIN 2501/316L	**B 8 5**
Flange DN 150, PN 16 Form C, DIN 2501/Hastelloy	**B 8 6**
Flange DN 150, PN 16 Form C, DIN 2501/ECTFE[5]	**B 8 7**
Flange DN 150, PN 16 Form C, DIN 2501/PFA[5]	**B 8 8**
Flange DN 150, PN 16 Form D, DIN 2501/316L	**C 0 0**
Flange DN 150, PN 40 Form C, DIN 2501/316L	**C 0 1**
Flange DN 150, PN 40 Form C, DIN 2501/Hastelloy	**C 0 2**
Flange DN 150, PN 40 Form F, DIN 2501/316L	**C 0 3**
Flange DN 150, PN 40 Form N, DIN 2512/316L	**C 0 4**
Flange DN 200, PN 10 Form C, DIN 2501/ECTFE[5]	**C 0 5**
Flange DN 200, PN 16 Form C, DIN 2501/316L	**C 0 6**
Flange DN 25, PN 40 Form B1, EN 1092-1/316L	**C 0 7**
Flange DN 25, PN 40 Form B1, EN 1092-1/Hastelloy	**C 0 8**
Flange DN 25, PN 40 Form B1, EN/ 316L/ PFA[5]	**C 1 0**
Flange DN 25, PN 40 Form B1, EN 1092-1/ Enamelled [6]	**C 1 1**
Flange DN 25, PN 40 Form B2, EN 1092-1/316L	**C 1 2**
Flange DN 25, PN 40 Form F, EN 1092-1/316L	**C 1 3**
Flange DN 25, PN 63 Form B1, EN 1092-1/316L	**C 1 4**
Flange DN 25, PN 100 Form B2, EN 1092-1/316L	**C 1 5**
Flange DN 40, PN 40 Form B1, EN/ 316L	**C 1 6**
Flange DN 40, PN 40 Form B1, EN 1092-1/PFA[5]	**C 1 7**
Flange DN 40, PN 40 Form B2, EN/316L	**C 1 8**
Flange DN 50, PN 40 Form B1, EN/316L	**C 2 0**
Flange DN 50, PN 40 Form B1, EN 1092-1/ Hastelloy	**C 2 1**
Flange DN 50, PN 40 Form B1, EN 1092-1/ Monel ZB2977	**C 2 2**
Flange DN 50, PN 40 Form B1, EN 1092-1/ECTFE[5]	**C 2 3**
Flange DN 50, PN 40 Form B1, EN/ 316L/PFA[5]	**C 2 4**

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SITRANS LVL200

Selection and Ordering data	Article No.
SITRANS LVL200, Standard Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5746-** ■■■■■ - ■■ **A 0**
Flange DN 50, PN 40 Form B1, EN 1092-1/ Enamelled[6]	**C 2 5**
Flange DN 50, PN 40 Form C, EN 1092-1/316L	**C 2 6**
Flange DN 50, PN 40 Form D, EN/316L	**C 2 7**
Flange DN 50, PN 40 Form D, EN 1092-1/Hastelloy	**C 2 8**
Flange DN 50, PN 40 Form B2, EN 1092-1/316L	**C 3 0**
Flange DN 50, PN 40 Form E, EN 1092-1/316L	**C 3 1**
Flange DN 80, PN 40 Form B1, EN 1092-1/316L	**C 3 2**
Flange DN 80, PN 40 Form B1, EN 1092-1/Hastelloy	**C 3 3**
Flange DN 80, PN 40 Form B1, EN 1092-1/ECTFE[5]	**C 3 4**
Flange DN 80, PN 40 Form B1, EN 1092-1/ Enamelled[6]	**C 3 5**
Flange DN 80, PN 40 Form B2, EN 1092-1/316L	**C 3 6**
Flange DN 100, PN 16 Form B1, EN 1092-1/316L	**C 3 7**
Flange DN 100, PN 16 Form B1, EN 1092-1/ Hastelloy	**C 3 8**
Flange DN 100, PN 16 Form B1, EN 1092-1/ Enamelled[6]	**C 4 0**
Flange DN 100, PN 40 Form B1, EN 1092-1/316L	**C 4 1**
Flange DN 100, PN 40 Form B1, EN 1092-1/ Enamelled[6]	**C 4 2**
Flange DN 100, PN 40 Form C, EN 1092-1/316L	**C 4 3**
Flange DN 100, PN 63 Form B2, EN 1092-1/316L	**C 4 4**
Flange DN 150, PN 16 Form B1, EN 1092-1/316L	**C 4 5**
Flange DN 150, PN 16 Form B1, EN 1092-1/PFA[5]	**C 4 6**
Flange DN 150, PN 40 Form B1, EN 1092-1/316L	**C 4 7**
Flange DN 150, PN 40 Form B1, EN 1092-1/ ECTFE[5]	**C 4 8**
Flange DN 150, PN 40 Form B2, EN 1092-1/316L	**C 5 0**
Flange 1" 150 lb ANSI B16.5/316L	**C 5 1**
Flange 1" 150 lb RF, ANSI B16.5/Hastelloy	**C 5 2**
Flange 1" 150 lb RF, ANSI B16.5/Monel ZB2977	**C 5 3**
Flange 1" 150 lb RF, ANSI B16.5/ECTFE[5]	**C 5 4**
Flange 1" 150 lb RF, ANSI B16.5/PFA[5]	**C 5 5**
Flange 1" 150 lb RF, ANSI B16.5/Enamelled[6]	**C 5 6**
Flange 1" 300 lb RF, ANSI B16.5/316L	**C 5 7**
Flange 1" 300 lb RF, ANSI B16.5/ECTFE[5]	**C 5 8**
Flange 1" 600 lb RF, ANSI B16.5/316L	**C 6 0**
Flange 1½" 150 lb RF, ANSI B16.5/316L	**C 6 1**
Flange 1½" 150 lb RF, ANSI B16.5/Hastelloy	**C 6 2**
Flange 1½" 150 lb RF, ANSI B16.5/ECTFE[5]	**C 6 3**
Flange 1½" 150 lb RF, ANSI B16.5/PFA[5]	**C 6 4**
Flange 1½" 150 lb RF, ANSI B16.5 Enamelled[6]	**C 6 5**
Flange 1½" 150 lb FF, ANSI B16.5/ECTFE[5]	**C 6 6**
Flange 1½" 300 lb RF, ANSI B16.5/316L	**C 6 7**
Flange 1½" 300 lb RF, ANSI B16.5/Monel ZB2977	**C 6 8**
Flange 1½" 300 lb RF, ANSI B16.5/ECTFE[6]	**C 7 0**
Flange 1½" 600 lb RF, ANSI B16.5/316L	**C 7 1**
Flange 2" 150 lb RF, ANSI B16.5/316L	**C 7 2**
Flange 2" 150 lb RF, ANSI B16.5/Hastelloy	**C 7 3**
Flange 2" 150 lb RF, ANSI B16.5/Monel ZB2977	**C 7 4**
Flange 2" 150 lb RF, ANSI B16.5/ECTFE[5]	**C 7 5**
Flange 2" 150 lb RF, ANSI B16.5/PFA[5]	**C 7 6**
Flange 2" 150 lb RF, ANSI B16.5/Enamelled[6]	**C 7 7**
Flange 2" 150 lb FF, ANSI B16.5/316L	**C 7 8**
Flange 2" 150 lb FF, ANSI B16.5/ECTF[5]	**C 8 0**
Flange 2" 150 lb SG (small groove), ANSI B16.5/316L	**C 8 1**

Selection and Ordering data	Article No.
SITRANS LVL200, Standard Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5746-** ■■■■■ - ■■ **A 0**
Flange 2" 300 lb RF, ANSI B16.5/316L	**C 8 2**
Flange 2" 300 lb RF, ANSI B16.5/Hastelloy	**C 8 3**
Flange 2" 300 lb RF, ANSI B16.5/ECTFE[5]	**C 8 5**
Flange 2" 300 lb RF, ANSI B16.5/PFA[5]	**C 8 6**
Flange 2" 300 lb RF, ANSI B16.5 Enamelled[6]	**C 8 7**
Flange 2" 300 lb RJF, ANSI B16.5/316L	**C 8 8**
Flange 2" 300 lb ST, ANSI B16.5/316L	**D 0 0**
Flange 2" 300 lb LG (large groove), ANSI B16.5/316L	**D 0 1**
Flange 2" 300 lb LT, ANSI B16.5/316L	**D 0 2**
Flange 2" 600 lb RF, ANSI B16.5/316L	**D 0 3**
Flange 2" 600 lb RF, ANSI B16.5/Monel ZB2977	**D 0 4**
Flange 2" 600 lb RF, ANSI B16.5/ECTFE[5]	**D 0 5**
Flange 2" 600 lb RJF, ANSI B16.5/316L	**D 0 6**
Flange 2" 600 lb LG, ANSI B16.5/316L	**D 0 7**
Flange 2" 900 lb RJF, ANSI B16.5/316L	**D 0 8**
Flange 2½" 150 lb RF, ANSI B16.5/316L	**D 1 0**
Flange 2½" 300 lb RF, ANSI B16.5/316L	**D 1 1**
Flange 3" 150 lb RF, ANSI B16.5/316L	**D 1 2**
Flange 3" 150 lb RF, ANSI B16.5/Hastelloy	**D 1 3**
Flange 3" 150 lb RF, ANSI B16.5/ECTFE[5]	**D 1 4**
Flange 3" 150 lb RF, ANSI B16.5/PFA[5]	**D 1 5**
Flange 3" 150 lb RF, ANSI B16.5/Enamelled[6]	**D 1 6**
Flange 3" 150 lb FF, ANSI B16.5/316L	**D 1 7**
Flange 3" 150 lb FF, ANSI B16.5/ECTFE[5]	**D 1 8**
Flange 3" 150 lb FF, ANSI B16.5/PFA[5]	**D 2 0**
Flange 3" 300 lb RF, ANSI B16.5/316L	**D 2 1**
Flange 3" 300 lb RF, ANSI B16.5/Hastelloy	**D 2 2**
Flange 3" 300 lb RF, ANSI B16.5/ECTFE[5]	**D 2 3**
Flange 3" 300 lb RF, ANSI B16.5/PFA[5]	**D 2 4**
Flange 3" 300 lb RF, ANSI B16.5/Enamelled[6]	**D 2 5**
Flange 3" 600 lb RF, ANSI B16.5/316L	**D 2 6**
Flange 3½" 150 lb RF, ANSI B16.5/316L	**D 2 7**
Flange 3½" 150 lb RF, ANSI B16.5/ECTFE[5]	**D 2 8**
Flange 4" 150 lb RF, ANSI B16.5/316L	**D 3 0**
Flange 4" 150 lb RF, ANSI B16.5/Hastelloy	**D 3 1**
Flange 4" 150 lb RF, ANSI B16.5/ECTFE[5]	**D 3 2**
Flange 4" 150 lb RF, ANSI B16.5/PFA[5]	**D 3 3**
Flange 4" 150 lb RF, ANSI B16.5/Enamelled[6]	**D 3 4**
Flange 4" 150 lb LT, ANSI B16.5/316L	**D 3 5**
Flange 4" 300 lb RF, ANSI B16.5/316L	**D 3 6**
Flange 4" 300 lb RF, ANSI B16.5/Hastelloy	**D 3 7**
Flange 4" 300 lb RF, ANSI B16.5/ECTFE[5]	**D 3 8**
Flange 4" 300 lb RJF, ANSI B16.5/316L	**D 4 0**
Flange 4" 300 lb LG, ANSI B16.5/316L	**D 4 1**
Flange 4" 300 lb LT, ANSI B16.5/316L	**D 4 2**
Flange 4" 600 lb RF, ANSI B16.5/316L	**D 4 3**
Flange 4" 600 lb RJF, ANSI B16.5/316L	**D 4 4**
Flange 6" 150 lb RF, ANSI B16.5/316L	**D 4 5**
Flange 6" 150 lb RF, ANSI B16.5/Hastelloy	**D 4 6**
Flange 6" 150 lb RF, ANSI B16.5/ECTFE[5]	**D 4 7**
Flange 6" 150 lb RF, ANSI B16.5/PFA[5]	**D 4 8**
Flange 6" 150 lb RJF, ANSI B16.5/316L	**D 5 0**
Flange 6" 300 lb RF, ANSI B16.5/316L	**D 5 1**
Flange 8" 150 lb RF, ANSI B16.5/316L	**D 5 2**
Flange 8" 150 lb RF, ANSI B16.5/ECTFE[5]	**D 5 3**
Flange 1" BS.10 Table E/316L	**D 5 4**

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Selection and Ordering data		Article No.
SITRANS LVL200, Standard Compact vibrating level switch for material detection in liquid and slurry applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.		**7ML5746-** ■■■■■ - ■■ **A 0**
Flange 1" BS.10 Table E/PFA[5]		**D 5 5**
Flange 1½" BS.10 Table E/316L		**D 5 6**
Flange 3½" BS.10 Table E/316L		**D 5 7**
Flange 4" BS.10 Table E/ECTFE[5]		**D 5 8**
Flange DN 40 10K, JIS/316L		**D 6 0**
Flange DN 50 10K, JIS/316L		**D 6 1**
Flange DN 80 10K, JIS/316L		**D 6 2**
Flange DN 100 10K, JIS/316L		**D 6 3**
Adapter/Process temperature		
Without adapter/-50 ... +150 °C (-58 ... +302 °F)	⬟	**1**
With adapter/-50 ... +200 °C (-58 ... +392 °F)[7]	⬟	**2**
With adapter/-50 .... +250 °C (-58 ... +482 °F)	⬟	**3**
With gas-tight leadthrough/-50 ... +150 °C (-58 ... +302 °F)	⬟	**4**
With gas-tight leadthrough/-50 ... +250 °C (-58 ... +482 °F)	⬟	**5**
Housing/ Cable entry		
Aluminium IP66/IP67/M20x1.5	⬟	**A**
Aluminium IP66/IP67/½" NPT	⬟	**B**
316L stainless steel (electropolished) IP66/IP67/M20X1.5[8][9]		**C**
316L stainless steel (electropolished) IP66/IP67/½" NPT[8][9]		**D**

1) Available with Adapter/Process temperature options 1, 3, 4, and 5 only
2) Available with Electronics option 4 only
3) Available with Adapter/Process temperature options 1 and 3 only
4) Available with Housing/Cable entry option B only
5) Available with Adapter/Process temperature options 1 and 4 only
6) Available with Adapter/Process temperature options 1, 2, and 4 only
7) Available with enamelled Process connection options only
8) Available with Approval options A, B, C only
9) Not available with SIL/IEC61508 Certificate of conformity (SIL-2 min. and max. detection)

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cleaning including Certificate (oil, grease, and silicone free)	**W01**
Identification Label (measurement loop) stainless steel: max. 16 characters add in plain text	**Y17**
Identification Label (measurement loop) Foil: max. 16 characters add in plain text	**Y18**
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175)[1]	**D07**
2.2-Factory certificate for material (EN 10204)[1]	**C15**

Selection and Ordering data	Order code
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[1]	**C20**
Dye penetration test + 3.1 certificate/instrument[1]	**C13**
X-ray test + 3.1 certificate/instrument[1]	**C14**
Positive material identification test + 3.1 certificate/instrument[1]	**C16**
Roughness test + 3.1 certificate/instrument[1]	**C18**
3.1-Inspection Certificate for instrument with test data (EN 10204)	**C25**
Quality and test plan	**C26**
Pressure test + 3.1 certificate/instrument[1]	**C31**
Helium leak test + 3.1 certificate/instrument[1]	**C32**
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument[1]	**C60**
Pressure test according to Norsok + 3.1 certificate/instrument[1]	**C61**
Additional Operating Instructions	Article No.
LVL200 (DPDT Relay)	
• English	**7ML1998-5KR01**
• French	**7ML1998-5KR11**
• Spanish	**7ML1998-5KR21**
• German	**7ML1998-5KR31**
LVL200 (Contactless electronic switch)	
• English	**7ML1998-5KQ01**
• French	**7ML1998-5KQ11**
• Spanish	**7ML1998-5KQ21**
• German	**7ML1998-5KQ31**
Electronics module LVL200 Relay	
• English	**7ML1998-5LS01**
• French	**7ML1998-5LS11**
• Spanish	**7ML1998-5LS21**
• German This device is shipped with the Siemens Milltronics manual DVD containing the Operating Instructions library.	**7ML1998-5LS31**
Spare Parts and Accessories	
Electronics module SITRANS LVL200 Relay	**7ML1830-1NC**
Electronics module SITRANS LVL200 Contactless	**7ML1930-6AA**
LVL200 Threaded Welded Socket	
• G¾" A/316L with FKM Seal	**7ML1930-1EE**
• G1" A/316L with FKM Seal	**7ML1930-1EF**
• M27x1.5/316L with FKM Seal	**7ML1930-1EG**
• G¾" A/316L with EPDM Seal	**7ML1930-1EH**
• G1" A/316L with EPDM Seal	**7ML1930-1EJ**
• M27x1.5/316L with EPDM Seal	**7ML1930-1EK**

1) Listed Certificates are not available with all configurations, please contact factory for more information

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SITRANS LVL200

Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension ↗ Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5747-** ■■■■-■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Electronics	
Contactless electronic switch 20...250 V AC/DC	1
Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC	2
NAMUR signal[1]	4
Approvals	
Without approvals	A
Overfill protection (WHG)	B
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG[2]	C
ATEX II 1/2G, 2G EEx d IIC T6 + WHG[3][4]	D
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + shipping approvals[2]	E
ATEX II 1/2G, 2G EEx d IIC T6 + shipping approvals[3][4]	F
ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + ATEX II 1/2D IP6X T[2]	G
IECEx Ex ia IIC T6[2]	H
Shipping approvals	K
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[2][5]	N
FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G[3][4][5]	P
FM (NI) Class I, Div. 2, Groups A, B, C, D[5]	Q
IECEx d IIC T6...T2 Ga/Gb[4]	R
CSA(XP)CL I,II,III Div. 1,Groups A, B, C, D, E, F, G...T2[4] Ga/Gb	S
CSA(NI)CL I,II,III, Div. 2,Groups A, B, C, D, E, F, G	T
BR-Ex d IIC T6...T2	U
CSA (IS) CL I, II, III Div. 1, Groups A, B, C, D, E, F, G[2]	V
Process connection	
Thread G¾" A, PN 64/316L	A00
Thread G¾" A, PN 64/316L Ra < 0.8 µm	A01
Thread ¾" NPT, PN 64/316L	A02
Thread ¾" NPT, PN 64/316L Ra < 0.8 µm	A03
Thread ¾" NPT, PN 64/Monel	A04
Thread G¾" A, PN 64/Hastelloy	A05
Thread ¾" NPT, PN 64/Hastelloy	A06
Thread G1" A, PN 64/316L	A07
Thread G1" A, PN 64/316L ECTFE coated MB1982[6]	A08
Thread G1" A, PN 64/316L PFA coated[6]	A10
Thread G1" A, PN 64/Monel	A11
Thread G1" A, PN 64/316L Ra < 0.8 µm	A13
Thread 1" NPT, PN 64/316L	A14
Thread 1" NPT, PN 64/316L ECTFE coated MB1982[6]	A15
Thread 1" NPT, PN 64/316L PFA coated[6]	A16
Thread 1" NPT, PN 64/Monel	A17
Thread 1" NPT, PN 64/316L Ra < 0.8 µm	A18
Thread G1" A, PN 64/Hastelloy	A20
Thread G1½" A, PN 64/316L	A21
Thread G1½" A, PN 64/316L Ra <0.8 µm	A22
Thread G1½" A, PN 64/Hastelloy	A23
Thread 1" NPT, PN 64/Hastelloy	A24
Thread 1½" NPT, PN 64/316L	A25
Thread 1½" NPT, PN 64/316L Ra< 0.8 µm	A26
Thread 1½" NPT, PN 64/Hastelloy	A27
Thread G2" A, PN 64/316L	A28
Thread M27x1.5 PN 64/316L	A30

Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5747-** ■■■■-■■■
Cyl. socket/316Ti/1.4581 ECTFE coated ZB2984[6]	A31
Conus DN 25 PN 40/316L Ra < 0.3 µm	A32
Conus DN 25 PN 40/316L Ra < 0.8 µm.	A33
Conus DN 25 PN 40/ECTFE (ZB3033)[6]	A34
Conus M52 PN 40/316L	A35
Conus M52 PN 40/316L Ra < 0.3 µm	A36
Conus M52 PN 40/316L Ra < 0.8 µm	A37
Tri-Clamp 1" PN 16/316L Ra < 0.3 µm	A38
Tri-Clamp 1" PN 16/Hastelloy	A40
Tri-Clamp 1" PN 16/316L Ra < 0.8 µm	A41
Tri-Clamp 1½" PN 16/316L Ra < 0.3 µm	A42
Tri-Clamp 1½" PN 16/Hastelloy	A43
Tri-Clamp 1½" PN 16/316L Ra < 0.8 µm	A44
Tri-Clamp 2" PN 16/316L Ra < 0.3 µm	A45
Tri-Clamp 2" PN 16/Hastelloy	A46
Tri-Clamp 2" PN 16/316L Ra < 0.8 µm	A47
Tri-Clamp 2½" PN 10/316L Ra < 0.3 µm	A48
Tri-Clamp 2½" PN 10/316L Ra < 0.8 µm	A50
Tri-Clamp 3" PN 10/316L Ra < 0.3 µm	A51
Tri-Clamp 3" PN 10/316L Ra < 0.8 µm	A52
Bolting DN 32 PN 40 DIN11851/316L Ra < 0.3 µm	A53
Bolting DN 32 PN 40 DIN11851/316L Ra < 0.8 µm	A54
Bolting DN 25 PN 40 DIN11851/316L Ra < 0.3 µm	A55
Bolting DN 25 PN 40 DIN11851/316L Ra < 0.8 µm	A56
Bolting DN 40 PN 40 DIN11851/316L Ra < 0.3 µm	A57
Bolting DN 40 PN 40 DIN11851/316L Ra < 0.8 µm	A58
Bolting DN 40 PN 40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	A60
Bolting DN 50 PN 25 DIN11851/316L Ra < 0.3 µm	A61
Bolting DN 50 PN 25 DIN11851/316L Ra < 0.8 µm	A62
Bolting DN 50 PN 25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	A63
Hygienic w.compr.nut F40 PN 25/316L	A64
Hygienic w.compr.nut F40 PN 25/316L Ra < 0.3 µm	A65
Hygienic w.compr.nut F40 PN 25/316L Ra < 0.8 µm	A66
Varivent N50-40/316L Ra < 0.3 µm	A67
Varivent N50-40/316L Ra < 0.8 µm	A68
Varivent N125/100/316L Ra < 0.8 µm	A70
DRD flange PN 40/316L ZB3007	A71
SMS DN 38/316L Ra < 0.8 µm[6]	A72
SMS DN 51 PN 6/316L Ra < 0.8 µm[6]	A73
Swagelok VCR screwing ZG2579 PN 64/316L	A74
Neumo biocontrol size 25 PN 16/316L Ra < 0.8 µm	A75
Neumo biocontrol size 50 PN 16/316L Ra < 0.8 µm	A76
Neumo biocontrol size 65 PN 16/316L Ra < 0.8 µm	A77
Neumo biocontrol size 80 PN 16/316L Ra < 0.8 µm	A78
SÜDMO DN 50 PN 10/316L Ra < 0.8 µm	A80
Small flange DN 25 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm	A81
Small flange DN 40 PN 1.5 DIN 28403/316L pol. Ra < 0.8 µm	A82
Ingold connection PN 16/316L Ra < 0.8 µm	A83
Terminal DN 33.7 PN 40 DIN 11864-3-A-/316L BN2 Ra < 0.8 µm	A84
Hygienic fl. DN 50 PN 16 DIN 11864-2-A-/316L Ra < 0.8 µm	A85
Flange DN 25 PN 6 Form C, DIN 2501/316L	A86

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Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5747-** ■■■■■-■■■■
Flange DN 25 PN 6 Form C, DIN 2501/PFA[6]	**A 8 7**
Flange DN 25 PN 40 Form C, DIN 2501/316L	**A 8 8**
Flange DN 25 PN 40 Form C, DIN 2501/Hastelloy	**B 0 0**
Flange DN 25 PN 40 Form C, DIN 2501/ECTFE[6]	**B 0 1**
Flange DN 25 PN 40 Form C, DIN 2501/PFA[6]	**B 0 2**
Flange DN 25 PN 40 Form D, DIN 2501/316L	**B 0 3**
Flange DN 25 PN 40 Form F, DIN 2501/316L	**B 0 4**
Flange DN 25 PN 40 Form N, DIN 2501/316L	**B 0 5**
Flange DN 25 PN 40 Form N, DIN 2501/Hastelloy	**B 0 6**
Flange DN 25 PN 40 Form N, DIN 2501/Monel solid	**B 0 7**
Flange DN 25 PN 40 V13, DIN 2501/316L	**B 0 8**
Flange DN 32 PN 40 Form C, DIN 2501/316L	**B 1 0**
Flange DN 32 PN 40 Form C, DIN 2501/ECTFE[6]	**B 1 1**
Flange DN 40 PN 6 Form C, DIN 2501/316L	**B 1 2**
Flange DN 40 PN 6 Form C, DIN 2501/ECTFE[6]	**B 1 3**
Flange DN 40 PN 40 Form C, DIN 2501/316L	**B 1 4**
Flange DN 40 PN 40 Form C, DIN 2501/Hastelloy	**B 1 5**
Flange DN 40 PN 40 Form C, DIN 2501/ECTFE[6]	**B 1 6**
Flange DN 40 PN 40 Form C, DIN 2501/PFA[6]	**B 1 7**
Flange DN 40 PN 40 Form C, DIN 2501/Enamelled[7]	**B 1 8**
Flange DN 40 PN 40 Form F, DIN 2501/316L	**B 2 0**
Flange DN 40 PN 40 Form N, DIN 2501/316L	**B 2 1**
Flange DN 40 PN 40 Form E, DIN 2501/316L	**B 2 2**
Flange DN 40 PN 40 V13, DIN 2501/316L	**B 2 3**
Flange DN 50 PN 40 Form C, DIN 2501/316L	**B 2 4**
Flange DN 50 PN 40 Form C, DIN 2501/Hastelloy	**B 2 5**
Flange DN 50 PN 40 Form C, DIN 2501/ECTFE[6]	**B 2 6**
Flange DN 50 PN 40 Form C, DIN 2501/ECTFE (ZB3108)[6]	**B 2 7**
Flange DN 50 PN 40 Form C, DIN 2501/PFA[6]	**B 2 8**
Flange DN 50 PN 40 Form D, DIN 2501/316L	**B 3 0**
Flange DN 50 PN 40 Form D, DIN 2501/Hastelloy	**B 3 1**
Flange DN 50 PN 40 Form F, DIN 2501/316L	**B 3 2**
Flange DN 50 PN 40 Form N, DIN 2501/316L	**B 3 3**
Flange DN 50 PN 40 Form N, DIN 2501/Hastelloy	**B 3 4**
Flange DN 50 PN 40 Form E, DIN 2501/316L	**B 3 5**
Flange DN 50 PN 40 V13, DIN 2501/316L	**B 3 6**
Flange DN 50 PN 40 R13, DIN 2501/316L	**B 3 7**
Flange DN 50 PN 64 Form F, DIN 2501/316L	**B 3 8**
Flange DN 50 PN 64 Form N, DIN 2501/Hastelloy	**B 4 0**
Flange DN 50 PN 64 Form C, DIN 2501/316L	**B 4 1**
Flange DN 50 PN 64 Form L, DIN 2501/316L	**B 4 2**
Flange DN 50 PN 100 Form E, DIN 2501/316L	**B 4 3**
Flange DN 50 PN 100 Form L, DIN 2501/316L	**B 4 4**
Flange DN 65 PN 40 Form C, DIN 2501/316L	**B 4 5**
Flange DN 65 PN 40 Form C, DIN 2501/Hastelloy	**B 4 6**
Flange DN 65 PN 40 Form C, DIN 2501/ECTFE[6]	**B 4 7**
Flange DN 65 PN 40 Form C, DIN 2501/PFA[6]	**B 4 8**
Flange DN 65 PN 40 Form F, DIN 2501/316L	**B 5 0**
Flange DN 65 PN 64 Form E, DIN 2501/316L	**B 5 1**
Flange DN 80 PN 40 Form C, DIN 2501/316L	**B 5 2**
Flange DN 80 PN 40 Form C, DIN 2501/Hastelloy	**B 5 3**
Flange DN 80 PN 40 Form C, DIN 2501/ECTFE[6]	**B 5 4**
Flange DN 80 PN 40 Form C, DIN 2501/PFA[6]	**B 5 5**
Flange DN 80 PN 40 Form F, DIN 2501/316L	**B 5 6**

Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5747-** ■■■■■-■■■■
Flange DN 80 PN 40 Form N, DIN 2501/316L	**B 5 7**
Flange DN 80 PN 40 Form N, DIN 2501/Hastelloy	**B 5 8**
Flange DN 100 PN 16 Form C, DIN 2501/316L	**B 6 0**
Flange DN 100 PN 16 Form C, DIN 2501/Hastelloy	**B 6 1**
Flange DN 100 PN 16 Form C, DIN 2501/ECTFE[6]	**B 6 2**
Flange DN 100 PN 16 Form C, DIN 2501/PFA[6]	**B 6 3**
Flange DN 100 PN 16 Form D, DIN 2501/316L	**B 6 4**
Flange DN 100 PN 16 Form F, DIN 2501/316L	**B 6 5**
Flange DN 100 PN 16 Form N, DIN 2501/316L	**B 6 6**
Flange DN 100 PN 40 Form C, DIN 2501/316L	**B 6 7**
Flange DN 100 PN 40 Form C, DIN 2501/ECTFE[6]	**B 6 8**
Flange DN 100 PN 40 Form C, DIN 2501/PFA[6]	**B 7 0**
Flange DN 100 PN 40 Form C, DIN 2501/Enamelled[7]	**B 7 1**
Flange DN 100 PN 40 Form F, DIN 2501/316L	**B 7 2**
Flange DN 100 PN 40 Form N, DIN 2501/316L	**B 7 3**
Flange DN 100 PN 40 V13, DIN 2501/316L	**B 7 4**
Flange DN 100 PN 64 Form E, DIN 2501/316L	**B 7 5**
Flange DN 100 PN 100 Form E, DIN 2501/316L	**B 7 6**
Flange DN 100 PN 100 Form L, DIN 2501/316L	**B 7 7**
Flange DN 125 PN 16 Form F, DIN 2501/316L	**B 7 8**
Flange DN 125 PN 40 Form C, DIN 2501/316L	**B 8 0**
Flange DN 125 PN 40 Form N, DIN 2512/316L	**B 8 1**
Flange DN 150 PN 16 Form C, DIN 2501/316L	**B 8 2**
Flange DN 150 PN 16 Form C, DIN 2501/Hastelloy	**B 8 3**
Flange DN 150 PN 16 Form C, DIN 2501/ECTFE[6]	**B 8 4**
Flange DN 150 PN 16 Form C, DIN 2501/PFA[6]	**B 8 5**
Flange DN 150 PN 16 Form D, DIN 2501/316L	**B 8 6**
Flange DN 150 PN 40 Form C, DIN 2501/316L	**B 8 7**
Flange DN 150 PN 40 Form C, DIN 2501/Hastelloy	**B 8 8**
Flange DN 150 PN 40 Form F, DIN 2501/316L	**C 0 0**
Flange DN 150 PN 40 Form N, DIN 2512/316L	**C 0 1**
Flange DN 200 PN 10 Form C, DIN 2501/ECTFE[6]	**C 0 2**
Flange DN 200 PN 16 Form C, DIN 2501/316L	**C 0 3**
Flange DN 25 PN 40 Form B1, EN 1092-1/316L	**C 0 4**
Flange DN 25 PN 40 Form B1, EN 1092-1/Hastelloy	**C 0 5**
Flange DN 25 PN 40 Form B1, EN/316L/PFA[6]	**C 0 6**
Flange DN 25 PN 40 Form B1, EN 1092-1/Enamelled[7]	**C 0 7**
Flange DN 25 PN 40 Form B2, EN 1092-1/316L	**C 0 8**
Flange DN 25 PN 40 Form F, EN 1092-1/316L	**C 1 0**
Flange DN 25 PN 63 Form B1, EN 1092-1/316L	**C 1 1**
Flange DN 25 PN 100 Form B2, EN 1092-1/316L	**C 1 2**
Flange DN 40 PN 40 Form B1, EN/316L	**C 1 3**
Flange DN 40 PN 40 Form B1, EN 1092-1/PFA[6]	**C 1 4**
Flange DN 40 PN 40 Form B2, EN/316L	**C 1 5**
Flange DN 50 PN 40 Form B1, EN/316L	**C 1 6**
Flange DN 50 PN 40 Form B1, EN 1092-1/Hastelloy	**C 1 7**
Flange DN 50 PN 40 Form B1,EN 1092-1/Monel ZB2977	**C 1 8**
Flange DN 50 PN 40 Form B1, EN 1092-1/ECTFE[6]	**C 2 0**
Flange DN 50 PN 40 Form B1, EN/316L/PFA[6]	**C 2 1**
Flange DN 50 PN 40 Form B1, EN 1092-1/Enamelled[7]	**C 2 2**
Flange DN 50 PN 40 Form C, EN 1092-1/316L	**C 2 3**

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SITRANS LVL200

Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5747-** ■■■■ - ■■■■
Flange DN 50 PN 40 Form D, EN/316L	**C 2 4**
Flange DN 50 PN 40 Form D, EN 1092-1/ Hastelloy	**C 2 5**
Flange DN 50 PN 40 Form B2, EN 1092-1/316L	**C 2 6**
Flange DN 50 PN 40 Form E, EN 1092-1/316L	**C 2 7**
Flange DN 80 PN 40 Form B1, EN 1092-1/316L	**C 2 8**
Flange DN 80 PN 40 Form B1, EN 1092-1/Hastelloy	**C 3 0**
Flange DN 80 PN 40 Form B1, EN 1092-1/ECTFE[6]	**C 3 1**
Flange DN 80 PN 40 Form B1, EN 1092-1/ Enamelled[7]	**C 3 2**
Flange DN 80 PN 40 Form B2, EN 1092-1/316L	**C 3 3**
Flange DN 100 PN 16 Form B1, EN 1092-1/316L	**C 3 4**
Flange DN 100 PN 16 Form B1, EN 1092-1/ Hastelloy	**C 3 5**
Flange DN 100 PN 16 Form B1, EN 1092-1/ Enamelled[7]	**C 3 6**
Flange DN 100 PN 40 Form B1, EN 1092-1/316L	**C 3 7**
Flange DN 100 PN 40 Form B1, EN 1092-1/ Enamelled[7]	**C 3 8**
Flange DN 100 PN 40 Form C, EN 1092-1/316L	**C 4 0**
Flange DN 100 PN 63 Form B2, EN 1092-1/316L	**C 4 1**
Flange DN 150 PN 16 Form B1, EN 1092-1/316L	**C 4 2**
Flange DN 150 PN 16 Form B1, EN 1092-1/PFA[6]	**C 4 3**
Flange DN 150 PN 40 Form B1, EN 1092-1/316L	**C 4 4**
Flange DN 150 PN 40 Form B1, EN 1092-1/ ECTFE[6]	**C 4 5**
Flange DN 150 PN 40 Form B2, EN 1092-1/316L	**C 4 6**
Flange 1" 150 lb ANSI B16.5/316L	**C 4 7**
Flange 1"150 lb RF, ANSI B16.5/Hastelloy	**C 4 8**
Flange 1"150 lb RF, ANSI B16.5//Monel ZB2977	**C 5 0**
Flange 1" 150 lb RF, ANSI B16.5/ECTFE[6]	**C 5 1**
Flange 1"150 lb RF, ANSI B16.5/PFA[6]	**C 5 2**
Flange 1" 150 lb RF, ANSI B16.5/Enamelled[7]	**C 5 3**
Flange 1" 300 lb RF, ANSI B16.5/316L	**C 5 4**
Flange 1" 300 lb RF, ANSI B16.5/ECTFE[6]	**C 5 5**
Flange 1" 600 lb RF, ANSI B16.5/316L	**C 5 6**
Flange 1½" 150 lb RF, ANSI B16.5/316L	**C 5 7**
Flange 1½" 150 lb RF, ANSI B16.5/Hastelloy	**C 5 8**
Flange 1½" 150 lb RF, ANSI B16.5/ECTFE[6]	**C 6 0**
Flange 1½" 150 lb RF, ANSI B16.5/PFA[6]	**C 6 1**
Flange 1½" 150 lb RF, ANSI B16.5 Enamelled[7]	**C 6 2**
Flange 1½" 150 lb FF, ANSI B16.5/ECTFE[6]	**C 6 3**
Flange 1½" 300 lb RF, ANSI B16.5/316L	**C 6 4**
Flange 1½" 300 lb RF, ANSI B16.5//Monel ZB2977	**C 6 5**
Flange 1½" 300 lb RF, ANSI B16.5/ECTFE[6]	**C 6 6**
Flange 1½" 600 lb RF, ANSI B16.5/316L	**C 6 7**
Flange 2" 150 lb RF, ANSI B16.5/316L	**C 6 8**
Flange 2" 150 lb RF, ANSI B16.5/Hastelloy	**C 7 0**
Flange 2" 150 lb RF, ANSI B16.5//Monel ZB2977	**C 7 1**
Flange 2" 150 lb RF, ANSI B16.5/ECTFE[6]	**C 7 2**
Flange 2" 150 lb RF, ANSI B16.5/PFA[6]	**C 7 3**
Flange 2" 150 lb RF, ANSI B16.5/Enamelled[7]	**C 7 4**
Flange 2" 150 lb FF, ANSI B16.5/316L	**C 7 5**
Flange 2" 150 lb FF, ANSI B16.5/ECTFE[6]	**C 7 6**
Flange 2" 150 lb SG (small groove), ANSI B16.5/316L	**C 7 7**
Flange 2" 300 lb RF, ANSI B16.5/316L	**C 7 8**
Flange 2" 300 lb RF, ANSI B16.5/Hastelloy	**C 8 0**

Selection and Ordering data	Article No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	**7ML5747-** ■■■■ - ■■■■
Flange 2" 300 lb RF, ANSI B16.5/ECTFE[6]	**C 8 2**
Flange 2" 300 lb RF, ANSI B16.5/PFA[6]	**C 8 3**
Flange 2" 300 lb RF, ANSI B16.5 Enamelled[7]	**C 8 4**
Flange 2" 300 lb RJF, ANSI B16.5/316L	**C 8 5**
Flange 2" 300 lb ST, ANSI B16.5/316L	**C 8 6**
Flange 2" 300 lb LG (large groove), ANSI B16.5/316L	**C 8 7**
Flange 2" 300 lb LT, ANSI B16.5/316L	**C 8 8**
Flange 2" 600 lb RF, ANSI B16.5/316L	**D 0 0**
Flange 2" 600 lb RF, ANSI B16.5/Monel ZB2977	**D 0 1**
Flange 2" 600 lb RF, ANSI B16.5/ECTFE[6]	**D 0 2**
Flange 2" 600 lb RJF, ANSI B16.5/316L	**D 0 3**
Flange 2" 600 lb LG, ANSI B16.5/316L	**D 0 4**
Flange 2" 900 lb RJF, ANSI B16.5/316L	**D 0 5**
Flange 2½" 150 lb RF, ANSI B16.5/316L	**D 0 6**
Flange 2½" 300 lb RF, ANSI B16.5/316L	**D 0 7**
Flange 3" 150 lb RF, ANSI B16.5/316L	**D 0 8**
Flange 3" 150 lb RF, ANSI B16.5/Hastelloy	**D 1 0**
Flange 3" 150 lb RF, ANSI B16.5//Monel ZB2977	**D 1 1**
Flange 3" 150 lb RF, ANSI B16.5/ECTFE[6]	**D 1 2**
Flange 3" 150 lb RF, ANSI B16.5/PFA[6]	**D 1 3**
Flange 3" 150 lb RF, ANSI B16.5/Enamelled[7]	**D 1 4**
Flange 3" 150 lb FF, ANSI B16.5/316L	**D 1 5**
Flange 3" 150 lb FF, ANSI B16.5/ECTFE[6]	**D 1 6**
Flange 3" 150 lb FF, ANSI B16.5/PFA[6]	**D 1 7**
Flange 3" 300 lb RF, ANSI B16.5/316L	**D 1 8**
Flange 3" 300 lb RF, ANSI B16.5/Hastelloy	**D 2 0**
Flange 3" 300 lb RF, ANSI B16.5/ECTFE[6]	**D 2 1**
Flange 3" 300 lb RF, ANSI B16.5/PFA[6]	**D 2 2**
Flange 3" 300 lb RF, ANSI B16.5/Enamelled[7]	**D 2 3**
Flange 3" 600 lb RF, ANSI B16.5/316L	**D 2 4**
Flange 3½" 150 lb RF, ANSI B16.5/316L	**D 2 5**
Flange 3½" 150 lb RF, ANSI B16.5/ECTFE[6]	**D 2 6**
Flange 4" 150 lb RF, ANSI B16.5/316L	**D 2 7**
Flange 4" 150 lb RF, ANSI B16.5/Hastelloy	**D 2 8**
Flange 4" 150 lb RF, ANSI B16.5/ECTFE[6]	**D 3 0**
Flange 4" 150 lb RF, ANSI B16.5/PFA[6]	**D 3 1**
Flange 4" 150 lb RF, ANSI B16.5/Enamelled[7]	**D 3 2**
Flange 4" 150 lb LT, ANSI B16.5/316L	**D 3 3**
Flange 4" 300 lb RF, ANSI B16.5/316L	**D 3 4**
Flange 4" 300 lb RF, ANSI B16.5/Hastelloy	**D 3 5**
Flange 4" 300 lb RF, ANSI B16.5/ECTFE[6]	**D 3 6**
Flange 4" 300 lb RJF, ANSI B16.5/316L	**D 3 7**
Flange 4" 300 lb LG, ANSI B16.5/316L	**D 3 8**
Flange 4" 300 lb LT, ANSI B16.5/316L	**D 4 0**
Flange 4" 600 lb RF, ANSI B16.5/316L	**D 4 1**
Flange 4" 600 lb RJF, ANSI B16.5/316L	**D 4 2**
Flange 5" 150 lb RF, ANSI B16.5/316L	**D 4 3**
Flange 6" 150 lb RF, ANSI B16.5/316L	**D 4 4**
Flange 6" 150 lb RF, ANSI B16.5/Hastelloy	**D 4 5**
Flange 6" 150 lb RF, ANSI B16.5/ECTFE[6]	**D 4 6**
Flange 6" 150 lb RF, ANSI B16.5/PFA[6]	**D 4 7**
Flange 6" 150 lb RJF, ANSI B16.5/316L	**D 4 8**
Flange 6" 300 lb RF, ANSI B16.5/316L	**D 5 0**
Flange 8" 150 lb RF, ANSI B16.5/316L	**D 5 1**
Flange 8" 150 lb RF, ANSI B16.5/ECTFE[6]	**D 5 2**
Flange 1" BS.10 Table E/316L	**D 5 3**

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Selection and Ordering data	Article No. 7ML5747-
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	■■■■■ - ■■■
Flange 1" BS.10 Table E/PFA[6]	**D 5 4**
Flange 1½" BS.10 Table E/316L	**D 5 5**
Flange 3½" BS.10 Table E/316L	**D 5 6**
Flange 4" BS.10 Table E/ECTFE[6]	**D 5 7**
Flange DN 40 10K, JIS/316L	**D 5 8**
Flange DN 50 10K, JIS/316L	**D 6 0**
Flange DN 80 10K, JIS/316L	**D 6 1**
Flange DN 100 10K, JIS/316L	**D 6 2**
Adapter/Process temperature	
Without adapter/-50 ... +150 °C	**1**
With adapter/-50 ... +200 °C[8]	**2**
With adapter/-50... +250 °C	**3**
With gas-tight leadthrough/-50 ... +150 °C	**4**
With gas-tight leadthrough/-50 ... +250 °C	**5**
Housing/ Cable entry	
Aluminium IP66/IP67/M20x1.5	**A**
Aluminium IP66/IP67/½" NPT	**B**
316L stainless steel (electropolished) IP66/IP67/M20X1.5[9][10]	**C**
316L stainless steel (electropolished) IP66/IP67/½" NPT[9][10]	**D**
NOTE: **When selecting a Rigid Extension option, extension coating must match the process connection coating and the material and surface roughness type.**	
Rigid Extension 316L	
80 ... 500 mm	**A 0**
501 ... 1 000 mm	**A 1**
1 001 ... 1 500 mm	**A 2**
1 501 ... 2 000 mm	**A 3**
2 001 ... 2 500 mm	**A 4**
2 501 ... 3 000 mm	**A 5**
3 001 ... 3 500 mm	**A 6**
3 501 ... 4 000 mm	**A 7**
Rigid Extension ECTFE coated[6]	
80 ... 500 mm	**B 0**
501 ... 1 000 mm	**B 1**
1 001 ... 1 500 mm	**B 2**
1 501 ... 2 000 mm	**B 3**
2 001 ... 2 500 mm	**B 4**
2 501 ... 3 000 mm	**B 5**
Rigid Extension PFA coated[6]	
80 ... 500 mm	**C 0**
501 ... 1 000 mm	**C 1**
1 001 ... 1 500 mm	**C 2**
1 501 ... 2 000 mm	**C 3**
2 001 ... 2 500 mm	**C 4**
2 501 ... 3 000 mm	**C 5**

Selection and Ordering data	Article No. 7ML5747-
SITRANS LVL200, Rigid extension Compact vibrating level switch for material detection in liquid applications such as overflow, high, low, and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	■■■■■ - ■■■
Rigid Extension 316L Ra ≤ 0.8 µm	
80 ... 500 mm	**D 0**
501 ... 1 000 mm	**D 1**
1 001 ... 1 500 mm	**D 2**
1 501 ... 2 000 mm	**D 3**
2 001 ... 2 500 mm	**D 4**
2 501 ... 3 000 mm	**D 5**
3 001 ... 3 500 mm	**D 6**
3 501 ... 4 000 mm	**D 7**
Rigid Extension 316L Ra ≤ 0.3 µm	
80 ... 500 mm	**E 0**
501 ... 1 000 mm	**E 1**
1 001 ... 1 500 mm	**E 2**
1 501 ... 2 000 mm	**E 3**
2 001 ... 2 500 mm	**E 4**
2 501 ... 3 000 mm	**E 5**
3 001 ... 3 500 mm	**E 6**
3 501 ... 4 000 mm	**E 7**
Rigid Extension Enamelled version[7]	
80 ... 250 mm	**F 0**
251 ... 500 mm	**F 1**
501 ... 750 mm	**F 2**
751 ... 1 000 mm	**F 3**
1 001 ... 1 250 mm	**F 4**
1 251 ... 1 500 mm	**F 5**
Rigid Extension Hastelloy	
80 ... 500 mm	**G 0**
501 ... 1 000 mm	**G 1**
1 001 ... 1 500 mm	**G 2**
1 501 ... 2 000 mm	**G 3**
2 001 ... 2 500 mm	**G 4**
2 501 ... 3 000 mm	**G 5**
3 001 ... 3 500 mm	**G 6**
3 501 ... 4 000 mm	**G 7**
Rigid Extension Monel	
80 ... 500 mm	**H 0**
501 ... 1 000 mm	**H 1**
1 001 ... 1 500 mm	**H 2**
1 501 ... 2 000 mm	**H 3**
2 001 ... 2 500 mm	**H 4**
2 501 ... 3 000 mm	**H 5**

1) Available with Adapter/Process temperature options 1, 3, 4, and 5 only
2) Available with Electronics option 4 only
3) Available with Adapter/Process temperature options 1 and 3 only
4) Extension length restricted to 2 956 mm
5) Available with Housing/Cable entry option B only
6) Available with Adapter/Process temperature options 1 and 4 only
7) Available with Adapter/Process temperature options 1, 2, and 4 only
8) Available with enamelled Process connection and Extension options only
9) Available with Approval options A, B, C only
10) Not available with SIL/IEC61508 Certificate of conformity (SIL-2 min. and max. detection)

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SITRANS LVL200

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Cleaning including Certificate (oil, grease and silicone free)	**W01**
Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	**Y01**
Identification Label (measurement loop) stainless steel: max. 16 characters add in plain text	**Y17**
Identification Label (measurement loop) Foil: max. 16 characters add in plain text	**Y18**
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175)[1)]	**D07**
2.2-Factory certificate for material (EN 10204) [1)]	**C15**
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[1)]	**C20**
Dye penetration test + 3.1 certificate/instrument[1)]	**C13**
X-ray test + 3.1 certificate/instrument[1)]	**C14**
Positive material identification test + 3.1 certificate/instrument[1)]	**C16**
Roughness test + 3.1 certificate/instrument[1)]	**C18**
3.1-Inspection Certificate for instrument with test data (EN 10204)	**C25**
Quality and test plan	**C26**
Pressure test + 3.1 certificate/instrument[1)]	**C31**
Helium leak test + 3.1 certificate/instrument[1)]	**C32**
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument[1)]	**C60**
Pressure test according to Norsok + 3.1 certificate/instrument[1)]	**C61**
Additional Operating Instructions	Article No.
LVL200 Extended (DPDT Relay)	
• English	**7ML1998-5KW01**
• French	**7ML1998-5KW11**
• Spanish	**7ML1998-5KW21**
• German	**7ML1998-5KW31**
LVL200 (Contactless electronic switch)	
• English	**7ML1998-5KV01**
• French	**7ML1998-5KV11**
• Spanish	**7ML1998-5KV21**
• German	**7ML1998-5KV31**
Electronics module LVL200 Relay	
• English	**7ML1998-5LS01**
• French	**7ML1998-5LS11**
• Spanish	**7ML1998-5LS21**
• German This device is shipped with the Siemens Milltronics manual DVD containing the Operating Instructions library.	**7ML1998-5LS31**

Selection and Ordering data	Article No.
Spare Parts and Accessories	
Electronics module SITRANS LVL200 Relay	**7ML1830-1NC**
Electronics module SITRANS LVL200 Contactless	**7ML1930-6AA**
Lock fitting, unpressurized, G1" A/316L	**7ML1930-1DQ**
Lock fitting, unpressurized, 1" NPT/316L	**7ML1930-1DR**
Lock fitting, unpressurized, G1 ...1/2" A/316L	**7ML1930-1DS**
Lock fitting, unpressurized, 1 ... 1/2" NPT/316L	**7ML1930-1DT**
Lock fitting, -1 ... 16 bar, G1" A/316L	**7ML1930-1DU**
Lock fitting, -1 ... 16 bar, 1" NPT/316L	**7ML1930-1DV**
Lock fitting, -1 ... 16 bar, G1 ... 1/2" A/316L	**7ML1930-1DW**
Lock fitting, -1 ... 16 bar, 1 ... 1/2" NPT/316L	**7ML1930-1DX**
Lock fitting, -1 ... 64 bar, G1" A/316L	**7ML1930-1EA**
Lock fitting, -1 ... 64 bar, 1" NPT/316L	**7ML1930-1EB**
Lock fitting, -1 ... 64 bar, G1 ... 1/2" A/316L	**7ML1930-1EC**
Lock fitting, -1 ... 64 bar, 1 ... 1/2" NPT/316L	**7ML1930-1ED**

[1)] Listed Certificates are not available with all configurations, please contact factory for more information

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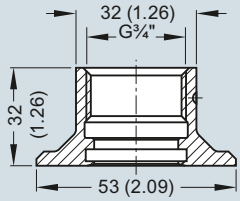
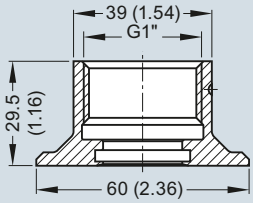
Options

LVL200 threaded welded socket

G¾" A/316L

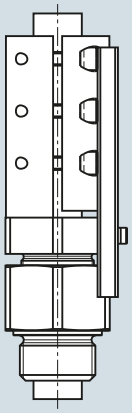


G1" A/316L

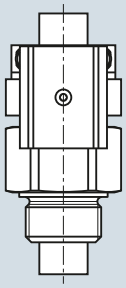


Lock fitting

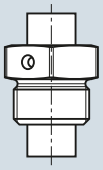
LVL200 extended 64 bar



LVL200 extended 16 bar



LVL200 extended unpressurized



SITRANS LVL200 welded socket and lock fitting, dimensions in mm (inch)

4

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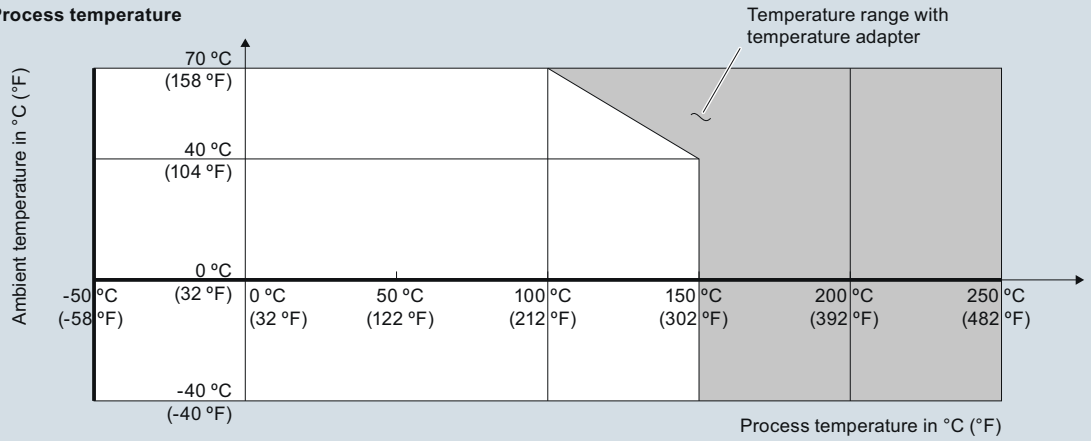
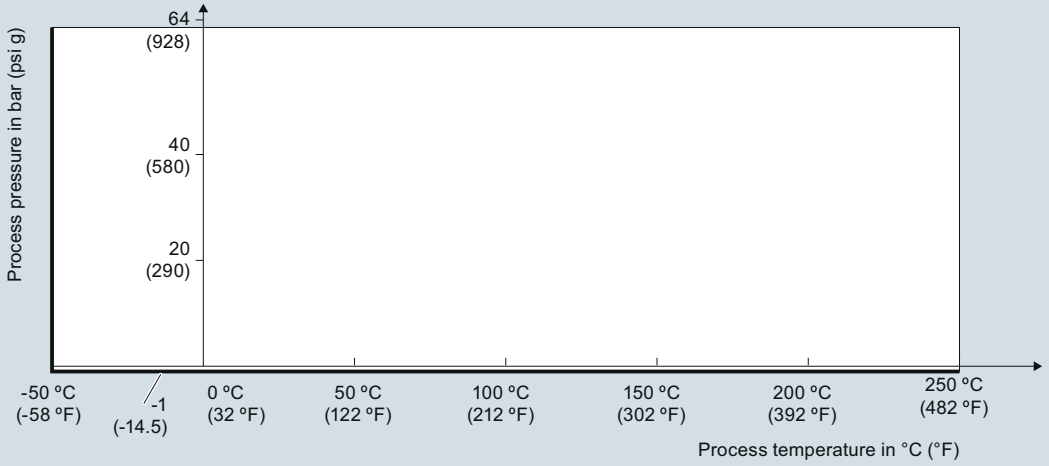
Characteristic curves

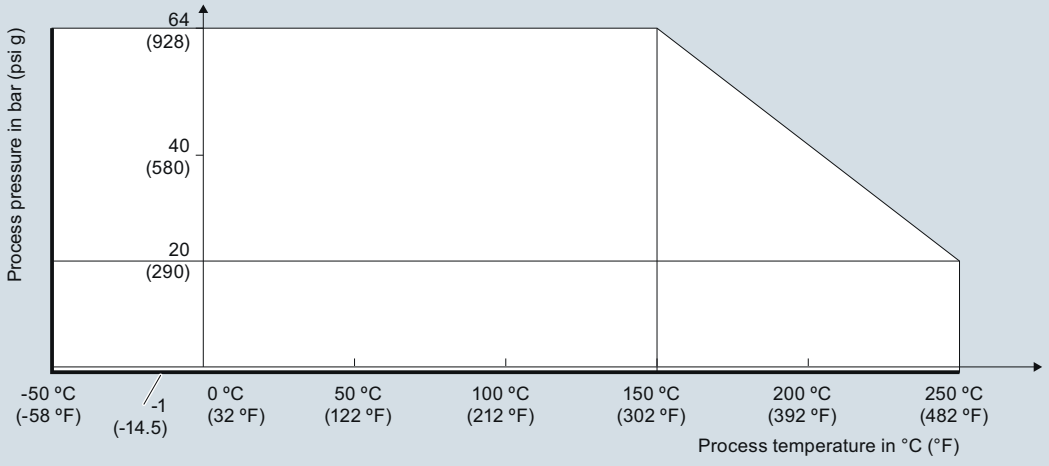
Ambient/Process temperature



Process pressure with switch position 0.7 g/cm³ (mode switch)



Process pressure with switch position 0.5 g/cm³ (mode switch)



SITRANS LVL200 Process Pressure/Process Temperature/Ambient Temperature derating curves

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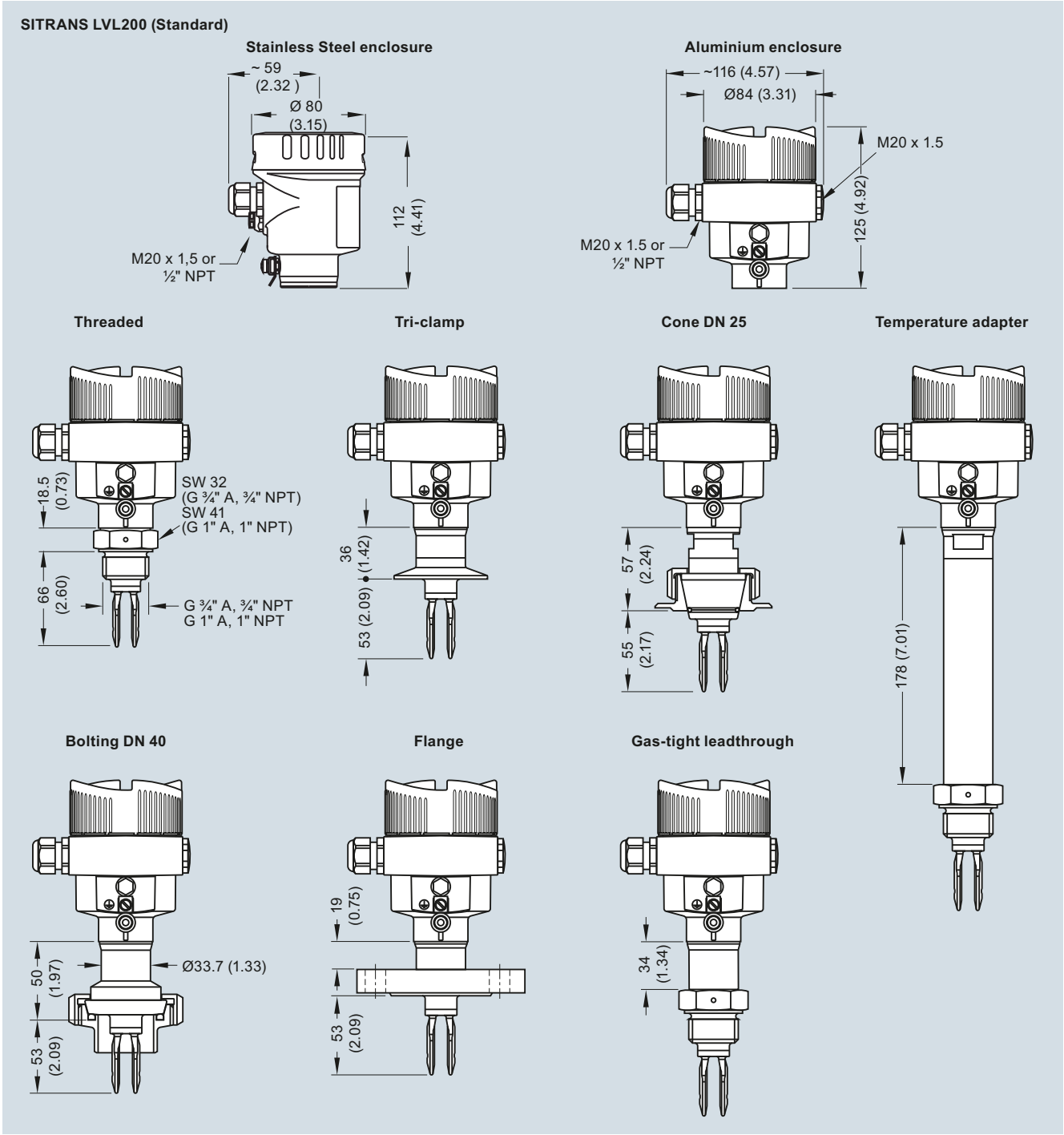
Dimensional drawings



SITRANS LVL200 (Standard), dimensions in mm (inch)

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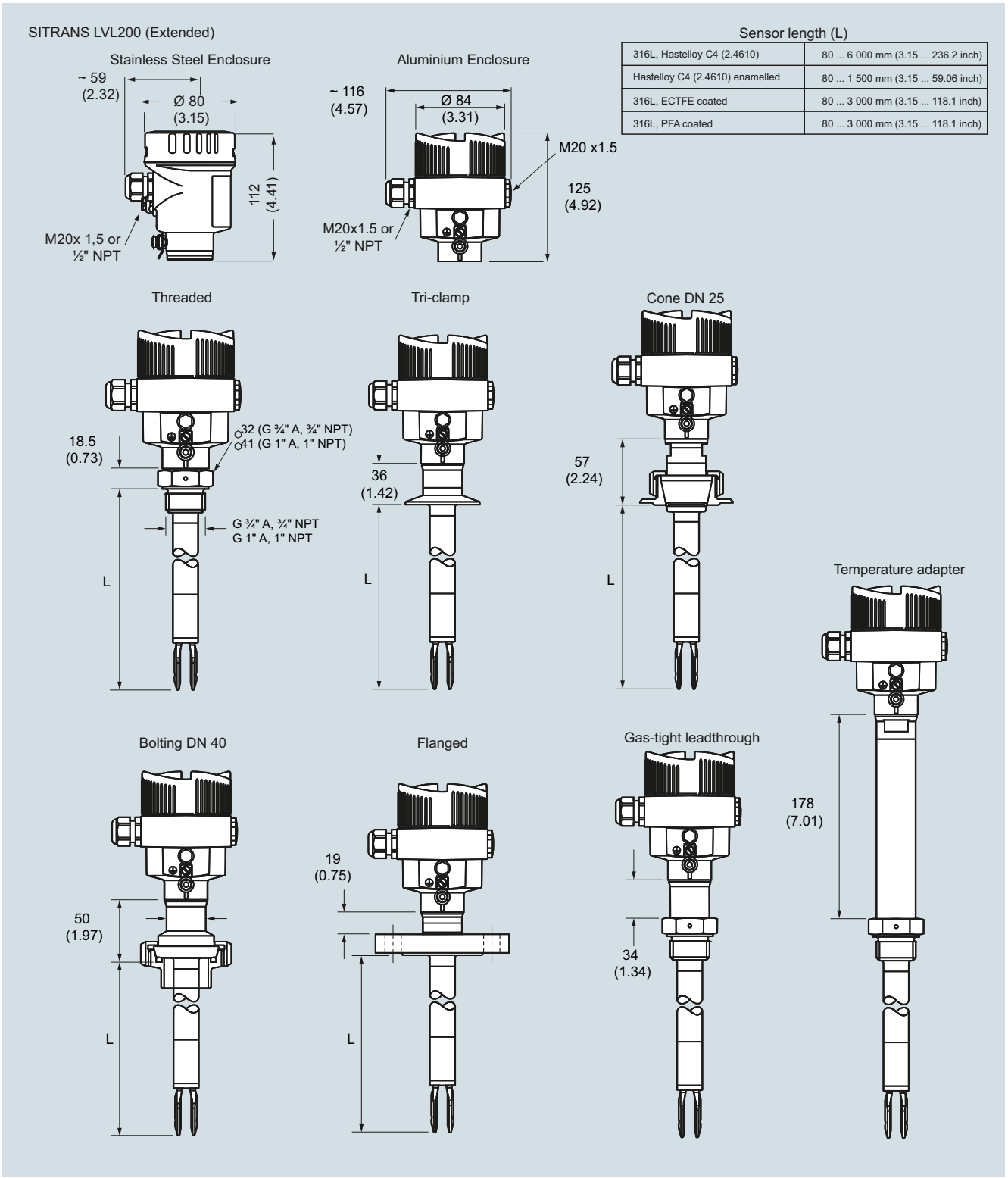
SITRANS LVL200



SITRANS LVL200 (Extended), dimensions in mm (inch)

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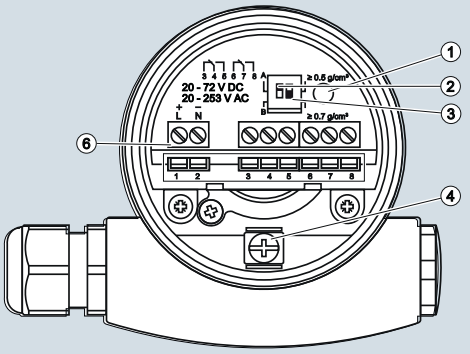
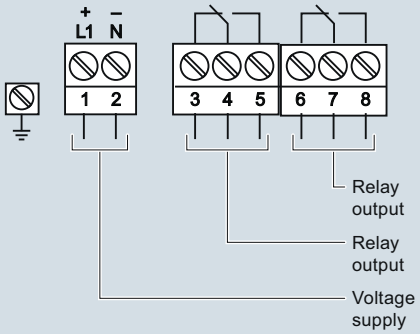
Schematics

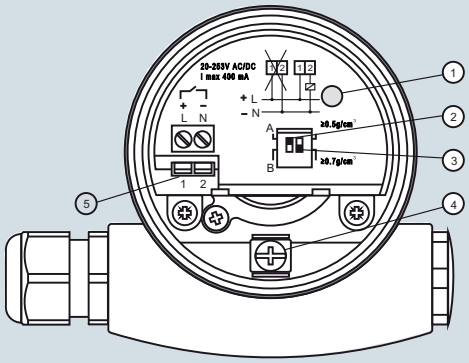
Relay (DPDT)



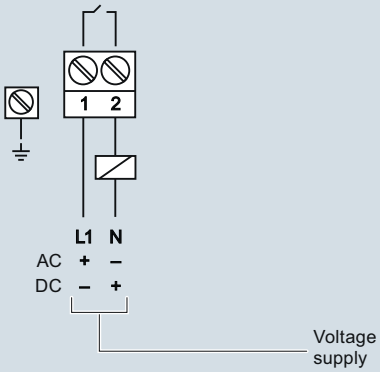
①	Control lamp
②	DIL switch for characteristics reversal
③	DIL switch for sensitivity adjustment
④	Ground terminal
⑤	Connection terminals



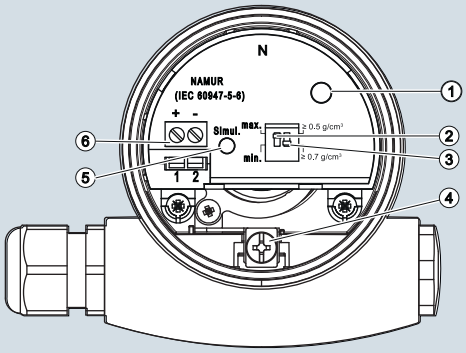
Contactless



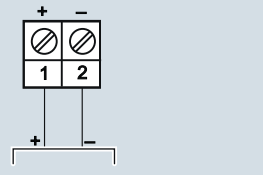
①	Control lamp
②	DIL switch for mode adjustment
③	DIL switch for switching point adaptation
④	Ground terminal
⑤	Connection terminals



NAMUR



①	Control lamp
②	DIL switch for characteristics reversal
③	DIL switch for sensitivity adjustment
④	Ground terminal
⑤	Simulation key
⑥	Connection terminals



SITRANS LVL200 connections

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SITRANS LVS100

Overview

SITRANS LVS100 is a vibrating point level switch for material detection in bulk solids.

Benefits

- High resistance to mechanical forces
- Sliding sleeve options for adjustable insertion length and ease of cleaning
- Rotatable enclosure for ease of installation and wiring
- Suitable for point level detection of materials starting at a bulk density of 30 g/l (1.9 lb/ft^3)
- Customer desired extensions up to 4 000 mm (157.48 inch)

Application

SITRANS LVS100 detects high, low or demand levels of dry bulk solids in bins, silos or hoppers.

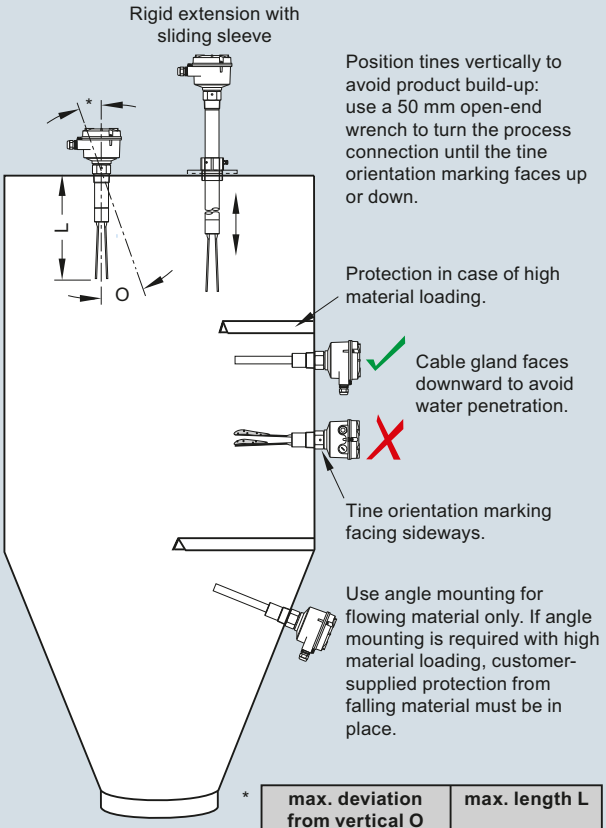
SITRANS LVS100 has a compact design and can be top, side, or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers

Configuration

Installation



* max. deviation from vertical O	max. length L
5°	4.0 m
45°	1.2 m
> 45°	0.6 m

SITRANS LVS100 installation, dimensions in mm (inch)

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Technical specifications

Mode of Operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High, low and demand
Measuring frequency	200 Hz
Output	
Relays	DPDT relay
Relay delay	From loss of vibration: approximately 1 second
	From resumption of vibration: approximately 1 ... 2 s
Signal delay	Probe uncovered to covered: approximately 1 s
	Probe covered to uncovered: approximately 1 ... 2 s
Relay fail-safe	High or low, switch selectable
Alarm output	Relay 8 A at 250 V AC, non-inductive
	Relay 5 A at 30 V DC, non-inductive
Sensitivity	High or low, switch selectable
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	
• Process temperature	-40 ... +150 °C (-40 ... +302 °F)
• Max. threaded bushing temperature	60 °C (140 °F)
• Max. enclosure surface temperature (Category 2D)	90 °C (194 °F)
• Max. extension surface temperature (Category 1D)	150 °C (302 °F)
• Pressure (vessel)	Max. 10 bar g (145 psi g) European Pressure Directive 97/23/EC: Category 1
Minimum material density	Approx. 30 g/l (1.9 lb/ft^3)

Design	
Material	
• Enclosure	Epoxy coated aluminum
Process connection	• Thread 1¼" NPT [(Taper), ANSI/ASME B1.20.1], R 1½" [(BSPT), EN 10226] • Thread R 1½" [(BSPT), EN 10226], ½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)] • Thread material: stainless steel 304 (1.4301) or 316TI (1.4571) depending on configuration
Tine material	Stainless steel 316TI (1.4571)
Degree of protection	IP66/Type 4/NEMA 4
Conduit entry	2 x M20x1.5 or 2 x ½" NPT
Weight	Standard version, no extensions: approx. 1.7 kg (3.7 lb)
Power supply	• 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA • 19 ... 40 V DC, +10 %, 1.5 W
Certificates and approvals	• CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • RCM • ATEX II 1/2 D • IECex

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Selection and Ordering data

Selection and Ordering data		Article No.
SITRANS LVS100, standard Vibrating point level switch for high or low level detection of bulk solids. Sensitivity > 30 g/l.	↗	**7ML5735-** ■■■■■ - 0 ■ A 0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Input Voltage		
DPDT Relay - 19 ... 230 V AC, 19 ... 40 V DC	⬟	1
DPDT Relay - 19 ... 230 V AC, 19 ... 40 V DC (stocked version)[1]	⬟	2
Process temperature		
Up to 150 °C (302 °F)	⬟	A
Process connection		
Threaded		
R 1½" [(BSPT), EN 10226]	⬟	A
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	B
R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve - min. length 500 mm (19.69 inch)[2]	⬟	C
1½" NPT [(Taper), ANSI/ASME B1.20.1] , sliding sleeve [min. length 500 mm (19.69 inch)][2]	⬟	D
Extension length		
Stainless steel 316TI (1.4571)		
Standard length, 170 mm (6.69 inch)	⬟	1 1
Add Order code Y01 and plain text: "Insertion length ... mm"		
Stainless steel 304 (1.4301)		
• 300 ... 500 mm (11.81 ... 19.69 inch)	⬟	1 2
• 501 ... 1 000 mm (19.72 ... 39.37 inch)	⬟	1 3
• 1 001 ... 1 500 mm (39.41 ... 59.06 inch)	⬟	1 4
• 1 501 ... 2 000 mm (59.09 ... 78.74 inch)	⬟	1 5
• 2 001 ... 2 500 mm (78.78 ... 98.43 inch)		1 6
• 2 501 ... 3 000 mm (98.46 ... 118.11 inch)		1 7
• 3 001 ... 3 500 mm (118.15 ... 137.80 inch)		1 8
• 3 501 ... 4 000 mm (137.83 ... 157.48 inch)		2 0
Approvals		
CSA/FM General Purpose, CE, RCM	⬟	A
CSA/FM Class II, Div. 1, Group E, F, G, Class III, ATEX II 1/2 D, RCM	⬟	B
IEC-Ex t IIIC Da/Db		C

[1] Only available with the following configurations 7ML5735-2AA11-0AA0 or 7ML5735-2AB11-0AA0

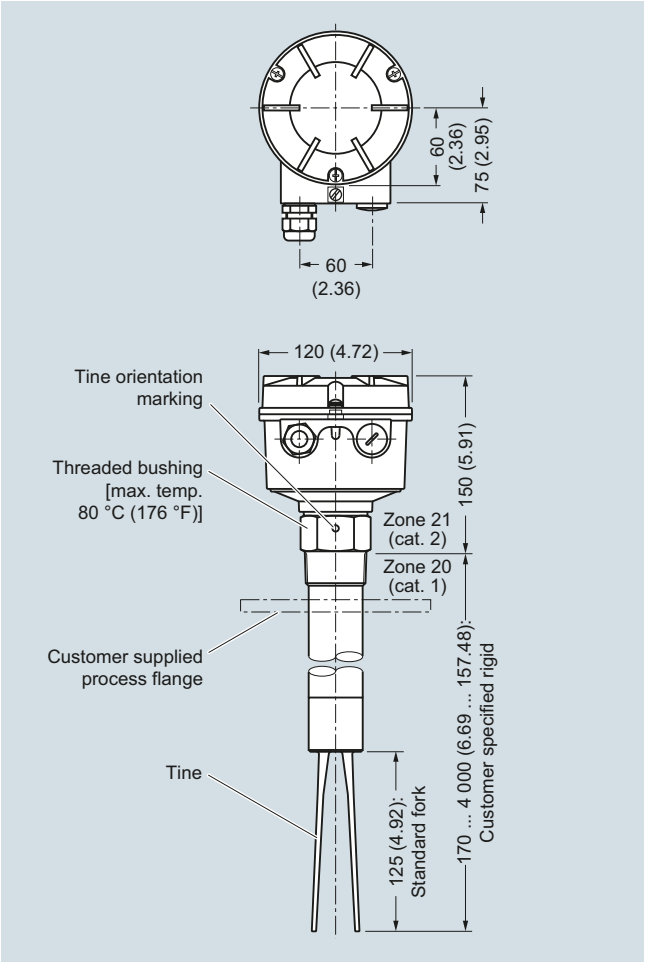
[2] Not available with extension length options 11, 12

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further Designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. (50 mm increments)	**Y01**
Signal bulb inserted in M20 cable gland[1]	**A20**
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5FT63**
Spare Parts	
Replacement Electronics Module LVS100 DPDT Relay (19 ... 253 V AC, 19 ... 55 V DC)	**7ML1830-1NS**
R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve	**7ML1830-1NT**
1½" NPT [(Taper), ANSI/ASME B1.20.1] , sliding sleeve [min. length 500 mm (19.69 inch)]	**7ML1830-1NU**

[1] Available only with approval CE

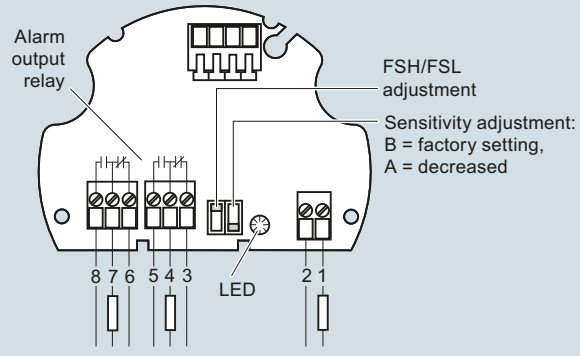
Dimensional drawings



SITRANS LVS100, dimensions in mm (inch)

Schematics

Universal voltage (DPDT relay)



AC: Terminal 1: L
Terminal 2: N
19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA

DC: Terminal 1: +
Terminal 2: -
19 ... 50 V DC, +10 %, 2 W

SITRANS LVS100 connections

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Overview

SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.

Benefits

- High resistance to mechanical forces
- Strong vibration resistance to high bulk material loads
- Rotatable enclosure for convenient wiring
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft^3); liquid/solid interface version, 50 g/l (3 lb/ft^3) and low density option min. 5 g/l (0.3 lb/ft^3)
- Customer desired extensions up to 20 000 mm (787 inch)
- Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5 inch) insertion length

Application

The standard LVS200 detects high, low, or demand levels of dry bulk solids in bins, silos, or hoppers. The liquid/solid interface version can also detect settled solids within liquids or solids within confined spaces such as feed pipes. It is designed to ignore liquids in order to detect the interface between a solid and a liquid.

A pipe extension version is available with either the standard or liquid/solid interface electronics and fork, separated by a customer supplied 1 inch pipe.

SITRANS LVS200 has an optional 4 ... 20 mA output for monitoring buildup on the fork to determine when preventative maintenance should be performed in sticky applications.

The LVS200 has a compact design and can be top, side or angle mounted. The vibrating fork design ensures the tines are kept clean. The unique design of the fork and crystal assembly eliminates false high level readings even if tines become damaged.

A signal from the electronic circuit excites a crystal in the probe causing the fork to vibrate. If the fork is covered by material, the change in vibration is detected by the electronic circuitry which causes the relay to change state after a one second delay. When the fork is free from material pressure, full vibration resumes and the relay reverts to its normal condition.

- Key Applications: dry bulk solids in bins, silos, hoppers or settled solids within liquids (interface version)

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Technical specifications

Mode of operation	
Measuring principle	Vibrating point level switch
Input	
Measured variable	High, low and demand
Measuring frequency	
• Standard	125 Hz
• Liquid/solid interface and short fork version	350 Hz
Output	
PNP	Open collector: Permanent load max. 0.4 A, short-circuit and overload protected Turn-on voltage: max. 50 V (reverse protection)
2-wire without contact	Load current: • Min. 10 mA • Max. 500 mA permanent • Max. 2A < 200 ms • Max. 5A < 50 ms Voltage drop on the electronic module: max. 7 V with closed electric circuit Cut-off current with open electric circuit: max. 5 mA
Relays	
• Version with 1 relay	SPDT relay
• Version with 2 relays	DPDT relay
Relay delay	• From loss of vibration: approximately 1 second • From resumption of vibration: approximately 1 ... 2 seconds
Signal delay	• Probe uncovered to covered: approximately 1 second • Probe covered to uncovered: approximately 1 ... 2 seconds
Relay fail-safe	High or low, switch selectable
Alarm output	• Relay 8 A at 250 V AC, non-inductive • Relay 5 A at 30 V DC, non-inductive
mA output	8/16 mA or 4 ... 20 mA
• Resolution	4 ... 20 mA ± 0.1 mA
Sensitivity	High or low, switch selectable
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• Installation category	III
• Pollution degree	2

Medium conditions	
• Process temperature	• All except CSA Class II, Group G: -40 ... +150 °C (-40 ... +302 °F) • CSA Class II, Group G: -40 ... +140 °C (-40 ... +284 °F), CSA temperature code T3B
• Max. threaded bushing temperature	60 °C (140 °F)
• Max. enclosure surface temperature (Category 2D)	90 °C (194 °F)
• Max. extension surface temperature (Category 1D)	150 °C (302 °F)
• Pressure (vessel)	Max. 10 bar g (145 psi g) European Pressure Directive 97/23/EC: Category 1
• Minimum material density	• Standard version: approx. 20 g/l (1.2 lb/ft^3) • Liquid/solid interface version: approx. 50 g/l (3 lb/ft^3) • Optional low density version: approx. 5 g/l (0.3 lb/ft^3)
Design	
Material	
• Enclosure	Epoxy coated aluminum
Process connection	• Thread 1½" NPT [(Taper), ANSI/ASME B1.20.1], R ½" [(BSPT), EN 10226] and flange options • Optional sliding bushing with 2" NPT [(Taper), ANSI/ASME B1.20.1] or BSP thread • Thread material: stainless steel 303 (1.4301)
Tine material	Stainless steel 316Ti (1.4571), PTFE-coated tines are available upon special request
Degree of protection	IP65/Type 4/NEMA 4
Conduit entry	2 x M20x1.5 or 2 x ½" NPT
Weight	• Standard version, no extensions: approx. 2.0 kg (4.4 lb) • Solids/liquids version, no extensions: approx. 1.9 kg (4.2 lb)
Power supply	• 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA • 19 ... 55 V DC, +10 %, 1.5 W
Certificates and approvals	• CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • RCM • ATEX II 1/2 D • CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, available only with power supply option 5 and 6 • ATEX II 1G and 1/2 G Eex ia IIC; ATEX II 1D and 1/2 D, available only with power supply option 5

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Selection and Ordering data		Article No.
SITRANS LVS200, standard SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.	↗	**7ML5731-** ■■■■■ - ■■ **A 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Power supply		
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)[1]	⬟	**1**
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)[1]		**2**
18 ... 50 V DC PNP[1]	⬟	**3**
19 ... 230 V AC/DC without contact, 2-wire loop powered[1]		**4**
7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire[2]		**5**
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire[3]		**6**
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) basic version[4][5]	►⬟	**7**
Process temperature		
Without temperature isolator	►⬟	**A**
With temperature isolator		**B**
Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process 150 °C (302 °F)/ max. temperature electronics 60 °C (140 °F)]		**C**
Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process150 °C (302 °F)/ max. temperature electronics 60 °C (140 °F)]		**D**
Process connection		
Threaded		
R 1½" [(BSPT), EN 10226]	►⬟	**A**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	►⬟	**B**
G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)][6]		**C**
2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)][6]		**D**
Flanged		
DN 100 PN 6, EN 1092-1[7]		**E**
DN 100 PN 16, EN 1092-1		**F**
2" ASME 150 lb B16.5		**G**
3" ASME 150 lb B16.5		**H**
4" ASME 150 lb B16.5		**J**
2" Tri-clamp (DN 50) ISO 2852		**K**
Extension length		
Stainless steel 304 (1.4301)		
Standard length, 235 mm (9.25 inch)	►⬟	**1 1**
Add Order code Y01 and plain text: "Insertion length ... mm"		
• 300 ... 500 mm (11.81 ... 19.69 inch)	⬟	**1 2**
• 501 ... 750 mm (19.72 ... 29.53 inch)	⬟	**1 3**
• 751 ... 1 000 mm (29.57 ... 39.37 inch)	⬟	**1 4**
• 1 001 ... 1 250 mm (39.41 ... 49.21 inch)	⬟	**1 5**
• 1 251 ... 1 500 mm (49.25 ... 59.06 inch)	⬟	**1 6**
• 1 501 ... 1 750 mm (59.09 ... 68.90 inch)	⬟	**1 7**
• 1 751 ... 2 000 mm (68.94 ... 78.74 inch)	⬟	**1 8**
• 2 001 ... 2 250 mm (78.78 ... 88.58 inch)	⬟	**2 1**
• 2 251 ... 2 500 mm (88.62 ... 98.43 inch)	⬟	**2 2**
• 2 501 ... 2 750 mm (98.46 ... 108.27 inch)	⬟	**2 3**
• 2 751 ... 3 000 mm (108.31 ... 118.11 inch)	⬟	**2 4**
• 3 001 ... 3 250 mm (118.15 ... 127.95 inch)	⬟	**2 5**
• 3 251 ... 3 500 mm (127.99 ... 137.80 inch)	⬟	**2 6**
• 3 501 ... 3 750 mm (137.83 ... 147.64 inch)	⬟	**2 7**
• 3 751 ... 4 000 mm (147.68 ... 157.48 inch)	⬟	**2 8**

Selection and Ordering data		Article No.
SITRANS LVS200, standard SITRANS LVS200 is a vibrating point level switch for high, low, or demand level detection of bulk solids.		**7ML5731-** ■■■■■ - ■■ **A 0**
Stainless steel 316L (1.4404)		
Standard length, 235 mm (9.25 inch)		**3 1**
Add Order code Y01 and plain text: "Insertion length ... mm"		
300 ... 500 mm (11.81 ... 19.69 inch)		**3 2**
501 ... 750 mm (19.72 ... 29.53 inch)		**3 3**
751 ... 1 000 mm (29.57 ... 39.37 inch)		**3 4**
1 001 ... 1 250 mm (39.41 ... 49.21 inch)		**3 5**
1 251 ... 1 500 mm (49.25 ... 59.06 inch)		**3 6**
1 501 ... 1 750 mm (59.09 ... 68.90 inch)		**3 7**
1 751 ... 2 000 mm (68.94 ... 78.74 inch)		**3 8**
2 001 ... 2 250 mm (78.78 ... 88.58 inch)		**4 1**
2 251 ... 2 500 mm (88.62 ... 98.43 inch)		**4 2**
2 501 ... 2 750 mm (98.46 ... 108.27 inch)		**4 3**
2 751 ... 3 000 mm (108.31 ... 118.11 inch)		**4 4**
3 001 ... 3 250 mm (118.15 ... 127.95 inch)		**4 5**
3 251 ... 3 500 mm (127.99 ... 137.80 inch)		**4 6**
3 501 ... 3 750 mm (137.83 ... 147.64 inch)		**4 7**
3 751 ... 4 000 mm (147.68 ... 157.48 inch)		**4 8**
Material process connection/extension		
Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301)[8]	►⬟	**1**
Stainless steel 316L (1.4404)[9]		**2**
Approvals		
CSA/FM Dust Ignition Proof, RCM	►⬟	**A**
ATEX II 1/2 D, RCM	►⬟	**B**
CSA/FM General Purpose, RCM	⬟	**C**
CE, RCM	⬟	**D**
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, RCM		**E**
ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, RCM		**F**
IEC-Ex t IIIC Da/Db		**G**

1) Available with Approval options A ... D, G only
2) Available with Approval options D, E, F only
3) Available with Approval options B, D, G only
4) Available with configurations 7ML5731-7AA11-1BA0 or 7ML5731-7AB11-1AA0 only
5) Basic version is cost effective and offers fast delivery
6) Not available with extension length options 11, 12, 31, 32
7) Max. 6 bar (87 psi)
8) Available with option extension length 11 ... 28
9) Available with option extension length 31 … 48

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

► Available ex stock. For details see page 9/5 in the appendix.

4

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SITRANS LVS200

Selection and Ordering data	Order code
Further Designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	**Y01**
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y14**
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch)[3]	**K05**
Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch), and increased aluminum fork width[1,3]	**G01**
Signal bulb inserted in M20 cable gland[2]	**A20**
NAMUR 8/16 mA switch amplifiers available, contact factory for pricing	
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5FT63**
Spare Parts	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	**7ML1830-1KL**
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	**A5E35525363**
Sliding sleeve, 2" BSP (ISO 228)	**7ML1830-1JM**
Sliding sleeve, 2" NPT (ASME B1.20.1)	**7ML1830-1JN**
Namur Isolator switch amplifier relay output KFD2-SR2-Ex1.W	**A5E03496569**
Available ex stock	
For details see page 9/5 in the appendix.	
SITRANS LVS200, standard, power supply 7, process temperature A, process connection A, extension length 11, material process connection/ extension 1, and approval B	**7ML5731-7AA11-1BA0**
SITRANS LVS200, standard, power supply 7, process temperature A, process connection B, extension length 11, material process connection/ extension 1, and approval A	**7ML5731-7AB11-1AA0**

[1] Available only with power supply 1 and Approval C, D and with Process connection flange E ... J

[2] Available with Approval option D only

[3] K05 and G01 are not available together

Selection and Ordering data	Article No.
SITRANS LVS200, short fork for liquids/ solids interface ↗	**7ML5732-** ■■■■■ - ■■ **A 0**
Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Power supply	
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)	**1**
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)	**2**
18 ... 50 V DC PNP	**3**
19 ... 230 V AC/DC without contact, 2-wire loop powered	**4**
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire[1]	**5**
Process temperature	
Without temperature isolator	**A**
With temperature isolator	**B**
Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process 150 °C (302 °F)/ max. temperature electronics 60 °C (140 °F)]	**C**
Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process 150 °C (302 °F)/ max. temperature electronics 60 °C (140 °F)]	**D**
Process connection	
Threaded	
R 1½" [(BSPT), EN 10226]	**A**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	**B**
G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69 inch)][2]	**C**
2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69 inch)][2]	**D**
Flanged	
DN 100 PN 6, EN 1092-1[3]	**E**
DN 100 PN 16, EN 1092-1	**F**
2" ASME 150 lb B16.5	**G**
3" ASME 150 lb B16.5	**H**
4" ASME 150 lb B16.5	**J**
2" Tri-clamp (DN 50) ISO 2852	**K**
Extension length	
Stainless steel 304 (1.4301)	
Standard length, 165 mm (6.50 inch)	**1 1**
Add Order code Y01 and plain text: "Insertion length ... mm"	
200 ... 500 mm (7.87 ... 19.69 inch)	**1 2**
501 ... 750 mm (19.72 ... 29.53 inch)	**1 3**
751 ... 1 000 mm (29.57 ... 39.37 inch)	**1 4**
1 001 ... 1 250 mm (39.41 ... 49.21 inch)	**1 5**
1 251 ... 1 500 mm (49.25 ... 59.06 inch)	**1 6**
1 501 ... 1 750 mm (59.09 ... 68.90 inch)	**1 7**
1 751 ... 2 000 mm (68.94 ... 78.74 inch)	**1 8**
2 001 ... 2 250 mm (78.78 ... 88.58 inch)	**2 1**
2 251 ... 2 500 mm (88.62 ... 98.43 inch)	**2 2**
2 501 ... 2 750 mm (98.46 ... 108.27 inch)	**2 3**
2 751 ... 3 000 mm (108.31 ... 118.11 inch)	**2 4**
3 001 ... 3 250 mm (118.15 ... 127.95 inch)	**2 5**
3 251 ... 3 500 mm (127.99 ... 137.80 inch)	**2 6**
3 501 ... 3 750 mm (137.83 ... 147.64 inch)	**2 7**
3 751 ... 4 000 mm (147.68 ... 157.48 inch)	**2 8**

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Selection and Ordering data		Article No.
SITRANS LVS200, short fork for liquids/ solids interface Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements		**7ML5732-** ■■■■■ - ■■ **A 0**
Stainless steel 316L (1.4404)		
Standard length, 165 mm (6.50 inch)		**3 1**
Add Order code Y01 and plain text: "Insertion length ... mm"		
200 ... 500 mm (7.87 ... 19.69 inch)		**3 2**
501 ... 750 mm (19.72 ... 29.53 inch)		**3 3**
751 ... 1 000 mm (29.57 ... 39.37 inch)		**3 4**
1 001 ... 1 250 mm (39.41 ... 49.21 inch)		**3 5**
1 251 ... 1 500 mm (49.25 ... 59.06 inch)		**3 6**
1 501 ... 1 750 mm (59.09 ... 68.90 inch)		**3 7**
1 751 ... 2 000 mm (68.94 ... 78.74 inch)		**3 8**
2 001 ... 2 250 mm (78.78 ... 88.58 inch)		**4 1**
2 251 ... 2 500 mm (88.62 ... 98.43 inch)		**4 2**
2 501 ... 2 750 mm (98.46 ... 108.27 inch)		**4 3**
2 751 ... 3 000 mm (108.31 ... 118.11 inch)		**4 4**
3 001 ... 3 250 mm (118.15 ... 127.95 inch)		**4 5**
3 251 ... 3 500 mm (127.99 ... 137.80 inch)		**4 6**
3 501 ... 3 750 mm (137.83 ... 147.64 inch)		**4 7**
3 751 ... 4 000 mm (147.68 ... 157.48 inch)		**4 8**
Material process connection/extension		
Stainless steel threads 304 (1.4301), flanges 321(1.4541), Tri-clamp 304 (1.4301)[4]	⬟	**1**
Stainless steel 316L (1.4404)[5]		**2**
Approvals		
CSA/FM Dust Ignition Proof, RCM	⬟	**A**
ATEX II 1/2 D, RCM	⬟	**B**
CSA/FM General Purpose, RCM	⬟	**C**
CE, RCM	⬟	**D**
IEC-Ex t IIIC Da/Db		**E**

1) Available with Approval option B, D, E only
2) Not available with extension length options 11,12, 31, 32
3) Max. 6 bar (87psi)
4) Available with option extension length 11 ... 28
5) Available with option extension length 31 … 48

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further Designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (147.48 inch)	**Y01**
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y14**
Signal bulb inserted in M20 cable gland[1]	**A20**
Adjustable sensitivity (by potentiometer) for solids/ liquids interface detection[1)2)]	**G02**
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5FT63**
Spare Parts	
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	**7ML1830-1KM**
Sliding sleeve, 2" BSP (ISO 228)	**7ML1830-1JM**
Sliding sleeve, 2" NPT (ASME B1.20.1)	**7ML1830-1JN**

1) Available with Approval option D only
2) Available with power supply option 1 only

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SITRANS LVS200

Selection and Ordering data	Article No.
SITRANS LVS200, pipe extension ↗ Vibrating point level switch for high or low levels of bulk solids Extended using 1" pipe extension (customer supplied) ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7ML5733-** ■■■■■ - ■■ **A 0**
Power supply	
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)[1]	**1**
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)[1]	**2**
18 ... 50 V DC PNP[1]	**3**
19 ... 230 V AC/DC without contact, 2-wire loop powered[1]	**4**
7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire[2]	**5**
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire[3]	**6**
Process temperature	
Up to 150 °C (302 °F)	**A**
Process connection	
Threaded	
R 1½" [(BSPT), EN 10226]	**A**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	**B**
Flanged	
DN 100 PN 6, EN 1092-1 [4]	**C**
DN 100 PN 16, EN 1092-1	**D**
2" ASME 150 lb B16.5	**E**
3" ASME 150 lb B16.5	**F**
4" ASME 150 lb B16.5	**G**
2" Tri-clamp (DN 50) ISO 2852	**K**
Process connection material	
Stainless steel threads 304 (1.4301), flanges 321 (1.4541), Tri-clamp 304 (1.4301)	**1**
Stainless steel 316L (1.4404)	**2**
Extension length	
Customer supplied 1" pipe extension Length: 300 ... 3 800 mm (11.81 ... 149.61 inch)	**1**
Application type	
Dry bulk solids (125 Hz)	**1**
Liquids/solids interface (350 Hz)	**2**
Approvals	
CSA/FM Dust Ignition Proof, RCM	**A**
ATEX II 1/2 D, RCM	**B**
CSA/FM General Purpose, RCM	**C**
CE, RCM	**D**
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, RCM	**E**
ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, RCM	**F**
IEC-Ex t IIIC Da/Db	**H**

[1] Available with Approval options A, B, C, D, G only

[2] Available with Approval options D, E and F only. Not available for application type 2 "Liquids/solids interface".

[3] Available with Approval options B, D, G only

[4] Max. 6 bar (87 psi)

Selection and Ordering data	Order code
Further Designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 3 800 mm (149.61 inch)	**Y01**
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y14**
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch)[5]	**K05**
Enhanced sensitivity < 5 g/l via electronics, increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width[1][4][5]	**G01**
Adjustable sensitivity (by potentiometer) for solids/liquids interface detection[2][3][4]	**G02**
Signal bulb inserted in M20 cable gland[2]	**A20**
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5FT63**
Spare Parts	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	**7ML1830-1KL**
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	**A5E35525363**
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	**7ML1830-1KM**
Isolated switch amplifier relay output KFD2-SR2-Ex1.W	**A5E03496569**

[1] Available only with power supply 1 and Approvals C, D and with Process connection flange C … G

[2] Available with approval options D only

[3] Available with power supply option 1 only and application type 2

[4] Not available with option K05

[5] Available with Application type 1 only

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Selection and Ordering data	Article No.
SITRANS LVS200, cable extended ↗ Vibrating point level switch for high or low level detection of bulk solids materials	**7ML5734-** ■■■■■ - ■■ **A 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Power supply	
19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)[1]	**1**
19 ... 230 V AC, 19 ... 55 V DC, two relay outputs (DPDT)[1]	**2**
18 ... 50 V DC PNP[1]	**3**
19 ... 230 V AC/DC without contact, 2-wire loop powered[1]	**4**
7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire[2]	**5**
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire[3]	**6**
Process temperature	
Up to 80 °C (176 °F)	**A**
Process connection	
Threaded	
R 1½" [(BSPT), EN 10226] (1.4301/304)	**A**
1½" NPT [(Taper), ANSI/ASME B1.20.1] (1.4301/304)	**B**
Flanged	
DN 100 PN 6, EN 1092-1 (1.4541/321)[4]	**C**
DN 100 PN 16, EN 1092-1 (1.4541/321)	**D**
2" ASME 150 lb B16.5 (1.4541/321)	**E**
3" ASME 150 lb B16.5 (1.4541/321)	**F**
4" ASME 150 lb B16.5 (1.4541/321)	**G**
Extension length	
750 ... 1 000 mm (29.5 ... 39.4 inch) [max. length 20 000 mm (787.4 inch), not with Power supply option 5 (max. 10 000 mm, 393.7 inch)]	**1 0**
Add Order code Y01 and plain text: "Insertion length ... mm"	
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**1 1**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	**1 2**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	**1 3**
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	**1 4**
5 001 ... 6 000 mm (196.89 ... 236.22 inch)	**1 5**
6 001 ... 7 000 mm (236.26 ... 275.59 inch)	**1 6**
7 001 ... 8 000 mm (275.63 ... 314.96 inch)[5]	**1 7**
8 001 ... 9 000 mm (315 ... 354.33 inch)[5]	**1 8**
9 001 ... 10 000 mm (354.37 ... 393.70 inch)[5]	**2 0**
10 001 ... 11000 mm (393.74 ... 433.07 inch)[5][6]	**2 1**
11 001 ... 12 000 mm (433.11 ... 472.44 inch)[5][6]	**2 2**
12 001 ... 13 000 mm (472.48 ... 511.81 inch)[5][6]	**2 3**
13 001 ... 14 000 mm (511.85 ... 551.18 inch)[5][6]	**2 4**
14 001 ... 15 000 mm (551.22 ... 590.55 inch)[5][6]	**2 5**
15 001 ... 16 000 mm (590.59 ... 629.92 inch)[5][6]	**2 6**
16 001 ... 17 000 mm (629.96 ... 669.29 inch)[5][6]	**2 7**
17 001 ... 18 000 mm (669.33 ... 708.66 inch)[5][6]	**2 8**
18 001 ... 19 000 mm (708.70 ... 748.03 inch)[5][6]	**3 0**
19 001 ... 20 000 mm (748.07 ... 787.40 inch)[5][6]	**3 1**
Application type	
Dry bulk solids (125 Hz)	**1**
Liquid/solids interface (350 Hz)[7]	**2**

Selection and Ordering data	Article No.
SITRANS LVS200, cable extended Vibrating point level switch for high or low level detection of bulk solids materials	**7ML5734-** ■■■■■ - ■■ **A 0**
Approvals	
CSA/FM Dust Ignition Proof, RCM	**A**
ATEX II 1/2 D, RCM	**B**
CSA/FM General Purpose, RCM	**C**
CE, RCM	**D**
CSA/FM IS Class I, II, III Div. 1, Groups A, B, C, D, E, F, G, FM Class 1, Aex ia IIC, CSA Class 1, Ex ia IIC, RCM	**E**
ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, RCM[6]	**F**
IEC-Ex t IIIC Da/Db	**G**

1) Available with Approval options A, B, C, D, G only
2) Available with Approval option D, E and F only. Not available for application type 2 "Liquids/solids interface".
3) Available with Approval option D only
4) Max. 6 bar (87 psi)
5) Not available with application type option 2
6) Not available with Power supply option 5
7) Cable length is limited to 7 000 mm (275.59 inch).

Selection and Ordering data	Order code
Further Designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 20 000 mm (787.40 inch)	**Y01**
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y14**
Enhanced sensitivity > 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch)	**K05**
Enhanced sensitivity < 5 g/l via electronics and increased insertion length of 25 mm (0.98 inch) and increased aluminum fork width[1]	**G01**
Signal bulb inserted in M20 cable gland[2]	**A20**
Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5FT63**
Spare Parts	
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	**7ML1830-1KL**
Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, two relay output (DPDT)]	**A5E35525363**
Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	**7ML1830-1KM**
Isolated switch amplifier relay output KFD2-SR2-Ex1.W	**A5E03496569**

1) Available only with power supply 1 and Approvals C, D and with process connection flange C … G
2) Available with Approval options C and D only

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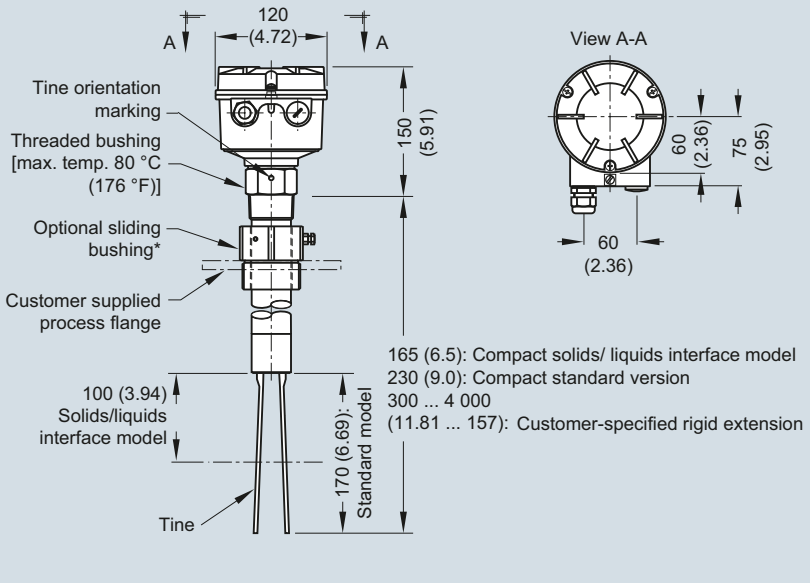
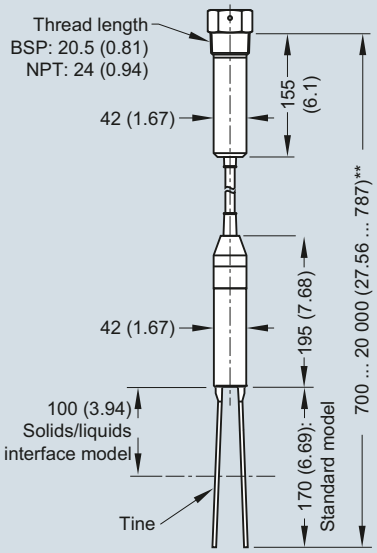
Dimensional drawings





Notes:

* The clamping screws of the sliding bushing must be tightened to 10 Nm.
** Cable version with liquids/solids interface model option length to 7 000 mm (275.59 inch)
Cable version with NAMUR electronics length to 10 000 mm (393.7 inch) tightened to 10 Nm.
See drawing 23650563 for pipe extended version details. (Pipe is customer supplied.)

SITRANS LVS200, dimensions in mm (inch)

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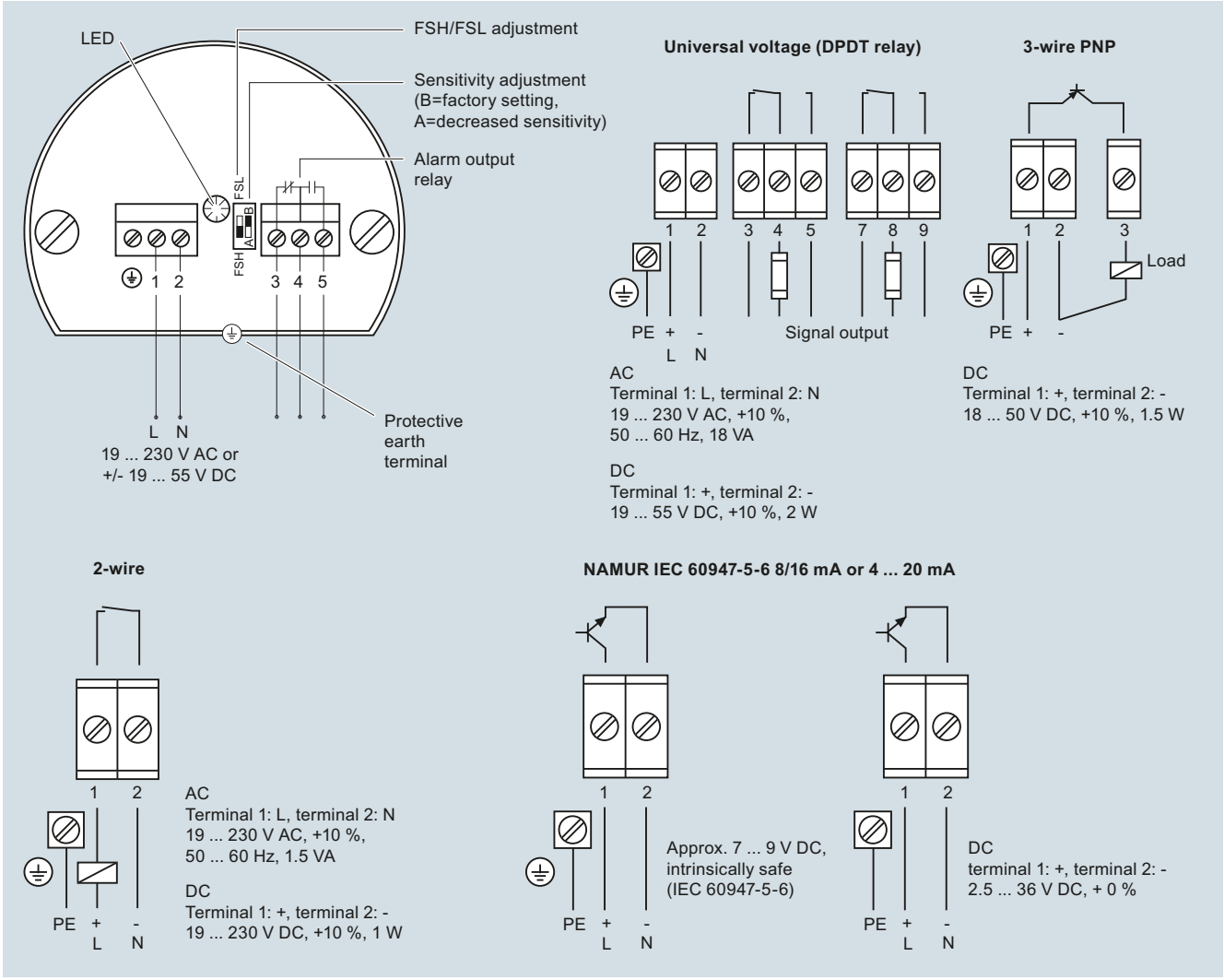
Schematics



SITRANS LVS200 connections

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SITRANS LPS200

Overview

SITRANS LPS200 is a rotary paddle switch for point level and material detection in bulk solids.

Benefits

- Proven paddle switch technology for bulk solids
- High integrity mechanical seal
- Optional switch selectable power supply
- Unique friction clutch mechanism prevents damage from falling material
- Rotatable enclosure for convenient wiring
- Optional paddles for use with low density materials
- Small paddle makes for simple installation through existing process connection
- High temperature model and optional extension kit available
- Optional fail-safe configuration detects loss of rotation

Application

The paddle switch technology detects full, empty, or demand conditions on materials such as grain, feed, cement, plastic granulate, and wood chips. The paddle switch can handle bulk densities as low as 15 g/l (2.19 lb/ft^3) with the optional rectangular vane or 100 g/l (6.25 lb/ft^3) with the standard measuring vane.

A low revolution geared motor with slip clutch drives a rotating measuring vane which senses the presence of material at the mounted level of the LPS200. As material comes into contact with the rotating paddle, rotation stops, which changes the microswitch state. When the paddle is no longer covered by material, rotation resumes and the relay reverts to its normal condition.

The LPS200 has a rugged design for use in harsh conditions in the solids industry. The sensitivity of the paddle can be adjusted for varying material properties like buildup on the vane.

The LPS200 comes in a variety of configurations including compact, extended and cable extension. It is equipped with a standard vane which is effective in most applications, but can be configured with a hinged or rectangular vane for increased sensitivity for light materials.

- Key Applications: bulk solids such as grain, feed, cement, plastic granulate, wood chips

Technical specifications

Mode of operation	
Measuring principle	Rotating point level switch
Input	
Measured variable	High and low and demand
Output	
Output signal	
• Alarm output	Microswitch 5 A at 250 V AC, non inductive Microswitch SPDT contact 4 A at 30 V DC, non-inductive
• Pickup delay	Standard (1 rpm model): approx. 1.3 seconds Optional process applications (5 rpm model): approx. 0.26 seconds
Sensitivity	Adjustable via reset force of spring or geometry of measuring vane
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature	-25 ... +60 °C (-13 ... +140 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	Bulk solids
• Temperature	
- Standard	-25 ... +80 °C (-13 ... +176 °F)
- Optional	-25 ... +600 °C (-13 ... +1 112 °F) Higher temperature version available. Contact PVC for pricing.
• Pressure (vessel)	
- Standard	Max. 0.5 bar g (7.25 psi g)
- Optional	Max. 10 bar g (145 psi g)
• Minimum material density	
- Standard measuring vane	• Can detect down to 100 g/l (6.25 lb/ft^3)
- Optional measuring vane	• Can detect down to15 g/l (2.19 lb/ft^3)
Design	
Material	
• Enclosure	Epoxy coated aluminum
• Process connection, measuring shaft and vane	Stainless steel or aluminum
Process connection	Thread NPT, BSP, and flange options
Degree of protection	IP65/Type 4/NEMA 4
Conduit entry	2 x M20x1.5 or 2 x ½" NPT
Power supply	
Jumper selectable	115 V AC, ± 15 %, 50 ... 60 Hz, 4 VA or 230 V AC, ± 15 %, 50 Hz, 6 VA, or 48 V AC, or 24 V AC or 24 V DC, ± 15 %, 2.5 W
Universal voltage (DPDT replay)	24 V DC ± 15 % 50 ... 60 Hz, 22 ... 230 V, ± 10 %, max. 10 VA
Certificates and approvals	• CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • ATEX II 1/2 D • RCM • IECex

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Selection and Ordering data		Article No. Ord. code
SITRANS LPS200, compact Rotary paddle switch for level and material detection in bulk solids. Compact design for side or top mounted applications.		**7ML5725-** ▭▭▭▭ - ▭▭▭ **0** ▭▭▭
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process temperature		
Up to 80 °C (176 °F)	⬟	**1**
Up to 150 °C (302 °F)		**2**
Up to 250 °C (482 °F)		**3**
Up to 600 °C (1 112 °F)[1)2)]		**4**
Up to 80 °C (176 °F) basic version aluminum[3)]	►⬟	**5**
Up to 80 °C (176 °F) basic version stainless steel[4)]	►⬟	**6**
Power supply		
230 V AC, 1 rev/min.	►⬟	**A**
230 V AC, 1 rev/min., fail-safe		**B**
230 V AC, 5 rev/min.	⬟	**C**
230 V AC, 5 rev/min., fail-safe		**D**
115 V AC, 1 rev/min.	►⬟	**E**
115 V AC, 1 rev/min., fail-safe		**F**
115 V AC, 5 rev/min.	⬟	**G**
115 V AC, 5 rev/min., fail-safe		**H**
48 V AC, 1 rev/min.	⬟	**J**
24 V AC, 1 rev/min.		**K**
24 V DC, 1 rev/min.	⬟	**L**
24 V DC, 1 rev/min., fail-safe		**M**
24 V DC, 5 rev/min.	⬟	**N**
24 V DC, 5 rev/min., fail-safe		**P**
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 1 rev/min.	►⬟	**Q**
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 5 rev/min.	⬟	**R**
48 V AC, 1 rev/min., fail-safe		**Z** **J 1 A**
48 V AC, 5 rev/min.		**Z** **J 1 B**
48 V AC, 5 rev/min., fail-safe		**Z** **J 1 C**
24 V AC, 1 rev/min., fail-safe		**Z** **J 1 D**
24 V AC, 5 rev/min.		**Z** **J 1 E**
24 V AC, 5 rev/min., fail-safe		**Z** **J 1 F**
Universal Voltage, 1 rev/min.[13)]		**Z** **J 2 A**
Universal Voltage, 1 rev/min, fail-safe[13)]		**Z** **J 2 B**
Universal Voltage, 5 rev/min.[13)]		**Z** **J 2 C**
Universal Voltage, 5 rev/min, fail-safe[13)]		**Z** **J 2 D**
Process connection		
Threaded		
G 1¼" [(BSPP), EN ISO 228-1]	⬟	**A**
G 1" [(BSPP), EN ISO 228-1]	⬟	**B**
G 1½" [(BSPP), EN ISO 228-1]	►⬟	**C**
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**D**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	►⬟	**E**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**F**
Flanged		
DN 32 PN 6, EN 1092-1[5)]		**G**
DN 100 PN 6, EN 1092-1[5)]		**H**
DN 100 PN 16, EN 1092-1		**J**
2" ASME 150 lb B16.5		**K**
3" ASME 150 lb B16.5		**L**
4" ASME 150 lb B16.5		**M**
2" Tri-clamp (DN 50) ISO2852[6)]		**N**

Selection and Ordering data		Article No. Ord. code
SITRANS LPS200, compact Rotary paddle switch for level and material detection in bulk solids. Compact design for side or top mounted applications.		**7ML5725-** ▭▭▭▭ - ▭▭▭ **0** ▭▭▭
Process pressure		
Up to 0.5 bar (7.25 psi)	►⬟	**1**
Up to 5 bar (72.5 psi)		**2**
Up to 10 bar (145 psi)		**3**
Process connection material		
Aluminum[7)]	►⬟	**1**
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301)	►⬟	**2**
Stainless steel 316L (1.4404)[8)]		**3**
Extension length		
100 mm (3.94 inch)[9)]	⬟	**1**
150 mm (5.91 inch)	►⬟	**2**
200 mm (7.87 inch)	⬟	**3**
250 mm (9.84 inch)	⬟	**4**
300 mm (11.81 inch)	⬟	**5**
Measuring vane		
Boot shaped, 35 x 106 mm (1.38 x 4.17 inch)[10)]	►⬟	**A**
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)[10)11)]	⬟	**B**
Boot shaped, 28 x 98 mm (1.10 x 3.86 inch)	⬟	**C**
Rectangular 50 x 150 mm (1.97 x 5.91 inch)[12)]	⬟	**D**
Rectangular 50 x 250 mm (1.97 x 9.84 inch)[12)]	⬟	**E**
Rectangular 98 x 150 mm (3.86 x 5.91 inch)[11)12)]	⬟	**F**
Rectangular 98 x 250 mm (3.86 x 9.84 inch)[11)12)]	⬟	**G**
Rectangular 50 x 98 mm (1.97 x 3.86 inch)[12)]	⬟	**H**
Approvals		
CSA/FM Dust Ignition Proof, RCM	►⬟	**A**
ATEX II 1/2 D, RCM	►⬟	**B**
CSA/FM General Purpose , RCM	►⬟	**C**
CE, RCM	►⬟	**D**
IEC Ex ta/tb IIIC		**E**

1) Available with approval option C and D only, up to 0.5 bar

2) Not available with process connection A,B, D, E and G

3) Only available with the following configurations 7ML5725-5AC11-2AD0 or 7ML5725-5EE11-2AC0

4) Only available with the following configurations 7ML5725-6QC12-2AB0 or 7ML5725-6QE12-2AA0

5) Available with process pressure 1 and 2 only

6) Available with process temperature 1 only

7) Available with process connections A ... F only, process pressure option 1 and process temperature 1 and 5 only

8) Available with process connection C, F, H … N and Measuring vane A

9) Available with measuring vane option A, C, D, E, H only

10) Add 16 mm (0.63 inch) to extension length

11) Available with extension lengths 2, 3, 4, 5

12) Available with process connections H … M only

13) Available with approval option B, D, and E only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

► Available ex stock. For details see page 9/5 in the appendix.

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SITRANS LPS200

Selection and Ordering data	Order code
Further Designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Heating of enclosure[1)2)]	**A35**
Signal bulb inserted in M20 cable gland[1)]	**A20**
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[3)]	**K01**
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y14**
Additional Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E34210883**
Spare Parts	
Motor gear /PLC, multi-voltage	**7ML1830-1KG**
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	**7ML1830-1KH**
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	**7ML1830-1KJ**
Rigid extension kit	
(Includes spring coupling, rigid tube extension and required pins)	
Extension: 500, 400, 300 mm (19.7, 15.8, 11.8 inch)	**7ML5711-0AA**
Extension: 1 000, 900, 800, 700, 600 mm (39.4, 35.4, 31.5, 27.6, 23.6 inch)	**7ML5711-1AA**
Extension: 1 500, 1 400, 1 300, 1 200, 1 100 mm (59.1, 55.1, 51.2, 47.2, 43.3 inch)	**7ML5711-2AA**
Rope extension kit, 2 m (6.56 ft)	**7ML1830-1KK**

Selection and Ordering data	Article No.
Available ex stock	
For details see page 9/5 in the appendix.	
SITRANS LPS200, compact for up to 80 °C (176 °F), aluminum, with power supply A, process connection C, process pressure 1, process connection material 1, extension length 2, measuring vane A, and approval D	**7ML1830-1KG**
SITRANS LPS200, compact for up to 80 °C (176 °F), aluminum, with power supply E, process connection E, process pressure 1, process connection material 1, extension length 2, measuring vane A, and approval C	**7ML5725-5EE11-2AC0**
SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Q, process connection C, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval B	**7ML5725-6QC12-2AB0**
SITRANS LPS200, compact for up to 80 °C (176 °F), stainless steel, with power supply Q, process connection E, process pressure 1, process connection material 2, extension length 2, measuring vane A, and approval A	**7ML5725-6QE12-2AA0**

1) Available with approval option D only

2) Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only

3) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design.

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Selection and Ordering data		Article No. Ord. code
SITRANS LPS200, shaft protected Rotary paddle switch for level and material detection in bulk solids; ideal for heavy, sticky, or high impact applications. Designed with added protection tube for enhanced shaft protection and protection against build-up on shaft (sidewall build-up). ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	↗	**7ML5726-**
Process temperature		
Up to 80 °C (176 °F)	⬟	**1**
Up to 150 °C (302 °F)		**2**
Up to 250 °C (482 °F)		**3**
Up to 600 °C (1 112 °F)[1)2)]		**4**
Up to 80 °C (176 °F) basic version[3)]	▶	**5**
Power supply		
230 V AC, 1 rev/min.	⬟	**A**
230 V AC, 1 rev/min., fail-safe		**B**
230 V AC, 5 rev/min.	⬟	**C**
230 V AC, 5 rev/min., fail-safe		**D**
115 V AC, 1 rev/min.	⬟	**E**
115 V AC, 1 rev/min., fail-safe		**F**
115 V AC, 5 rev/min.	⬟	**G**
115 V AC, 5 rev/min., fail-safe		**H**
48 V AC, 1 rev/min.	⬟	**J**
24 V AC, 1 rev/min.	⬟	**K**
24 V DC, 1 rev/min.	⬟	**L**
24 V DC, 1 rev/min., fail-safe		**M**
24 V DC, 5 rev/min.	⬟	**N**
24 V DC, 5 rev/min., fail-safe		**P**
Switch selectable 230 V AC/115 V AC/ 24 V DC multi-voltage, 1 rev/min.	▶⬟	**Q**
Switch selectable 230 V AC/115 V AC/ 24 V DC multi-voltage, 5 rev/min.	⬟	**R**
48 V AC, 1 rev/min., fail-safe		**Z** **J 1 A**
48 V AC, 5 rev/min.		**Z** **J 1 B**
48 V AC, 5 rev/min., fail-safe		**Z** **J 1 C**
24 V AC, 1 rev/min., fail-safe		**Z** **J 1 D**
24 V AC, 5 rev/min.		**Z** **J 1 E**
24 V AC, 5 rev/min., fail-safe		**Z** **J 1 F**
Universal Voltage, 1 rev/min.[14)]		**Z** **J 2 A**
Universal Voltage, 1 rev/min, fail-safe[14)]		**Z** **J 2 B**
Universal Voltage, 5 rev/min.[14)]		**Z** **J 2 C**
Universal Voltage, 5 rev/min, fail-safe[14)]		**Z** **J 2 D**
Process connection		
Threaded		
G 1¼" [(BSPP), EN ISO 228-1]	⬟	**A**
G 1½" [(BSPP), EN ISO 228-1]	▶⬟	**B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	▶⬟	**C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**D**
Flanged		
DN 32 PN 6, EN 1092-1[4)]		**E**
DN 100 PN 6, EN 1092-1[4)]		**F**
DN 100 PN 16, EN 1092-1		**G**
2" ASME 150 lb B16.5		**H**
3" ASME 150 lb B16.5		**J**
4" ASME 150 lb B16.5		**K**
2" Tri-clamp (DN 50) ISO2852[5)]		**L**

Selection and Ordering data		Article No. Ord. code
SITRANS LPS200, shaft protected Rotary paddle switch for level and material detection in bulk solids; ideal for heavy, sticky, or high impact applications. Designed with added protection tube for enhanced shaft protection and protection against build-up on shaft (sidewall build-up).		**7ML5726-**
Process pressure		
Up to 0.5 bar (7.25 psi)	▶⬟	**1**
Up to 5 bar (72.5 psi)		**2**
Up to 10 bar (145 psi)		**3**
Process connection material		
Aluminum[6)]	⬟	**1**
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301)	▶⬟	**2**
Stainless steel 316L (1.4404)[7)]		**3**
Extension length		
150 mm (5.91 inch)[8)]	⬟	**1**
200 mm (7.87 inch)	▶⬟	**2**
250 mm (9.84 inch)	⬟	**3**
300 mm (11.81 inch)	⬟	**4**
Extension material (protection tube)		
Aluminum[9)]	⬟	**A**
Stainless steel 303 (1.4305)	▶⬟	**B**
Stainless steel 316L (1.4404)[10)]		**C**
Measuring vane		
Boot shaped 35 x 106 mm (1.38 x 4.17 inch)[11)]	▶⬟	**A**
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)[11)12)]	⬟	**B**
Rectangular 50 x 150 mm (1.97 x 5.91 inch)[13)]	⬟	**D**
Rectangular 50 x 250 mm (1.97 x 9.84 inch)[13)]	⬟	**E**
Rectangular 98 x 150 mm (3.86 x 5.91 inch)[12)13)]	⬟	**F**
Rectangular 98 x 250 mm (3.86 x 9.84 inch)[12)13)]	⬟	**G**
Rectangular 50 x 98 mm (1.97 x 3.86 inch)[13)]	⬟	**H**
Approvals		
CSA/FM Dust Ignition Proof, RCM	▶⬟	**1**
ATEX II 1/2 D, RCM	▶⬟	**2**
CSA/FM General Purpose, RCM	⬟	**3**
CE, RCM	⬟	**4**
IEC Ex ta/tb IIIC		**5**

1) Available with approval option 3 and 4 only and up to max 0.5 bar

2) Not available with process connections A, C, E

3) Only available with the following configurations 7ML5726-5QB12-2BA2 or 7ML5726-5QC12-2BA1

4) Available with process pressure 1 and 2 only

5) Available with process temperature 1 only

6) Available with process connections A ... E only, available with process pressure option 1 only, and process temperature 1 only

7) Extension and vane will also change to 316L, only for process connection B, D, F …L and vane A

8) Available with measuring vane options A, D, E, H only

9) Available with process pressure 1 and process temperature 1 only

10) Available with process connections B, D, F … L and vane A

11) Add 16 mm (0.63 inch) to extension length

12) Available with extension length options 2 … 4 only

13) Available with process connections F, G, H, J, K only

14) Available with approval options 2, 4 and 5 only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

▶ Available ex stock. For details see page 9/5 in the appendix.

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SITRANS LPS200

Selection and Ordering data	Order code
Further Designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Heating of enclosure[1)2)]	**A35**
Signal bulb inserted in M20 cable gland[1)]	**A20**
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[3)]	**K01**
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y14**
Additional Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E34210883**
Spare Parts	
Motor gear /PLC, multi-voltage	**7ML1830-1KG**
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	**7ML1830-1KH**
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	**7ML1830-1KJ**
Available ex stock	
For details see page 9/5 in the appendix.	
SITRANS LPS200, extended for up to 80 °C (176 °F), power supply Q, process connection B, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 2	**7ML5726-5QB12-2BA2**
SITRANS LPS200, extended for up to 80 °C (176 °F), power supply Q, process connection C, process pressure 1, process connection material 2, extension length 2, extension material B, measuring vane A, and approval 1	**7ML5726-5QC12-2BA1**

1) Available with approval option 4 only

2) Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only

3) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design.

Selection and Ordering data	Article No. Ord. code
SITRANS LPS200, cable extension Rotary paddle switch for level and material detection in bulk solids. Cable extension for increased length in top-mounted applications	**7ML5727-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process temperature	
Up to 80 °C (176 °F)	**1**
Up to 150 °C (302 °F)	**2**
Up to 250 °C (482 °F)	**3**
Up to 600 °C (1 112 °F)[1)2)]	**4**
Up to 80 °C (176 °F) basic version[3)]	**5**
Power supply	
230 V AC, 1 rev/min.	**A**
230 V AC, 1 rev/min., fail-safe	**B**
230 V AC, 5 rev/min.	**C**
230 V AC, 5 rev/min., fail-safe	**D**
115 V AC, 1 rev/min.	**E**
115 V AC, 1 rev/min., fail-safe	**F**
115 V AC, 5 rev/min.	**G**
115 V AC, 5 rev/min., fail-safe	**H**
48 V AC, 1 rev/min.	**J**
24 V AC, 1 rev/min.	**K**
24 V DC, 1 rev/min.	**L**
24 V DC, 1 rev/min., fail-safe	**M**
24 V DC, 5 rev/min.	**N**
24 V DC, 5 rev/min., fail-safe	**P**
Switch selectable 230 V AC/115 V AC/ 24 V DC multi-voltage, 1 rev/min.	**Q**
Switch selectable 230 V AC/115 V AC/ 24 V DC multi-voltage, 5 rev/min.	**R**
48 V AC, 1 rev/min., fail-safe	**Z J 1 A**
48 V AC, 5 rev/min.	**Z J 1 B**
48 V AC, 5 rev/min., fail-safe	**Z J 1 C**
24 V AC, 1 rev/min., fail-safe	**Z J 1 D**
24 V AC, 5 rev/min.	**Z J 1 E**
24 V AC, 5 rev/min., fail-safe	**Z J 1 F**
Universal Voltage, 1 rev/min.[9)]	**Z J 2 A**
Universal Voltage, 1 rev/min, fail-safe[9)]	**Z J 2 B**
Universal Voltage, 5 rev/min.[9)]	**Z J 2 C**
Universal Voltage, 5 rev/min, fail-safe[9)]	**Z J 2 D**
Process connection	
Threaded	
G 1¼" [(BSPP), EN ISO 228-1]	**A**
G 1½" [(BSPP), EN ISO 228-1]	**B**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	**C**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	**D**
Flanged	
DN 32 PN 6, EN 1092-1[4)]	**E**
DN 100 PN 6, EN 1092-1[4)]	**F**
DN 100 PN 16, EN 1092-1	**G**
2" ASME 150 lb B16.5	**H**
3" ASME 150 lb B16.5	**J**
4" ASME 150 lb B16.5	**K**

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Selection and Ordering data		Article No. Ord. code
SITRANS LPS200, cable extension Rotary paddle switch for level and material detection in bulk solids. Cable extension for increased length in top-mounted applications		**7ML5727-** ■■■■■ - ■■■ ■■■
Process pressure		
Up to 0.5 bar (7.25 psi)	⬟	**1**
Up to 5 bar (72.5 psi)		**2**
Up to 10 bar (145 psi)		**3**
Process connection material		
Aluminum[5]	⬟	**1**
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541)	⬟	**2**
Cable extension length		
Standard cable length, 2 000 mm (78.74 inch)	⬟	**0**
Add Order code Y01 and plain text: "Insertion length ... mm"		
500 ... 1 000 mm (19.69 ... 39.37 inch)	⬟	**1**
Cable length 1 001 ... 2 000 mm (39.41 ... 78.74 inch)	⬟	**2**
Cable length 2 001 ... 3 000 mm (78.78 ... 118.11 inch)	⬟	**3**
Cable length 3 001 ... 4 000 mm (118.15 ... 157.48 inch)	⬟	**4**
Cable length 4 001 ... 5 000 mm (157.52 ... 196.85 inch)	⬟	**5**
Cable length 5 001 ... 6 000 mm (196.89 ... 236.22 inch)	⬟	**6**
Cable length 6 001 ... 7 000 mm (236.26 ... 275.59 inch)	⬟	**7**
Cable length 7 001 ... 10 000 mm (275.63 ... 393.70 inch)	⬟	**8**
Without extension[8]		**9** **N 1 A**
Measuring vane		
Boot shaped, 35 x 106 mm (1.38 x 4.17 inch)[6]	⬟	**A**
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)[6]	⬟	**B**
Boot shaped, 28 x 98 mm (1.10 x 3.86 inch)[7]	⬟	**C**
Rectangular 50 x 150 mm (1.97 x 5.91 inch)[7]	⬟	**D**
Rectangular 50 x 250 mm (1.97 x 9.84 inch)[7]	⬟	**E**
Rectangular 98 x 150 mm (3.86 x 5.91 inch)[7]	⬟	**F**
Rectangular 50 x 98 mm (1.97 x 3.86 inch)[7]	⬟	**G**
Approvals		
CSA/FM Dust Ignition Proof, RCM	⬟	**A**
ATEX II 1/2 D, RCM	⬟	**B**
CSA/FM General Purpose, RCM	⬟	**C**
CE, RCM	⬟	**D**
IEC Ex ta/tb IIIC		**E**

1) Available with approval option C and D up to max. 0.5 bar
2) Not available with process connections A, C, E
3) Only available with the following configurations 7ML5727-5QC12-0AA0 or 7ML5727-5QB12-0AB0
4) Available with process pressure 1 and 2 only
5) Available with process connections A ... E only, process pressure option 1 only and process temperature options 1 and 5 only
6) Add 16 mm (0.63 inch) to extension length
7) Available with process connections F … K only
8) Not available with P01 and available with Approval D, mounting kit for rope extension included
9) Available with approval options B,D, and E only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further Designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 10 000 mm (393.70 inch)	**Y01**
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y14**
Reinforced cable (max. 28 kN pulling force)[1]	**P01**
Heating of enclosure[2][3]	**A35**
Signal bulb inserted in M20 cable gland[2]	**A20**
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[4]	**K01**
Additional Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E34210883**
Spare Parts	
Motor gear /PLC, multi-voltage	**7ML1830-1KG**
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	**7ML1830-1KH**
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	**7ML1830-1KJ**
Available ex stock	
For details see page 9/5 in the appendix.	
SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Q, process connection B, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval B	**7ML5727-5QB12-0AB0**
SITRANS LPS200, cable extension for up to 80 °C (176 °F), power supply Q, process connection C, process pressure 1, process connection material 2, extension length 0, measuring vane A, and approval A	**7ML5727-5QC12-0AA0**

1) Available only for process temperature up to 80 °C (176 °F) and process connection material 2
2) Available with approval option D only
3) Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only
4) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design

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SITRANS LPS200

Selection and Ordering data	Article No.	Ord. code
SITRANS LPS200, angled extension ↗ Rotary paddle switch with robust design for level and material detection in bulk solids; ideal for heavy or sticky applications. Angled extension is designed to avoid falling material and rotates horizontally in side mount applications to continue working even with heavy build-up.	**7ML5728-**	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process temperature		
Up to 80 °C (176 °F)	1	
Up to 150 °C (302 °F)	2	
Up to 250 °C (482 °F)	3	
Power supply		
230 V AC, 1 rev/min.	A	
230 V AC, 1 rev/min., fail-safe	B	
230 V AC, 5 rev/min.	C	
230 V AC, 5 rev/min., fail-safe	D	
115 V AC, 1 rev/min.	E	
115 V AC, 1 rev/min., fail-safe	F	
115 V AC, 5 rev/min.	G	
115 V AC, 5 rev/min., fail-safe	H	
48 V AC, 1 rev/min.	J	
24 V AC, 1 rev/min.	K	
24 V DC, 1 rev/min.	L	
24 V DC, 1 rev/min., fail-safe	M	
24 V DC, 5 rev/min.	N	
24 V DC, 5 rev/min., fail-safe	P	
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 1 rev/min.	Q	
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 5 rev/min.	R	
48 V AC, 1 rev/min., fail-safe	Z	J 1 A
48 V AC, 5 rev/min.	Z	J 1 B
48 V AC, 5 rev/min., fail-safe	Z	J 1 C
24 V AC, 1 rev/min., fail-safe	Z	J 1 D
24 V AC, 5 rev/min.	Z	J 1 E
24 V AC, 5 rev/min., fail-safe	Z	J 1 F
Universal Voltage, 1 rev/min.[2]	Z	J 2 A
Universal Voltage, 1 rev/min, fail-safe[2]	Z	J 2 B
Universal Voltage, 5 rev/min.[2]	Z	J 2 C
Universal Voltage, 5 rev/min, fail-safe[2]	Z	J 2 D
Process connection		
Flanged		
DN 100 PN 6, EN 1092-1[1]	A	
DN 100 PN 16, EN 1092-1	B	
4" ASME 150 lb B16.5	C	
Process pressure		
Up to 0.5 bar (7.25 psi)	1	
Up to 5 bar (72.5 psi)	2	
Up to 10 bar (145 psi)	3	
Process connection material		
Stainless steel 303/321 (1.4305/1.4541)	1	
Extension length		
125 mm (4.92 inch)	1	
150 mm (5.91 inch)	2	
200 mm (7.87 inch)	3	
250 mm (9.84 inch)	4	
300 mm (11.81 inch)	5	

Selection and Ordering data	Article No.	Ord. code
SITRANS LPS200, angled extension Rotary paddle switch with robust design for level and material detection in bulk solids; ideal for heavy or sticky applications. Angled extension is designed to avoid falling material and rotates horizontally in side mount applications to continue working even with heavy build-up.	**7ML5728-**	
Measuring vane		
Rectangular vane, 50 x 98 mm (1.97 x 3.86 inch)	A	
Rectangular vane, 50 x 150 mm (1.97 x 5.91 inch)	B	
Rectangular vane, 50 x 250 mm (1.97 x 9.84 inch)	C	
Rectangular vane 98 x 150 mm (3.86 x 5.91 inch)	D	
Rectangular vane 98 x 250 mm (3.86 x 9.84 inch)	E	
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	F	
Approvals		
CSA/FM Dust Ignition Proof, RCM	A	
ATEX II 1/2 D, RCM	B	
CSA/FM General Purpose, RCM	C	
CE, RCM	D	
IEC Ex ta/tb IIIC	E	

[1] Available with process pressure 1 and 2 only

[2] Available with approval option B,D, and E only

Selection and Ordering data	Order code
Further Designs Please add "**-Z**" to Article No. and specify Order code(s).	
Heating of enclosure[1)2)]	**A35**
Signal bulb inserted in M20 cable gland[1)]	**A20**
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[3)]	**K01**
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/ identification (max. 27 characters); specify in plain text	**Y14**
Additional Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E34210883**
Spare Parts	
Motor gear /PLC, multi-voltage	**7ML1830-1KG**
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	**7ML1830-1KH**
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	**7ML1830-1KJ**

[1] Available with approval option D only

[2] Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only

[3] This option does not automatically implement a food conform design

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Selection and Ordering data	Article No.	Ord. code
SITRANS LPS200, rigid extension Rotary paddle switch for top mount point level and material detection in bulk solids	**7ML5730-**	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process temperature		
Up to 80 °C (176 °F)	1	
Up to 150 °C (302 °F)	2	
Up to 250 °C (482 °F)	3	
Up to 600 °C (1 112 °F)[1)2)]	4	
Power supply		
230 V AC, 1 rev/min.	A	
230 V AC, 1 rev/min., fail-safe	B	
230 V AC, 5 rev/min.	C	
230 V AC, 5 rev/min., fail-safe	D	
115 V AC, 1 rev/min.	E	
115 V AC, 1 rev/min., fail-safe	F	
115 V AC, 5 rev/min.	G	
115 V AC, 5 rev/min., fail-safe	H	
48 V AC, 1 rev/min.	J	
24 V AC, 1 rev/min.	K	
24 V DC, 1 rev/min.	L	
24 V DC, 1 rev/min., fail-safe	M	
24 V DC, 5 rev/min.	N	
24 V DC, 5 rev/min., fail-safe	P	
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 1 rev/min.	Q	
Switch selectable 230 V AC/115 V AC/24 V DC multi-voltage, 5 rev/min.	R	
48 V AC, 1 rev/min., fail-safe	Z	J 1 A
48 V AC, 5 rev/min.	Z	J 1 B
48 V AC, 5 rev/min., fail-safe	Z	J 1 C
24 V AC, 1 rev/min., fail-safe	Z	J 1 D
24 V AC, 5 rev/min.	Z	J 1 E
24 V AC, 5 rev/min., fail-safe	Z	J 1 F
Universal Voltage, 1 rev/min.[14)]	Z	J 2 A
Universal Voltage, 1 rev/min, fail-safe[14)]	Z	J 2 B
Universal Voltage, 5 rev/min.[14)]	Z	J 2 C
Universal Voltage, 5 rev/min, fail-safe[14)]	Z	J 2 D
Process connection		
Threaded		
G 1¼" [(BSPP), EN ISO 228-1]	A	
G 1½" [(BSPP), EN ISO 228-1]	B	
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	C	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	D	
Flanged		
DN 32 PN 6, EN 1092-1[3)]	E	
DN 100 PN 6, EN 1092-1[3)]	F	
DN 100 PN 16, EN 1092-1	G	
2" ASME 150 lb B16.5	H	
3" ASME 150 lb B16.5	J	
4" ASME 150 lb B16.5	K	
2" Tri-clamp 2' (DN 50) ISO2852[4)]	L	

Selection and Ordering data	Article No.	Ord. code
SITRANS LPS200, rigid extension Rotary paddle switch for top mount point level and material detection in bulk solids	**7ML5730-**	
Process pressure		
Up to 0.5 bar (7.25 psi)	1	
Up to 5 bar (72.5 psi)	2	
Up to 10 bar (145 psi)	3	
Process connection material		
Aluminum[5)]	1	
Stainless steel, threads 303 (1.4305), flanges 321 (1.4541), Tri-clamp 304 (1.4301)	2	
Stainless steel 316L (1.4404)[6)]	3	
Extension material (protection tube)		
Aluminum[7)8)]	0	
Stainless steel 303 (1.4305)[9)]	1	
Stainless steel 316L (1.4404)[10)11)]	2	
Extension length		
Aluminum		
250 ... 500 mm (9.84 ... 19.69 inch)	A	
501 ... 750 mm (19.72 ... 29.53 inch)	B	
751 ... 1 000 mm (29.57 ... 39.37 inch)	C	
1 001 ... 1 250 mm (39.41 ... 42.21 inch)	D	
1 251 ... 1 500 mm (49.25 ... 59.06 inch)	E	
1 501 ... 1 750 mm (59.09 ... 68.90 inch)	F	
1 751 ... 2 000 mm (68.94 ... 78.74 inch)	G	
2 001 ... 2 250 mm (78.78 ... 88.58 inch)	H	
2 251 ... 2 500 mm (88.62 ... 98.43 inch)	J	
2 501 ... 2 750 mm (98.46 ... 108.27 inch)	K	
2 751 ... 3 000 mm (108.31 ... 118.11 inch)	L	
3 001 ... 3 250 mm (118.15 ... 127.95 inch)	M	
3 251 ... 3 500 mm (127.99 ... 137.80 inch)	N	
3 501 ... 3 750 mm (137.83 ... 147.64 inch)	P	
3 751 ... 4 000 mm (147.67 ... 157.48 inch)	Q	
Stainless steel 303 (1.4305)		
250 ... 500 mm (9.84 ... 19.69 inch)	R	
501 ... 750 mm (19.72 ... 29.53 inch)	S	
751 ... 1 000 mm (29.57 ... 39.37 inch)	T	
1 001 ... 1 500 mm (39.41 ... 59.05 inch)	U	
1 501 ... 2 000 mm (59.09 ... 78.74 inch)	V	
2 001 ... 2 500 mm (78.78 ... 98.42 inch)	W	
2 501 ... 3 000 mm (98.46 ... 118.11 inch)	X	
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	Y	
Stainless steel 316L (1.4404)		
250 ... 500 mm (9.84 ... 19.69 inch)	Z	P 1 A
501 ... 750 mm (19.72 ... 29.53 inch)	Z	P 1 B
751 ... 1 000 mm (29.57 ... 39.37 inch)	Z	P 1 C
1 001 ... 1 500 mm (39.41 ... 59.05 inch)	Z	P 1 D
1 501 ... 2 000 mm (59.09 ... 78.74 inch)	Z	P 1 E
2 001 ... 2 500 mm (78.78 ... 98.42 inch)	Z	P 1 F
2 501 ... 3 000 mm (98.46 ... 118.11 inch)	Z	P 1 G
3 001 ... 4 000 mm (118.5 ... 157.48 inch)	Z	P 1 H

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SITRANS LPS200

Selection and Ordering data	Article No.	Ord. code
SITRANS LPS200, rigid extension Rotary paddle switch for top mount point level and material detection in bulk solids	**7ML5730-**	■■■■■ - ■■■■ ■■■
Measuring vane		
Boot shaped, 35 x 106 mm (1.34 x 4.17 inch)[12]	⬟	**A**
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)[12]	⬟	**B**
Rectangular 50 x 150 mm (1.97 x 5.91 inch)[13]	⬟	**C**
Rectangular 50 x 250 mm (1.97 x 9.84 inch)[13]	⬟	**D**
Rectangular 98 x 150 mm (3.86 x 5.91 inch)[13]	⬟	**E**
Rectangular 98 x 250 mm (3.86 x 9.84 inch)[13]	⬟	**F**
Rectangular 50 x 98 mm (1.97 x 3.86 inch)[13]	⬟	**G**
Approvals		
CSA/FM Dust Ignition Proof, RCM	⬟	**1**
ATEX II 1/2 D, RCM	⬟	**2**
CSA/FM General Purpose, RCM	⬟	**3**
CE, RCM	⬟	**4**
IEC Ex ta/tb IIIC		**5**

1) Available with approval option 3 and 4, up to max 0.5 bar

2) Not available with process connection A, C, E

3) Available with process pressure 1 and 2 only

4) Available with process temperature 1 only

5) Available with process connections A ... E only, with process pressure option 1 only and process temperature 1 only

6) Available with process connection B, D, F … L and measuring vane option A

7) Available with process pressure 1 and process temperature 1 only

8) Available with extension length options A … Q only

9) Available with extension length options R … Y only

10) Available with process connection B, D, F …L and measuring vane A, process connection material 3. Available only with extension length options P1A … P1H only

11) Only available with seal at tube end, option P06 … P09

12) Add 16 mm (0.63 inch) to extension length

13) Available with process connections F, G, H, J, K only

14) Available with approval options 2, 4 and 5 only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix

Selection and Ordering data	Order code
Further Designs Please add "**-Z**" to Article No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4 000 mm (157.48 inch)	**Y01**
Stainless steel tag [100 x 45 mm (3.94 x 1.77 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y14**
Heating of enclosure[1)2)]	**A35**
Signal bulb inserted in M20 cable gland[1)]	**A20**
Food grade materials (in contact with process), according to 1935/2004/EC, with FDA conform shaft sealing[3)4)]	**K01**
Seal at tube end for ingress protection and shaft stability	
Max. temperature 80 °C (176 °F)	**P06**
Max. temperature 150 °C (302 °F)	**P07**
Max. temperature 250 °C (482 °F)	**P08**
Max. temperature 600 °C (1 112 °F)	**P09**
Sliding sleeve (standard, max. pressure 0.5 bar)[1)5)]	**P12**
Sliding sleeve (pressure tight, for over-pressure application starting from 1 bar max., dependent on pressure option ordered)[6)]	**P13**
Additional Operating Instructions	Article No.
Multi-language This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E34210883**
Spare Parts	
Motor gear/PLC, multi-voltage	**7ML1830-1KG**
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17 inch)	**7ML1830-1KH**
Hinged vane, 98 x 200 mm (3.86 x 7.87 inch)	**7ML1830-1KJ**

1) Available with approval option 4 only

2) 15) Available with power supply options A ,C, E, G, J, K, L, N, J1B, J1D, J1E, J2A, J2C only

3) Available when ordered with ingress protection seal P06 … P09 only

4) Available up to 250 °C (482 °F). This option does not automatically implement a food conform design

5) Available with process pressure 1 only

6) Available up to 250 °C (482 °F)

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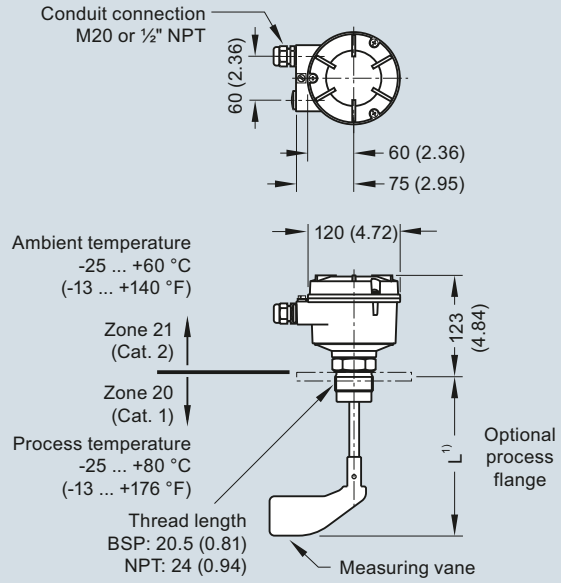
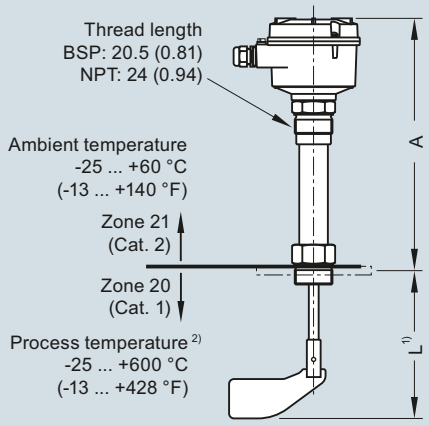
Dimensional drawings

Standard model: compact version



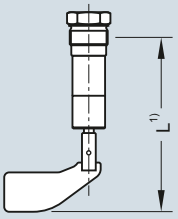
High temperature model: compact version



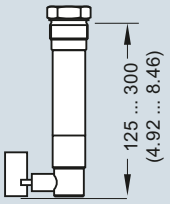
Process temperature	A
150/250 °C (302/482 °F)	200 (7.87)
600 °C (1 112 °F)	400 (15.74)

L= Length
100 (3.94)
150 (5.91)
200 (7.87)
250 (9.84)
300 (11.81)

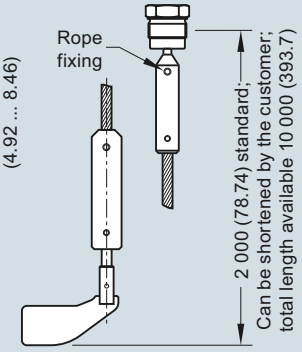
Shaft protected option



Angle option

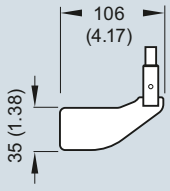


Rope option

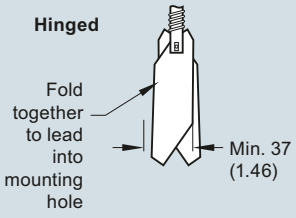


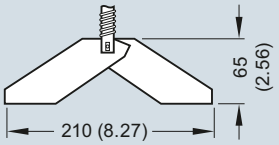
Measuring vanes

Standard

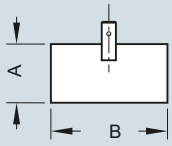


Hinged





Rectangular



Rectangular vane options

A	B
50 (1.97)	98 (3.86)
50 (1.97)	150 (5.90)
50 (1.97)	250 (9.84)
98 (3.86)	150 (5.90)
98 (3.86)	250 (9.84)

Vane	Completely covered with material		Covered up to 10 cm (3.93 inch) with material	
	Spring adjustment		Spring adjustment	
	Light	Central (factory setting)	Light	Central (factory setting)
Boot shaped 35 x 106 mm	200 g/l (12.5 lb/ft³)	300 g/l (18.7 lb/ft³)	100 g/l (6.2 lb/ft³)	150 g/l (9.4 lb/ft³)
Boot shaped 28 x 98 mm	300 g/l (18.7 lb/ft³)	500 g/l (31.2 lb/ft³)	150 g/l (9.4 lb/ft³)	150 g/l (9.4 lb/ft³)
Rectangular 50 x 98 mm	300 g/l (18.7 lb/ft³)	500 g/l (31.2 lb/ft³)	150 g/l (9.4 lb/ft³)	250 g/l (15.6 lb/ft³)
Rectangular 50 x 150 mm	80 g/l (5.0 lb/ft³)	120 g/l (7.5 lb/ft³)	40 g/l (2.5 lb/ft³)	60 g/l (3.7 lb/ft³)
Rectangular 50 x 250 mm	30 g/l (1.9 lb/ft³)	50 g/l (3.1 lb/ft³)	15 g/l (0.9 lb/ft³)	25 g/l (1.6 lb/ft³)
Rectangular 98 x 150 mm	30 g/l (1.9 lb/ft³)	50 g/l (3.1 lb/ft³)	15 g/l (0.9 lb/ft³)	25 g/l (1.6 lb/ft³)
Rectangular 98 x 250 mm	20 g/l (1.2 lb/ft³)	30 g/l (1.9 lb/ft³)	15 g/l (0.9 lb/ft³)	15 g/l (0.9 lb/ft³)
Hinged 98 x 200 mm	70 g/l (4.4 lb/ft³)	100 g/l (6.2 lb/ft³)	35 g/l (2.2 lb/ft³)	50 g/l (3.1 lb/ft³)

1. For 35 x 106 mm boot shaped and 98 x 200 mm hinged measuring vanes, add 16 mm to extension length.
2. For use with all approval options except CSA class II. See manual for more details.

Notes

For heavy material, only top mounting of paddle switch is recommended.
Compact LPS200 is recommended for side mounting on bins for low or intermediate material levels.

SITRANS LPS200, dimensions in mm (inch)

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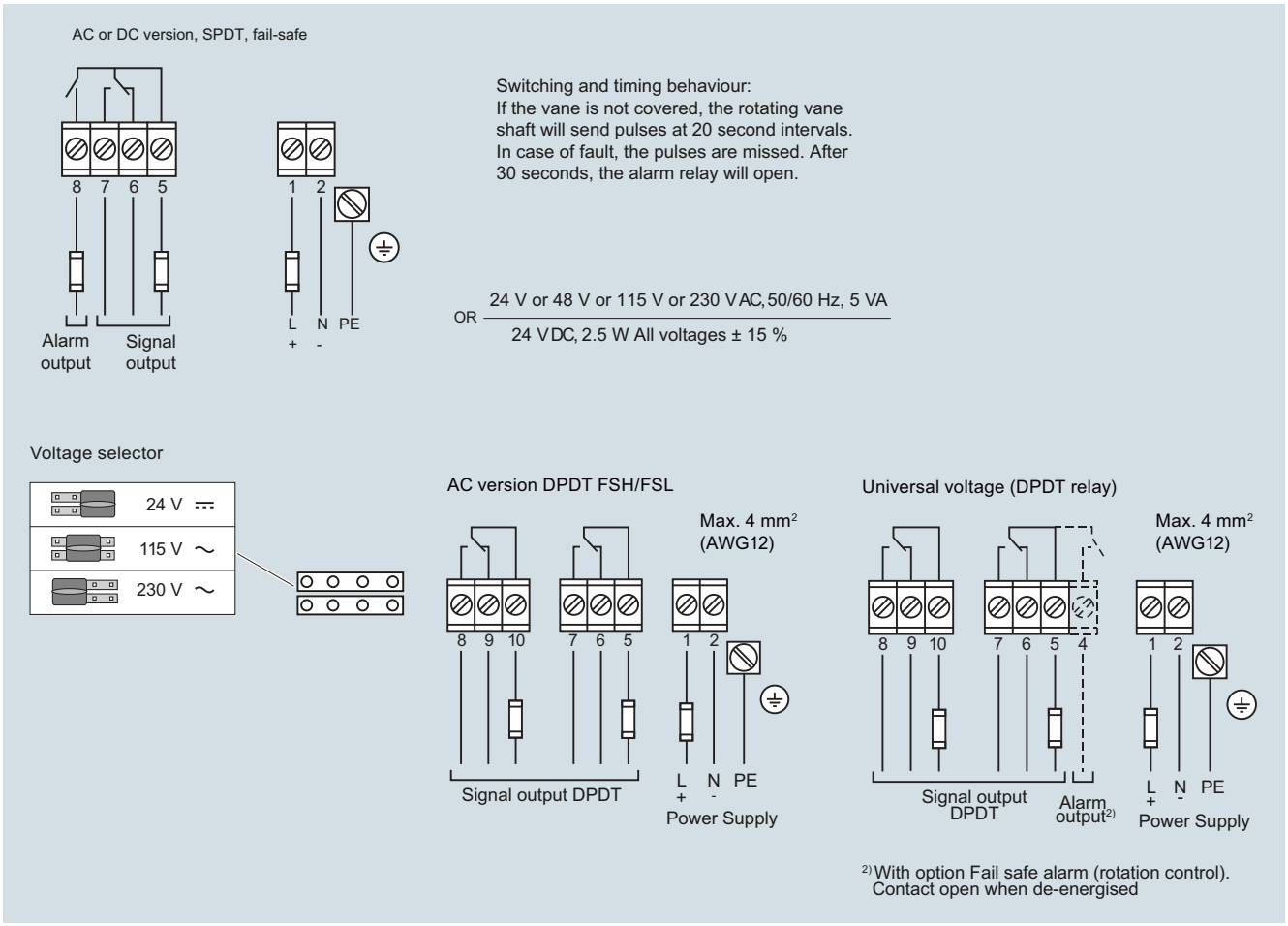
Schematics



SITRANS LPS200 connections

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Overview

The Pointek ULS200 is an ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials.

Benefits

- 2 switch outputs for high-high, high, low and low-low level alarms or pump up/pump down control
- Integral temperature compensation
- AC or DC power supply
- Electronics provided with fail-safe function
- Threaded and sanitary fitting clamp process connections
- Polycarbonate enclosure, Type 6/NEMA 6/IP67
- Easy, two-button programming

Application

The measuring range for bulk solids is max. 3 m (9.8 ft) and 5 m (16.4 ft) for liquids and slurries. Unlike invasive contacting devices, there is no material buildup on the sensor.

The level switch has a rugged design, combining the transducer and electronics in one durable device. It has no moving parts and is virtually maintenance-free.

The transducer, available in ETFE or PVDF copolymer, is inert to most chemicals. This means the device can be used in the chemical, petrochemical, water, and wastewater industries. A sanitary version of the ULS200, with an industry standard flange option, is easy to remove from the application for cleaning. It thus satisfies the prerequisites for use in the food, beverage, and pharmaceutical industries. The Pointek ULS200 delivers superior performance while reducing maintenance, downtime, and equipment replacement costs.

- Key Applications: liquids, slurries, fluid materials, plugged chute detection, chemical industry

Design

Installation

The Pointek ULS200 should be mounted in an area that is within the temperature range specified and that is suitable to the enclosure rating and materials of construction. The cover should be accessible to allow programming, wiring and display viewing.

It is advisable to keep the Pointek ULS200 away from high voltage or current runs, contactors and SCR control drives.

Locate the Pointek ULS200 so that it has a clear sound path perpendicular to the material surface. The sound path should not intersect the fill path, rough walls, seams, rungs etc.

Mounting and Interconnection

The Pointek ULS200 is available in three thread types: 2" NPT, R 2" (BSPT), EN 10226 or PF2 and can be fitted with the optional 75 mm (3 inch) flange adapter for mating to 3" ASME, DN 65, PN 10, and JIS 10K 3B sized flanges.

Separate cables and conduit may be required to conform to standard instrumentation wiring or electrical codes.

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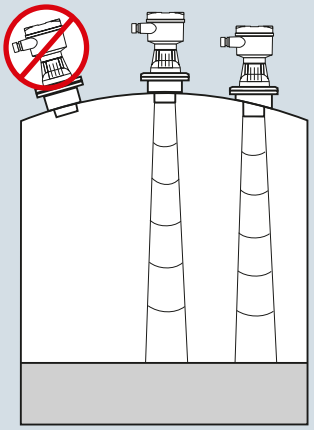
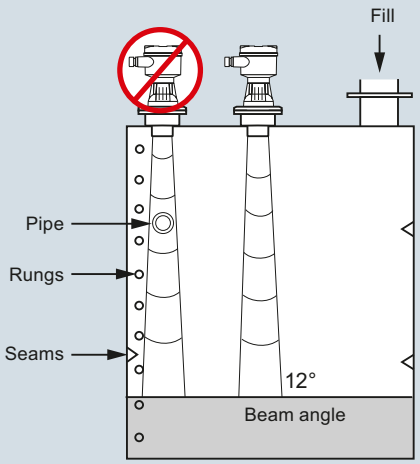
Configuration

Parabolic mounting



Flat mounting and Beam angle



Pointek ULS200 Mounting

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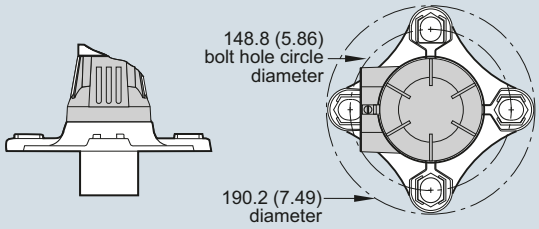
Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level switch
Measuring range	
Measuring range in liquids	0.25 ... 5 m (0.8 ... 16.4 ft)
Measuring range in bulk solids	0.25 ... 3 m (0.8 ... 9.8 ft)
Output	
AC Version (relay)	2 SPDT Form C contacts, rated 5 A at 250 V AC or 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (relay)	2 SPDT Form C contacts, rated 5 A at 30 V DC, resistive load; rated 1 A at 48 V DC resistive load
DC Version (transistor)	2 switches, rated max. 100 mA, 48 V DC
Accuracy	
AC/DC version	
• Resolution	3 mm (0.1 inch)
• Repeatability	0.25 % of measuring range
Rated operation conditions	
Installation conditions	
• Location	Indoors/outdoors
• Beam angle	12°
Ambient conditions	
• Ambient temperature	-40 ... +60 °C (-40 ... +140 °F)
• If mounted in metal threads	-20 ... +60 °C (-5 ... +140 °F)
Medium conditions	
• Process pressure	0.5 bar (7.25 psi) max.
Design	
Material	Polycarbonate with gasket
Weight	Approx. 1.5 kg (3.3 lb)
Transducer material	PVDF or ETFE copolymer
Threaded mounting	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
• Optional flange adapter	For 3" ASME, DN 65, PN 10 and JIS 10 K3B
Sanitary mounting	4" sanitary fitting clamp
Power supply	
AC version	100 ... 230 V AC, ± 15 %, 50/60 Hz, max. 12 VA, 5 W
DC version	18 ... 30 V DC, 3 W
Displays and controls	
Display	LCD, three digits, 9 mm (0.35 inch) high, for display of distance between sensor face and material, multi-segment graphic for operating state
Memory	EEPROM, non-volatile
Programming	2 keys
Electronics/enclosure	Connection: terminal block, max. 2.5 mm^2 (14 AWG) solid/ 1.5 mm^2 (16 AWG) stranded
Degree of protection	IP67/Type 6/NEMA 6
Cable inlet	2 x ½" NPT or 2 x PG 13.5
Certificates and approvals	CE (EMC certificate available on request), CSA $_{US/C}$, FM

Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN 10 and JIS 10K 3B flanges



Pointek ULS200 Optional Flange Adapter, dimensions in mm (inch)

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Pointek ULS200

Selection and Ordering data		Article No.
Pointek ULS200 ↗ Ultrasonic non-contacting switch with two switch points for level detection of bulk solids, liquids and slurries in a wide variety of industries; ideal for sticky materials		**7ML1510-** ■■■ **0** ■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Power supply		
24 V DC, relay output	⬟	**1**
24 V DC, transistor output	⬟	**2**
100 ... 230 V AC, relay output	⬟	**3**
Approvals		
CE, RCM, CSA Class I, II, Div. 2[1]	⬟	**J**
CE, RCM, CSA$_{us/c}$, FM	⬟	**K**
Transducer/Process connection		
ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**A**
EFTE, R 2" [(BSPT), EN 10226]	⬟	**B**
EFTE, G 2" [(BSPP), EN ISO 228-1]	⬟	**C**
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**E**
PVDF copolymer, R 2" [(BSPT), EN 10226]	⬟	**F**
PVDF copolymer, G [(BSPP), EN ISO 228-1]	⬟	**G**
PVDF copolymer, 4" sanitary mounting[2]		**J**
Enclosure/cable inlet		
Polycarbonate		
• Cable inlet PG 13.5	⬟	**1**
• Cable inlet ½" NPT	⬟	**2**

[1] Available with Enclosure/cable inlet option 2 only

[2] Available with Approvals option K only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s)	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ⬟ Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
Quick Start manual, multi-language	**A5E32268616**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	**7ML1930-1AC**
Universal Box Bracket Mounting Kit	**7ML1830-1BK**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	**7ML1830-1BT**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	**7ML1830-1BU**
2" BSPT Locknut, plastic	**7ML1830-1DQ**
2" NPT Locknut	**7ML1830-1DT**
4" sanitary mounting clamp	**7ML1830-1BR**
Spare Parts	
Polycarbonate Lid	**7ML1830-1LG**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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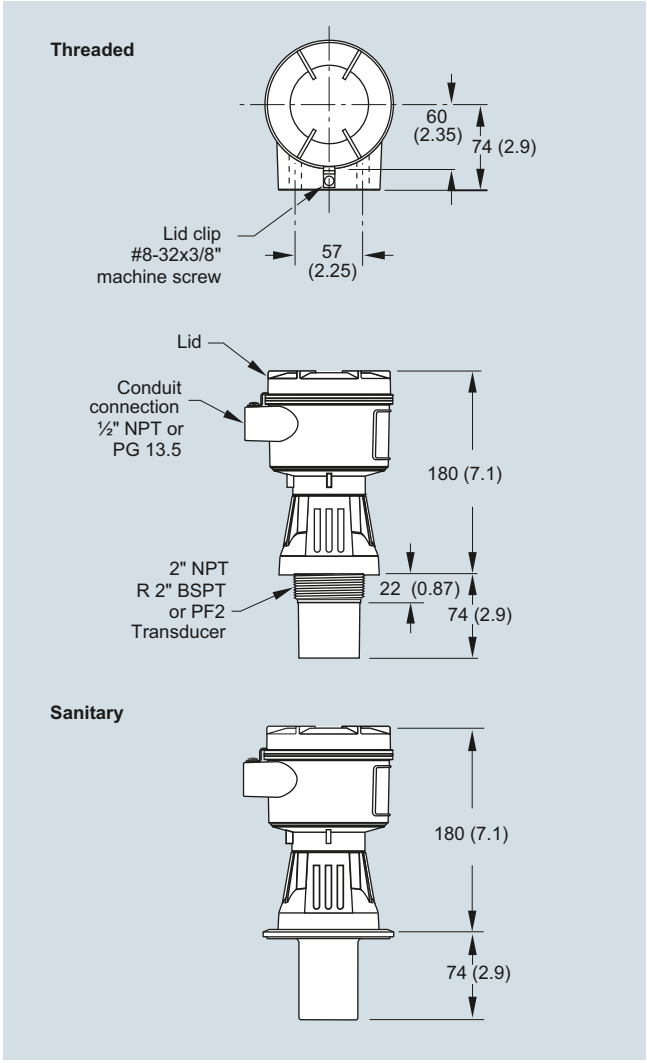
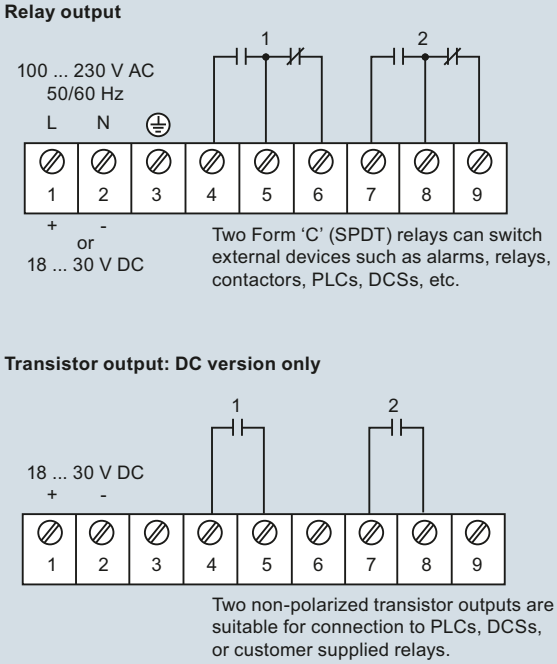
Dimensional drawings



Pointek ULS200, dimensions in mm (inch)

Schematics



Pointek ULS200 connections

4

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Overview

Introduction

Ultrasonic measurement is based on the speed of sound. Sound can be used as a measurement tool because there is a measurable time lapse between sound generation and the "hearing" of the sound. This time lapse is then converted into usable information. Ultrasonic sensing equipment generates a sound above 20 000 Hz and then interprets the time lapse of the returned echo. The transducer creates the sound and senses the echo and then a transceiver interprets the sound and converts it into information.

Siemens ultrasonic units include Sonic Intelligence, a signal processing technology. Using unique algorithms, Sonic Intelligence differentiates between true echoes from the material and false echoes from obstructions or electrical noise, providing intelligent processing of echo profiles.

Typical System

Ultrasonic level measurement requires two components: one to generate the sound and catch the echo (transducer) and one to interpret the data and derive a measurement (transceiver). Even though some ultrasonic instruments combine the components in one unit, the individual functionality remains distinct. The measurement output is communicated to the unit, PLCs or PCs for process control.

Principle of Operation

A piezoelectric crystal inside the transducer converts an electrical signal into sound energy, firing a burst into the air which travels to the target and then is reflected back to the transducer. The transducer then acts as a receiving device and converts the sonic energy back into an electrical signal contained in the transceiver. An electronic signal processor analyzes the return echo and calculates the distance between the transducer and the target. The time lapse between firing the sound burst and receiving the return echo is directly proportional to the distance between the transducer and the material in the vessel. This basic principle lies at the heart of the ultrasonic measurement technology and is illustrated in the equation:
Distance = (Velocity of Sound x Time)/2.

Mode of operation

Common Terms

Attenuation

Denotes a decrease in signal magnitude in transmission from one point to another. Attenuation may be expressed as a scalar ratio of the input magnitude to the output magnitude or in decibels.

Beam angle

The diameter of a conical boundary centered around the axis of transmission when the power (radiating perpendicular to the transducer face on the axis of transmission) is reduced by half (-3 dB).

Blanking distance

Specified zone extending downward from the transducer face in which received echoes are ignored by the transceiver. Blanking distance ignores echoes from ringing.

Echo confidence

The recognition of the validity of the echo as material level.
A measure of echo reliability.

Ringing

The inherent nature of the transducer to continue vibrating after the transmit pulse has ceased; the decay of the transmit pulse.

Transducer/Transceiver

A transducer provides the initial ultrasonic pulse and receives its echo. An ultrasonic transducer amplifies the sound wave created by the piezoelectric crystal and transmits that sound wave to the face of the transducer while at the same time dampening the sound wave from the other sides of the crystal.

Transceivers analyze the echo from the transducer to determine the required measurement.

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Technical specifications

Ultrasonic Transmitter/Controller Selection Guide

Criteria	SITRANS Probe LU	SITRANS LUT400	HydroRanger 200	MultiRanger 100/200	SITRANS LU
Range	6 m (20 ft) or 12 m (40 ft)	0.3 ... 60 m (1 ... 196 ft), transducer and application dependent	15 m (50 ft) transducer and application dependent	15 m (50 ft) transducer and application dependent	60 m (200 ft) transducer and application dependent
Typical applications	Chemical storage vessels, filter beds, liquid storage vessels	Wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage	Wet wells, flumes/weirs, bar screen control	Wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage	Chemical storage, liquid storage, bulk solids storage (sugar, flour bins, grains, cereals), plastic pellets
Output	HART model: 4 ... 20 mA/HART PROFIBUS PA model: PROFIBUS	4 ... 20 mA/HART 3 relays	6 relays standard, two 4 ... 20 mA outputs (isolated)	1 relay (option on MultiRanger 100) 3 relays standard 6 relays (option) Two 4 ... 20 mA outputs (isolated)	4 relays (LU01, LU02) Up to 40 relays (LU10) 4 ... 20 mA isolated
Communications	HART or PROFIBUS PA Options: • SIMATIC PDM for remote configuration and diagnostics	HART 7.0, USB, SIMATIC PDM	Built-in Modbus RTU/ ASCII via RS-485 Options: • SIMATIC PDM • SmartLinx (PROFIBUS DP, DeviceNet)	Built-in Modbus RTU or ASCII via RS-485 Options: • SIMATIC PDM • SmartLinx (PROFIBUS DP, DeviceNet)	Dolphin, RS-232/RS-485 (LU01, LU02)) Dolphin via infrared (LU10)
Power specifications	HART: 4 ... 20 mA, 24 V DC nominal, max. 550 Ω, 30 V DC max. PROFIBUS PA: 12, 13, 15, or 20 mA, dependent on programming	AC version: 100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V DC version: 10 … 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V	AC version: 100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W	AC version: 100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA/17 W DC version: 12 ... 30 V DC, 20 W	LU01, LU02: AC version: 100/115/200/ 230 V AC DC version: 18 ... 30 V DC, 25 W LU10: 100/115/200/ 230 V AC
Approvals	CE, $CSA_{US/C}$, FM, RCM, ATEX, IECEx	CE, $CSA_{US/C}$, UL Listed, FM, RCM, Lloyd's Register, ABS	CE, $CSA_{US/C}$, UL Listed, FM, RCM	CE, $CSA_{US/C}$, UL Listed, FM, RCM	CE, $CSA_{US/C}$, FM, Lloyd's Register

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Ultrasonic

7ML1830-2AN

SITRANS Probe LU HART*
SITRANS LU

7ML5830-2AJ

SITRANS Probe LU PROFIBUS

7ML1830-2AK

MultiRanger 100/200
HydroRanger 200

* **Note:** To order the IS version of this hand programmer, order 7ML5830-2AH.

Handheld programmer selection guide

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Application

SIEMENS

Ultrasonic Level Application Questionnaire

Customer information

Contact: _____ Prepared By: _____
Company: _____ Date: _____
Address: _____ Notes on the Application: _____
City: _____ Country: _____
Zip/Postal Code: _____ Phone: ( ) _____
Fax: ( ) _____ E-mail: _____

Tanks/Vessel information (Supply sketch where possible) Sketch attached ☐

Type:
☐ Storage
☐ Process
☐ Pump station
☐ Open channel

Dimensions:
Height: _____ m/ft
Width/Diameter: _____ m/ft

Critical Information
Nozzle Length: _____ cm/inch
Nozzle Diameter: _____ cm/inch

Tank top: ☐ Open ☐ Flat ☐ Conical ☐ Parabolic

Tank bottom: ☐ Sloped ☐ Flat ☐ Conical ☐ Parabolic

Internal equipment and/or obstructions: (Eg. Agitator, heating coils, supports, other)
☐ No
☐ Yes Please list _____

Measurement type: ☐ Point Level ☐ Continuous Level ☐ Volume ☐ Flow

Area safety classification: (Specify code required) _____

Material

Material being measured: _____ ☐ Slurry ☐ Liquid ☐ Solid

Material temperature: Norm: _____ °C/°F Max: _____ °C/°F

Atmosphere: ☐ Air ☐ Other _____ **Homogenous:** ☐ Yes ☐ No

Dust: ☐ None ☐ Light ☐ Heavy

Installation (indicate all that apply)

Power available: _____

Inputs required:
☐ 4 ... 20 mA
☐ Pump Interlocks (#): _____

Outputs required:
☐ 4 ... 20 mA
☐ Relays (#): _____

Communications:
☐ HART/4 ... 20 mA
☐ PROFIBUS DP
☐ PROFIBUS PA
☐ Modbus RTU/ASCII
☐ DeviceNet
☐ Other
☐ None

Products recommended:

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Ultrasonic Application Questionnaire

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SITRANS Probe LU

Overview

SITRANS Probe LU is a 2-wire loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.

Benefits

- Continuous level measurement up to 12 m (40 ft) range
- Easy installation and simple start-up
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART Communicator
- Communication using HART or PROFIBUS PA
- ETFE or PVDF transducers for chemical compatibility
- Sonic Intelligence signal processing
- Auto False-Echo Suppression for fixed obstruction avoidance
- Level to volume or level to flow conversion

Application

The SITRANS Probe LU is ideal for level monitoring in the water and wastewater industry, chemical storage vessels, and small bulk hoppers.

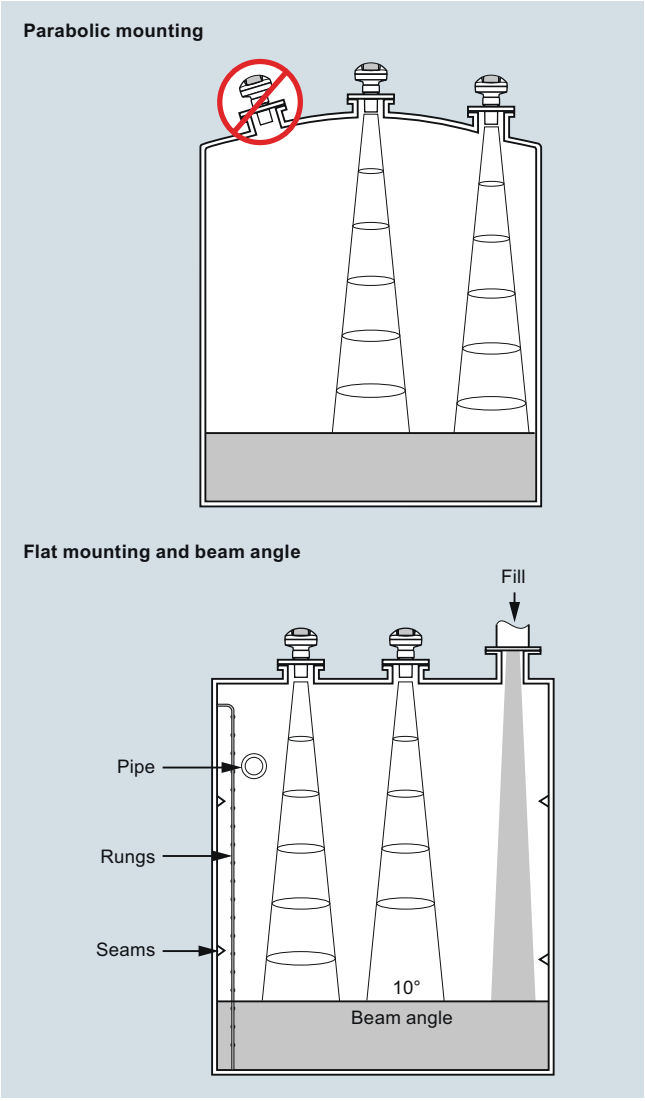
The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Sonic Intelligence, Auto False Echo Suppression for fixed obstruction avoidance, and accuracy of 0.15 % of range or 6 mm (0.25 inch), the Probe LU provides unmatched reliability.

The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

The transducer on the Probe LU is available as ETFE or PVDF to suit the chemical conditions of your application. As well, for applications with varying material and process temperatures, the Probe LU incorporates an internal temperature sensor to compensate for temperature changes.

- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration



SITRANS Probe LU mounting

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Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level measurement
Typical application	Level measurement in storage vessels and simple process vessels
Inputs	
Measuring range	
• 6 m (20 ft) model	0.25 ... 6 m (10 inch ... 20 ft)
• 12 m (40 ft) model	0.25 ... 12 m (10 inch ... 40 ft)
Frequency	54 kHz
Outputs	
mA/HART	
• Range	4 ... 20 mA
• Accuracy	± 0.02 mA
PROFIBUS PA	Profile 3, Class B
Performance	
Resolution	≤ 3 mm (0.12 inch)
Accuracy	± the greater of 0.15 % of range or 6 mm (0.24 inch)
Repeatability	≤ 3 mm (0.12 inch)
Blanking distance	0.25 m (10 inch)
Update time	≤ 5 s
• 4/20 mA/HART version	≤ 5 s at 4 mA
• PROFIBUS version	≤ 4 s at 15 mA current loop
Temperature compensation	Built-in to compensate over temperature range
Beam angle	10°
Rated operating conditions	
Ambient conditions	
• Location	Indoor/outdoor
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Relative humidity/ingress protection	Suitable for outdoor
• Installation category	I
• Pollution degree	4
Medium conditions	
• Temperature at flange or threads	-40 ... +85 °C (-40 ... +185 °F)
• Pressure (vessel)	0.5 bar g (7.25 psi g)
Design	
Material (enclosure)	PBT (Polybutylene Terephthalate)
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6/ IP67/IP68 enclosure
Weight	2.1 kg (4.6 lb)
Cable inlet	2 x M20x1.5 cable gland or 2 x ½" NPT thread or 1 x M20 x 1.5 and 1 x ½" NPT
Material (transducer)	ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)

Process connection	
Threaded connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Flange connection	3 inch (80 mm) universal flange
Other connection	FMS 200 mounting bracket (see page 5/189) or customer supplied mount
Display and Controls	
Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
Memory	Non-volatile EEPROM
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 4 ... 20 mA
PROFIBUS PA	12, 13, 15, or 20 mA depending on programming (General Purpose or Intrinsically Safe version) Per IEC 61158-2
Certificates and Approvals	
General	$CSA_{US/C}$, FM, CE, RCM
Marine (only applies to HART communication option)	• Lloyd's Register of Shipping • ABS Type Approval
Hazardous	
• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga
• Intrinsically Safe (USA/Canada)	CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (International)	SIR 13.0008X Ex ia IIC T4 Ga
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga
• Non-incendive (USA)	FM Class I, Div. 2, Groups A, B, C, D T4
Handheld Programmer	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	ATEX II 1GD / IECEx SIR 09.0073 Ex ia IIC T4 Ga Ex iaD 20 T135 °C FM/CSA Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G T6
Ambient temperature	-20 ... 50 °C (-5 ... 122 °F)
Interface	Proprietary infrared pulse signal
Power	3 V lithium battery (non-replaceable)

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SITRANS Probe LU

Selection and Ordering data		Article No.
SITRANS Probe LU **2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels, and simple process vessels.** ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	↗	**7ML5221-** ■■■■■
Enclosure/Cable Inlet		
Plastic (PBT), 1 x M20x1.5 and 1 x ½" NPT (no cable glands supplied)	⬟	**0**
Plastic (PBT), 2 x M20x1.5 (includes 1 general purpose cable gland: 7ML1930-1AM)	⬟	**1**
Plastic (PBT), 2 x ½" NPT (no cable glands supplied)	⬟	**2**
Range/Transducer material		
6 m (20 ft), ETFE	⬟	**A**
6 m (20 ft), PVDF Copolymer	⬟	**B**
12 m (40 ft), ETFE	⬟	**C**
12 m (40 ft), PVDF Copolymer	⬟	**D**
Process connection		
2" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**A**
R 2" [(BSPT), EN 10226]	⬟	**B**
G 2" [(BSPP), EN ISO 228-1]	⬟	**C**
Communication/Output		
4 ... 20 mA, HART	⬟	**1**
PROFIBUS PA	⬟	**2**
Approvals		
General Purpose, FM, $CSA_{US/C}$, CE, RCM, KCC	⬟	**1**
Non-incendive, FM Class I, Div. 2 Groups A,B,C,D T5[1]	⬟	**4**
Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4[2]	⬟	**5**
Intrinsically Safe ATEX 1G / IECEx / INMETRO Ex ia IIC T4 Ga, RCM, KCC[2]	⬟	**6**
Intrinsically Safe ATEX 1G / IECEx / INMETRO Ex ia IIC T4 Ga, RCM, KCC[3]	⬟	**7**
Intrinsically safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1 Groups E, F, G; Class III T4[3]	⬟	**8**

1) Available with Enclosure/Cable Inlet option 2 only.

2) Available with communication option 2 only.

3) Available with communication option 1 only.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Operating Instructions for HART/mA device		Article No.
English		**A5E32337695**
French		**7ML1998-5HT11**
German Note: The Operating Instructions should be ordered as a separate item on the order.		**A5E34957881**
Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.		**A5E32168031**
Operating Instructions for PROFIBUS PA device		
English		**A5E32337708**
German Note: The Operating Instructions should be ordered as a separate item on the order.		**A5E34957884**
Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.		**A5E32081626**
Accessories		
Handheld programmer, Intrinsically Safe, EEx ia		**7ML5830-2AH**
Handheld programmer, General Purpose approvals		**7ML1830-2AN**
Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA		**7ML5830-2AJ**
HART modem/USB (for use with a PC and SIMATIC PDM)		**7MF4997-1DB**
2" NPT locknut, plastic		**7ML1830-1DT**
2" BSPT locknut, plastic		**7ML1830-1DQ**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT		**7ML1830-1BT**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT		**7ML1830-1BU**
One General Purpose polymeric cable gland M20x1.5, rated for -20 ... +80 °C (-4 ... +176 °F)		**7ML1930-1AM**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) for General Purpose or ATEX EEx e installations (available for HART only)		**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA)		**7ML1930-1AQ**
Probe LU, rock guard/sunshield kit, 304 stainless steel		**7ML1930-1GH**
SITRANS RD100, loop powered display - see Chapter 7		**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7		**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7		**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7		**7ML5750-...**
For applicable back up point level switch see point level measurement section.		
Spare Parts		
Plastic lid		**7ML1830-1KB**

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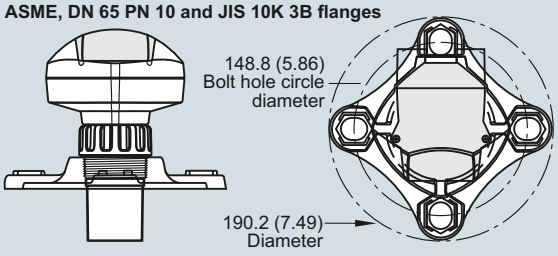
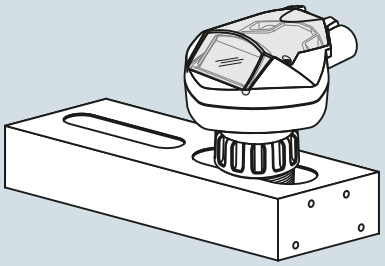
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN 10 and JIS 10K 3B flanges



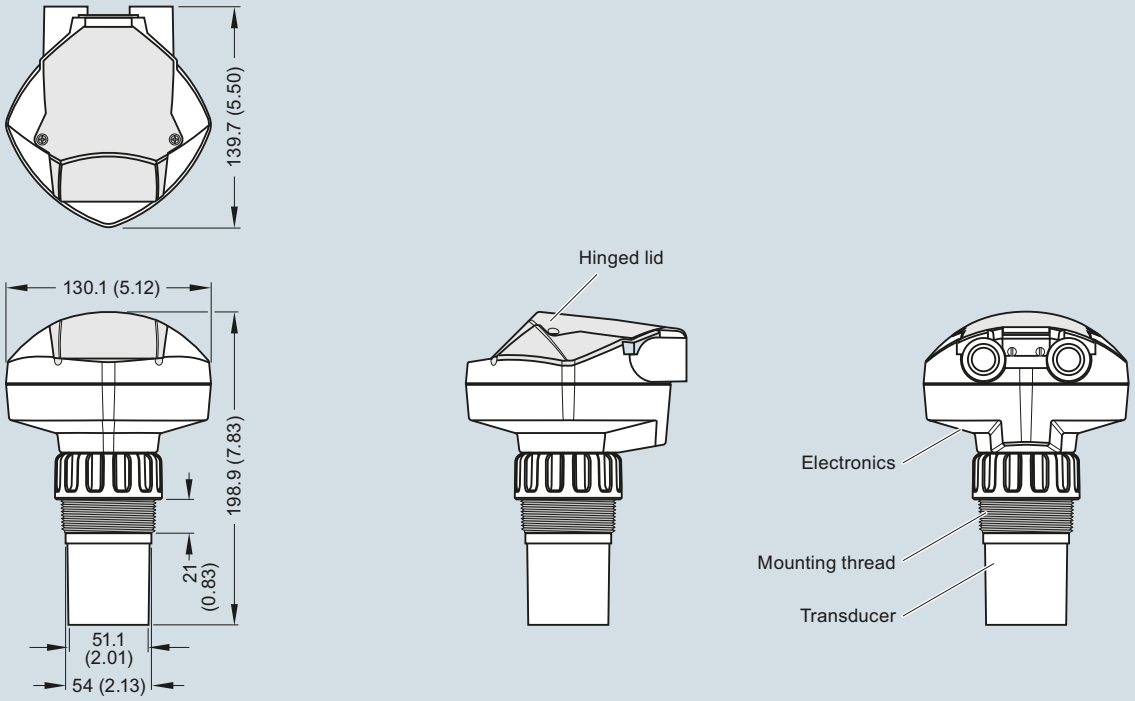
SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with FMS 200 mounting bracket



SITRANS Probe LU with optional mounting bracket

Dimensional drawings



Note: Above model is shown without M20 cable glands or 1/2" NPT conduit connectors.

SITRANS Probe LU, dimensions in mm (inch)

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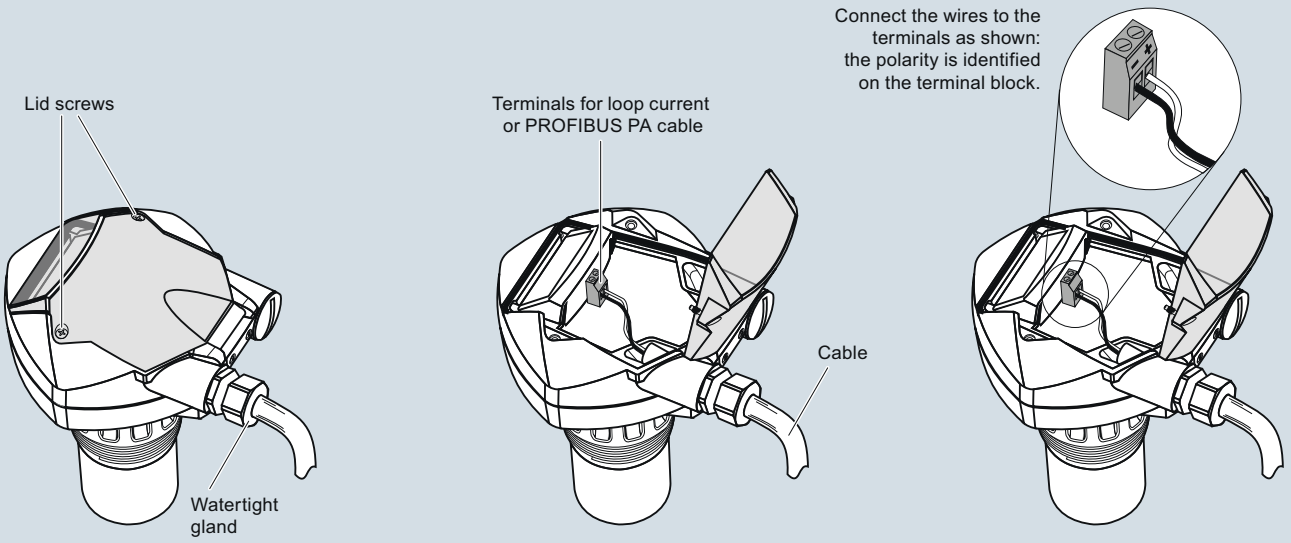
Schematics



Note:

- HART model above is shown with M20 cable glands. 1/2" NPT threaded connection is also available.
- DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
- All field wiring must have insulation suitable for rated input voltages.
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LU connections

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Overview

The Probe is a short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels.

Benefits

- Easy to install, program and maintain
- Accurate and reliable
- Sanitary models available
- Sonic Intelligence echo processing
- Integral temperature compensation

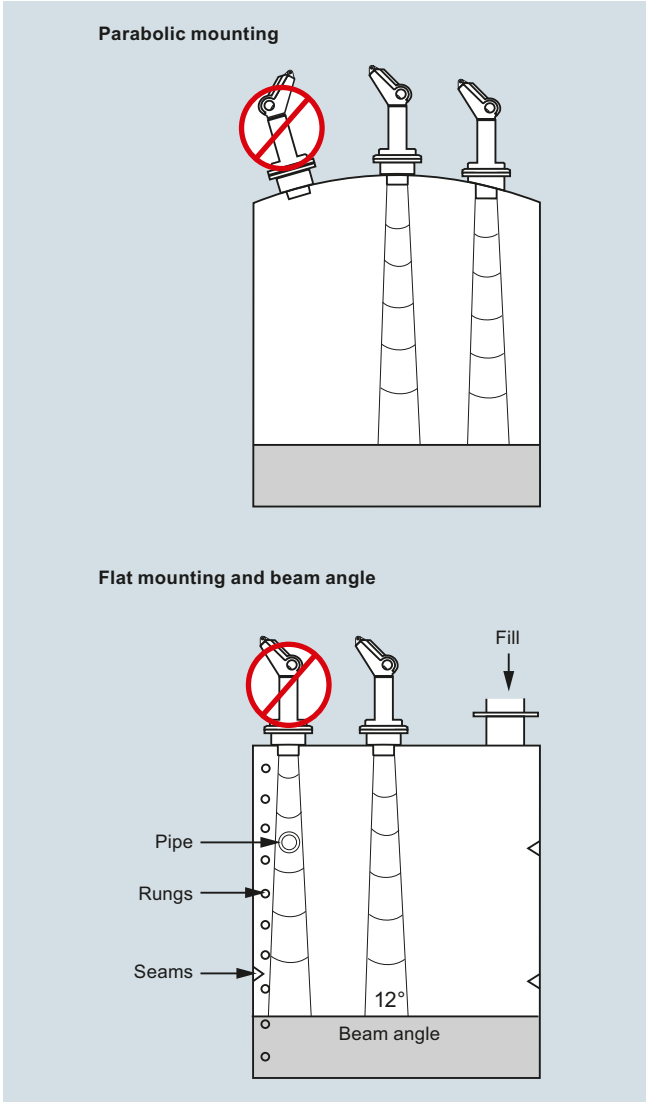
Application

The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. The Probe is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

The reliability of the level data is based on the Sonic Intelligence echo processing algorithms. A filter discriminates between the true echo and false echoes from acoustic or electrical noises and agitator blades in motion. The ultrasonic pulse propagation time to the material and back is temperature-compensated and converted into distance for display, analog output and relay actuation.

- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

Configuration



The Probe mounting

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The Probe

Technical specifications

	Three-wire version	Two-wire version (standard)
Mode of operation		
Measuring principle	Ultrasonic level measurement	Ultrasonic level measurement
Input		
Measuring range	0.25 ... 5 m (0.8 ... 16.4 ft)	0.25 ... 5 m (0.8 ... 16.4 ft)
Frequency	54 kHz	54 kHz
Output		
mA	4 ... 20 mA	4 ... 20 mA
• Span	Proportional/ inversely proportional	Proportional/ inversely proportional
• Max. load	750 Ω at 24 V DC	600 Ω in the loop at 24 V DC
Relay	For level alarm or fault	No
Power supply		
Supply voltage	18 ... 30 V DC, max. 0.2 A	12 ... 30 V DC, 0.1 A surge
Max. power consumption	5 W (200 mA at 24 V DC)	0.75 W (25 mA at 24 V DC)
Certificates and approvals	CE, RCM, $CSA_{US/C}$, FM	CE, RCM, $CSA_{US/C}$
Accuracy		
Error in measurement	0.25 % of measuring range (in air)	
Resolution	3 mm (0.125 inch)	
Temperature compensation	Built in	
Echo processing	Sonic Intelligence	
Rated operation conditions		
Beam angle	12°	
Ambient temperature		
• Standard	-40 ... +60 °C (-40 ... +140 °F)	
• Metallic mounting	-20 ... +60 °C (-4 ... +140 °F)	
Max. static operating pressure	Normal atmospheric pressure	
Degree of protection	IP65	
Design		
Weight		
• Without flange adapter	1.5 kg (3.3 lb)	
• With flange adapter	1.7 kg (3.7 lb)	
Material		
• Electronics enclosure	PVC	
• Transducer	PVDF copolymer	
Degree of protection	IP65	
Process connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]	
Flange adapter	3" Universal, (fits DN 65, PN 10 and 3"ASME) 4" sanitary	
Cable inlet	2 inlets for PG 16 or ½" NPT cable glands	

Selection and Ordering data		Article No.
The Probe	↗	**7ML1201-**
Short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels		**0 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Measuring range		
5 m (16.40 ft)	⬟	**1**
Transducer/Process connection		
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**E**
PVDF copolymer, R 2" [(BSPT), EN 10226]	⬟	**F**
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]	⬟	**G**
PVDF copolymer, 4" Sanitary mounting	⬟	**J**
Model/Approval		
3 Wire, 24 V DC, CE, RCM, CSA, FM	⬟	**E**
2 Wire, 24 V DC, CE, RCM, CSA	⬟	**F**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
⬟ Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 20 characters) specify in plain text	**Y17**
Additional Operating Instructions	Article No.
3 Wire, 24 V model, Multi-language manual	**7ML1998-5GD62**
2 Wire model, Multi-language manual	**A5E32243983**
Accessories	
Universal Box Bracket Mounting kit	**7ML1830-1BK**
Sanitary 4" mounting clamp	**7ML1830-1BR**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT	**7ML1830-1BT**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT	**7ML1830-1BU**
2" NPT locknut, plastic	**7ML1830-1DT**
2" BSPT locknut, plastic	**7ML1830-1DQ**
Plastic M20 cable gland with metal locknut	**7ML1930-1DB**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch see point level measurement section.	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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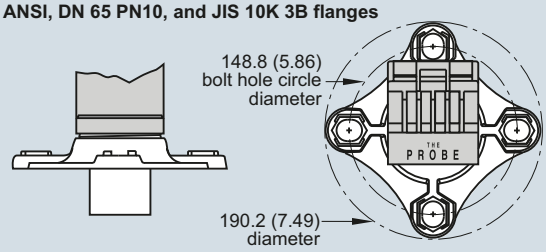
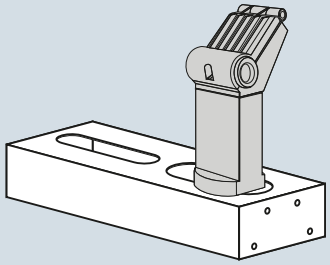
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ANSI, DN 65 PN10, and JIS 10K 3B flanges



The Probe Optional Flange Adapter, dimensions in mm (inch)

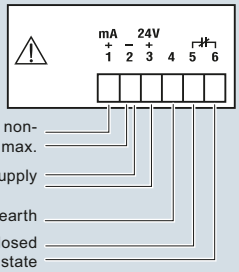
The Probe with FMS 200 mounting bracket



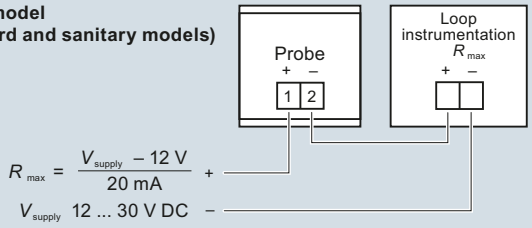
The Probe with Optional Mounting Bracket

Schematics

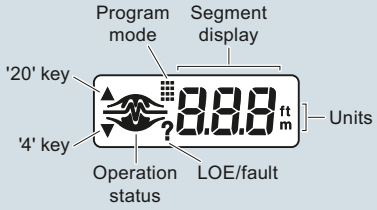
3 wire model (standard and sanitary models)



2 wire model (standard and sanitary models)



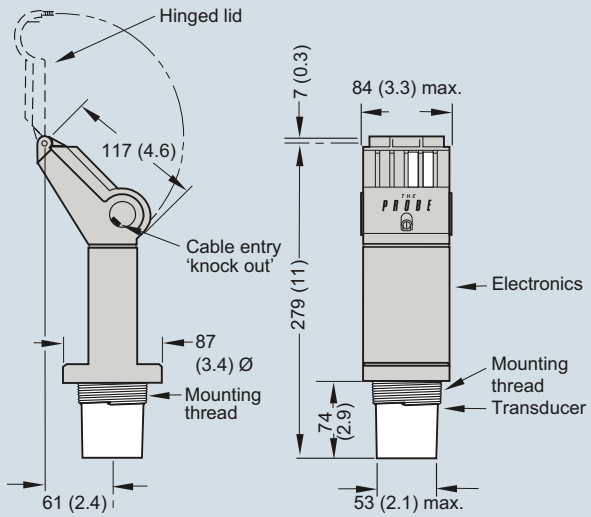
Display



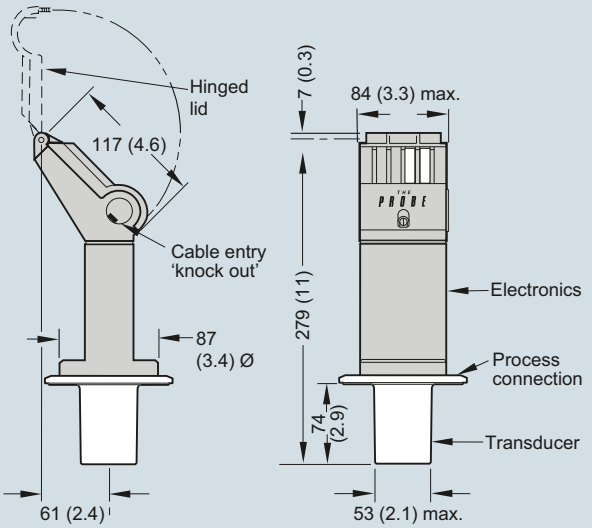
The Probe connections

Dimensional drawings

Standard model



Sanitary model



The Probe, dimensions in mm (inch)

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SITRANS LUT400 series

Overview

The Siemens SITRANS LUT400 series controllers are compact, single point, long-range ultrasonic controllers for continuous level or volume measurement of liquids, slurries, and solids, and high accuracy monitoring of open channel flow.

Benefits

- Small 1/2 DIN enclosure [144 h x 144 d x 146 w mm (5.7 x 5.7 x 5.75 inch)] with standard universal mounting bracket for wall, pipe, and DIN rail, plus an optional panel mount
- Easy to use HMI display with local four-button programming, menu-driven parameters, and Wizard support for key applications
- English, German, French, Spanish, Chinese, Italian, Portuguese, and Russian texts on the HMI.
- Level, Volume, OCM Flow monitoring
- Three relays combined with a suite of pump, alarm, and relay control features
- HART Communications
- EDDs for SIMATIC PDM, AMS Device Manager, and Field Communicator 375/475, plus DTMs for FDTs (Field Device Tools)
- Web browser for local programming from an intuitive web-based interface
- Two discrete inputs for backup level override and pump interlock functions
- Echo profile and trend views from the local display
- Patented digital receiver for improved performance in electrically noisy applications (close proximity to VSDs)
- Real time clock with daylight savings time, supporting an integrated datalogger and energy saving algorithms for minimizing pump operation during high cost energy periods
- Removable terminal blocks for ease of wiring
- MCERTS Certified for Open Channel Flow

Application

The SITRANS LUT400 comes in three different models, depending on the application, level of performance and functionality required:

- SITRANS LUT420 Level Controller: Level or volume measurement of liquids, slurries, and solids, as well as basic pump control functions, and basic data logging capability
- SITRANS LUT430 Level, Pump and Flow Controller: Includes all features of the LUT420 plus a full suite of advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability
- SITRANS LUT440 High Accuracy OCM: Our most featured, highest accuracy model. Includes all features of the LUT430, plus the industry's best accuracy (± 1 mm within 3 m), full suite of advanced control functionality, and enhanced flow logging capability
- Key applications: wet wells, reservoirs, flumes/weirs, chemical storage, liquid storage, hoppers, crusher bins, dry solids storage

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Technical specifications

Mode of Operation	Ultrasonic level, volume, pump, and open channel flow
Measuring range	0.3 … 60 m (1 … 196 ft), transducer dependent
Input	
Discrete	0 ... 50 V DC switching level Logical 0 ≤ 10 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
Transducer frequency	10 ... 52 kHz
Ultrasonic transducer	Compatible transducers: All EchoMax and ST-H series transducers
Relays	• 1 SPDT Form C, NO or NC relay, rated 1A at 250 V AC, non-inductive and 3A at 30 V DC • 2 SPST Form A, NO relays, rated 5A at 250 V AC, non-inductive and 3 A at 30 V DC
mA output	4 … 20 mA, isolated
• Max. load	600 Ω max. in ACTIVE mode, 750 Ω max. in PASSIVE mode
• Resolution	0.1 % of range
Accuracy	
Error in measurement	• Standard operation: ± 1 mm (0.04 inch) plus 0.17 % of measured distance • High accuracy OCM: ± 1 mm (0.04 inch), within 3 m (9.84 ft) range
Resolution	• Standard operation: 0.1 % of range or 2 mm (0.08 inch), whichever is greater • High accuracy OCM: 0.6 mm (0.02 inch), within 3 m (9.84 ft) range
Temperature compensation	• -40 ... +150 °C (-40 ... +300 °F) • Integral temperature sensor in transducer • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 … +50 °C (-4 … +122 °F)

Design	
Weight	
• Enclosure with display lid	1.3 kg (2.87 lb)
• Enclosure with blank lid:	1.2 kg (2.65 lb)
Material (enclosure)	Polycarbonate
Degree of protection	
• Enclosure with display or blank lid:	IP65/Type 4X/NEMA 4X
• Enclosure with blank lid and knock-out removed:	IP20
Remote display lid	IP65/Type 3/NEMA 3
Cable	
Transducer and mA output signal	• Transducer, mA output: 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 … 0.75 mm² (22 … 18 AWG) • Relay/power to be copper conductors per local requirements to meet 250 V 5 A contact rating
Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	60 x 40 mm (2.36 x 1.57 inch) removable LCD, 240 x 160 pixels resolution, operational up to 5 m from enclosure base
Programming	
• Primary	4 Local push buttons
• Secondary	• PC running SIMATIC PDM • PC running Emerson AMS Device Manager • PC running a web browser • PC running a Field Device Tool (FDT) • Field Communicator 375/475 (FC375/FC475)
Memory	• 512 kB flash EPROM • 1.5 MByte flash for data logging
Power supply	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA Fuse: 5 x 20 mm, Slow Blow, 0.25 A, 250 V
DC version	10 … 32 V DC, 10 W Fuse: 5 x 20 mm, Slow Blow, 1.6 A, 125 V
Certificates and approvals	
General	$CSA_{US/C}$, CE, FM, UL listed, RCM, MCERTS certified for Open Channel Flow
Hazardous	
• Non-incendive (Canada)	CSA Class I, Div. 2, Groups A, B, C, D; Class II, Div. 2, Groups F, G; Class III
• Shipping	Lloyd's Register, ABS
Communication	HART 7.0, USB

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SITRANS LUT400 series

		SITRANS LUT420	SITRANS LUT430	SITRANS LUT440
Category	**Feature**	**Level Controller**	**Level, pump and flow controller**	**High accuracy OCM controller**
Operations	Level, space, and distance measurement	✓	✓	✓
	Open channel flow measurement		✓	✓
	Volume conversion	✓	✓	✓
Specifications	Compatible with EchoMax and ST-H transducers	✓	✓	✓
	Standard accuracy: ± 1 mm +0.17 % of measured distance	✓	✓	✓
	High accuracy: ± 1 mm within 3 meters			✓
	Mounting options: wall or panel, pipe, DIN-rail	✓	✓	✓
Data logging and communications	HART communications	✓	✓	✓
	4 ... 20 mA output (active and passive)	✓	✓	✓
	Integrated datalogger for measurement value and alarms	✓	✓	✓
	Integrated datalogger for fixed rate flow logging		✓	✓
	Integrated datalogger for variable rate flow logging triggered by changes in flow condition			✓
	Daily data logging for maximum, minimum and average flow, daily totalized volume, and minimum and maximum temperature		✓	✓
Flow monitoring	High accuracy open channel flow measurement			✓
	9 digit daily and running flow totalizers		✓	✓
	High and low flowrate alarms		✓	✓
	External totalizer and sampler control		✓	✓
	MCERTS Class 1 Certification			✓
	MCERTS Class 2 Certification		✓	
Pump control	Energy saving algorithms for pump control		✓	✓
	Wall cling reduction	✓	✓	✓
	Pump run-on functionality		✓	✓
	Pump start and power resumption delays		✓	✓
	Alternate duty pump routines	✓	✓	✓
	Fixed duty and service ratio pump routines		✓	✓
	Pumped volume totalizer		✓	✓
	Submergence detection	✓	✓	✓
	Discrete input pump interlocks		✓	✓
	Time to spill calculation		✓	✓

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Selection and Ordering data		Article No.
SITRANS LUT420 and LUT430 Compact ultrasonic level controllers for continuous short to long-range level or volume measurement of liquids, slurries, and solids. Both units include basic relay functions for pumps, alarms, and other controls, plus onboard data logging. LUT430 offers additional advanced pump control and alarm functionality, open channel flow monitoring, and basic flow data logging capability. Functionality varies by model.	↗	**7ML5050-** **0 ■ ■ ■ - ■ ■ ■ 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Model		
SITRANS LUT420 - Level controller	⬟	**A**
SITRANS LUT430 - Level, Pump & Flow controller	⬟	**B**
Enclosure display options		
With display	⬟	**A**
With remote panel mount display [Includes panel mount cable extension, 2.5 m (8.2 ft)]	⬟	**B**
No display (blank lid provided)	⬟	**C**
Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715		
Input voltage		
100 ... 230 V AC ± 15 %	⬟	**1**
10 ... 32 V DC	⬟	**2**
Cable inlet		
3 cable inlets, cable glands not supplied	⬟	**1**
3 cable inlets, 3 M20 plastic cable glands supplied	⬟	**2**
Number of measurement points		
Single point system (includes one transducer input, one mA output, and one external temperature sensor input)	⬟	**1**
Communications and I/O		
HART, 2 discrete inputs, 3 relays	⬟	**D**
Approvals		
General purpose CE, FM, $CSA_{US/C}$, UL, RCM	⬟	**A**
Hazardous locations CSA Class I, II, III, Div. 2 (Groups A, B, C, D, F, G)		**C**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA	⬟	**N07**
Operating Instructions		Article No.
English		**A5E33329501**
French		**7ML1998-5MV11**
Spanish		**7ML1998-5MV21**
German		**A5E35690863**
Italian		**7ML1998-5MV51**
Multi-language compact operating instructions Note: The operating instructions should be ordered as a separate line item on the order.		**7ML1998-5XU81**

Selection and Ordering data	Article No.
Communications Manual	
English	**A5E33701270**
French	**7ML1998-5NE11**
Spanish	**7ML1998-5NE21**
German	**7ML1998-5NE31**
Italian Note: The communications manual should be ordered as a separate line item on the order.	**7ML1998-5NE51**
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	**7ML1930-1AC**
TS-3 Temperature Sensor - see TS-3 on page 4/189	**7ML1813-...**
Panel mount cable extension, 2.5 m (8.2 ft)	**7ML1930-1GF**
Qty 3 cable glands and retaining nuts	**7ML1930-1GB**
USB cable, 2 m (6.56 ft) - Standard USB-A to USB-mini B	**7ML1930-1GD**
Hart modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
Sunshield, 304 stainless steel	**7ML1930-1GE**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
Spare parts	
Panel mount retrofit kit (convert standard unit with display to panel mount version)	**7ML1830-1PA**
Terminal block replacement kit (5 piece kit with one of each removable terminal)	**7ML1830-1PB**
Wall/Pipe mount plate	**7ML1830-1PC**
Enclosure (include blank label)	**7ML1830-1PD**
SITRANS LUT400 Lid (with Display)	**7ML1830-1PE**
SITRANS LUT400 Lid (blank)	**7ML1830-1PF**
Fuse - AC (0.25 A, 250 V, Slow Blow)	**7ML1830-1PG**
Fuse - DC (1.6 A, 125 V, Slow Blow)	**7ML1830-1PH**
Battery BR2032	**7ML1830-1PJ**
Panel mount gasket and fastener kit	**7ML1830-1PK**
DIN-rail clip	**7ML1830-1PL**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Selection and Ordering data		Article No.
SITRANS LUT440 The SITRANS LUT440 is the most accurate and featured model in the LUT400 series. It includes high accuracy open channel monitoring, relay functions for external samplers, totalizers, alarms, and enhanced data logging, as well as all pump and control functions available with other models in the LUT400 series. ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	↗	**7ML5050-** **0** ■■■ - ■■■ **0**
Model		
SITRANS LUT440 - High accuracy Open Channel Monitor[1]	⬟	**C**
Enclosure display options		
With display	⬟	**A**
With remote panel mount display [Includes panel mount cable extension, 2.5 m (8.2 ft)]	⬟	**B**
No display (blank lid provided)	⬟	**C**
Note: Enclosure includes back-plate for wall and pipe mounting, and an integrated clip for DIN-rail mounting. DIN-rail mounting for standard TS35 x 7.5 and TS35 x 15 mm DIN-rail to IEC 60715, EN 60715		
Input voltage		
100 ... 230 V AC ± 15 %	⬟	**1**
10 ... 32 V DC	⬟	**2**
Cable inlet		
3 cable inlets, cable glands not supplied	⬟	**1**
3 cable inlets, 3 M20 plastic cable glands supplied	⬟	**2**
Number of measurement points		
Single point system (includes one transducer input, one mA output, and one external temperature sensor input)	⬟	**1**
Communications and I/O		
HART, 2 discrete inputs, 3 relays	⬟	**D**
Approvals		
General purpose CE, FM, $CSA_{US/C}$, UL, RCM	⬟	**A**
Hazardous locations CSA Class I, II, III, Div. 2, (Groups A, B, C, D, F, G)		**C**

[1] Compatible with all EchoMax Transducers. High accuracy OCM performance with the use of an XRS-5 transducer and TS-3 temperature sensor (each sold separately).

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	⬟	**Y15**
Namur NE43 failsafe setting - device preset to failsafe < 3.6 mA	⬟	**N07**

Operating Instructions	Article No.
English	**A5E33329501**
French	**7ML1998-5MV11**
Spanish	**7ML1998-5MV21**
German	**A5E35690863**
Italian	**7ML1998-5MV51**
Note: The operating instructions should be ordered as a separate line item on the order.	

Selection and Ordering data	Article No.
Communications Manual	
English	**A5E33701270**
French	**7ML1998-5NE11**
Spanish	**7ML1998-5NE21**
German	**7ML1998-5NE31**
Italian	**7ML1998-5NE51**
Note: The communications manual should be ordered as a separate line item on the order.	
Accessories	
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	**7ML1930-1AC**
TS-3 Temperature Sensor - see TS-3 on page 4/189	**7ML1813-...**
Panel mount cable extension 2.5 m (8.2 ft)	**7ML1930-1GF**
Qty 3 cable glands and retaining nuts	**7ML1930-1GB**
USB cable 2 m (6.56 ft) - Standard USB-A to USB-mini B	**7ML1930-1GD**
HART modem/USB (for use with PC and SIMATIC PDM)	**7MF4997-1DB**
Sunshield, 304 stainless steel	**7ML1930-1GE**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
Spare parts	
Panel mount retrofit kit (convert standard unit with display to panel mount version)	**7ML1830-1PA**
Terminal block replacement kit (5 piece kit with one of each removable terminal)	**7ML1830-1PB**
Wall/Pipe mount plate	**7ML1830-1PC**
Enclosure (include blank label)	**7ML1830-1PD**
SITRANS LUT400 Lid (with Display)	**7ML1830-1PE**
SITRANS LUT400 Lid (blank)	**7ML1830-1PF**
Fuse - AC (0.25 A, 250 V, Slow Blow)	**7ML1830-1PG**
Fuse - DC (1.6 A, 125 V, Slow Blow)	**7ML1830-1PH**
Battery BR2032	**7ML1830-1PJ**
Panel mount gasket and fastener kit	**7ML1830-1PK**
DIN-rail clip	**7ML1830-1PL**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix

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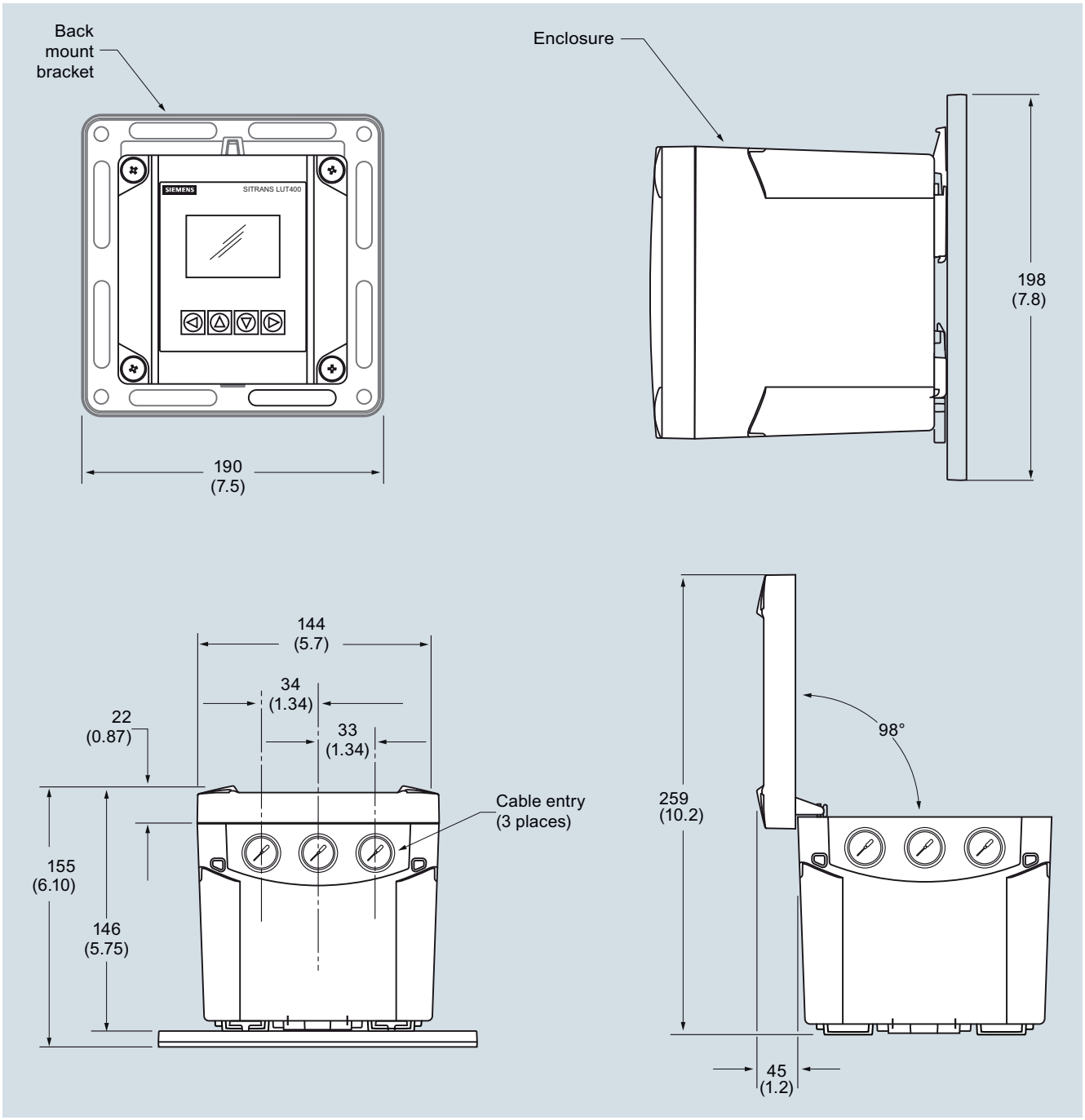
Dimensional drawings



SITRANS LUT400, dimensions in mm (inch)

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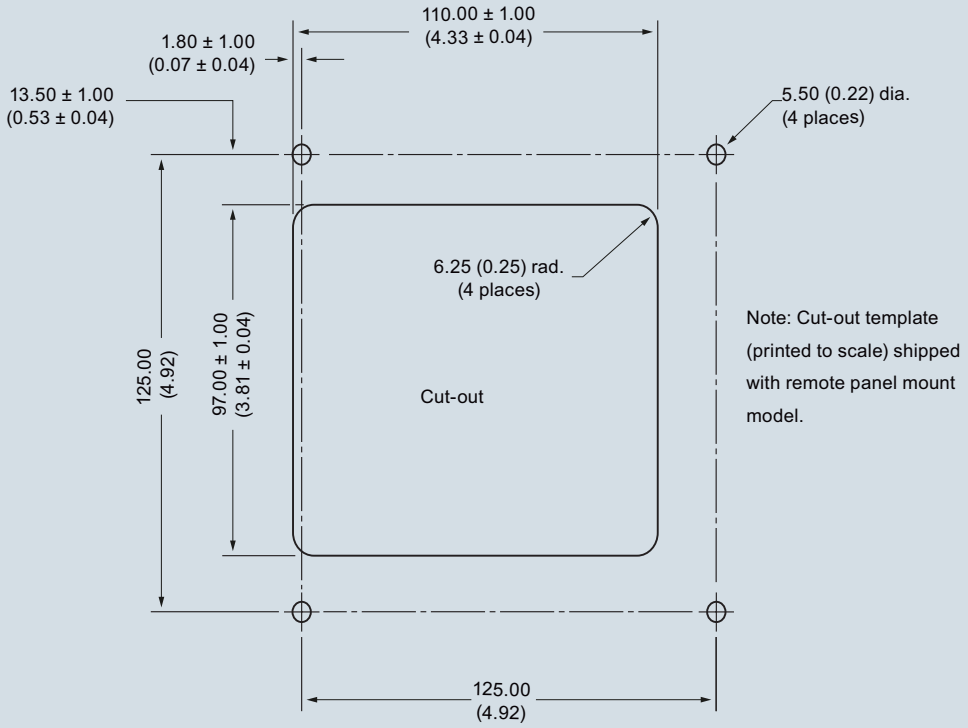

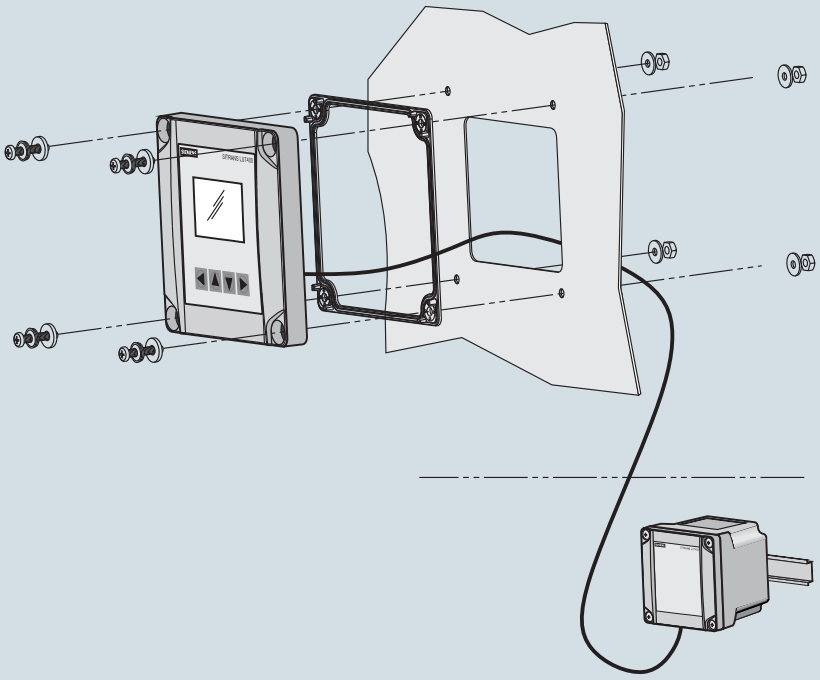

SITRANS LUT400, dimensions in mm (inch)

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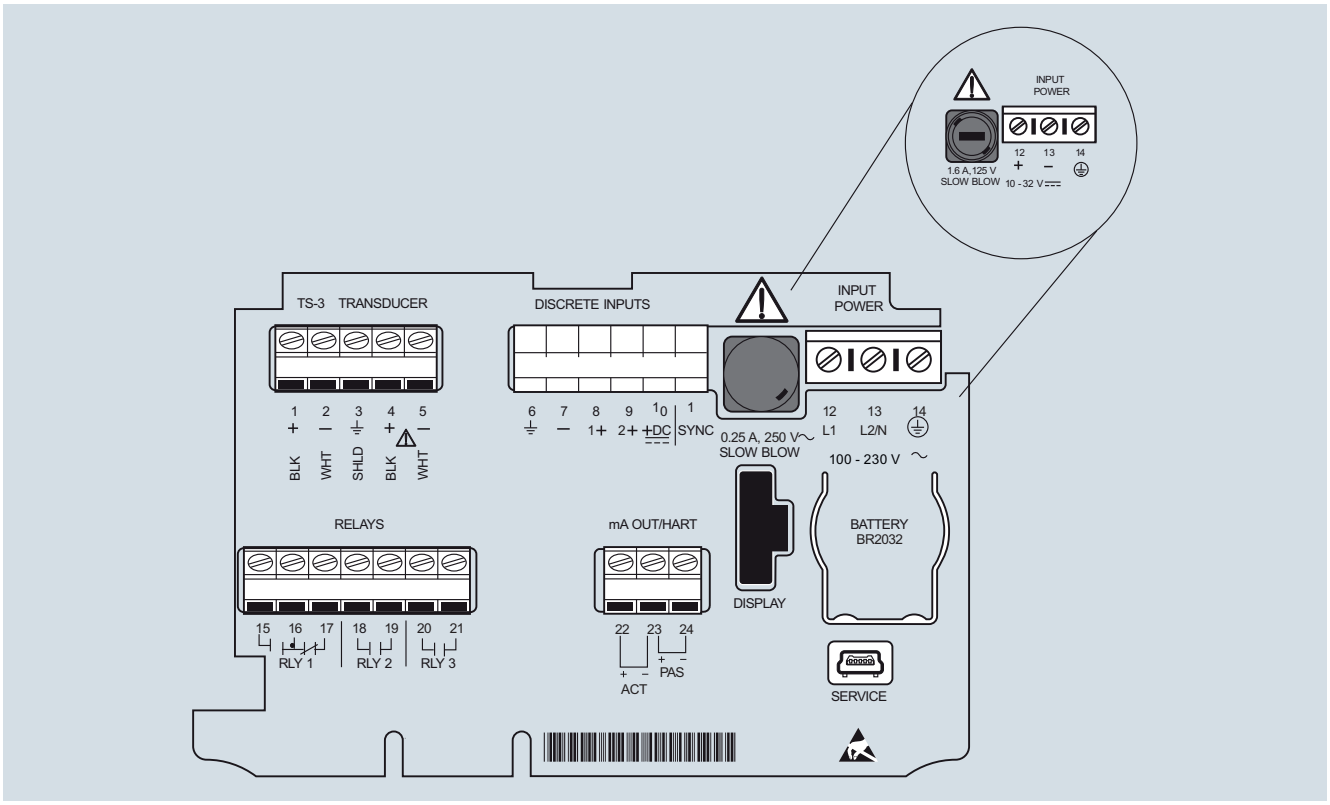
Schematics



SITRANS LUT400 connections

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MultiRanger 100/200

Overview

MultiRanger is a versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries.

Benefits

- Digital input for back-up level override from point level device
- Communication using built-in Modbus RTU via RS 485
- Compatible with SmartLinx system and SIMATIC PDM configuration software
- Single or dual point level monitoring
- Auto False-Echo Suppression for fixed obstruction avoidance
- Differential amplifier transceiver for common mode noise reduction and improved signal-to-noise ratio
- MultiRanger 100: level measurements, simple pump control, and level alarm functions
- MultiRanger 200: level, volume and flow measurements in open channels, differential control, extended pump control, and alarm functions
- Wall and panel mounting options

Application

MultiRanger can be used on different materials, including fuel oil, municipal waste, acids, woodchips, or on materials with high angles of repose. MultiRanger offers true dual point monitoring, digital communications with built-in Modbus RTU via RS 485, as well as compatibility with SIMATIC PDM, allowing PC configuration and setup. MultiRanger features Sonic Intelligence advanced echo-processing software for increased reading reliability.

MultiRanger 100 offers cost-effective level alarming, as well as on/off and alternating pump control. MultiRanger 200 will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion.

It is compatible with chemical-resistant EchoMax transducers that can be used in hostile environments at temperatures as high as 145 °C (293 °F).

- Key Applications: wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage

Design

The MultiRanger is available in wall or panel mounting options.

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Technical specifications

Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
Input	
Analog (MultiRanger 200 only)	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS 15/15F, and XRS-5
Relays	Rating 5 A at 250 V AC, non-inductive
• Version with 1 relay (MultiRanger 100 only)	1 SPST Form A
• Version with 3 relays	2 SPST Form A/1 SPDT Form C
• Version with 6 relays	4 SPST Form A/2 SPDT Form C
mA output	0 ... 20 mA or 4 ... 20 mA
• Max. load	750 Ω, isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range[1] or 2 mm (0.08 inch), whichever is greater
Temperature compensation	• -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (housing)	-20 ... +50 °C (-4 ... +122 °F)

Design	
Weight	
• Wall mount	1.37 kg (3.02 lb)
• Panel mount	1.50 kg (3.31 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3
Electrical connection	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	100 x 40 mm (4 x 1.5 inch) multi-block LCD with backlighting
Programming	Programming using hand-held programmer, SIMATIC PDM or via PC with Dolphin Plus software
Power supply	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	• CE, RCM[2] • Lloyd's Register of Shipping • ABS Type Approval • FM, $CSA_{US/C}$, UL listed • CSA Class I, Div. 2, Groups A, B, C and D, Class II, Div.2, Groups F and G, Class III (wall mount only), ATEX II 3D
Communication	• RS 232 with Modbus RTU or ASCII via RJ-11 connector • RS 485 with Modbus RTU or ASCII via terminal strips • Optional: SmartLinx cards for - PROFIBUS DP - DeviceNet

[1] Program range is defined as the empty distance to the face of the transducer plus any range extension

[2] EMC performance available on request

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MultiRanger 100/200

Selection and Ordering data		Article No.
MultiRanger 100/200 Versatile short to medium-range ultrasonic single and multi-vessel level monitor/controller for virtually any application in a wide range of industries	↗	**7ML5033-** ■■■■■ - ■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Versions		
MultiRanger 100, level measurement only	⬟	**1**
MultiRanger 200, level, volume, flow and differential measurements	⬟	**2**
Mounting, enclosure design		
Wall mount, standard enclosure	⬟	**A**
Wall mount, 4 entries, 4 M20 cable glands included	⬟	**B**
Panel mount (CE, $CSA_{US/C}$, FM, UL)	⬟	**C**
Power supply		
100 ... 230 V AC	⬟	**A**
12 ... 30 V DC	⬟	**B**
Number of measurement points		
Single point version	⬟	**0**
Dual point version	⬟	**1**
Communication (SmartLinx)		
Without module	⬟	**0**
SmartLinx PROFIBUS DP module	⬟	**2**
SmartLinx DeviceNet module See SmartLinx product on page 4/362 for more information.	⬟	**3**
Output relays		
3 relays (2 Form A, 1 Form C), 250 V AC	⬟	**1**
6 relays (4 Form A, 2 Form C), 250 V AC	⬟	**2**
1 relay (1 Form A), 250 V AC (available on MultiRanger 100 model only)	⬟	**3**
Approvals		
General Purpose CE, FM, $CSA_{US/C}$, UL listed, RCM	⬟	**A**
CSA Class I, Div. 2, Groups A, B, C and D; Class II, Div. 2, Groups F and G; Class III[1]	⬟	**B**
ATEX II 3D[2]	⬟	**C**

[1] For wall mount applications only

[2] For standard enclosure wall mount, option A only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ⬟ Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
English	**7ML1998-5FB06**
French	**7ML1998-5FB13**
Spanish	**7ML1998-5FB23**
German	**7ML1998-5FB36**
Quick Start guide, multi-language Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5QD83**
Other Operating Instructions	
SmartLinx PROFIBUS DP, English	**7ML1998-1AQ03**
SmartLinx PROFIBUS DP, German	**7ML1998-1AQ33**
SmartLinx PROFIBUS DP, French	**7ML1998-1AQ13**
SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	**7ML1998-1BH02**
Accessories	
Handheld programmer	**7ML1830-2AK**
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	**7ML1930-1AC**
M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)	**7ML1930-1FV**
Sunshield kit, 304 stainless steel	**7ML1930-1GA**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
Spare parts	
Power Supply Board (100 ... 230 V AC)	**7ML1830-1MD**
Power Supply Board (12 ... 30 V DC)	**7ML1830-1ME**
Display Board	**7ML1830-1MF**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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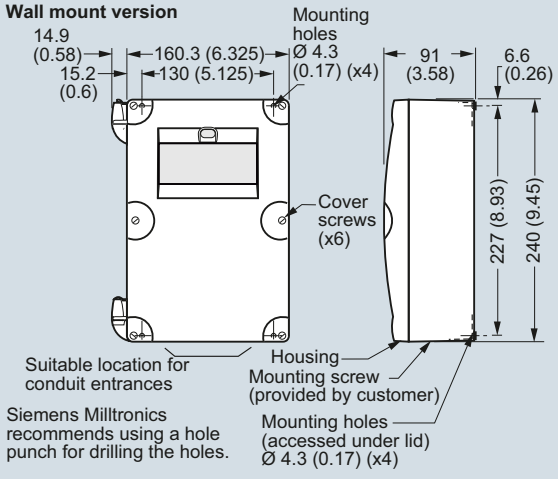
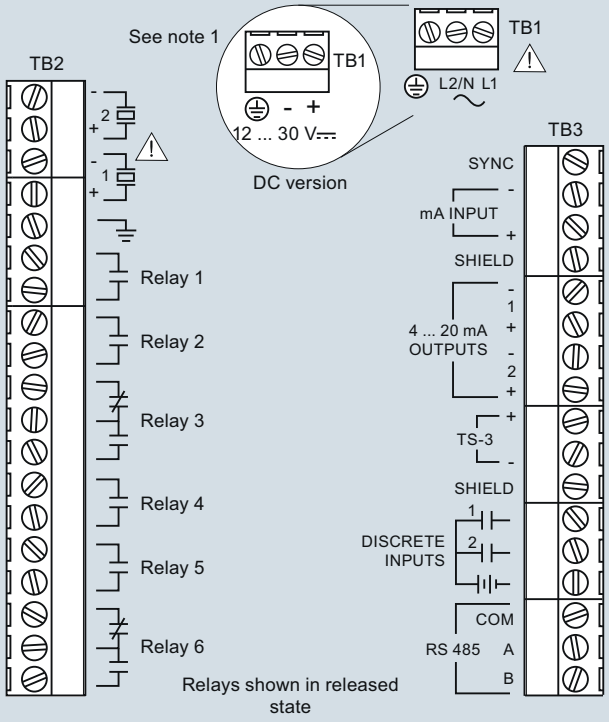
Dimensional drawings



MultiRanger, dimensions in mm (inch)

Schematics



Note:

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the MultiRanger shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

MultiRanger connections

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HydroRanger 200

Overview

HydroRanger 200 is an ultrasonic level controller for up to six pumps and provides control, differential control, and open channel flow monitoring.

Benefits

- Monitors wet wells, weirs and flumes
- Digital communications with built-in Modbus RTU via RS 485
- Compatible with SmartLinx system and SIMATIC PDM configuration software
- Single or dual point level monitoring
- 6 relay (standard), 1 or 3 relay (optional)
- Auto False-Echo Suppression for fixed obstruction avoidance
- Anti-grease ring/tide mark buildup
- Differential amplifier transceiver for common mode noise rejection and improved signal-to-noise ratio
- Wall and panel mounting options

Application

For water authorities, municipal water, and wastewater plants, HydroRanger 200 is an economical, low-maintenance solution delivering control efficiency and productivity needed to meet today's exacting standards. It offers single point monitoring with all models, and optional dual-point monitoring with 6 relay model. As well, it has digital communications with built-in Modbus RTU via RS 485.

The standard 6 relay HydroRanger 200 will monitor open channel flow and features more advanced relay alarming and pump control functions as well as volume conversion. It is compatible with SIMATIC PDM, allowing for PC configuration and setup. Sonic Intelligence advanced echo-processing software provides increased reading reliability. The optional 1 or 3 relay models provide accurate level measurement functions only; these two models do not provide open channel flow, differential level measurement or volume conversion functions.

HydroRanger 200 uses proven continuous ultrasonic echo ranging technology to monitor water and wastewater of any consistency up to 15 m (50 ft) in depth. Achievable resolution is 0.1 % with accuracy to 0.25 % of range. Unlike contacting devices, HydroRanger 200 is immune to problems caused by suspended solids, harsh corrosives, grease or silt in the effluent, reducing downtime.

- Key Applications: wet wells, flumes/weirs, bar screen control

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Technical specifications

Mode of Operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft), transducer dependent
Measuring points	1 or 2
Input	
Analog	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable (6 relay model)
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA
Output	
EchoMax transducer	44 kHz
Ultrasonic transducer	Compatible transducers: ST-H and EchoMax series XPS-10, XPS 15/15F, and XRS-5
Relays[1]	Rating 5 A at 250 V AC, non-inductive
• Model with 1 relay[2]	1 SPST Form A
• Model with 3 relays[2]	2 SPST Form A/1 SPDT Form C
• Model with 6 relays	4 SPST Form A/2 SPDT Form C
mA output	0 ... 20 mA or 4 ... 20 mA
• Max. load	750 Ω, isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater[3]
Temperature compensation	• -50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor in transducer • External TS-3 temperature sensor (optional) • Programmable fixed temperature values
Rated operating conditions	
Installation conditions	
• Location	Indoor / outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-4 ... +122 °F)

Design	
Weight	
• Wall mount	1.37 kg (3.02 lb)
• Panel mount	1.50 kg (3.31 lb)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3
Cable	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm² (18 AWG), Belden 8 760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1 200 ft)
Displays and controls	100 x 40 mm (4 x 1.5 inch) multi-block LCD with backlighting
Programming	Programming using handheld programmer or via PC with SIMATIC PDM software
Power supply[4]	
AC version	100 ... 230 V AC ± 15 %, 50/60 Hz, 36 VA (17 W)
DC version	12 ... 30 V DC (20 W)
Certificates and approvals	• CE, RCM[5] • Lloyd's Register of Shipping • ABS Type Approval • FM, $CSA_{US/C}$, UL listed • $CSA_{US/C}$ Class I, Div. 2, Groups A, B, C and D, Class II, Div. 2, Groups F and G, Class III (wall mount only) • MCERTS Class 3 approved for Open Channel Flow
Communication	• RS 232 with Modbus RTU or ASCII via RJ-11 connector • RS 485 with Modbus RTU or ASCII via terminal blocks • Optional: SmartLinx cards for - PROFIBUS DP - DeviceNet

1) All relays certified for use with equipment that fails in a state at or under the rated maximums of the relays

2) This model is level control only; no open channel flow, differential level or volume conversion functions

3) Program range is defined as the empty distance to the face of the transducer plus any range extension

4) Maximum power consumption is listed

5) EMC performance available upon request

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HydroRanger 200

Selection and Ordering data	Article No.
Siemens HydroRanger 200 ↗ Ultrasonic level controller for up to six pumps that provides control, differential control and open channel flow monitoring. The HydroRanger 200 is also available as a level measurement controller only. Select option from number of measurement points options below.	**7ML5034-** ■■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Mounting	
Wall mount, standard enclosure	**1**
Wall mount, 4 entries, 4 M20 cable glands included	**2**
Panel mount[1]	**3**
Power supply	
100 ... 230 V AC	**A**
12 ... 30 V DC	**B**
Number of measurement points	
Single point model, 6 relays	**A**
Dual point model, 6 relays	**B**
Single point model, level only, 1 relay[2]	**C**
Single point model, level only, 3 relays[2]	**D**
Communication (SmartLinx)	
Without module	**0**
SmartLinx PROFIBUS DP module	**2**
SmartLinx DeviceNet module See SmartLinx product on page 4/362 for more information.	**3**
Approvals	
General Purpose CE, FM, $CSA_{US/C}$, UL listed, RCM	**1**
CSA Class I, Div. 2, Groups A, B, C, and D; Class II, Div. 2, Groups F and G; Class III (for wall mount applications only)	**2**

1) Available with approval option 1 only

2) This model is level control only; no open channel flow, differential level, or volume conversion functions.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
English	**7ML1998-5FC03**
French	**7ML1998-5FC11**
German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5FC33**
Other Operating Instructions	
SmartLinx PROFIBUS DP, English	**7ML1998-1AQ03**
SmartLinx PROFIBUS DP, German	**7ML1998-1AQ33**
SmartLinx PROFIBUS DP, French	**7ML1998-1AQ13**
SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	**7ML1998-1BH02**
Accessories	
Handheld programmer	**7ML1830-2AK**
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosure	**7ML1930-1AC**
Sunshield kit, 304 stainless steel	**7ML1930-1GA**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
Spare parts	
Power Supply Board (100 ... 230 V AC)	**7ML1830-1MD**
Power Supply Board (12 ... 30 V DC)	**7ML1830-1ME**
Display Board	**7ML1830-1MF**

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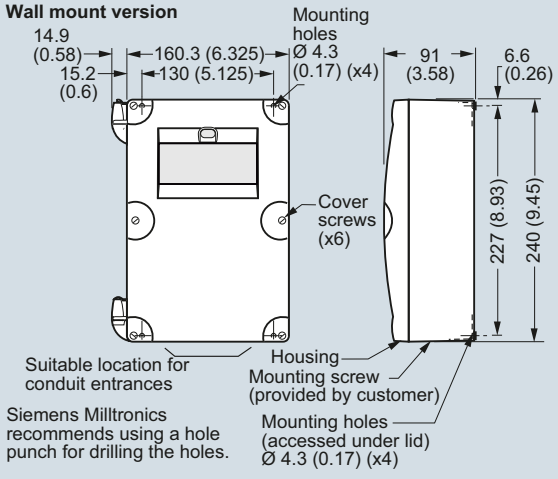
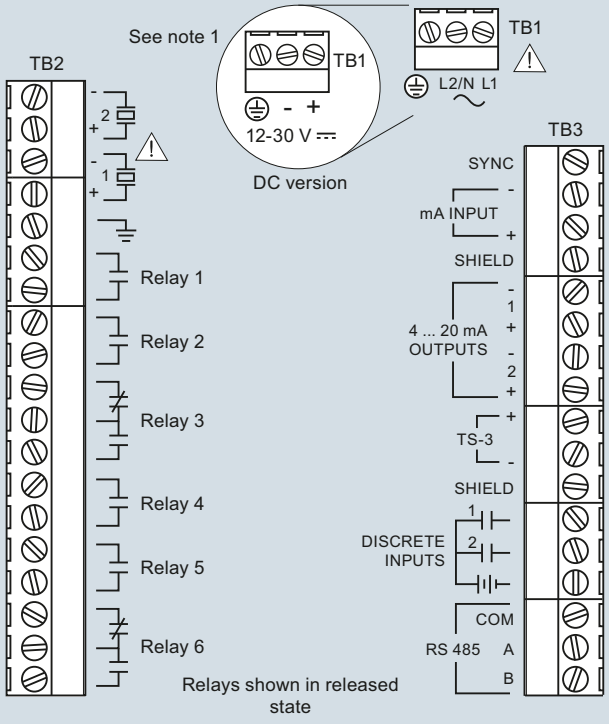
Dimensional drawings



HydroRanger 200, dimensions in mm (inch)

Schematics



Notes

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1 200 ft.). Route cable in grounded metal conduit, separate from other cables.
2. Verify that all system components are installed in accordance with instructions.
3. Connect all cable shields to the HydroRanger 200 shield connections. Avoid differential ground potentials by not connecting cable shields to ground (earth) anywhere else.
4. Keep exposed conductors on shielded cables as short as possible to reduce noise on the line caused by stray transmissions and noise pickup.

HydroRanger 200 connections

4

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SITRANS LU01 and LU02

Overview

The SITRANS LU01 is an ultrasonic long-range level controller for liquids and solids in a single vessel up to 60 m (200 ft). Handheld programmer shown is an accessory and must be ordered separately.

Benefits

- Single point, long-range level monitoring
- Easy to install; easy to program using removable infrared keypad (optional)
- Compatible with all EchoMax transducers
- Backlit LCD display with reading in standard engineering units
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus compatible
- High/low alarms

Application

The system consists of a SITRANS LU01 monitor linked to a non-contacting ultrasonic transducer that can be mounted up to 365 m (1 200 ft) away. The SITRANS LU01 will measure distance, level or volume, and it features Sonic Intelligence echo processing software for superior reliability.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

Modules for popular industrial buses can be factory installed or added later to meet changing needs. No external gateway is required, reducing hardware and cabling costs.

- Key Applications: chemical storage, liquid storage, bulk solids storage (gravel, flour bins, grains, cereals), plastic pellets

Overview

The SITRANS LU02 is a dual point ultrasonic long-range level controller for liquids and solids in one or two vessels up to 60 m (200 ft). Handheld programmer shown is an accessory and must be ordered separately.

Benefits

- Dual point, long-range level monitoring
- Easy to install; easy to program using removable infrared keypad (optional)
- Compatible with all EchoMax transducers
- Backlit LCD display with reading in standard engineering units
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus compatible
- High/low alarms

Application

SITRANS LU02 will measure liquids, solids or a combination of both in one or two vessels of different sizes, shapes and configurations up to 60 m (200 ft).

The system uses ultrasonic technology to measure level, space, distance, volume or average/differential. It features Sonic Intelligence echo processing software for superior reliability. Transducers can be mounted up to 365 m (1 200 ft) from the monitor.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

- Key Applications: chemical storage, liquid storage, bulk solids storage (gravel, flour bins, grains, cereals), plastic pellets, tripper car

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Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 60 m (1 ... 200 ft)
Measuring points	SITRANS LU01: Max. one point; SITRANS LU02: Max. two points
Output signal	
Ultrasonic transducer	EchoMax series, ST-H transducers
Relays	4 SPDT Form C relays, rated at 5 A at 250 V AC, resistive load
mA output	0/4 ... 20 mA, optically isolated
• Max. load	750 Ω, isolated, 30 V
• Resolution	0.1 % of range
• Outputs	SITRANS LU01: Max. one mA output SITRANS LU02: Max. two mA outputs
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (optional) • Programmable fixed temperature
Rated operating conditions	
Ambient conditions	
• Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	2.7 kg (6 lb)
Material (enclosure)	Polycarbonate
Degree of protection (wall mount)	IP65
Electrical connection	
Ultrasonic transducer cable extension	RG62-A/U coaxial cable with low capacitance
mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm^2 (22 ... 18 AWG), Belden 8 760 or equivalent is acceptable
Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
Synchronization	Up to 16 LU01/LU02 units can be synchronized together
Power supply	
AC model	100/115/200/230 V AC ± 15 %, 50/60 Hz, 31 VA
DC model	18 ... 30 V DC, 25 W
Displays and controls	51 x 127 mm (2 x 5 inch) graphics LCD with backlighting
Memory	EEPROM (non-volatile), no backup battery required
Programming	Using removable programmer (ordered separately) or Dolphin Plus (option)
Certificates and approvals	CE, $CSA_{US/C}$, FM, ATEX II 3D Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5)
Options	
External temperature sensor	TS-3
Communications	Dolphin Plus: Siemens Windows-compatible interface and ComVerter link (infrared)

Selection and Ordering data

Article No.

SITRANS LU01/LU02 ↗ **7ML5004-**

Single or dual point ultrasonic long-range level monitoring system for liquids and solids, and ranges up to 60 m (200 ft).

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Number of measuring points	
LU01 version, 1 point	1
LU02 version, 2 points	2
Input voltage	
100/115/200/230 V AC, voltage selector switch	A
18 ... 30 V DC	B
Feature software	
Standard	A
Application software	
Standard	1
Data communications	
No module (SmartLinx ready)	0
Enclosure	
Wall mount	1
Wall mount, drilled, 6 x M20 Note: Cable glands are not included and should be ordered as a separate line on the order.	3
Approvals	
CE, $CSA_{US/C}$, FM[1]	A
CE	B
ATEX II 3D[2]	C

[1] Available with enclosure option 1 only

[2] Available with enclosure option 3 only

4

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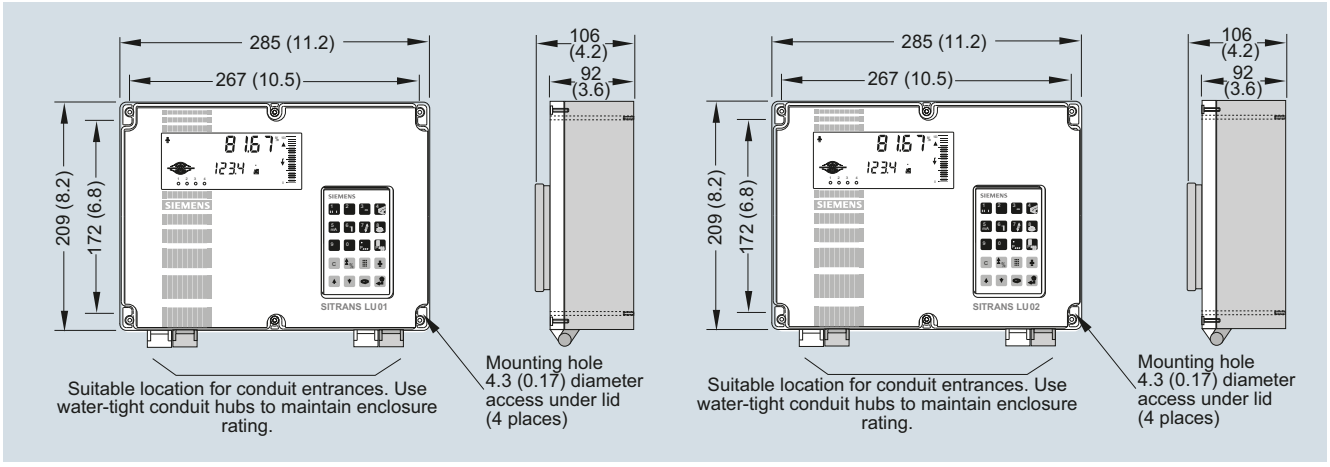
SITRANS LU01 and LU02

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
SITRANS LU01	
English	**7ML1998-5BE02**
French	**7ML1998-5BE12**
German	**7ML1998-5BE32**
SITRANS LU02	
English	**7ML1998-5BD02**
French	**7ML1998-5BD12**
German	**7ML1998-5BD32**
Note: The Operating Instructions should be ordered as a separate line item. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	

Selection and Ordering data	Article No.
Accessories	
Handheld programmer	**7ML1830-2AN**
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	**7ML1930-1AC**
M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)	**7ML1830-1GM**
M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)	**7ML1930-1FV**
TS-3 Temperature Sensor - see TS-3 on page 4/189	**7ML1830-2AN**
Sunshield kit, 304 stainless steel	**7ML1930-1GA**
Spare parts	
Card, LU01 mother main, AC, comm ready	**7ML1830-1KX**
Card, LU02 mother main, AC, comm ready	**7ML1830-1MA**
Card, LU02 daughter, comm ready	**7ML1830-1LP**
Card, LU01 daughter, comm ready	**7ML1830-1LN**
Card, display See SmartLinx product page 4/362 for more information.	**7ML1830-1LQ**

Dimensional drawings



Dimensional drawings for SITRANS LU01 (left) and SITRANS LU02 (right), dimensions in mm (inch)

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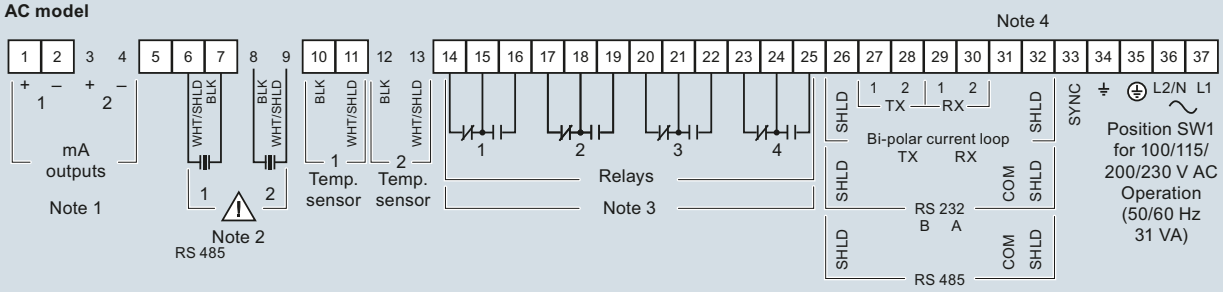
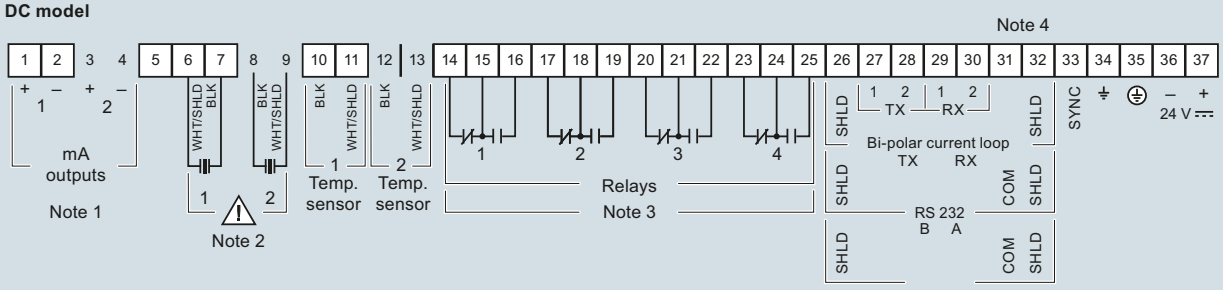
Schematics

AC model



DC model

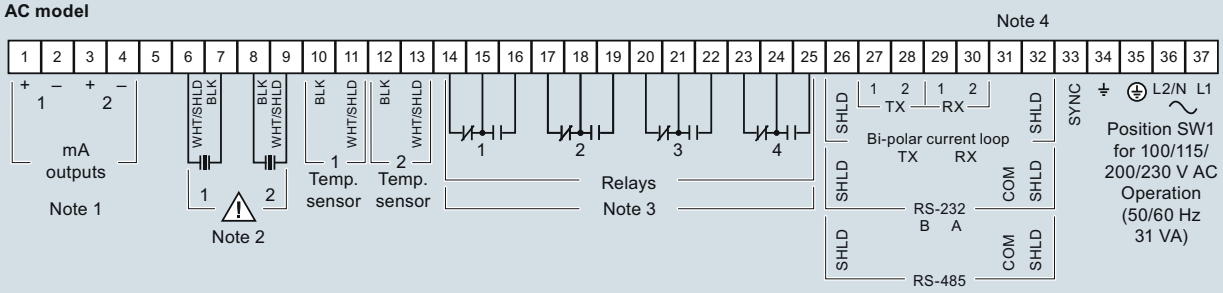


Notes:

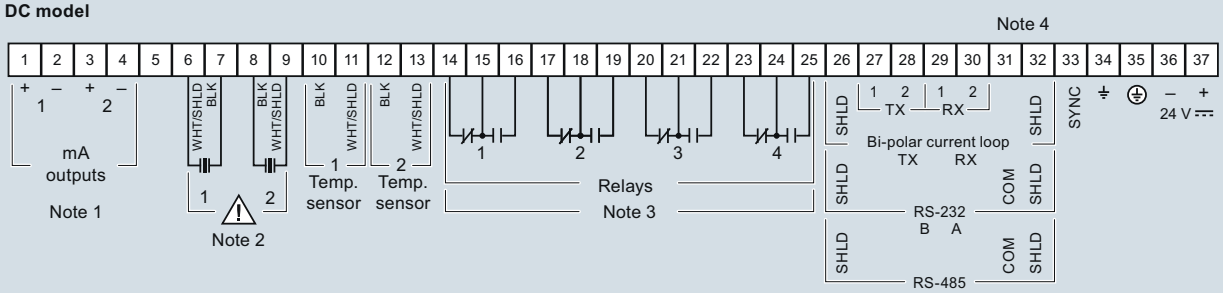
1. Optically isolated, 750 Ω max. load
2. Use RG62-A/U coaxial (or equivalent) for extensions up to 365 m (1 200 ft). Run in grounded metal conduit, separate from other wiring.
3. Each relay has 1 set of Form 'C' (SPDT) contacts, relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed.
4. Required if mounted adjacent to other SITRANS LU01 units or other specified Siemens Milltronics devices. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5 mm²) wire.

SITRANS LU01 connections

AC model



DC model



Notes:

1. Optically isolated, 750 Ω max. load
2. Use RG62-A/U coaxial (or equivalent) for extensions up to 365 m (1 200 ft). Run in grounded metal conduit, separate from other wiring.
3. Each relay has 1 set of Form 'C' (SPDT) contacts, relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting fuses are installed.
4. Required if mounted adjacent to other SITRANS LU01 units or other specified Siemens Milltronics devices. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5 mm²) wire.

SITRANS LU02 connections

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SITRANS LU10

Overview

SITRANS LU10 is an ultrasonic long-range level monitor for liquids and solids, offering 10-point monitoring in a single unit. Handheld programmer shown is an accessory and must be ordered separately.

Benefits

- Ten point, long-range level monitoring
- Automatic level-to-volume conversion for standard or custom tank shapes
- Dolphin Plus compatible
- Backlit LCD display with reading in standard engineering units
- Easy to install, easy to program using removable infrared keypad (optional)

Application

It can be used in a wide range of applications to scan liquids, solids or a combination of both contained in vessels of differing size, shape, and configuration up to 60 m (200 ft).

SITRANS LU10 uses ultrasonic technology to measure level, space, distance, volume, or average/differential. Transducers can be mounted up to 365 m (1 200 ft) from the monitor. The SITRANS LU10 features Sonic Intelligence echo processing software for superior reliability. Readings are displayed in user-selectable linear engineering units on the LCD.

- Key Applications: chemical storage, liquid storage, bulk solids storage (sugar, flour bins, grains, cereals), plastic pellets, tank farms

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Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level measurement
Measuring range	Max. 0.3 ... 60 m (1 ... 200 ft)
Measuring points	Max. 10
Output	
Ultrasonic transducer	EchoMax series, ST-H transducers
Relays	SPDT Form C relays, rated 5 A at 250 V AC, resistive load
mA output	SITRANS LU AO module (option): 0/4 ... 20 mA, optically isolated
• Max. load	750 Ω, isolated
• Resolution	0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24 inch), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08 inch), whichever is greater
Temperature compensation	-50 ... +150 °C (-58 ... +302 °F) • Integral temperature sensor • External TS-3 temperature sensor (expandable to 10 inputs with optional TIB-9 card) • Programmable fixed temperature
Rated operating conditions	
Ambient conditions	
• Ambient temperature for enclosure	-20 ... +50 °C (-4 ... +122 °F)
Design	
Weight	2.7 kg (6 lb)
Material (enclosure)	Polycarbonate
Degree of protection (wall mount)	IP65/Type 4X/NEMA 4X
Electrical connection	
Ultrasonic transducer	RG62-A/U coaxial cable with low capacitance
Signal transmission	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm² (22 ... 18 AWG), Belden 8760 or equivalent is acceptable
Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
Synchronization	Up to 16 LU10 units can be synchronized together

Power supply	100/115/200/230 V AC ± 15 %, 50/60 Hz, 31 VA
Displays and controls	51 x 127 mm (2 x 5 inch) graphics LCD with backlighting
Memory	EEPROM (non-volatile), no backup battery required
Programming	Using removable programmer (ordered separately) or Dolphin Plus (option)
Certificates and approvals	• CE, RCM, FM, $CSA_{US/C}$, ATEX II 3D • Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5)
Options	
Expansion card	TIB-9, increases the number of TS-3 inputs from 1 ... 10
External temperature sensor	TS-3
Communications	Dolphin Plus: Siemens Windows-compatible interface and ComVerter link (infrared)
I/O devices	• Max. 3 I/O devices per SITRANS LU10 • SITRANS LU AO analog output module (max. 1)

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SITRANS LU10

Selection and Ordering data	Article No.
SITRANS LU10 ↗ Ten point ultrasonic long-range level monitoring system for liquids and solids applications, and ranges up to 60 m (200 ft). ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7ML5007-**
Input voltage 100/115, 200/230 V AC, selectable	**1**
Feature software Standard	**A**
Application software Standard	**A**
Data communications No module (SmartLinx ready)	**0**
TIB-9 temperature card None With TIB-9 card	**0** **1**
Enclosure Wall mount Wall mount, drilled, 12 x M20 x1.5 for cable glands Note: Cable glands are not included and should be ordered as a separate line on the order.	**1** **2**
Approvals CE, $CSA_{US/C}$, FM[1] ATEX II 3D[1] CE, RCM[2]	**A** **B** **D**

[1] Available with enclosure option 1 only

[2] Available with enclosure option 2 only

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
English	**7ML1998-5AN02**
French	**7ML1998-5AN12**
German	**7ML1998-5AN32**
Accessories	
Handheld programmer	**7ML1830-2AN**
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77 inch), one text line, suitable for enclosures	**7ML1930-1AC**
Temperature Card TIB 9-card	**7ML1830-1CN**
M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs)	**7ML1830-1GM**
M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers)	**7ML1930-1FV**
TS-3 Temperature Sensor - see TS-3 on page 4/189	
Sunshield kit, 304 stainless steel	**7ML1930-1GA**
Spare parts	
Card, mother main, AC, comm ready	**7ML1830-1ML**
Card, daughter, comm ready	**7ML1830-1LY**
Card, display See SmartLinx product on page 4/362 for more information.	**7ML1830-1LQ**

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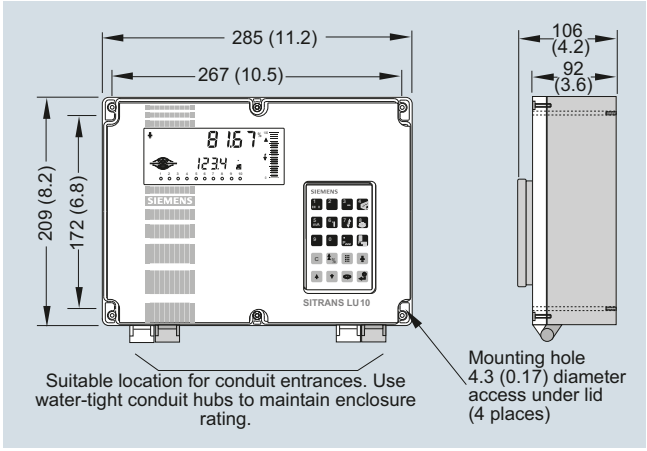
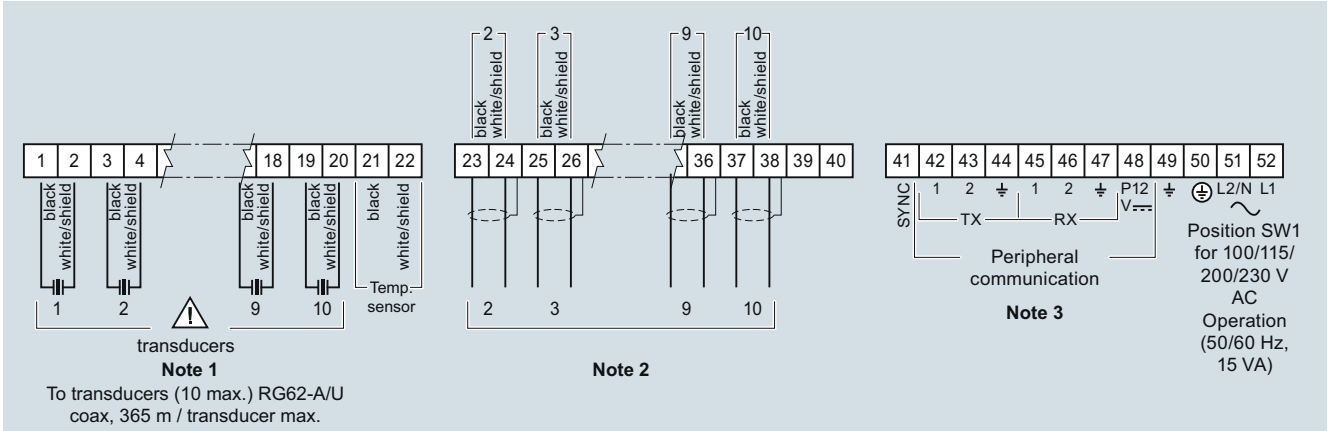
Dimensional drawings



SITRANS LU10, dimensions in mm (inch)

Schematics



Notes:

1. Transducer cables must be run in a grounded metal conduit separate from other wiring (except TS-3 temperature sensor wiring, if applicable).
2. Optional TIB-9 card for multiple temperature sensors. Do not jump the terminals if TS-3s are not used.
3. The SITRANS LU10 is compatible with the following Siemens Milltronics peripherals:
   - SITRANS LU AO - analog output module

SITRANS LU10 connections

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SITRANS LU AO

Overview

The SITRANS LU AO Analog Output Module provides remote analog output for the measurement points of the SITRANS LU10 level monitor.

Benefits

- Analog outputs can be up to 1 500 m (5 000 ft) from the SITRANS LU 10
- Analog outputs can be per transducer and/or average of 2 or more

Application

The operation of the SITRANS LU AO is programmed via the SITRANS LU10. The only on-board settings are for bank selection and output testing.

The SITRANS LU AO can provide up to 10 analog outputs (each sharing a common negative bus which is electrically isolated from ground).

Technical specifications

Mode of operation	
Input	
Communications	Data from SITRANS LU10
Transmission rate	4 800 bits/s
Voltage	± 20 mA bipolar current loop
Polarization	Non-polarized
Max. load	1 receiving unit
Output	
Analog outputs	10 analog outputs, programmable from SITRANS LU10 0 or 4 ... 20 mA, isolated
± 20 mA bipolar current loop	Input and transmission
• Max. load	750 Ω
• Resolution	0.1 %
Rated operating conditions	
Ambient conditions	
• Ambient temperature for enclosure	-20 ... +50 °C (-5 ... +122 °F)
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Design	
Weight	2 kg (4.4 lb)
Material (enclosure)	Polycarbonate
Degree of protection	Type 4X/NEMA 4X/IP65
• Cable connection	2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm² (22 ... 18 AWG)
• Electrical connection and relay connection	Copper conductor according to local requirements, rated 250 V 5 A
Power supply	100/115/200/230 V AC ± 15 %, 50/60 Hz, 15 VA
Displays and controls	1 LED for display of voltage/ communications state
Certificates and approvals	CE, FM, $CSA_{US/C}$, RCM

Selection and Ordering data

	Article No.
SITRANS LU AO Provides remote analog output for the measurement points of the SITRANS LU10 level monitor. Approvals: $CSA_{US/C}$, FM, CE, RCM	**7ML5810-1A**
Operating Instructions	
English	**7ML1998-5CE01**
German	**7ML1998-5CE31**
Note: Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the Quick Start and Operating Instructions library.	
Accessories	
Sun Shield, 304 stainless steel	**7ML1930-1GA**

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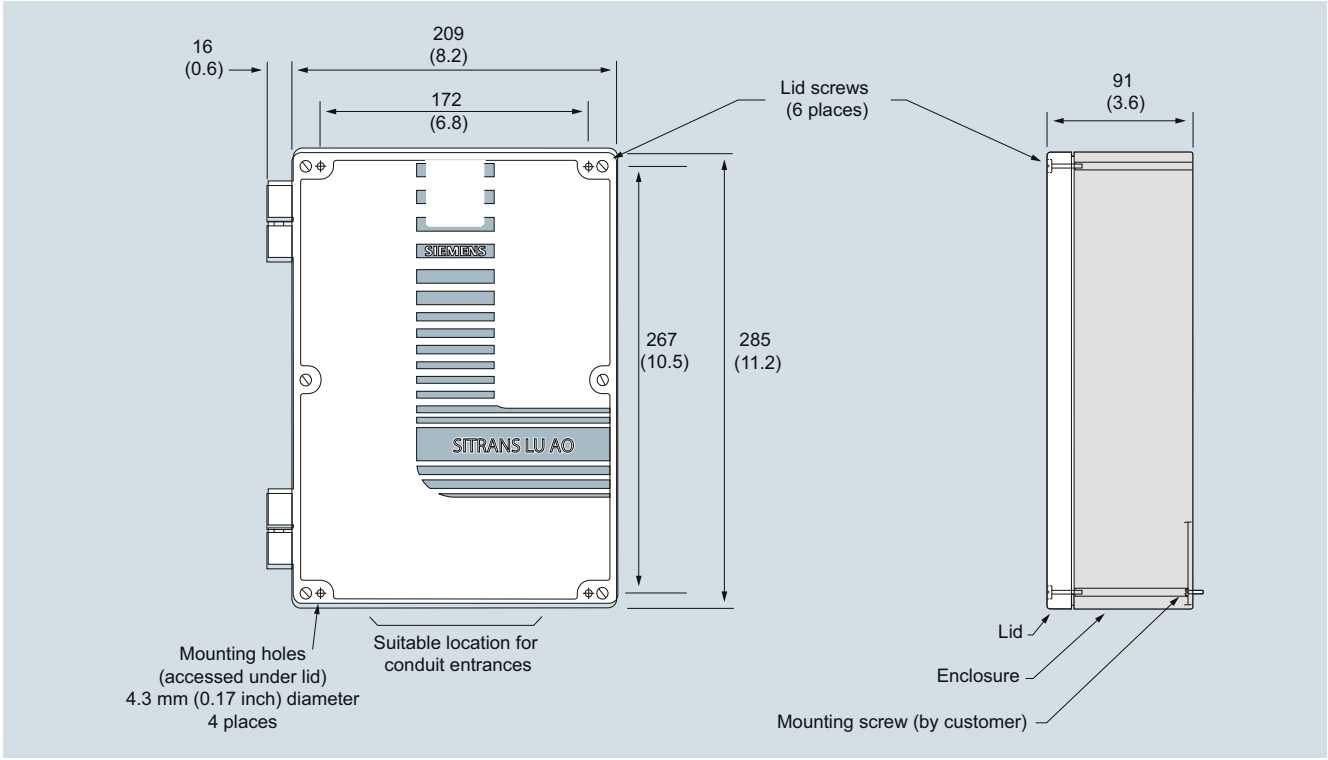
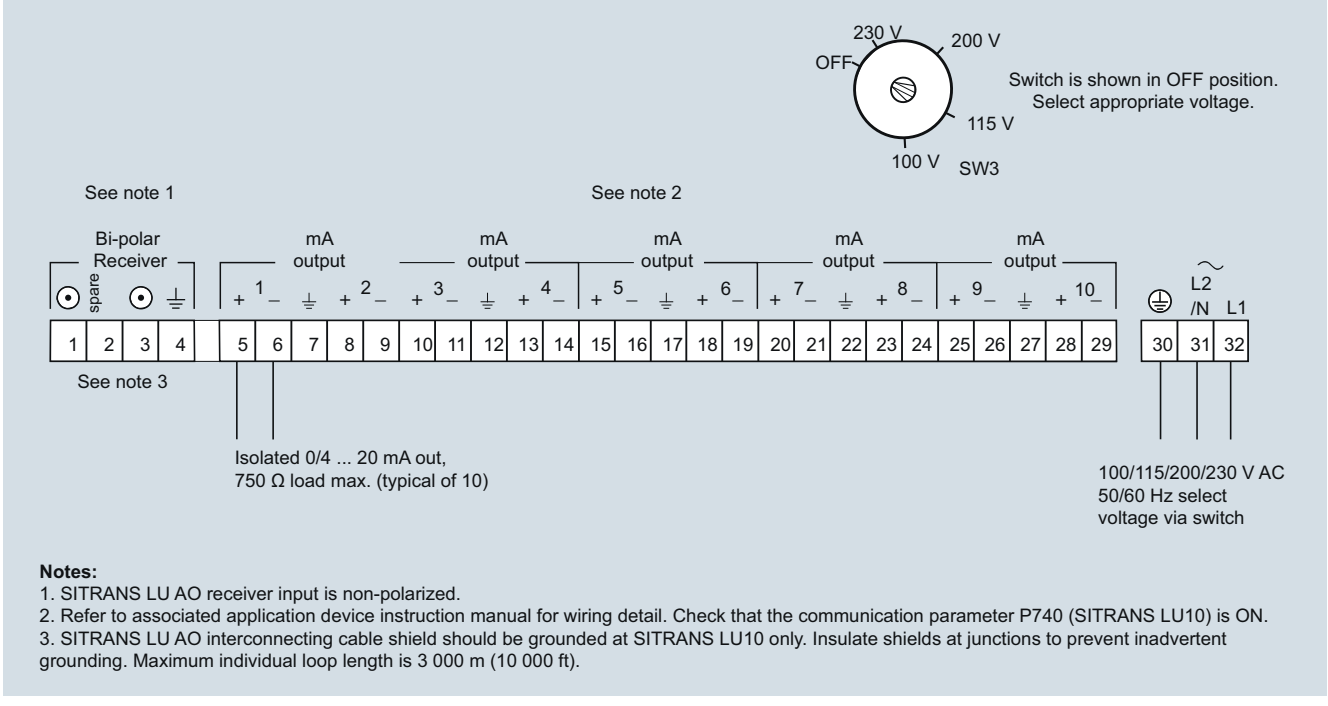
Dimensional drawings



SITRANS LU AO, dimensions in mm (inch)

Schematics



Notes:
1. SITRANS LU AO receiver input is non-polarized.
2. Refer to associated application device instruction manual for wiring detail. Check that the communication parameter P740 (SITRANS LU10) is ON.
3. SITRANS LU AO interconnecting cable shield should be grounded at SITRANS LU10 only. Insulate shields at junctions to prevent inadvertent grounding. Maximum individual loop length is 3 000 m (10 000 ft).

SITRANS LU AO connections

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Ultrasonic transducers

Overview

Ultrasonic Transducers

Ultrasonic measuring systems are the cost-effective choice for monitoring and control in short- to long-range applications for liquids, slurries, and solids in a wide range of industries. Transducers are impervious to dust, moisture, corrosion, vibration, flooding, and extreme temperature. They are easy to install and virtually maintenance-free. Choose from a wide selection of models designed for short or long range applications on liquids or solids.

Technical specifications

EchoMax Transducers					
	Liquids		**Liquids and Solids**		
			Standard		
	XRS-5	**ST-H**	**XPS-10**	**XPS-15**	**XPS-30**
Max. range[1)]	8 m (26 ft)	10 m (33 ft)	10 m (33 ft)	15 m (50 ft)	30 m (100 ft)
Min. range	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.3 m (1 ft)	0.6 m (2 ft)
Max. temperature	65 °C (149 °F)	73 °C (164 °F)	95 °C (203 °F)	95 °C (203 °F)	95 °C (203 °F)
Min. temperature	-20 °C (-4 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)
Typical Applications	Wet wells and open channels	Chemical storage and liquid tanks	Dusty solids and slurries	Deep wet wells and solids	Powders, pellets and solids
Frequency	44 kHz	44 kHz	44 kHz	44 kHz	30 kHz
Beam angle (-3dB)	10°	12°	12°	6°	6°
Thread size	R 1" [(BSPT), EN 10226] 1" NPT	1" and 2" NPT R 2" [(BSPT), EN 10226], 2" [(BSPP), EN ISO 228-1]	R 1" [(BSPT), EN 10226] 1" NPT	R 1" [(BSPT), EN 10226] 1" NPT	R 1.5" [(BSPT), EN 10226] Universal thread 1.5" NPT
Enclosure	• PVDF Copolymer • CSM • Option: Flange with PTFE facing	• ETFE • Option: PVDF	• PVDF • Option: Foam facing • Flange with PTFE facing	• PVDF • Option: Foam facing • Flange with PTFE facing	• PVDF • Option: Foam facing • Flange with PTFE facing
Compatible with:					
SITRANS LUT400	•	•	•	•	•
SITRANS LU	•	•	•	•	•
HydroRanger 200	•	•	•	•	
MultiRanger 100/200	•	•	•	•	

[1)] Application conditions such as extreme dust or angle of repose may reduce the usable maximum range. Consult your local Siemens representative for further information.

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Overview

ST-H transducers use ultrasonic technology to measure level in chemical storage and liquid tanks.

Benefits

- Can be mounted on a narrow standpipe
- Immune to corrosive and harsh environments
- Integral temperature sensor

Application

The narrow design of the ST-H allows the transducer to be mounted on a narrow standpipe. When mounted correctly, it is completely protected from the process and can even be used in harsh, corrosive environments.

During operation, the ultrasonic transducer emits acoustic pulses in a narrow beam perpendicular to the transducer face. The level transceiver measures the propagation time between pulse emission and reception of the echo to calculate the distance from the transducer to the material. Variations in sound velocity due to changes in temperature within the permissible range are automatically compensated by the integral temperature sensor.

- Key Applications: chemical storage, liquid tanks

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	0.3 ... 10 m (1 ... 33 ft)
Output	
Frequency	44 kHz
Beam angle	12°
Accuracy	
Temperature compensation	Compensated by integral temperature sensor
Rated operating conditions	
Pressure	Normal atmospheric pressure
Ambient conditions	
• Ambient temperature	-20 ... +60 °C (-5 ... +140 °F) (ATEX approved model) -40 ... +73 °C (-40 ... +163 °F) (CSA/FM approved model)
Design	
Weight[1)]	1.4 kg (3 lb)
Material (enclosure)	Base and lid made of ETFE or PVDF (epoxy fitted joint)[2)]
Process connection	2" NPT [(Taper), ANSI/ASME B1.20.1], R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Degree of protection	IP68
Cable connection	2-core shielded/twisted, 0.519 mm^2 (20 AWG), PVC sheath
Cable (max. length)	365 m (1 200 ft) with RG 62 A/U coaxial cable
Options	
• Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Certificates and approvals	CE, CSA Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T3 (ETFE only), FM Class I, II, Div. 1, Groups C, D, E, F, G T4A, ATEX II 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC

1) Approximate shipping weight of transducer with standard cable length

2) When measuring chemicals, check compatibility of ETFE or PVDF and epoxy, or mount joint external to process.

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Selection and Ordering data	Article No.
EchoMax ST-H ultrasonic transducer ↗	**7ML1100-**
Level measurement in chemical storage and liquid tanks. The narrow design of the ST-H allows the transducer to be mounted on a 2 inch standpipe. Measuring range: min. 0.3 m (1 ft), max. 10 m (33 ft).	■■ **A** ■ **0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1]	**0**
ETFE, R 2" [(BSPT), EN 10226]	**1**
ETFE, G 2" [(BSPP), EN ISO 228-1]	**2**
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]	**3**
PVDF copolymer, R 2" [(BSPT), EN 10226]	**4**
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]	**5**
Cable length	
5 m (16.40 ft)	**A**
10 m (32.81 ft)	**B**
30 m (98.43 ft)	**C**
50 m (164.04 ft)	**D**
100 m (328.08 ft)	**E**
Approvals	
CE, FM Class I, II, Div. 1, Groups C,D,E,F,G T4A	**2**
ATEX 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC CSA Class I, II, III, Div. 1, Groups A,B,C,D,E,F,G T3	**3**
CE, ATEX 2G / INMETRO Ex mb IIC T5 Gb, RCM, KCC	**4**
Operating Instructions	Article No.
Quick Start Manual, multi-language	**A5E32105880**
Applications Guidelines, multi-language	**7ML1998-5HV61**
Note: The Applications Guidelines should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	

[1] Available with Process connection options 0 ... 2 only

[2] Available with Process connection options 3 ... 5 only

[3] Not suitable for Ketone, Hexane, Ester or Ethyl Acetate atmospheres

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 16 characters) specify in plain text	**Y17**
Accessories	Article No.
Universal box bracket, mounting kit	**7ML1830-1BK**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" NPT	**7ML1830-1BT**
3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" BSPT	**7ML1830-1BU**
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	**7ML1830-1AQ**
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	**7ML1830-1AX**
Easy Aimer 304, NPT with 1" stainless steel coupling	**7ML1830-1AU**
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	**7ML1830-1GN**

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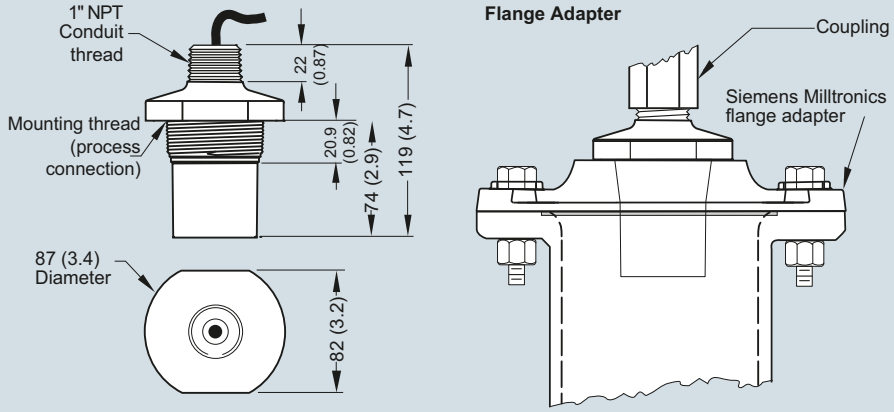
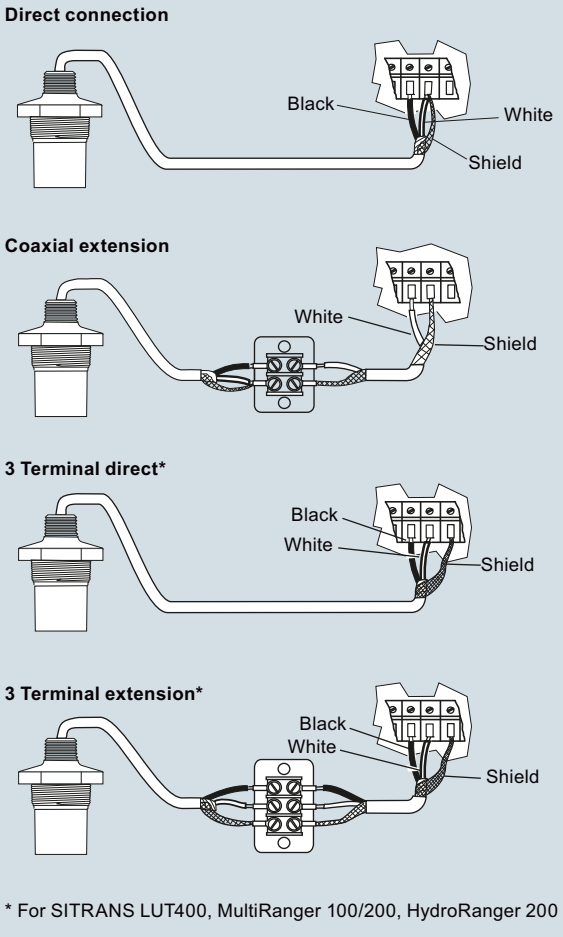
Dimensional drawings



ST-H ultrasonic transducer, dimensions in mm (inch)

Schematics



ST-H ultrasonic transducer connections

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Overview

EchoMax XRS-5 ultrasonic transducer provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds using a beam angle of just 10° and a CSM rubber face.

Benefits

- Narrow beam angle of only 10°
- Chemically resistant PVDF copolymer enclosure and CSM rubber face
- Measuring range: 8 m (26 ft) for measurement of liquids and slurries
- Fully submersible: IP68 degree of protection
- Easy installation with 1" NPT or R 1" BSPT connection

Application

The XRS-5 is non-contacting with a measuring range from 0.3 ... 8 m (1 ... 26 ft). Advanced echo processing ensures reliable data even in conditions with obstructions, turbulence and foam.

The hermetically sealed CSM rubber face and the PVDF copolymer enclosure are designed for maximum resistance to methane, salt water, caustics and harsh chemicals common to wastewater installations. With an IP68 degree of protection, this rugged sensor is fully submersible in the event of flood conditions. Use a submergence shield if full submergence is possible in the application. A submergence shield will maintain a high level reading output during submerged conditions.

The low-cost XRS-5 transducer is compatible with a full range of Siemens controllers, from a basic system for high/low alarm or simple pump control, up to advanced control systems with communications, telemetry and SCADA integration capabilities.

- Key Applications: wet wells, flumes, weirs, filter beds

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	0.3 ... 8 m (1 ... 26 ft), dependent on application
Output	
Frequency	44 kHz
Beam angle	10°
Accuracy	
Temperature error	Compensated by integral temperature sensor
Rated operating conditions	
Vessel pressure	Normal atmospheric pressure
Ambient conditions	
• Ambient temperature	-20 ... +65 °C (-4 ... +149 ° F)
Design	
Weight (approximate shipping weight of sensor with standard cable length)	1.2 kg (2.6 lb)
Material (enclosure)	PVDF copolymer enclosure and CSM face
Process connection	1" NPT [(Taper), ANSI/ASME B1.20.1] or R 1" [(BSPT), EN 10226]
Degree of protection	IP65/IP68
Cable connection	2-core shielded/twisted, 0.5 mm^2 (20 AWG), PVC sheath
Cable (max. length)	• 365 m (1 200 ft) with RG 62 A/U coaxial cable • 365 m (1 200 ft) with 2-core twisted pair, foil shield, 0.5 mm^2 (20 AWG), PVC sheath, only for MultiRanger 100/200
Options	
Flange version	Factory flange with PTFE face for ASME, EN or JIS configuration
Submergence shield	For applications with flooding possible
Certificates and approvals	CE, RCM, KCC CSA Class I, Div. 2, Groups A,B,C,D, Class II, Div. 1 Groups E,F,G FM Class I, Zone 1, AEx m IIC, T6 Class II, III, Div. 1, Groups E,F,G T6 ATEX II 2GD / IECEx / INMETRO Ex mb IIC T6 Gb, Ex tb IIIC T85 °C Db

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Selection and Ordering data		Article No.
EchoMax XRS-5 transducer ↗		**7ML1106-**
With a beam angle of 10°, the XRS-5 provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds. Measuring range: min. 0.3 m (1 ft), max. 8 m (26 ft)		■■■■ **0 - 0** ■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**1**
R 1" [(BSPT), EN 10226]	⬟	**2**
Cable length		
5 m (16.40 ft)	⬟	**A**
10 m (32.81 ft)	⬟	**B**
30 m (98.43 ft)		**C**
Facing		
Standard (CSM rubber)	⬟	**A**
PTFE (flange versions)		**B**
Approvals		
CE, RCM, KCC, CSA Class I, Div. 2, Groups A,B,C,D, Class II, Div. 1 Groups E,F,G FM Class I, Zone 1, AEx m IIC, T6 Class II, III, Div. 1, Groups E,F,G T6 ATEX II 2GD / IECEx / INMETRO Ex mb IIC T6 Gb, Ex tb IIIC T85 °C Db	⬟	**2**
Mounting flange (flush mount)		
None	⬟	**A**
3" ASME, 150 lb, flat faced		**B**
4" ASME, 150 lb, flat faced		**C**
6" ASME, 150 lb, flat faced		**D**
DN 80, PN 10/16, Type A, flat faced		**J**
DN 100, PN 10/16, Type A, flat faced		**K**
DN 150, PN 10/16, Type A, flat faced		**L**
JIS10K 3B style		**Q**
JIS10K 4B style		**R**
JIS10K 6B style		**S**
Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.		

Operating Instructions	Article No.
Quick Start Manual, multi-language	**A5E32299685**
Applications Guidelines, multi-language	**7ML1998-5HV61**
Note: The Applications Guidelines should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs Please add "**-Z**" to Article No. and specify Order code(s).		
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 16 characters) specify in plain text	⬟	**Y17**

Accessories	Article No.
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	**7ML1930-1BJ**
Submergence shield kit	**7ML1830-1BH**
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	**7ML1830-1AQ**
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	**7ML1830-1AX**
Easy Aimer 304, NPT with 1" stainless steel coupling	**7ML1830-1AU**
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	**7ML1830-1GN**
FMS-200 universal box bracket, mounting kit	**7ML1830-1BK**
FMS-210 channel bracket, wall mount	**7ML1830-1BL**
FMS-220 extended channel bracket, wall mount	**7ML1830-1BM**
FMS-310 channel bracket, floor mount	**7ML1830-1BN**
FMS-320 extended channel bracket, floor mount	**7ML1830-1BP**
FMS-350 bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	**7ML1830-1BQ**
1" NPT locknut, plastic	**7ML1830-1DS**
1" BSPT locknut, plastic	**7ML1830-1DR**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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EchoMax XRS-5

Selection and Ordering data		Article No.
EchoMax XRS-5C transducer	↗	**7ML1105-**
With a beam angle of 10°, the XRS-5 provides reliable, continuous level monitoring of liquids and slurries in narrow lift stations/wet wells, flumes, weirs and filter beds. Measuring range: min. 0.3 m (1 ft), max. 8 m (26 ft)		**1 - 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process connection		
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**1**
Cable length		
5 m (16.40 ft)	⬟	**A**
10 m (32.81 ft)	⬟	**B**
30 m (98.43 ft)		**C**
Facing		
Standard (CSM rubber)	⬟	**A**
PTFE (flange versions)		**B**
Approvals		
CSA Class I Div. 1, Groups A,B,C,D; Class II Div. 1, Groups E,F,G; Class III	⬟	**1**
Mounting flange (flush mount)		
None	⬟	**A**
3" ASME, 150 lb, flat faced		**B**
4" ASME, 150 lb, flat faced		**C**
6" ASME, 150 lb, flat faced		**D**
Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.		

Operating Instructions	Article No.
Quick Start Manual, multi-language	**A5E32299685**
Applications Guidelines, multi-language	**7ML1998-5HV61**
Note: The Applications Guidelines should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 16 characters) specify in plain text	⬟	**Y17**

Accessories	Article No.
Submergence shield kit	**7ML1830-1BH**
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	**7ML1830-1AQ**
Easy Aimer 304, NPT with 1" stainless steel coupling	**7ML1830-1AU**
FMS-200 universal box bracket, mounting kit	**7ML1830-1BK**
FMS-210 channel bracket, wall mount	**7ML1830-1BL**
FMS-220 extended channel bracket, wall mount	**7ML1830-1BM**
FMS-310 channel bracket, floor mount	**7ML1830-1BN**
FMS-320 extended channel bracket, floor mount	**7ML1830-1BP**
FMS-350 bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	**7ML1830-1BQ**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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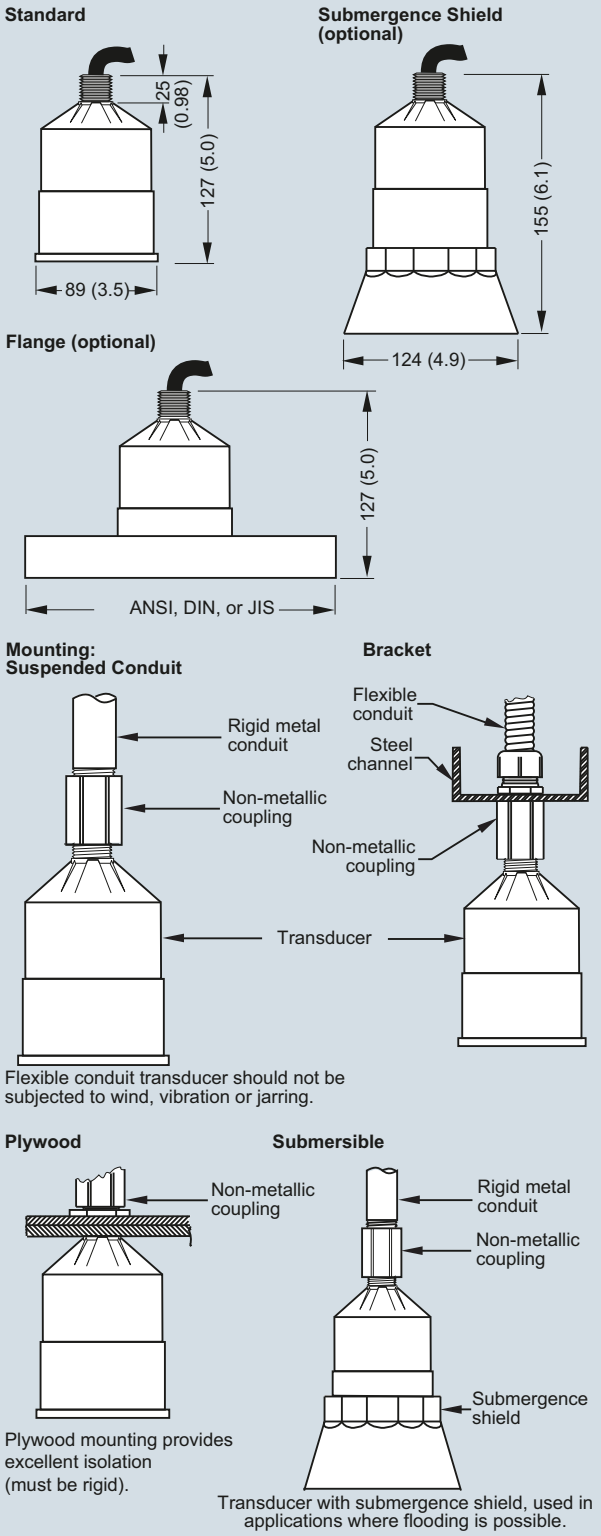
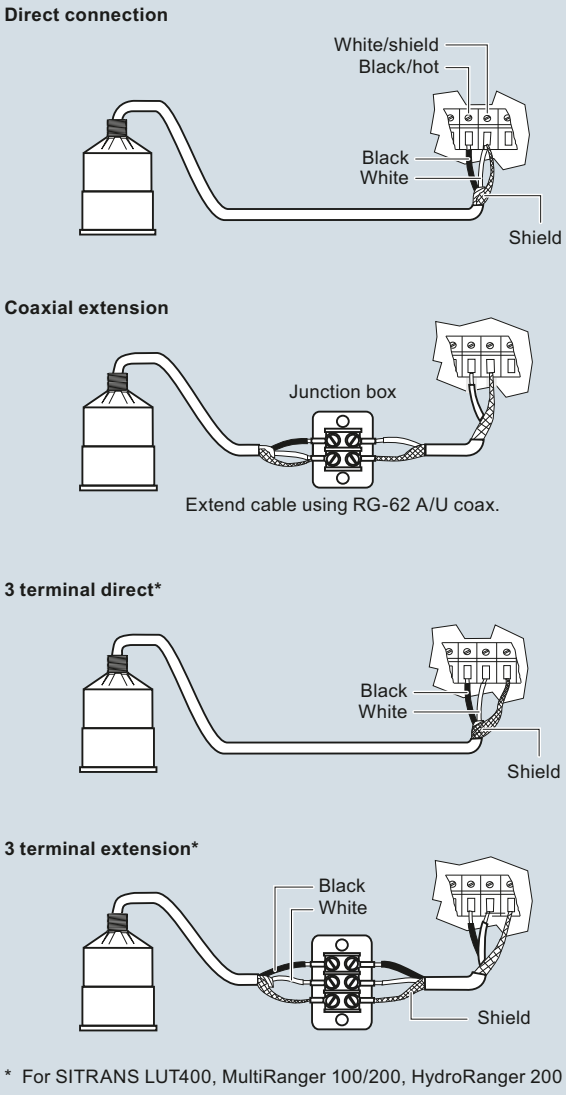
Dimensional drawings



XRS-5 ultrasonic transducer, dimensions in mm (inch)

Schematics



XRS-5 ultrasonic transducer connections

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EchoMax XPS

Overview

EchoMax XPS transducers use ultrasonic technology to measure level in a wide range of liquids and solids.

Benefits

- Integral temperature compensation
- Low ringing effect reduces blanking distance
- Optional foam facing for dusty applications
- Self-cleaning and low-maintenance
- Chemically resistant
- Hermetically sealed

Application

XPS transducers can be fully immersed, are resistant to steam and corrosive chemicals, and can be installed without flanges.

The XPS series offers versions for various measuring ranges up to 30 m (100 ft) and up to a max. temperature of 95 °C (203 °F).

During operation, the EchoMax transducers emit acoustic pulses in a narrow beam. The level monitor measures the propagation time between pulse emission and its reflection (echo) to calculate the distance.

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Technical specifications

Input	XPS-10	XPS-15 (standard and F models)	XPS-30
Measuring range	0.3 ... 10 m (1 ... 33 ft)	Standard: 0.3 ... 15 m (1 ... 50 ft) XPS-15F: 0.45 ... 15 m (1.5 ... 50 ft)	0.6 ... 30 m (2 ... 100 ft)
Output			
Frequency	44 kHz	44 kHz	30 kHz
Beam angle	12°	6°	6°
Environmental			
Location	Indoors/outdoors		
Ambient temperature	-40 ... +95 °C (-40 ... +203 °F)	XPS-15F: -20 ... +95 °C (-4 ... +203 °F)	-40 ... +95 °C (-40 ... +203 °F)
Pollution degree	4		
Pressure	8 bar g (120 psi g) Flanged: 0.5 bar g (7.25 psi g)	8 bar g (120 psi g) Flanged: 0.5 bar g (7.25 psi g)	0.5 bar g (7.25 psi g) Flanged: 0.5 bar g (7.25 psi g)
Design			
Weight	0.8 kg (1.8 lb)	1.3 kg (2.8 lb) Flanged: 2 kg (4.4 lb)	4.3 kg (9.5 lb)
Power supply	Operation of transducer only with approved Siemens Milltronics controllers		
Material	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange	Standard: PVDF Flanged: PVDF with CPVC flange Option: PTFE face with CPVC flange
Color	Blue	Standard: Blue XPS-15F: Gray	Blue
Process connection	1" NPT or 1" BSPT	Standard: 1" NPT or 1" BSPT XPS-15F: 1" NPT	1.5" universal thread (NPT or BSPT)
Degree of protection	IP66/68	IP66/68	IP66/68
Cable	2 wire twisted pair/braided and foil shielded 0.5 mm^2 (20 AWG) PVC jacket		
Separation	Max. 365 m (1 200 ft)		
Certificates and approvals	Standard: CE, CSA, FM, ATEX, IECEx	Standard: CE, CSA, FM, ATEX, IECEx XPS-15F: FM Class I, Div. 1, Groups A, B, C and D, Class II Div. 1, Groups E, F and G, Class III	CE, CSA, FM, ATEX, IECEx

[1] EMC certificate available on request.

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EchoMax XPS

Selection and Ordering data		Article No.
EchoMax XPS-10 ultrasonic transducer ↗		**7ML1115-**
High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max.10 m		■■■■ **0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Mounting thread and facing		
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0**
1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing[1]		**1**
1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing[2]		**2**
R 1" [(BSPT), EN 10226]	⬟	**3**
R 1" [(BSPT), EN 10226] with foam facing[1]		**4**
R 1" [(BSPT), EN 10226] with PTFE facing[2]		**5**
Cable length		
5 m (16.40 ft)	⬟	**B**
10 m (32.81 ft)	⬟	**C**
30 m (98.43 ft)	⬟	**E**
50 m (164.04 ft)		**F**
100 m (328.08 ft)		**K**
Mounting flange		
None	⬟	**A**
3" ASME, 150 lb, flat faced		**C**
4" ASME, 150 lb, flat faced		**D**
6" ASME, 150 lb, flat faced		**E**
8" ASME, 150 lb, flat faced		**F**
DN 80, PN 10/16, Type A, flat faced		**G**
DN 100, PN 10/16, Type A, flat faced		**J**
DN 150, PN 10/16, Type A, flat faced		**L**
JIS10K3B Style		**M**
JIS10K4B Style		**P**
JIS10K6B Style (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)		**R**
Approvals		
ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III	⬟	**3**
CSA Class I, Div. 1, Groups A,B,C,D, Class II, Div. 1, Groups E,F,G, Class III[3]	⬟	**4**

[1] Not available with flanged versions

[2] Available with flanged versions only

[3] Valid with mounting thread and facing options 0 ... 2 only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
Quick Start guide, multi-language	**A5E32282889**
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	**7ML1998-5HV61**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	**7ML1930-1BJ**
Submergence shield kit	**7ML1830-1BH**
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	**7ML1830-1AQ**
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	**7ML1830-1AX**
Easy Aimer 304, NPT with 1" stainless steel coupling	**7ML1830-1AU**
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	**7ML1830-1GN**
Universal box bracket, mounting kit	**7ML1830-1BK**
Channel bracket, wall mount	**7ML1830-1BL**
Extended channel bracket, wall mount	**7ML1830-1BM**
Channel bracket, floor mount	**7ML1830-1BN**
Extended channel bracket, floor mount	**7ML1830-1BP**
Bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	**7ML1830-1BQ**
1" NPT locknut, plastic	**7ML1830-1DS**
1" BSPT locknut, plastic	**7ML1830-1DR**

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Selection and Ordering data		Article No.
EchoMax XPS-15 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		**7ML1118-** ■■■■ **0**
Mounting thread and facing		
1" NPT [(Taper), ANSI/ASME B1.20.1]	⬟	**0**
1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing[1]		**1**
1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing[2]		**2**
R 1" [(BSPT), EN 10226]	⬟	**3**
R 1" [(BSPT), EN 10226] with foam facing[1]		**4**
R 1" [(BSPT), EN 10226] with PTFE facing[2]		**5**
Cable length		
5 m (16.40 ft)	⬟	**B**
10 m (32.81 ft)	⬟	**C**
30 m (98.43 ft)	⬟	**E**
50 m (164.04 ft)		**F**
100 m (328.08 ft)		**K**
Mounting flange		
None	⬟	**A**
6" ASME, 150 lb, flat faced		**D**
8" ASME, 150 lb, flat faced		**E**
DN 150, PN 10/16, Type A, flat faced		**J**
DN 200, PN 10, Type A, flat faced		**K**
JIS10K 6B		**N**
JIS10K 8B		**P**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)		
Approvals		
ATEX 2GD Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex tb IIIC T135 °C Db; FM Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F,G; Class III	⬟	**3**
CSA Class I, Div. 1 Groups A,B,C,D, Class II, Div. 1, Groups E,F,G, Class III [3]	⬟	**4**

[1] Not available with flanged versions

[2] Available with flanged versions only

[3] Available with mounting options 0 ... 2 only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: ⬟ Measuring point number/ identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
Quick Start guide, multi-language	**A5E32282889**
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	**7ML1998-5HV61**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	**7ML1930-1BJ**
Submergence shield kit	**7ML1830-1BJ**
Universal box bracket, mounting kit	**7ML1830-1BK**
Channel bracket, wall mount	**7ML1830-1BL**
Extended channel bracket, wall mount	**7ML1830-1BM**
Channel bracket, floor mount	**7ML1830-1BN**
Extended channel bracket, floor mount	**7ML1830-1BP**
Bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	**7ML1830-1BQ**
1" NPT locknut, plastic	**7ML1830-1DS**
1" BSPT locknut, plastic	**7ML1830-1DR**
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	**7ML1830-1AQ**
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	**7ML1830-1AX**
Easy Aimer 304, NPT with 1" stainless steel coupling	**7ML1830-1AU**
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	**7ML1830-1GN**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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EchoMax XPS

Selection and Ordering data	Article No.
EchoMax XPS-15F ultrasonic transducer ↗ High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. Measuring range: min. 0.3 m, max. 15 m ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7ML1171-** ■■■■**0**
Mounting thread and facing	
1" NPT [(Taper), ANSI/ASME B1.20.1]	**1**
Cable length	
5 m (16.40 ft)	**B**
10 m (32.81 ft)	**C**
30 m (98.43 ft)	**D**
50 m (164.04 ft)	**E**
100 m (328.08 ft)	**F**
Mounting flange, flush mount	
None	**A**
6" ASME, 150 lb, flat faced	**B**
8" ASME, 150 lb, flat faced (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	**C**
Approvals	
FM Class I, Div. 1, Groups A, B, C, and D, Class II Div. 1, Groups E, F, and G, Class III	**1**

Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring point number/ identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
English	**A5E32725813**
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	**7ML1998-5HV61**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	**7ML1930-1BJ**
Submergence shield kit	**7ML1830-1BJ**
Universal box bracket, mounting kit	**7ML1830-1BK**
Channel bracket, wall mount	**7ML1830-1BL**
Extended channel bracket, wall mount	**7ML1830-1BM**
Channel bracket, floor mount	**7ML1830-1BN**
Extended channel bracket, floor mount	**7ML1830-1BP**
Bridge channel bracket, floor mount (see Mounting Brackets on page 4/187 for more information)	**7ML1830-1BQ**
1" NPT locknut, plastic	**7ML1830-1DS**
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	**7ML1830-1AQ**
Easy Aimer 304, NPT with 1" stainless steel coupling	**7ML1830-1AU**

Selection and Ordering data	Article No.
EchoMax XPS-30 ultrasonic transducer ↗ High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226] Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft) ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7ML1123-** ■■■■**0**
Mounting thread and facing	
1½" universal thread	**0**
1½" universal thread, foam facing[1]	**1**
1½" universal thread, PTFE facing[2]	**2**
Cable length	
5 m (16.40 ft)	**B**
10 m (32.81 ft)	**C**
30 m (98.43 ft)	**E**
50 m (164.04 ft)	**F**
100 m (328.08 ft)	**K**
Mounting flange	
None	**A**
6" ASME, 150 lb, flat faced	**D**
8" ASME, 150 lb, flat faced	**E**
DN 150, PN 10/16, Type A, flat faced	**J**
DN 200, PN 10, Type A, flat faced	**K**
JIS10K 6B	**N**
JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)	**P**
Approvals	
ATEX 2G 1D Ex mb IIC T4 Gb, Ex ta IIIC T135 °C Da; IECEx SIR 13.0009X Ex mb IIC T4 Gb, Ex ta IIIC T135 °C Da	**5**

[1] Not available with flanged versions

[2] Available with flanged versions only

Selection and Ordering data	Order code
Further designs Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
Quick Start guide, multi-language	**A5E32282889**
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	**7ML1998-5HV61**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch), one text line for fastening on sensors	**7ML1930-1BJ**
1½" BSPT locknut, plastic	**7ML1830-1DP**
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling	**7ML1830-1AN**
Easy Aimer 304, NPT with 1½" stainless steel coupling	**7ML1830-1AT**
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	**7ML1830-1AX**
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	**7ML1830-1GN**

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Selection and Ordering data	Article No.
EchoMax XPS-30C ultrasonic transducer ↗ High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226] Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)	**7ML1155-** ■■■■ **1**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Mounting thread and facing	
1½" universal thread	**0**
1½" universal thread, foam facing[1]	**1**
1½" universal thread, PTFE facing[2]	**2**
Cable length	
5 m (16.40 ft)	**B**
10 m (32.81 ft)	**C**
30 m (98.43 ft)	**E**
50 m (164.04 ft)	**F**
100 m (328.08 ft)	**K**
Mounting flange	
None	**A**
6" ASME, 150 lb, flat faced	**D**
8" ASME, 150 lb, flat faced	**E**
DN 150, PN 10/16, Type A, flat faced	**J**
DN 200, PN 10, Type A, flat faced	**K**
JIS10K 6B	**N**
JIS10K 8B (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.)	**P**
Approvals	
CSA, Class I, Div. 2, Groups A,B,C,D; Class II, Div. 1, Groups E,F, G; Class III	**4**

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]: Measuring-point number / identification (max. 27 characters) specify in plain text	**Y15**
Operating Instructions	Article No.
Quick Start guide, multi-language	**A5E32282889**
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	**7ML1998-5HV61**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling	**7ML1830-1AN**
Easy Aimer 304, NPT with 1½" stainless steel coupling	**7ML1830-1AT**
1½" BSPT locknut, plastic	**7ML1830-1DP**

[1] Not available with flanged version

[2] Available for flanged versions only

4

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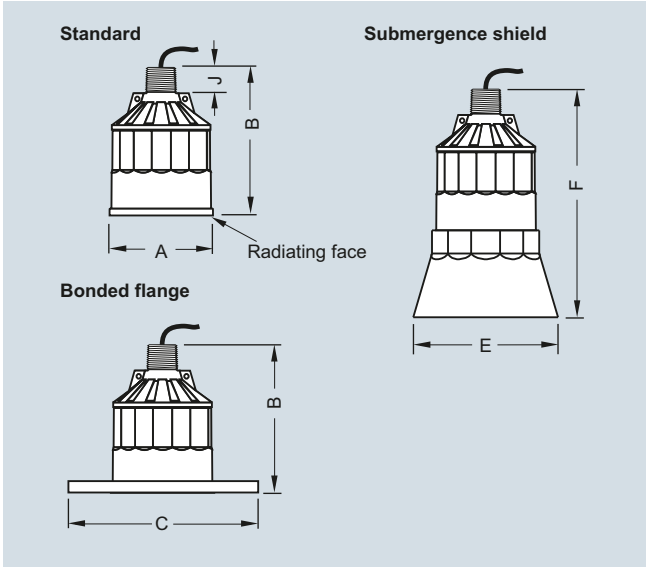
4

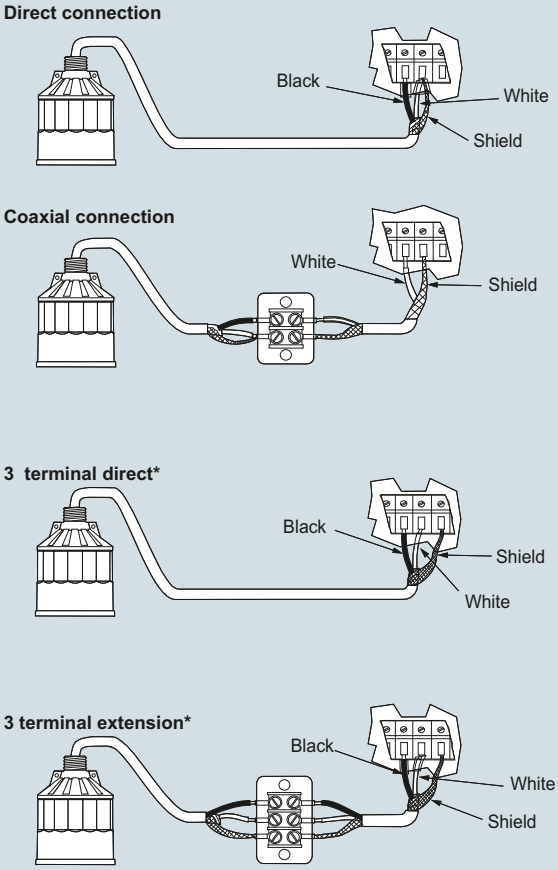
Dimensional drawings



XPS ultrasonic transducer, dimensions in mm (inch)

Version			
Dimension	**XPS-10**	**XPS-15**	**XPS-30**
A	88 mm (3.464 inch)	121 mm (4.764 inch)	175 mm (6.890 inch)
B	122 mm (4.803 inch)	132 mm (5.197 inch)	198 mm (7.795 inch)
C	According to ASME, DIN and JIS		
E	124 mm (4.882 inch)	158 mm (6.220 inch)	n/a
F	152 mm (5.984 inch)	198 mm (7.795 inch)	n/a
J	28 mm (1.1 inch)	28 mm (1.1 inch)	28 mm (1.1 inch)

Schematics



* For SITRANS LUT400, MultiRanger 100/200, HydroRanger 200

Mounting
Make particularly sure that the radiating face of the transducer is protected from damage. Mount the transducer so that it is above the maximum material level by at least the blanking value. On liquid applications, the transducer must be mounted so that the axis of transmission is perpendicular to the liquid surface. On solids applications, a Milltronics Easy Aimer should be used to facilitate aiming the transducer. Consider the optional temperature sensor when mounting the transducer.

Interconnection
Do not route cable openly or near high voltage or current runs, contactors and SCR control drives. For optimum isolation against electrical noise, run cable separately in a grounded metal conduit. Seal all thread connections to prevent ingress of moisture.

XPS ultrasonic transducer connections

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Application

EA 304 aiming device

The Easy Aimer 304 flange is a stainless steel aiming device for alignment of Siemens ultrasonic transducers used for level measurement of bulk solids.

The sensor must be mounted aimed towards the low level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 27° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 304 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

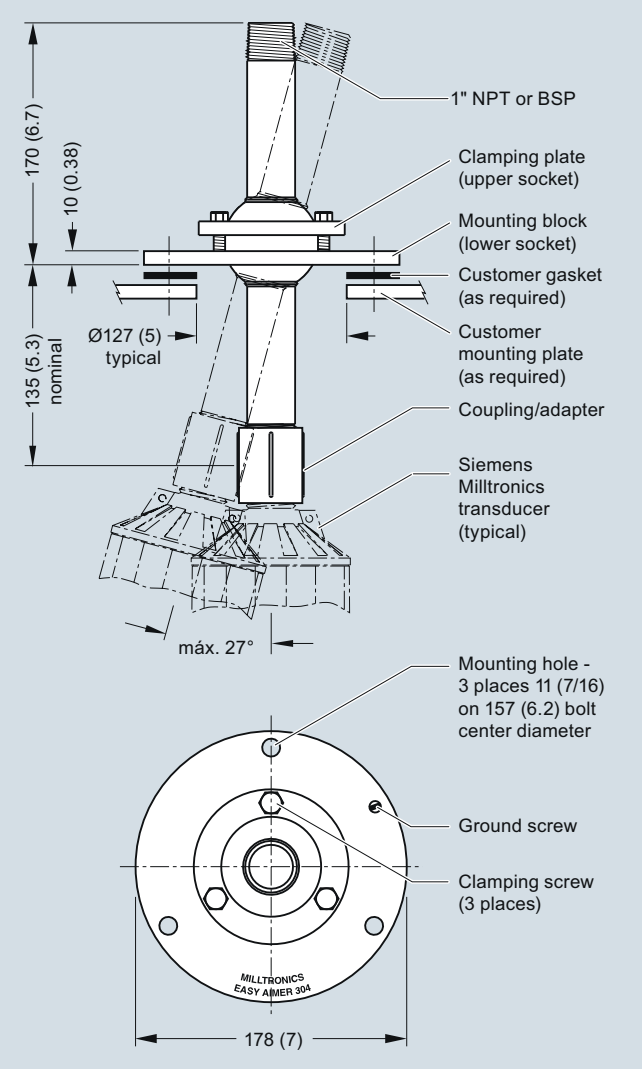
Application

EA 2 aiming device

The Easy Aimer 2 flange is a cast aluminum aiming device for alignment of Siemens ultrasonic transducers.

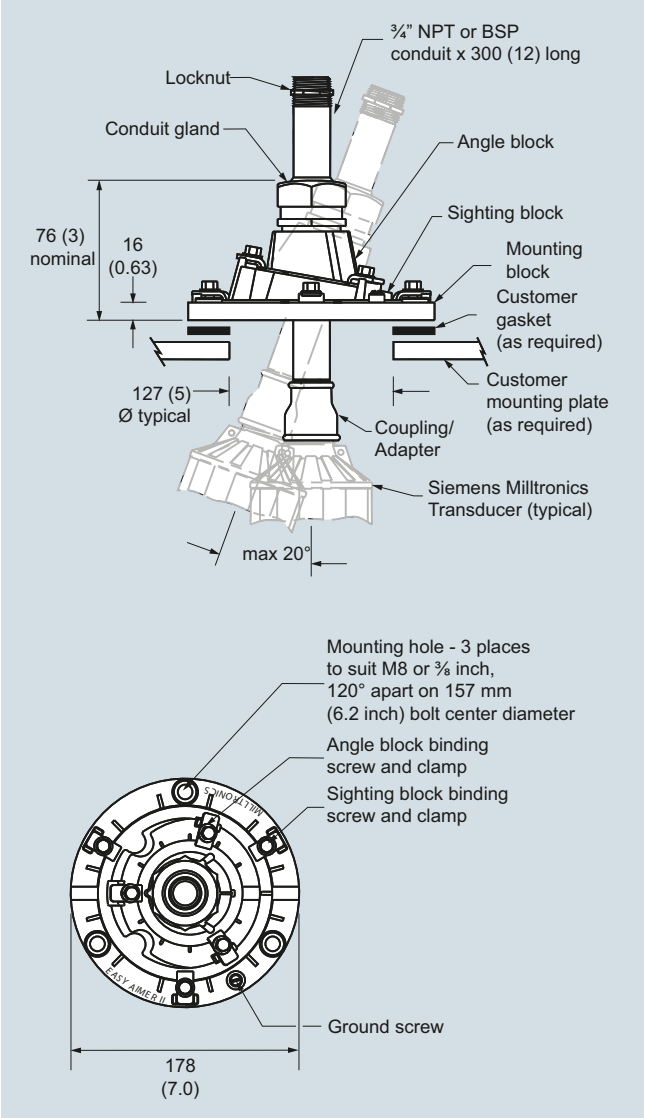
The flange has graduated adjustments and an adjustable insertion length. When used for applications with bulk solids, the sensor is mounted so that it is aimed towards the lower level draw point in the silo. The sensor can be rotated through 360° and angled at 0 to 20° off vertical. It must be mounted using an access plate with welded studs or a flange in order to isolate the mounting holes from the pressurized environment. When installed properly, the EA 2 aiming device is capable of withstanding pressures up to 0.5 bar (Europe) or 15 psi (North America). It can even be used in corrosive and aggressive environments.

Dimensional drawings



EA 304 aiming device, dimensions in mm (inch)

Dimensional drawings



EA 2 aiming device, dimensions in mm (inch)

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EA aiming devices

Selection and Ordering data	Article No.
Easy aimer Used on solids applications to aim transducers for optimal performance. Available in a 304 stainless steel model, or a cast aluminum model.	
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	**7ML1830-1AX**
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 stainless steel couplings	**7ML1830-1GN**
Easy Aimer 2, aluminum, BSPT conduit	**7ML1830-1AL**
Easy Aimer 2, aluminum, NPT with 1½" galvanized coupling[1)]	**7ML1830-1AN**
Easy Aimer 2, aluminum, NPT with 1" galvanized coupling	**7ML1830-1AP**
Easy Aimer 2, aluminum, NPT with ¾" x 1" PVC coupling	**7ML1830-1AQ**
Easy Aimer 304, BSPT conduit	**7ML1830-1AS**
Easy Aimer 304, NPT with 1½" stainless steel coupling[1)]	**7ML1830-1AT**
Easy Aimer 304, NPT with 1" stainless steel coupling	**7ML1830-1AU**
Operating Instructions Easy Aimer 2 and 304 Operating Instructions, Multi-language Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the Quick Start and Operating Instructions library.	**7ML1998-5HG62**

1) For use with XPS-30 transducers only

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Application

Siemens mounting brackets permit simple, fast installation of ultrasonic transducers. These rugged, high quality mounting brackets are constructed of 304 (1.4301) stainless steel and are suitable for use indoors and outdoors. They adjust to fit almost any application, saving you the time and expense of building custom brackets. Each kit includes all mounting parts.

FMS-200
universal box bracket system

Mounting of units with 1 inch or 2 inch threaded connection.

Distance from sensor to wall or beam: 20 ... 31 cm (8 ... 12 inch).

The unique box design also acts as a sun shield for transducers with 1 inch threaded connections.

FMS-210
wall mounting set

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam: 12 ... 48 cm (5 ... 19 inch).

FMS-220
extended wall mounting set

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to wall or beam: 32 ... 98 cm (13 ... 39 inch).

FMS-310
floor mounting set

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 5 ... 57 cm (2 ... 22 inch).

FMS-320
extended floor mounting set

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch).

Distance from mounting support: 41 ... 108 cm (16 ... 43 inch).

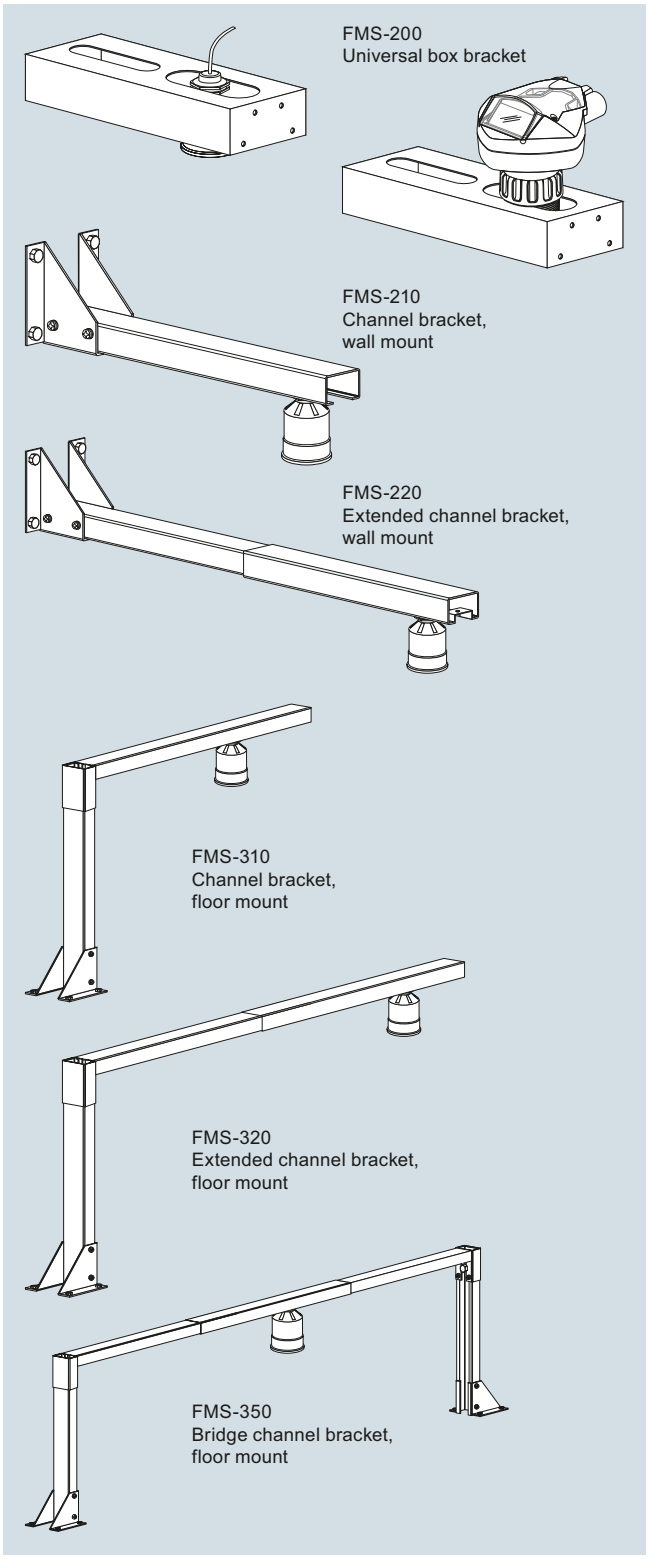
FMS-350
floor mounting set, bridge

Mounting of transducers with 1 inch threaded connection.

Distance from transducer to floor: 20 ... 48 cm (8 ... 19 inch), anywhere along the complete width of the bridge [166 cm (65 inch)].

This kit is particularly suitable for measurements on open channels (OCM) by providing a very stable mount for the transducer above a flume or weir.

Integration



FMS mounting brackets

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FMS mounting brackets

Selection and Ordering data	Article No.
Mounting brackets for XPS-10 sensors	
FMS-200 universal box bracket set	**7ML1830-1BK**
FMS-210 wall mounting set	**7ML1830-1BL**
FMS-220 extended wall mounting set	**7ML1830-1BM**
FMS-310 floor mounting set	**7ML1830-1BN**
FMS-320 extended floor mounting set	**7ML1830-1BP**
FMS-350 floor mounting set, bridge	**7ML1830-1BQ**
Additional Operating Instructions	
FMS-200	**7ML1998-5BK61**
FMS-210	**7ML1998-5BL61**
FMS-220	**7ML1998-5BM61**
FMS-310	**7ML1998-5BN61**
FMS-320	**7ML1998-5BP61**
FMS-350	**7ML1998-5BQ61**
Note: The Operating Instructions should be ordered as a separate line item on the order.	

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Overview

The TS-3 temperature sensor provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.

Benefits

- Chemically resistant ETFE enclosure
- Fast response time
- Approved for use in potentially explosive atmospheres

Application

Temperature compensation is essential in applications where temperature variations of the sound medium are expected.

By installing the temperature sensor close to the sound path of the associated ultrasonic transducer, a signal representative of the sound medium's ambient temperature is obtained. The temperature sensor should not be mounted in direct sunlight.

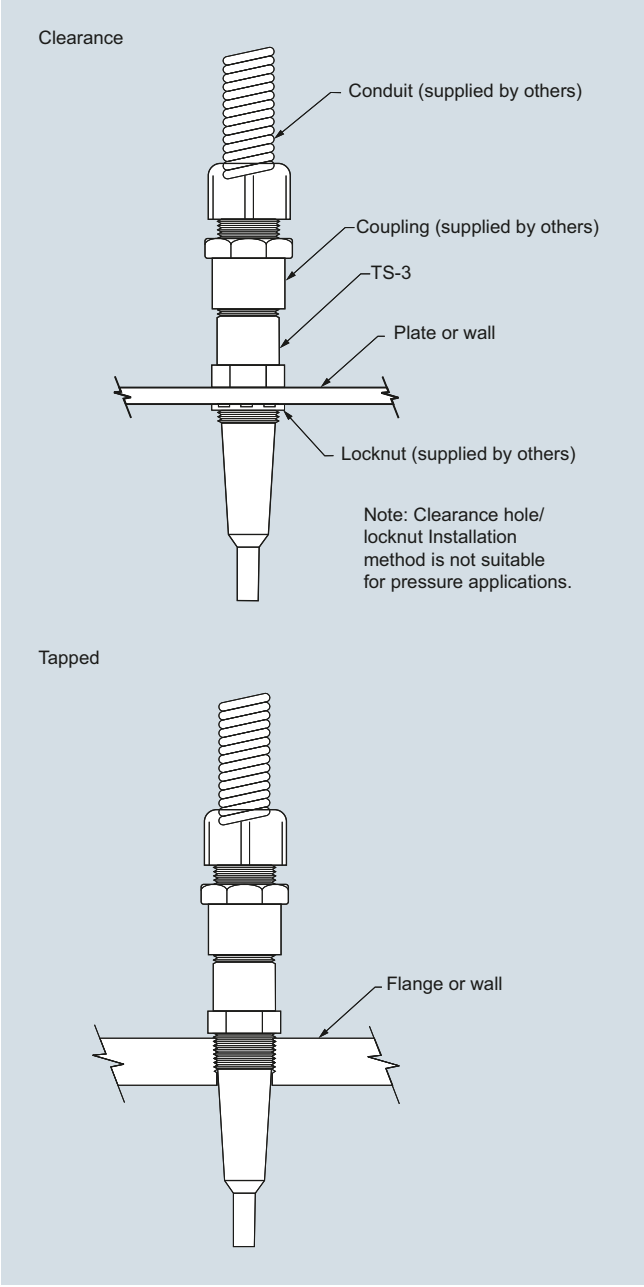
The TS-3 is used in conjunction with ultrasonic transducers that do not have an integral temperature sensor. It is also recommended in cases where the integral temperature sensor of the transducer cannot be used.

The following conditions are typical for use of the TS-3 sensor: where a fast reaction to temperature variations is required, where a flanged ultrasonic transducer is used, or where high temperatures are encountered.

The TS-3 is not compatible with devices using the TS-2 or LTS-1 temperature sensors. Refer to the associated controller manual for more details.

- Key Applications: For use in applications where temperature sensor measurement from transducer does not accurately represent vessel temperature. Used for applications requiring quick temperature response (open channel monitoring).

Design



TS-3 temperature sensor

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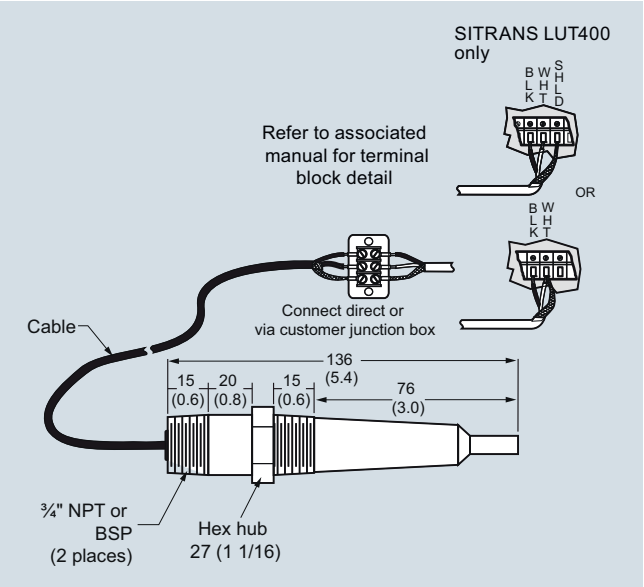
TS-3 temperature sensor

Technical specifications

Mode of operation	
Measuring principle	Temperature sensor
Input	
Measuring range	-40 ... +100 °C (-40 ... +212 °F)
Output	
Response time	
• Forced circulation (temperature variation: 63 %)	55 s
• Flange, forced circulation	90 s
• Natural convection	150 s
Rated operating conditions	
Installation instructions	Mounted indoors/outdoors, but not exposed to direct sunlight
Pressure	Max. 4 bar (60 psi/400 kPa)
Design	
Material (enclosure)	ETFE[1)]
Cable connection	2-core, 0.5 mm² (20 AWG), shielded, silicone sheath
Process connection	¾" NPT [(Taper), ANSI/ASME B1.20.1]
	R ¾" [(BSPT), EN 10226], totally encapsulated
Certificates and approvals	CE, IEC Ex, FM, CSA, ATEX

1) ETFE is a fluoropolymer inert to most chemicals. For exposure to specific environments, check the chemical compatibility charts before installing the TS-3 in your application.

Dimensional drawings



TS-3 temperature sensor, dimensions in mm (inch)

Selection and Ordering data

Selection and Ordering data	Article No.
TS-3 temperature sensor ↗	**7ML1813-** ■■B■
TS-3 provides an input signal for temperature compensation of specific Siemens ultrasonic level controllers.	
Compensation is essential in applications where variation in temperature of the sound medium is expected.	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Cable length	
1 m (3.28 ft)	1
5 m (16.40 ft)	2
10 m (32.81 ft)	3
30 m (98.43 ft)	4
50 m (164.04 ft)	5
70 m (229.66 ft)	6
90 m (295.28 ft)	7
Process connection	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	A
R ¾" [(BSPT), EN 10226]	B
Approvals	
CSA, FM	3
CE, ATEX, IEC Ex	4
Operating Instructions	
English	**A5E32337739**
German	**A5E34990011**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing ATEX Quick Starts and Operating Instructions.	
Accessories	
¾" NPT locknut, aluminum	**7ML1930-1BE**
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77 inch) for fastening on sensors	**7ML1930-1BJ**

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Overview

Radar measurement technology is non-contacting and low maintenance. Because microwaves require no carrier medium, they are virtually unaffected by the process atmosphere (vapor, pressure, dust, or temperature extremes). Siemens offers a variety of models to meet the specific needs of your application.

SITRANS Probe LR is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence to a range of 20 m (65 ft).

SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, corrosive or aggressive materials, to a range of 20 m (66 ft). Ideal for small vessels and low dielectric media.

SITRANS LR260 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids in silos to a range of 30 m (98.4 ft). Ideal for applications with extreme dust and high temperatures to 200 °C (392 °F) and liquids in vessels.

SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal to noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.

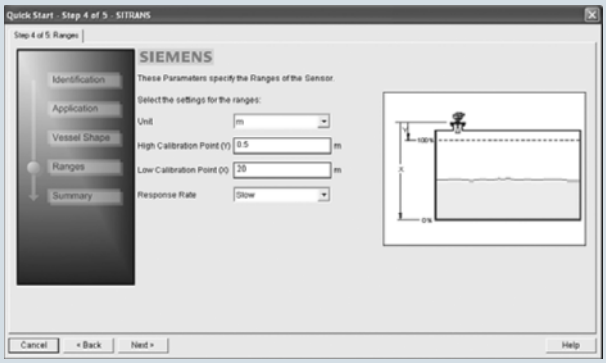
SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft).

Auto False-Echo Suppression

SITRANS LR instruments offer the unique advantage of Process Intelligence signal processing technology. This in-depth knowledge and experience is built into the software's advanced algorithms to provide intelligent processing of echo profiles. The result is repeatable, fast and reliable measurement.

A special feature of SITRANS radar devices is Auto False-Echo Suppression, an echo processing technique that automatically detects and suppresses false echoes from vessel obstructions. You can implement this feature using two parameters on the local interface or SIMATIC PDM communicating over HART or PROFIBUS PA.

Local display interface – graphically displays echo profiles and diagnostic information (available with LR200, LR250, LR260 and LR560)
Quick to configure – Quick Start Wizard via SIMATIC PDM guides you during setup (available with LR200, LR250, LR260, LR460, LR560)



Mode of operation

Principle of Operation

Radar measurement technology measures the time of flight from the transmitted signal to the return signal. From this time, distance measurement and level are determined.

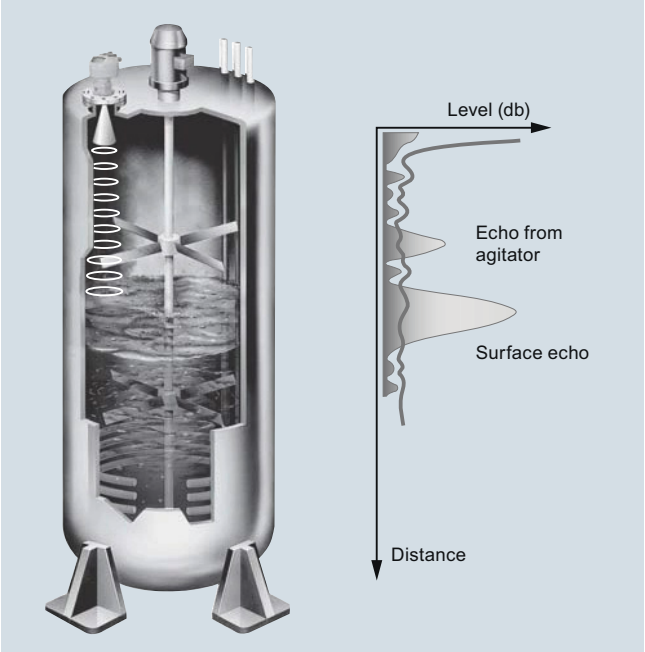
Unlike ultrasonic measurement, radar technology does not require a carrier medium and travels at the speed of light (300 000 000 m/s). Most industrial radar devices operate from 6 to 26 GHz.

Siemens offers pulse radar transmitters (SITRANS Probe LR, SITRANS LR200, SITRANS LR250, SITRANS LR260) and FMCW (Frequency Modulated Continuous Wave) radar transmitters (SITRANS LR460, SITRANS LR560).

Pulse radar emits a microwave pulse from the antenna at a fixed repetition rate that reflects off the interface between the two materials with different dielectric constants (the atmosphere and the material being monitored). The echo is detected by a receiver and the transmit time is used to calculate level.

Reflected echoes are digitally converted to an echo profile. The profile is analyzed to determine the distance from the material surface to the reference point on the instrument.

FMCW (Frequency Modulated Continuous Wave) radar devices send microwaves to the surface of the material. The wave frequency is modulated continuously. At the same time, the receiver is also receiving continuously and the difference in frequency between the transmitter and the receiver is directly proportional to the distance to the material.



Radar operation in a reactor vessel

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Technical specifications

Radar Selection Guide

Criteria	SITRANS Probe LR	SITRANS LR200	SITRANS LR250	SITRANS LR260	SITRANS LR460	SITRANS LR560
Typical industries	Chemicals, petro-chemicals, water/ waste-water, drilling mud	Chemicals, petro-chemicals, aluminum, wastewater	Chemicals, petro-chemicals, and oil and gas, mining, marine, food and beverage, and phar-maceutical	Cement, power generation, petrochemical, food processing, mineral processing, mining	Cement, power generation, food processing, mineral processing, mining	Cement, power generation, food processing, mineral processing, mining
Typical applications	Liquids, storage ves-sels, wet wells, and drilling mud tanks	Liquids, process ves-sels with agitators, build-up, and high temperatures	Liquids, storage and process vessels with agitators, vaporous liquids, high temper-atures, low dielectric media, and crude oil produced water	Cement, plastics, grain, flour, coal, liquids < 20 m, and low dielectric liquids < 30 m	Cement, fly ash, grain, coal, flour, plastics	Cement, fly ash, grain, coal, flour, plastics
Range	0.3 ... 20 m (1 ... 65 ft)	0.4 ... 20 m (1.3 ... 65 ft)	50 mm (2 inch) from end of horn to 20 m (65 ft), horn depen-dent	30 m (98.4 ft)	100 m (328 ft)	40 m (131 ft) 100 m (328 ft)
Frequency	5.8 GHz (North America 6.3 GHz)	5.8 GHz (North America 6.3 GHz)	K-band (25.0 GHz)	K-band (25.0 GHz)	24 ... 25 GHz FMCW	78 ... 79 GHz
Performance accuracy	0.1 % of range or 10 mm (0.4 inch)	0.1 % of range or 10 mm (0.4 inch)	≤ 3 mm (0.118 inch)	25 mm (1 inch) from minimum detectable distance to 300 mm (11.8 inch) Remainder of range = 10 mm (0.39 inch) or 0.1 % of span (whichever is greater)	0.25 %	0.25 %
Temperature	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +80 °C (-40 ... +176 °F	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F), dependent on antenna type	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F) dependent on antenna type	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +200 °C (-40 ... +392 °F) dependent on antenna type	Ambient: 65 °C (149 °F) Process: 200 °C (392 °F)	Ambient: -40 ... +80 °C (-40 ... +176 °F) Process: -40 ... +100 °C (-40 ... 212 °F) Optional: 200 °C (392 °F)
Output/communica-tions/remote configu-ration and diagnostics	• 4 ... 20 mA/HART • SIMATIC PDM	• 4 ... 20 mA/HART • PROFIBUS PA • SIMATIC PDM • AMS • SITRANS DTM/FDT for PACTware, Fieldcare, etc.	• 4 ... 20 mA/HART • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • AMS • SITRANS DTM/FDT for PACTware, Fieldcare, etc.	• 4 ... 20 mA/HART • PROFIBUS PA • SIMATIC PDM	• 4 ... 20 mA/HART • PROFIBUS PA • SIMATIC PDM	• 4 ... 20 mA/HART • PROFIBUS PA • FOUNDATION Fieldbus • SIMATIC PDM • AMS • SITRANS DTM/FDT for PACTware, Fieldcare, etc.
Power	• 24 V DC nominal • Loop powered	• 24 V DC nominal • Loop powered	• 24 V DC nominal • Loop powered	• 24 V DC nominal • Loop powered	• 100 ... 230 V AC, ±15 %, 50/60 Hz, 6 W • 24 V DC, +25/-20 %, 6 W	• 24 V DC nominal • Loop powered
Approvals	CE, RCM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST-R, IECEx, ANZEx, TIIS	CE, RCM, Lloyds Register of Shipping, ABS, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST-R, IECEx, ANZEx, TIIS, NEPSI	CE, RCM, Lloyds Register of Shipping, ABS, BV, FCC, Indus-try Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST-R, IECEx, TIIS, NEPSI Functional safety SIL 2, EHEDG, 3-A, USP Class VI	CE, RCM, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, GOST, IECEx	CE, RCM, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, IECEx, GOST	CE, RCM, FCC, Industry Canada, R&TTE ATEX, CSA, FM, INMETRO, IECEx, NEPSI, GOST

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Application

SIEMENS

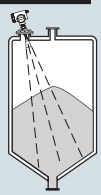
Radar Application Questionnaire

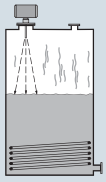
Customer information

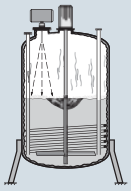
Contact: _____ Prepared By: _____
Company: _____ Date: _____
Address: _____ Notes on the Application: _____
City: _____ Country: _____
Zip/Postal Code: _____ Phone: ( ) _____
E-mail: _____ Fax: ( ) _____

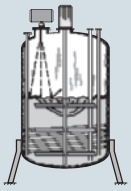
Vessel Information

☐ Sketch attached

☐ Storage Solids 

☐ Storage Liquids 

☐ Process 

☐ Reactor 

Area safety classification: (specify code required) _____

Height: _____ m/ft **Diameter:** _____ m/ft Filling method: _____

Top:
☐ Flat
☐ Parabolic
☐ Conical

Atmosphere: (indicate all that apply)
☐ Foam ☐ Steam
☐ Dust ☐ Deposit (build-up)
☐ Vapor

Pressure:
Normal: _____
Maximum (relief): _____

Mounting connection (specify type) _____

Distance to sidewall: _____ cm/inch

Mounting connection maximum temperature: _____ °C/°F

Max. temperature at electronics: _____ °C/°F

Critical Information
Nozzle Length: _____ cm/inch
Nozzle Diameter: _____ cm/inch

Stilling well or Still Pipe mounting: ☐ Yes ☐ No Stilling well diameter: _____ cm/inch

Material

Material being measured: _____ ☐ Liquid ☐ Solid ☐ Liquified gas

Material temperature: Norm: _____ °C/°F Max: _____ °C/°F

Material surface: ☐ Flat ☐ Tu ☐ Agitated ☐ Vortex Dielectric constant: ☐ $\varepsilon r < 3$ ☐ $\varepsilon r > 3$

Installation

Power available: _____

Communications:
☐ HART /4 ... 20 mA
☐ PROFIBUS PA
☐ FOUNDATION Fieldbus ☐ None

Products recommended:

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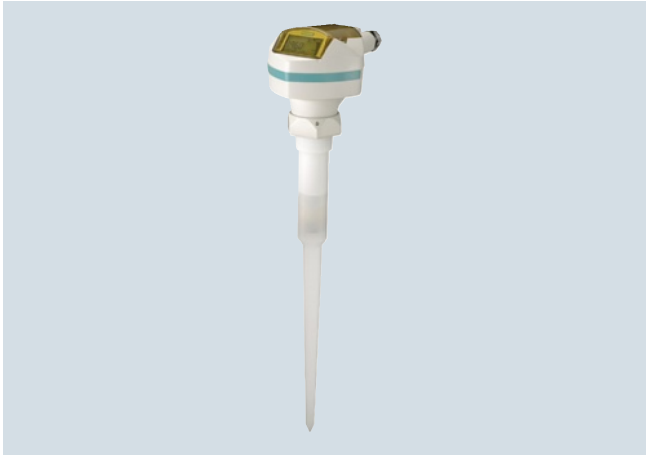
SITRANS Probe LR

Overview



SITRANS Probe LR is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).

Benefits

- Uni-Construction polypropylene rod antenna standard
- Easy installation and simple start up
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART handheld communicator
- Communication using HART
- Process Intelligence signal processing
- Extremely high signal-to-noise ratio
- Auto False-Echo Suppression of false echoes

Application

The Probe LR is ideal for applications with chemical vapors, temperature gradients, vacuum or pressure, such as simple chemical storage or water treatment vessels. SITRANS Probe LR has a range of 0.3 to 20 m (1 to 65 ft).

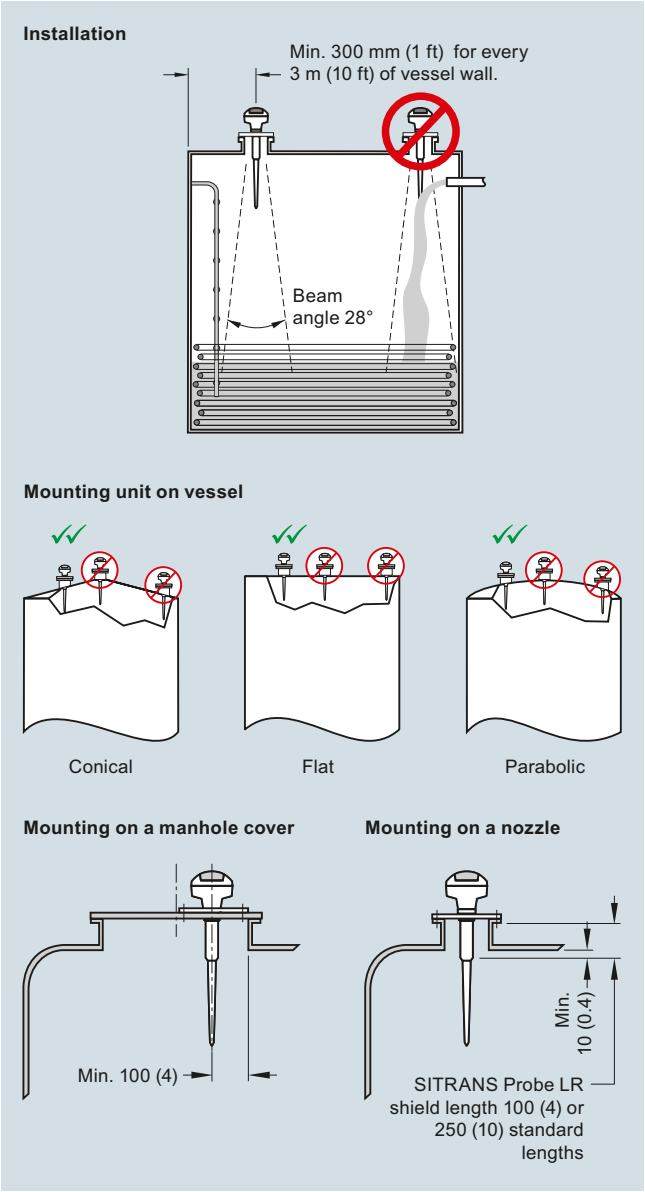
Probe LR is designed for safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna includes an internal, integrated shield that eliminates vessel nozzle interference.

SITRANS Probe LR incorporates Process Intelligence signal processing. The Probe LR also has a high signal-to-noise ratio leading to improved reliability.

Start-up is easy with as few as two parameters for basic operation. Programming is simple using SIMATIC PDM, HART handheld communicator or the Intrinsically Safe handheld programmer.

- Key Applications: chemical storage, wastewater wet well, and drilling mud

Configuration



SITRANS Probe LR installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Pulse radar level measurement
Frequency	5.8 GHz (North America 6.3 GHz)
Measuring range	0.3 ... 20 m (1.0 ... 65 ft)
Output	
Analog output	4 ... 20 mA
Accuracy	± 0.02 mA
Span	Proportional or inversely proportional
Communications	HART
Performance (reference conditions)	
Accuracy	± the greater of 0.1 % of range or 10 mm (0.4 inch)
Influence of ambient temperature	0.003 %/K
Repeatability	± 5 mm (2 inch)
Fail-safe	mA signal programmable as high, low or hold (LOE)
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ε_r	ε_r > 1.6 (for ε_r < 3, use stillpipe)
Vessel temperature	-40 ... +80 °C (-40 ... +176 °F)
Vessel pressure	3 bar g (43.5 psi g)
Design	
Enclosure	
• Body construction	PBT (Polybutylene Terephthalate)
• Lid construction	PEI (Polyether Imide)
• Cable inlet	2 x M20x1.5 or 2 x ½" NPT with adapter
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight	1.97 kg (4.35 lb)
Antenna	
• Material	Polypropylene rod, hermetically sealed construction
• Dimensions	Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle or optional 250 mm (10 inch) long shield
Process connections	1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226] G 1½" [(BSPP), EN ISO 228-1]

Power supply	• Nominal 24 V DC with max. 550 Ω, maximum 30 V DC • 4 ... 20 mA
Certificates and approvals	
General	$CSA_{US/C}$, CE, FM, RCM
Marine	• Lloyd's Register of Shipping • ABS Type Approval
Radio	FCC, Industry Canada and European (R&TTE), RCM
Hazardous	
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga
• Intrinsically Safe (Canada)	CSA Class I, Div.1, Groups A,B,C,D; Class II, Div. 1, Group G; Class III
• Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4
• Intrinsically Safe (International)	IECEx Ex ia IIC T4
• Intrinsically Safe (Russia)	GOST-R Ex ia
• Intrinsically Safe (USA)	FM Class I, Div.1, Groups A,B,C,D; Class II, Div. 1, Groups E,F, G; Class III
Programming	
Handheld programmer	HART communicator 375
PC	SIMATIC PDM
Intrinsically safe Siemens handheld programmer (optional)	Infrared receiver
• Approvals (handheld programmer)	ATEX II 1G EEx ia IIC T4 CSA and FM Class I, Div.1, Groups A,B,C,D, T6 at max. ambient
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

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SITRANS Probe LR

Selection and Ordering data		Article No.
SITRANS Probe LR	↗	**7ML5430-**
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage vessels with nominal pressure and temperature, to a range of 20 m (66 ft).		
Max. 3 bar g (43.5 psi g) pressure and 80 °C (176 °F)		**0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Enclosure/Cable inlet		
Plastic, (PBT), 2 x ½" NPT	⬟	**1**
Plastic, (PBT), 2 x M20x1.5	⬟	**2**
Antenna type/Material - (max. 3 bar and 80 °C)		
Polypropylene Antenna		
1½" NPT [(Taper), ANSI/ASME B1.20.1], comes with integral 100 mm shield	⬟	**A**
R 1½" [(BSPT), EN 10226], comes with integral 100 mm shield	⬟	**B**
G 1½" [(BSPP), EN ISO 228-1], comes with integral 100 mm shield	⬟	**C**
1½" NPT [(Taper), ANSI/ASME B1.20.1], comes with integral 250 mm shield	⬟	**D**
R 1½" [(BSPT), EN 10226], comes with integral 250 mm shield	⬟	**E**
G 1½" [(BSPP), EN ISO 228-1], comes with integral 250 mm shield	⬟	**F**
Approvals		
General Purpose, CE, R&TTE, RCM	⬟	**A**
General Purpose, CSA$_{us/c}$, FM, FCC	⬟	**B**
CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1 Group G, Class III, FCC, Intrinsically Safe	⬟	**C**
FM, Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Intrinsically Safe	⬟	**D**
IECEx Ex ia IIC T4; ATEX II 1G EEx ia IIC T4, R&TTE, RCM, Intrinsically Safe; INMETRO Ex ia IIC T4 Ga; GOST-R	⬟	**E**
Communication/Output		
4 ... 20 mA, HART	⬟	**1**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text ⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000 ⬟	**C11**
Operating Instructions	Article No.
English	**A5E32337711**
French	**7ML1998-5HR11**
Spanish	**7ML1998-5HR21**
German Note: The Operating Instructions should be ordered as a separate item on the order.	**A5E34957879**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Additional Operating Instructions	
Multi-language Quick Start manual	**A5E32106153**
Accessories	
Handheld programmer, Intrinsically Safe, ATEX II 1G, Ex ia	**7ML5830-2AH**
HART modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F)	**7ML1930-1AP**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	
Spare parts	
Plastic lid	**7ML1830-1KB**
For applicable back up point level switch - see point level measurement section	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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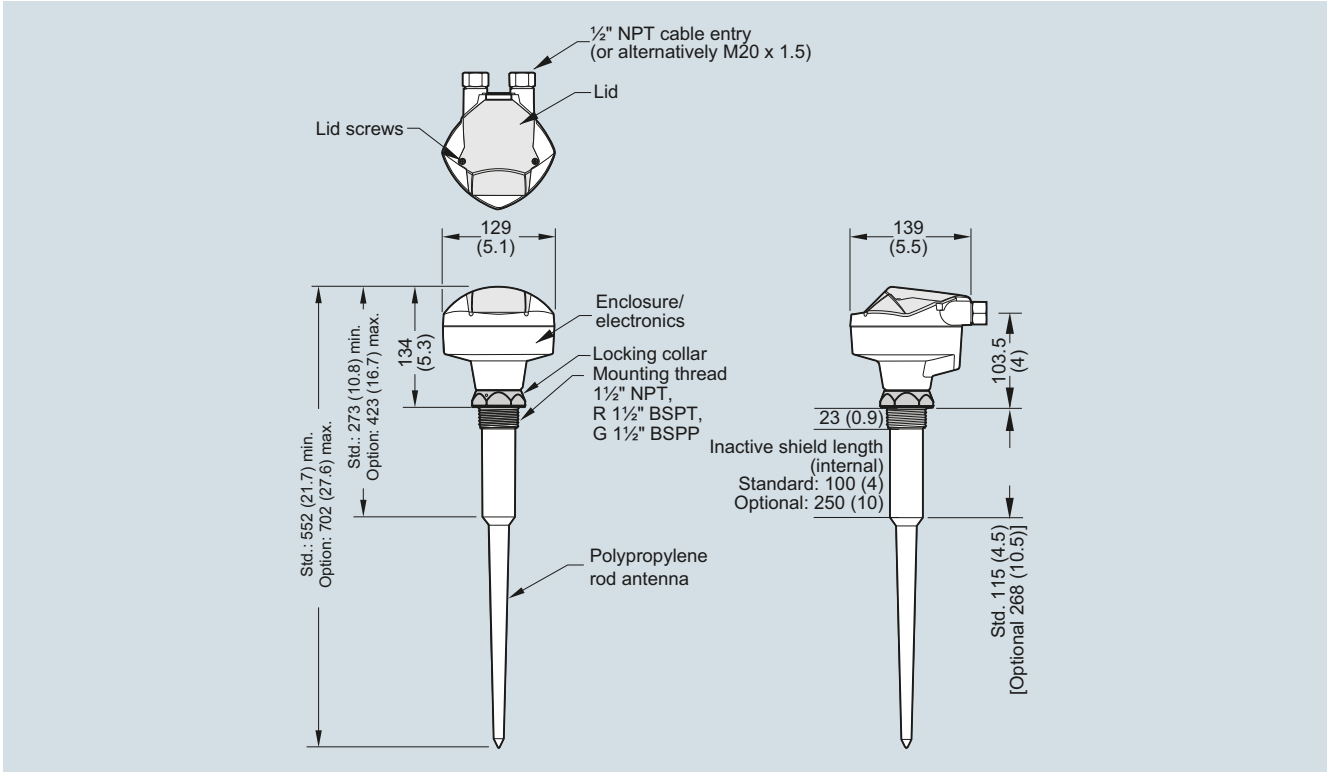
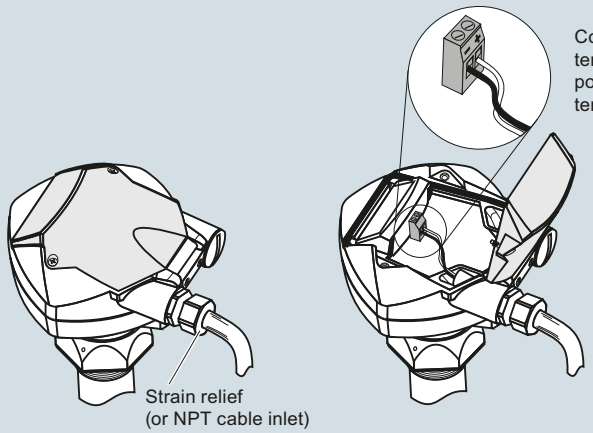
Dimensional drawings



SITRANS Probe LR, dimensions in mm (inch)

Schematics



Hand Programmer

SITRANS Probe LR
Part number: 7ML5830-2AH

Notes:

- DC terminal shall be supplied from an SELV source in accordance with IEC-1010-1 Annex H.
- All field wiring must have insulation suitable for rated input voltages.
- Use shielded twisted pair cable (14-22 AWG)
- Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS Probe LR connections

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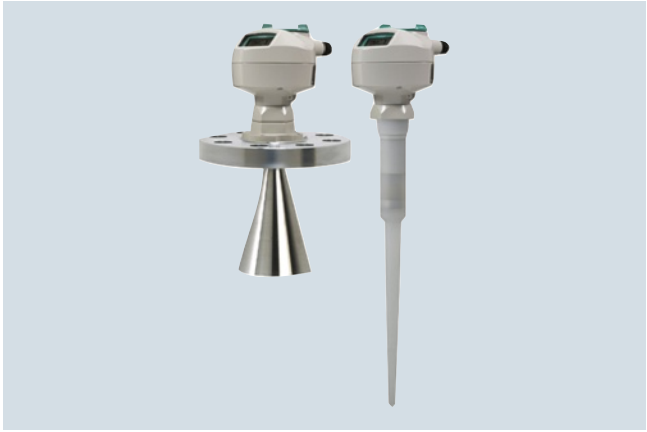
SITRANS LR200

Overview



SITRANS LR200 is a 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature, pressure, agitation, and turbulence to a range of 20 m (65 ft).

Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

Application

SITRANS LR200's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid. It also features a built-in alphanumeric display in four languages.

The SITRANS LR200 has a standard Uni-Construction polypropylene rod antenna that offers excellent chemical resistance and is hermetically sealed. The Uni-Construction antenna features an internal, integrated shield that eliminates vessel nozzle interference.

Start-up is easy with as few as two parameters for basic operation. Installation is simplified as the electronics are mounted on a rotating head that swivels, allowing the instrument to line up with conduit or wiring connections or simply to adjust the position for easy viewing. SITRANS LR200 features Process Intelligence signal-processing technology for superior reliability.

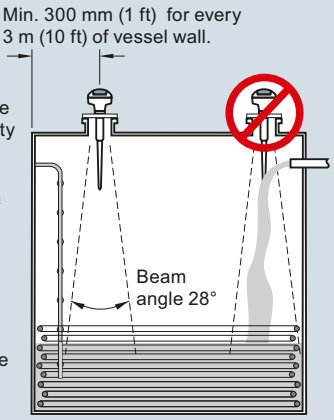
- Key Applications: liquid process vessels with agitators, vaporous liquids, high temperatures, asphalt, digesters

Configuration

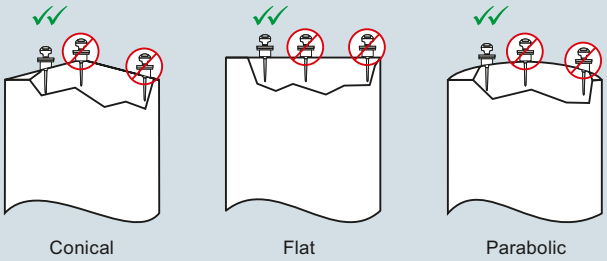
Installation

Note:

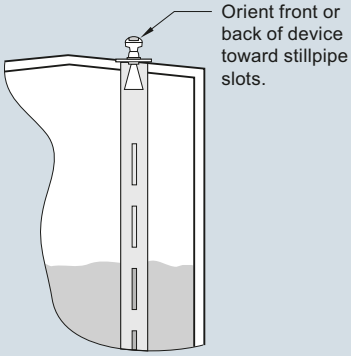
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- Beam angle for horn antenna dependent on horn size
- The peak energy density is directly in front of and in line with the rod antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



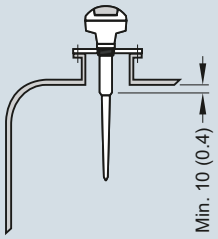
Mounting unit on vessel



Mounting unit on stilling well



Mounting on a nozzle



SITRANS LR200 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Radar level measurement
Frequency	5.8 GHz (North America 6.3 GHz)
Measuring range	0.3 ... 20 m (1.0 ... 65 ft)
Output	
Analog output	4 ... 20 mA
Accuracy	± 0.02 mA
Span	Proportional or inversely proportional
Communications	HART Optional: PROFIBUS PA (Profile 3.0, Class B)
Fail-safe	Programmable as high, low or hold (Loss of Echo)
Performance (according to reference conditions IEC60770-1)	
From end of antenna to 600 mm:	40 mm (1.57 inch)
Remainder of range:	10 mm (0.4 inch) or 0.1 % of span (whichever is greater)
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ε_r	$\varepsilon_r > 1.6$ (for $\varepsilon_r < 3$, use stillpipe)
Vessel temperature and pressure	Varies with connection type; see Pressure/Temperature curves for more information
Design	
Enclosure	
• Material	Aluminum, polyester powder coated
• Cable inlet	2 x M20x1.5 or 2 x ½" NPT with adapter
Degree of protection	Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68
Weight	< 2.82 kg (6.21 lb) (polypropylene rod antenna)
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages
Antenna	
• Material	Polypropylene rod, hermetically sealed construction, optional PTFE
• Dimensions	Standard 100 mm (4 inch) shield for maximum 100 mm (4 inch) nozzle, or optional 250 mm (10 inch) long shield
• Optional rods and horn	Refer to SITRANS LR200 Antennas for optional rods and horns
Process connections	
• Process connection	1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226], or G 1½" [(BSPP), EN ISO 228-1] (polypropylene rod antenna)
• Flange connection	Refer to SITRANS LR200 Antennas for more connections

Power supply	
4 ... 20 mA/HART	
• General Purpose, Non-incendive, Intrinsically Safe	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
• Flame proof, Increased safety, Explosion proof	Nominal 24 V DC (max. 30 V DC) with max. 250 Ω
PROFIBUS PA	• 10.5 mA • Per IEC 61158-2
Certificates and approvals	
General	$CSA_{US/C}$, CE, FM, RCM
Marine	• Lloyd's Register of Shipping • ABS Type Approval
Radio	FCC, Industry Canada and European (R&TTE), RCM
Hazardous	
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga
• Explosion Proof (Canada/USA)	CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4
• Intrinsically Safe (Canada/USA)	CSA/FM, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III, T4
• Non-incendive (USA)	FM, Class I, Div. 2, Groups A, B, C, D, T5
• Flame Proof/Increased Safety (China)	NEPSI Ex d mb ia IIC T4/ Ex e mb ia IIC T4
• Flame Proof (Europe)	ATEX II 1/2 G Ex d mb ia IIC T4 Ga/Gb
• Increased Safety (Europe)	ATEX II 1/2 G Ex e mb ia IIC T4 Ga/Gb
• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4
• Intrinsically Safe (International)	IECEx Ex ia IIC T4
• Intrinsically Safe (Russia)	GOST-R Ex ia
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C T_a = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, T6 T_a = +50 °C
Handheld communicator	HART communicator 375
PC	• SIMATIC PDM • AMS
Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

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SITRANS LR200

Selection and Ordering data	Article No.
SITRANS LR200, Uni-Construction polypropylene rod antenna version 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft). Max. 3 bar g (43.5 psi g) pressure and 80 °C (176 °F) ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	↗ **7ML5422-** ■■■■ **0**
Enclosure/Cable inlet Aluminum, epoxy painted 2 x ½" NPT 2 x M20x1.5	**2** **3**
Polypropylene antenna type - (Max. 3 Bar pressure and 80 °C) 1½" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 100 mm shield R 1½" [(BSPT), EN 10226], c/w integral 100 mm shield G 1½" [(BSPP), EN ISO 228-1], c/w integral 100 mm shield 1½" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 250 mm shield R 1½" [(BSPT), EN 10226], c/w integral 250 mm shield G 1½" [(BSPP), EN ISO 228-1], c/w integral 250 mm shield	**A** **B** **C** **D** **E** **F**
Approvals General Purpose, CE, R&TTE, RCM General Purpose, CSA, FM, Industry Canada, FCC Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC Intrinsically Safe, IECEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, RCM; GOST-R Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC[1] Increased Safety, ATEX II 1/2G Ex e mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R[2)3)] Flame Proof, ATEX II 1/2G Ex d mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R[3)] Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC[1)3)]	**A** **B** **C** **D** **E** **F** **G** **H** **J**
Communication/Output PROFIBUS PA 4 ... 20 mA, HART, start-up at < 3.6 mA	**2** **3**

[1] Available with enclosure option 2 only

[2] Available with enclosure option 3 only

[3] Available with communication option 3 only

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Namur NE43 compliant, device preset to failsafe < 3.6 mA[1)]	**N07**
Operating Instructions for HART/mA device	Article No.
English	**A5E32337676**
German	**A5E34942758**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E31993614**
Operating Instructions for PROFIBUS PA device	
English	**A5E32337680**
German	**A5E34942820**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E32153438**
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	**7ML1930-1BK**
HART modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[2)]	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA[2)]	**7ML1930-1AQ**
One general purpose polymeric cable gland M20x1.5, rated -20 ... + 80 °C (-40 ... +176 °F)	**7ML1930-1AM**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

[1] Available with communication option 3 only

[2] Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

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Selection and Ordering data	Article No.
SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version	**7ML5423-**
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Antenna material (uses antenna adapter)	
PTFE, uses antenna adapter and additional process connection below	1
Process connection (refer to Pressure/ Temperature curves, page 4/208)	
Flanges (316L stainless steel)	
DN 50 PN 16, Type A, flat faced	A A
DN 80 PN 16, Type A, flat faced	B A
DN 100 PN 16, Type A, flat faced	C A
DN 150 PN 16, Type A, flat faced	D A
2" ASME 150 lb, flat faced	F B
3" ASME 150 lb, flat faced	G B
4" ASME 150 lb, flat faced	H B
6" ASME 150 lb, flat faced	J B
DN 50 PN 40, flat faced	A C
DN 80 PN 40, flat faced	B C
DN 100 PN 40, flat faced	C C
DN 150 PN 40, flat faced	D C
2" ASME 300 lb, flat faced, available with Pressure rating option 1 only due to flange hole spacing	F D
3" ASME 300 lb, flat faced	G D
4" ASME 300 lb, flat faced	H D
6" ASME 300 lb, flat faced	J D
JIS DN 50 10K	A E
JIS DN 80 10K	B E
JIS DN 100 10K	C E
JIS DN 150 10K	D E
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	
Threaded connection (316L stainless steel)	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	L A
2" NPT [(Taper), ANSI/ASME B1.20.1]	M A
R 1½" [(BSPT), EN 10226]	L C
R 2" [(BSPT), EN 10226]	M C
G 1½" [(BSPP), EN ISO 228-1]	L E
G 2" [(BSPP), EN ISO 228-1]	M E
Antenna extensions or Inactive shield length	
No antenna extension	0
50 mm (2 inch) extension, PTFE	1
100 mm (4 inch) extension, PTFE	2
100 mm (4 inch) extension, 316L stainless steel shield[1)]	3
150 mm (6 inch) extension, 316L stainless steel shield[1)]	4
200 mm (8 inch) extension, 316L stainless steel shield[1)]	5
250 mm (10 inch) extension, 316L stainless steel shield[1)]	6
Process seal/gasket	
Integral Gasket, for flat faced flange process connections only, not for Antenna extension options 3 ... 6	0
FKM O-ring, not available for combination of flat faced flanges with Antenna extension options 0, 1 or 2	1

Selection and Ordering data	Article No.
SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version	**7ML5423-**
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).	
Enclosure/Cable inlet	
Aluminum, Epoxy painted	
2 x ½" NPT	2
2 x M20x1.5	3
Communication/Output	
PROFIBUS PA	B
4 ... 20 mA, HART, start-up at < 3.6 mA	C
Approvals	
General Purpose, CE, R&TTE, RCM	A
General Purpose, CSA, FM, Industry Canada, FCC	B
Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada	C
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC	D
Intrinsically Safe, IECEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, RCM; GOST-R	E
Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC[2)]	F
Increased Safety, ATEX II 1/2G Ex e mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R[3)4)]	G
Flame Proof, ATEX II 1/2G Ex d mb ia IIC T4 Ga/ Gb, CE, R&TTE, RCM; GOST-R[4)]	H
Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC[2)4)]	J
Pressure rating	
Rating per Pressure/Temperature curves in manual	0
0.5 bar g (7.25 psi g) maximum	1

1) Available with process connection options BA, CA, DA, GB, HB, JB, BC, CC, DC, GD, HD, JD, BE, CE, DE, MA, MC, ME only

2) Available with enclosure option 2 only

3) Available with enclosure option 3 only

4) Available with communication option C only

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SITRANS LR200

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Namur NE43 compliant, device preset to failsafe < 3.6 mA[3)]	**N07**
Operating Instructions for HART/mA device	Article No.
English	**A5E32337676**
German	**A5E34942758**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E31993614**
Operating Instructions for PROFIBUS PA device	
English	**A5E32337680**
German	**A5E34942820**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E32153438**
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	**7ML1930-1BK**
Antenna, rod, PTFE	**7ML1830-1HC**
Antenna extension, 50 mm (2 inch), PTFE	**7ML1830-1CH**
Antenna extension, 100 mm (4 inch), PTFE	**7ML1830-1CG**
HART modem / USB (for use with PC and SIMATIC PDM)	**7MF4997-1DB**
Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) ... 80 °C (176 °F), HART (two are required)	**7ML1930-1AP**
Metallic cable gland M20 x 1.5, rated -40 °C (-40 °F) ... 80 °C (176 °F), PROFIBUS PA (two required)	**7ML1930-1AQ**
One General Purpose polymeric cable gland M20 x 1.5, rating for -20 °C (-4°F) ...+ 80 °C (176 °F)	**7ML1930-1AM**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

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Selection and Ordering data	Article No.								
SITRANS LR200, **Flange adapter/Horn Antenna version**	↗	**7ML5425-**				-			
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).									
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.									
Antenna material (uses antenna adapter)									
316L stainless steel with PTFE cone emitter		**0**							
316L stainless steel with PTFE cone emitter and purge connection with 1/8" NPT inlet[1]		**1**							
Sliding waveguide system with 1 000 mm (40 inch) waveguide[1)2)]		**2**							
Process connection (refer to Pressure/ Temperature curves, page 4/209)									
Flanges (316L stainless steel)									
DN 50 PN 16 EN 1092-1 Type A flat faced[1)]			**A**	**A**					
DN 80 PN 16 EN 1092-1 Type A flat faced			**B**	**A**					
DN 100 PN 16 EN 1092-1 Type A flat faced			**C**	**A**					
DN 150 PN 16 EN 1092-1 Type A flat faced			**D**	**A**					
DN 200 PN 16 EN 1092-1 Type A flat faced			**E**	**A**					
DN 80 PN 10/16 DIN EN 1092-1 Type B1 raised face[3)]			**B**	**F**					
DN 100 PN 10/16 DIN EN 1092-1 Type B1 raised face[3)]			**C**	**F**					
DN 150 PN 10/16 DIN EN 1092-1 Type B1 raised face[3)]			**D**	**F**					
DN 200 PN 16 DIN EN 1092-1 Type B1 raised face[3)]			**E**	**F**					
2" ASME 150 lb, flat faced[1)]			**F**	**B**					
3" ASME 150 lb, flat faced			**G**	**B**					
4" ASME 150 lb, flat faced			**H**	**B**					
6" ASME 150 lb, flat faced			**J**	**B**					
8" ASME 150 lb, flat faced			**K**	**B**					
DN 50 PN 40, flat faced[3)]			**A**	**C**					
DN 80 PN 40, flat faced[3)]			**B**	**C**					
DN 100 PN 40, flat faced[3)]			**C**	**C**					
DN 200 PN 40, flat faced[3)]			**E**	**C**					
DN 80 PN 25/40 DIN EN 1092-1 Type B1 raised face[3)]			**C**	**G**					
DN 100 PN 25/40 DIN EN 1092-1 Type B1 raised face[3)]			**D**	**G**					
DN 150 PN 25/40 DIN EN 1092-1 Type B1 raised face[3)]			**E**	**G**					
2" ASME 300 lb, flat faced[1)3)]			**F**	**D**					
3" ASME 300 lb, flat faced[3)]			**G**	**D**					
4" ASME 300 lb, flat faced[3)]			**H**	**D**					
JIS DN 50 10K[1)]			**A**	**E**					
JIS DN 80 10K			**B**	**E**					
JIS DN 100 10K			**C**	**E**					
JIS DN 150 10K			**D**	**E**					
JIS DN 200 10K			**E**	**E**					
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)									
Communication/Output									
PROFIBUS PA					**1**				
4 ... 20 mA, HART, start-up at < 3.6 mA					**2**				

Selection and Ordering data	Article No.								
SITRANS LR200, **Flange adapter/Horn Antenna version**		**7ML5425-**				-			
2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).									
Process seal/gasket									
FKM (-40 ... +200 °C)					**0**				
Nitrile (-40 ... +60 °C), sliding waveguide systems only					**1**				
FFKM (-35 ... +200 °C)					**2**				
Enclosure/Cable inlet									
Aluminum, Epoxy painted									
2 x ½" NPT							**2**		
2 x M20x1.5							**3**		
Horn size/Waveguide options									
80 mm (3 inch) horn[4)]								**B**	
100 mm (4 inch) horn[4)]								**C**	
150 mm (6 inch) horn								**D**	
200 mm (8 inch) horn								**E**	
100 mm (4 inch) horn with 100 mm (4 inch) waveguide extension[4)]								**F**	
100 mm (4 inch) horn with 150 mm (6 inch) waveguide extension[4)]								**G**	
100 mm (4 inch) horn with 200 mm (8 inch) wave-guide extension[4)]								**H**	
100 mm (4 inch) horn with 250 mm (10 inch) waveguide extension[4)]								**J**	
150 mm (6 inch) horn with 100 mm (4 inch) waveguide extension								**K**	
150 mm (6 inch) horn with 150 mm (6 inch) waveguide extension								**L**	
150 mm (6 inch) horn with 200 mm (8 inch) waveguide extension								**M**	
150 mm (6 inch) horn with 250 mm (10 inch) waveguide extension								**N**	
200 mm (8 inch) horn with 100 mm (4 inch) waveguide extension								**P**	
200 mm (8 inch) horn with 150 mm (6 inch) waveguide extension								**Q**	
200 mm (8 inch) horn with 200 mm (8 inch) waveguide extension								**R**	
200 mm (8 inch) horn with 250 mm (10 inch) waveguide extension								**S**	
(Add Order code Y01 and plain text: "waveguide length ... mm")									

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SITRANS LR200

Selection and Ordering data	Article No.
SITRANS LR200, Flange adapter/Horn Antenna version 2-wire, 6 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in process vessels including high temperature and pressure, to a range of 20 m (66 ft).	**7ML5425-** ■■■■■ - ■■■
Approvals	
General Purpose, CE, R&TTE, RCM	**A**
General Purpose, CSA, FM, Industry Canada, FCC	**B**
Intrinsically Safe, CSA Class I, II, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada	**C**
Intrinsically Safe, FM Class I, II, Div. 1, Groups A, B, C, D, E, F, G, FCC	**D**
Intrinsically Safe, IECEx/ATEX II 1G Ex ia IIC T4, INMETRO Ex ia IIC T4, CE, R&TTE, RCM; GOST-R	**E**
Non incendive, FM Class I, Div. 2, Groups A, B, C, D, FCC[5]	**F**
Increased Safety, ATEX II 1/2G Ex e mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R[6][7]	**G**
Flame Proof, ATEX II 1/2G Ex d mb ia IIC T4 Ga/Gb, CE, R&TTE, RCM; GOST-R[7]	**H**
Explosion Proof, CSA/FM Class I, II, III, Groups A, B, C, D, E, F, G, Industry Canada, FCC[5][7]	**J**
Pressure rating	
Rating per Pressure/Temperature curves in manual 0.5 bar g (7.25 psi g) maximum	**0** **1**

1) Available with pressure rating option 1 only
2) Maximum Process Temperature 60 °C (140 °F)
3) Available with Antenna Material option 0 and 1 only
4) For stillpipe applications only
5) Available with enclosure option 2 only
6) Available with enclosure option 3 only
7) Available with communication option 2 only

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Namur NE43 compliant, device preset to failsafe < 3.6 mA[1]	**N07**
Operating Instructions for HART/mA device	Article No.
English	**A5E32337676**
German	**A5E34942758**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E31993614**
Operating Instructions for PROFIBUS PA device	
English	**A5E32337680**
German	**A5E34942820**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E32153438**
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	**7ML1930-1BK**
HART modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[2]	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA[3]	**7ML1930-1AQ**
One general purpose polymeric cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F)	**7ML1930-1AM**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

1) Available with communication option 2 only
2) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.
3) Available with enclosure option 2 only

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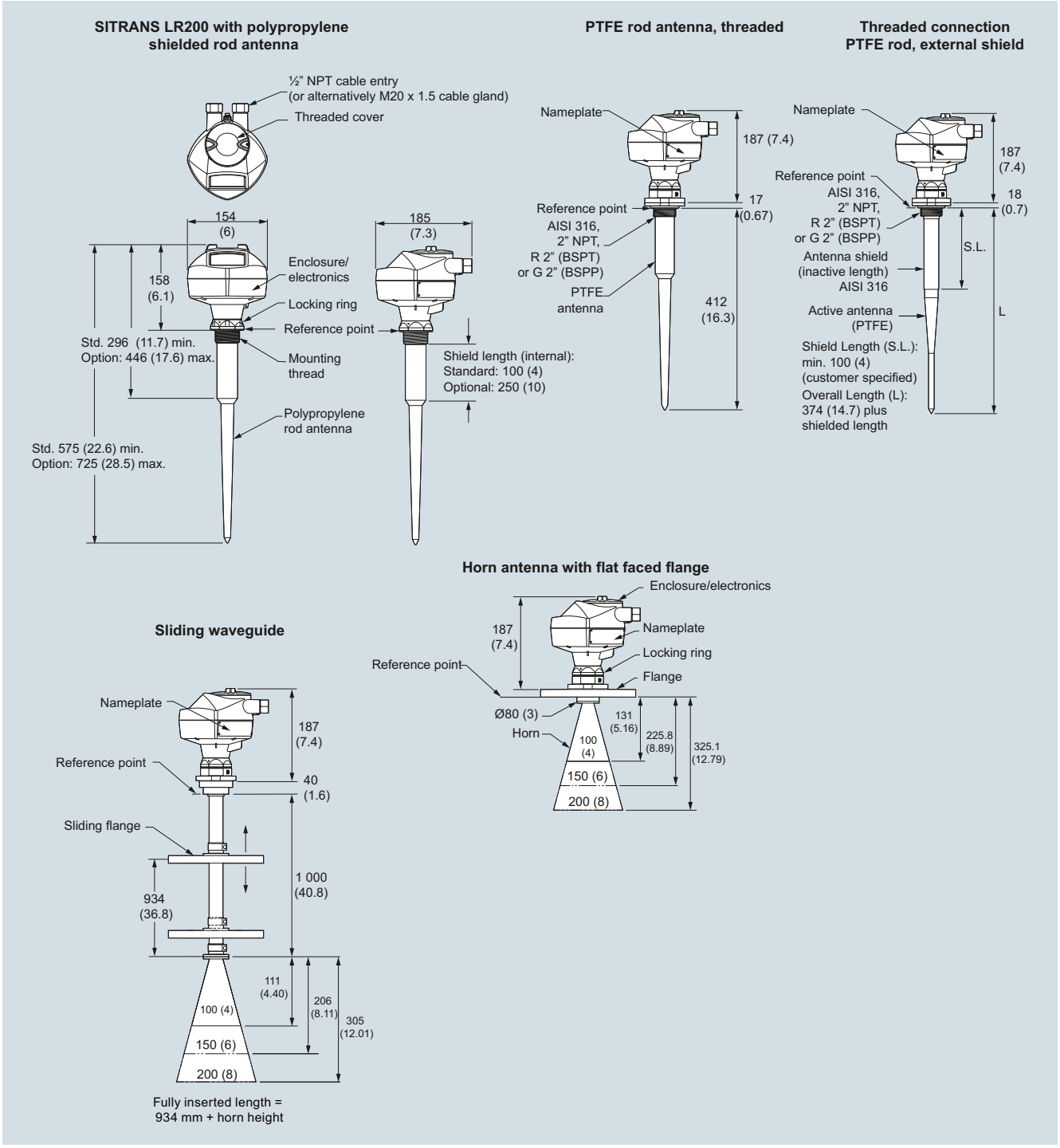
Dimensional drawings



SITRANS LR200, dimensions in mm (inch)

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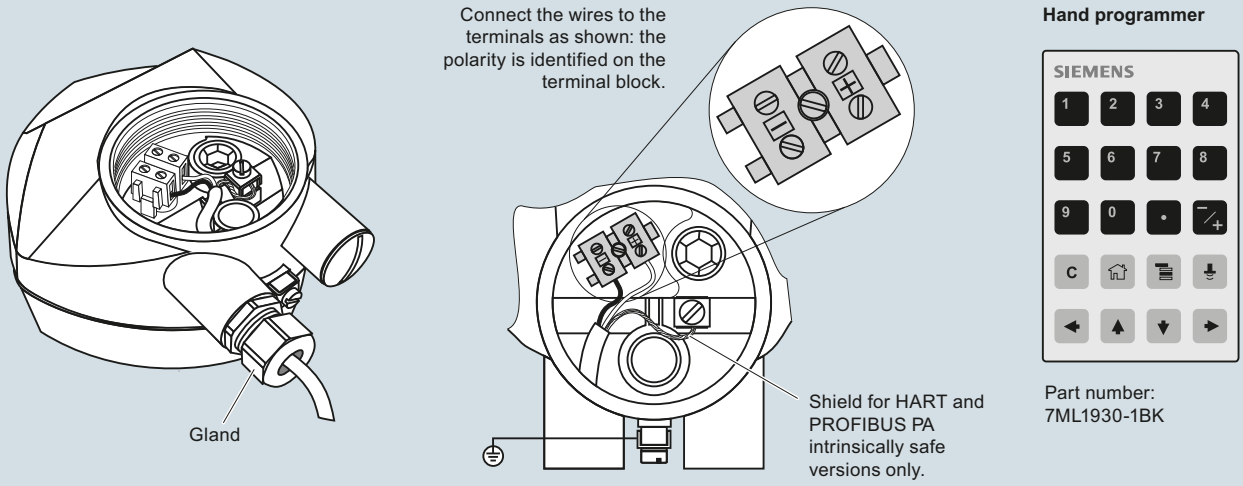
Schematics



Notes:

1. DC terminal shall be supplied from an SELV source in accordance with IEC 1010-1 Annex H.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR200 connections

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Integration

Sliding waveguide antenna, typically for digester applications that include an isolation valve between the instrument and the vessel.

Horn with waveguide extension. Used for high temperature isolation, long standpipes, and clearing tank obstructions.

SITRANS LR200 with flange adapter for connection to optional antennas.

Flat faced flange connection with PTFE rod antenna.

Shielded rod antenna with a stainless steel shield eliminates standpipe interference. Various lengths available.

Antenna configurations for SITRANS LR200

Technical specifications

Antenna Types	Flat Faced Flange with Rod	Shielded Rod	Horn (4", 6", 8" sizes available)
Connection type	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)	Threaded 2" NPT, R 2" (BSPT), G 2" (BSPP) or flat faced flange nominal pipe sizes 80, 100 mm (3, 4 inch)	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6 inch)
Wetted parts	PTFE	PTFE, 316L stainless steel, FKM o-ring	316L stainless steel, PTFE, FKM o-ring
Extensions	50 or 100 mm (2 or 4 inch) PTFE or UHMW-PE	100, 150, 200 or 250 mm (4, 6, 8 or 10 inch) standard shield length	Use waveguide for extensions to 6 m (20 ft) long
Dielectric constant	> 3	> 3	> 3
Insertion length (max.)	41 cm (16.3 inch)	Variable	Variable with extension
Purging option (liquid or gas)	No	No	Yes
Sliding waveguide option for digesters[1)]	Yes	No	Yes
Weight[2)]	6.5 kg (14.3 lb)	5.0 kg (11 lb)	7.5 kg (16.5 lb)

1) Maximum pressure 0.5 bar g at 60 °C (7.25 psi g at 140 °F)

2) Not including extensions, includes SITRANS LR200 and smallest process connection

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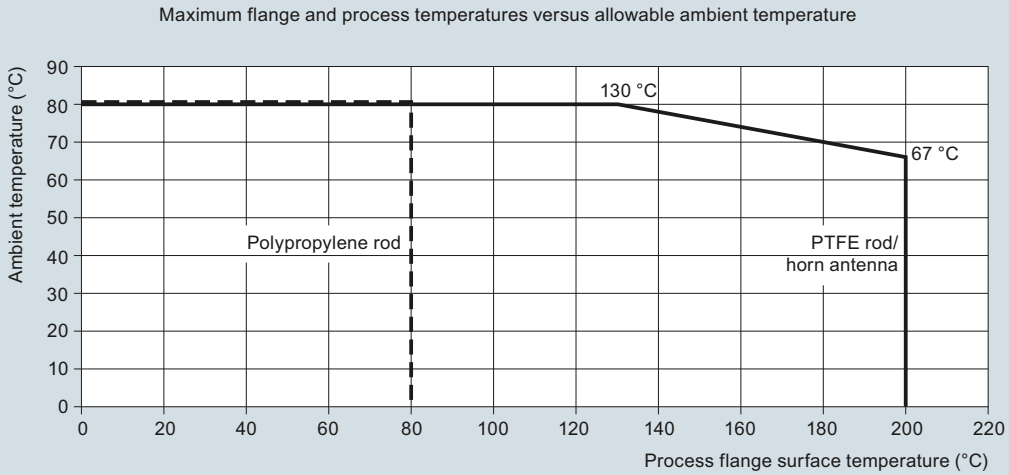
Characteristic curves



SITRANS LR200 Ambient/Process Flange Surface Temperature Curve

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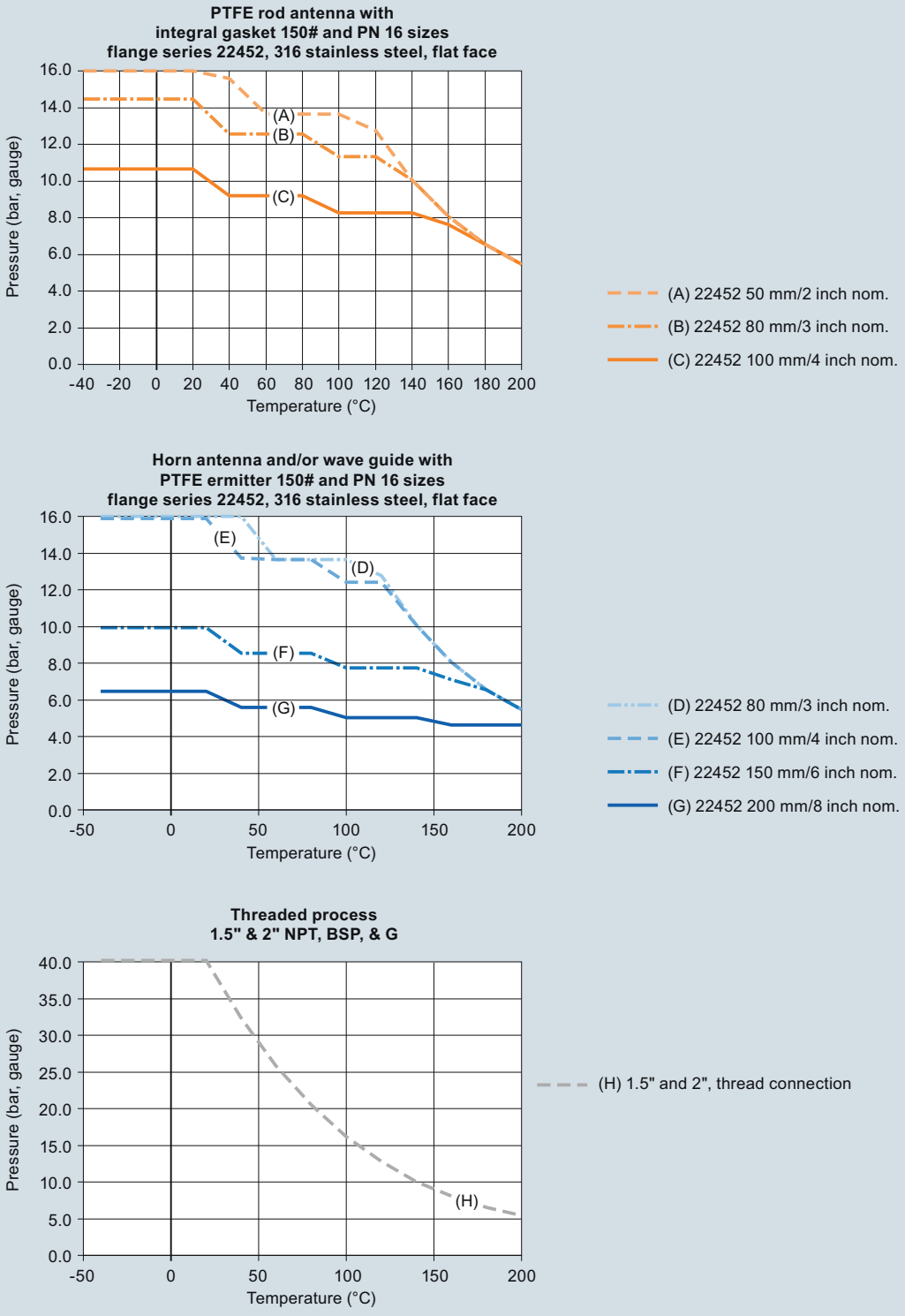

SITRANS LR200 Process Pressure/Temperature derating curves

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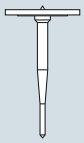
Selection and ordering data

SITRANS LR200 Specials	Article No.
SITRANS LR200 PROFIBUS PA Aluminum Enclosure Kit with electronics and covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection.[5)]	**A5E01483420**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection.[5)]	**A5E01483440**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection.[5)]	**A5E01483456**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection.[5)]	**A5E01483547**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with PROFIBUS PA communication, no process connection.[5)]	**A5E01483559**
SITRANS LR200 HART aluminum enclosure kit with electronics and covers (7ML5422, 7ML5423, 7ML5424, 7ML5425), calibrated for use with standard rod antenna	
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection.[5)]	**A5E02956419**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection.[5)]	**A5E02956420**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection.[5)]	**A5E02956421**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection.[5)]	**A5E02956422**

SITRANS LR200 Specials	Article No.
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection.[5)]	**A5E03617085**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection.[5)]	**A5E03617086**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection.[5)]	**A5E03617087**
SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection.[5)]	**A5E03617088**
SITRANS LR200 Horn Antenna Kits with mounting screws (no emitter supplied)	
80 mm (3 inch) horn antenna kit	**PBD:25500K02A**
100 mm (4 inch) horn antenna kit	**PBD:25500K03A**
150 mm (6 inch) horn antenna kit	**PBD:25500K05A**
200 mm (8 inch) horn antenna kit	**PBD:25500K07A**
SITRANS LR200 Extension Kits for Horn Antenna with mounting screws	
100 mm (4 inch) extension kit for horn antenna	**PBD:25501K0100A**
150 mm (6 inch) extension kit for horn antenna	**PBD:25501K0150A**
200 mm (8 inch) extension kit for horn antenna	**PBD:25501K0200A**
250 mm (10 inch) extension kit for horn antenna	**PBD:25501K0250A**
500 mm (20 inch) extension kit for horn antenna	**PBD:25501K0500A**
1 000 mm (40 inch) extension kit for horn antenna	**PBD:25501K1000A**
SITRANS LR200 Flanged Rod Antenna Kit with 316L stainless steel flat faced flanges	
Flanged PTFE rod antenna kit, 2" ASME, 150 lb. See drawing 51003 on http://www.siemens.com/radar[1)4)]	**PBD: 51003K020AAAA**
Flanged PTFE rod antenna kit, DN 50 PN 16. See drawing 51003 on http://www.siemens.com/radar[1)4)]	**PBD: 51003K050AJAA**
Flanged PTFE rod antenna kit, JIS 10K DN 50. See drawing 51003 on http://www.siemens.com/radar[1)4)]	**PBD: 51003K050AOAA**

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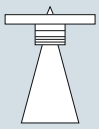
SITRANS LR200 Specials	Article No.
SITRANS LR200 PTFE Rod Antenna Kit with 316L stainless steel 1½"pipe thread process connection	
PTFE rod antenna kit, 1½" NPT 316L stainless steel process connection, FKM O-ring; See drawing 51004 on http://www.siemens.com/radar[4)]	**PBD: 51004K1AAA**
PTFE rod antenna kit, R 1½" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring; see drawing 51004 on http://www.siemens.com/radar[4)]	**PBD: 51004K2AAA**
PTFE rod antenna kit, 1½" G 316L stainless steel process connection, FKM O-ring; see drawing 51004 on http://www.siemens.com/radar[4)]	**PBD: 51004K3AAA**
SITRANS LR200 PTFE Rod Antenna Kit with 316L stainless steel 2" pipe thread process connection	
PTFE rod antenna kit, 2" NPT 316L stainless steel process connection, FKM O-ring; see drawing 51005 on http://www.siemens.com/radar[4)]	**PBD: 51005K1AAA**
PTFE rod antenna kit, R 2" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring; see drawing 51005 on http://www.siemens.com/radar[4)]	**PBD: 51005K2AAA**
PTFE rod antenna kit, 2" G 316L stainless steel process connection, FKM O-ring; see drawing 51005 on http://www.siemens.com/radar[4)]	**PBD: 51005K3AAA**

SITRANS LR200 Specials	Article No.
SITRANS LR200 PTFE Rod Antenna Kit (100 mm shield) with 316L stainless steel 2" pipe thread process connection	
PTFE rod antenna shielded kit, 2" NPT 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar[3)4)]	**PBD: 51002K0100AAA**
PTFE rod antenna shielded kit, R 2" (BSPT), EN 10226 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar[3)4)]	**PBD: 51002K0100BAA**
PTFE rod antenna shielded kit, 2" G 316L stainless steel process connection, FKM O-ring, 100 mm 316L stainless steel shield. See drawing 51002 on http://www.siemens.com/radar[3)4)]	**PBD: 51002K0100CAA**
SITRANS LR200 Horn Antenna Kit with 316L stainless steel flat faced flange, with PTFE emitter (without waveguide)	
Horn antenna kit, 2" ASME 316L stainless steel flange 3" horn, PTFE emitter[1)4)]	**PBD: 51006K020AAAA**
Horn antenna kit, 2" ASME 316L stainless steel flange 4" horn, PTFE emitter[1)2)]	**PBD: 51006K020AABA**
Horn antenna kit, 2" ASME 316L stainless steel flange 6" horn, PTFE emitter[1)2)]	**PBD: 51006K020AACA**
Horn antenna kit, 2" ASME 316L stainless steel flange 8" horn, PTFE emitter[1)2)]	**PBD: 51006K020AADA**
Horn antenna kit, DN 50 PN 16 316L stainless steel flange 80 mm horn, PTFE emitter[1)2)]	**PBD: 51006K050AJAA**
Horn antenna kit, DN 50 PN 16 316L stainless steel flange 100 mm horn, PTFE emitter[1)2)]	**PBD: 51006K050AJBA**
Horn antenna kit, DN 50 PN 16 316L stainless steel flange 150 mm horn, PTFE emitter[1)2)]	**PBD: 51006K050AJCA**
Horn antenna kit, DN 50 PN 16 316L stainless steel flange 200 mm horn, PTFE emitter[1)2)]	**PBD: 51006K050AJDA**

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SITRANS LR200 Specials	Article No.
SITRANS LR200 PTFE flanged rod antenna kit with 316L stainless steel shield and 316L stainless steel flat faced flange	
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 100 mm 316L stainless steel shield.[1)4)]	**PBD: 51014K0100AAA**
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 100 mm 316L stainless steel shield.[1)4)]	**PBD: 51014K0100EJA**
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 150 mm 316L stainless steel shield.[1)4)]	**PBD: 51014K0150AAA**
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 150 mm 316L stainless steel shield.[1)4)]	**PBD: 51014K0150EJA**
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 200 mm 316L stainless steel shield.[1)4)]	**PBD: 51014K0200AAA**
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 200 mm 316L stainless steel shield.[1)4)]	**PBD: 51014K0200EJA**
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L stainless steel flange, 250 mm 316L stainless steel shield.[1)4)]	**PBD: 51014K0250AAA**
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L stainless steel flange, 250 mm 316L stainless steel shield.[1)4)]	**PBD: 51014K0250EJA**

SITRANS LR200 Specials	Article No.
PTFE paste	
Kit, PTFE paste, Tube, 250 mL	**PBD:51036065**
Cable gland	
One polymeric cable gland M20x1.5, rated -20 ... +80 °C (-4 ... +176 °F) for General Purpose and ATEX EEx e	**7ML1930-1AN**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA	**7ML1930-1AQ**

Please contact ceg.smpi@siemens.com for special requests.

1) Available in flange sizes including ASME, DIN and JIS: please contact ceg.smpi@siemens.com.

2) Available with no pressure rating

3) Available in other shield lengths: please contact ceg.smpi@siemens.com.

4) Available with Pressure rating; serial number of original unit required with completed Application Questionnaire found on page 4/193.

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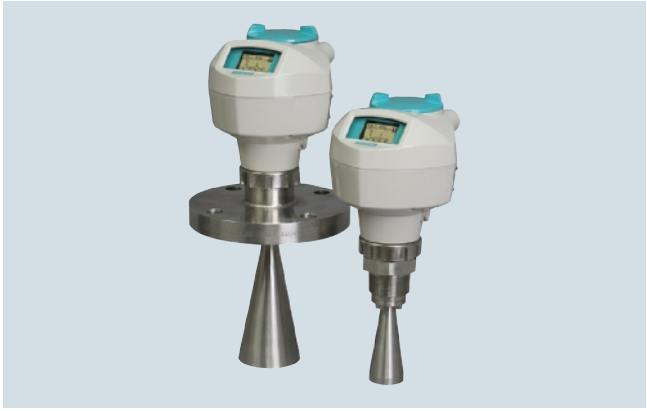
Overview



SITRANS LR250 is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft).

Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small antennas for easy mounting in nozzles
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller horn antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without saving to open the instrument's lid.

SITRANS LR250 measures superbly on low dielectric media, and in small vessels, as well as tall and narrow vessels.

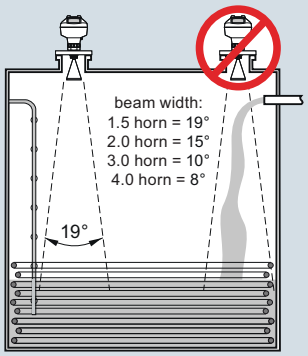
- Key Applications: liquid bulk storage tanks, process vessels, vaporous liquids, high temperatures, low dielectric media and applications with functional safety requirements

Configuration

Installation

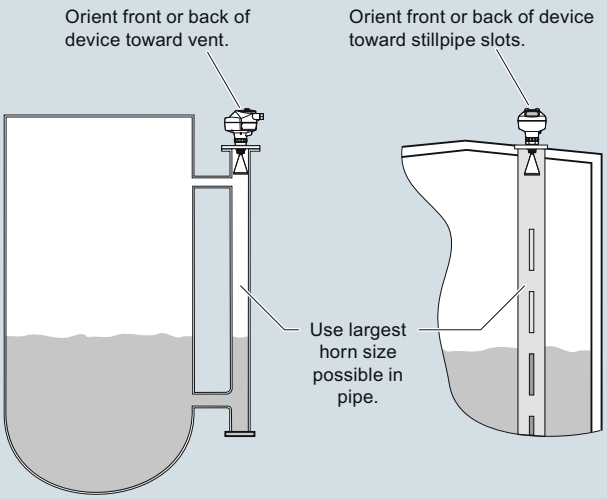
Note:

- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the horn antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.
- Use largest possible antenna.



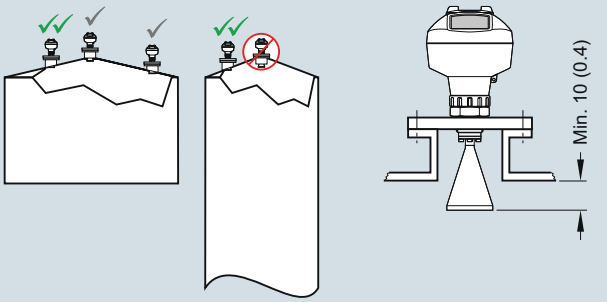
Mounting unit on bypass

Mounting unit on stilling well



Mounting unit on vessel

Mounting on a nozzle



SITRANS LR250 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	20 m (65 ft), antenna dependent
Output	
HART:	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	• Programmable as high low or hold (loss of echo) • NE 43 programmable
PROFIBUS PA:	Profile 3.01
• Function blocks	2 Analog Input (AI)
FOUNDATION Fieldbus	H1
• Functionality	Basic or LAS
• Version	ITK 5.2.0
• Function blocks	2 Analog Input (AI)
Performance (according to reference conditions IEC60770-1)	
Maximum measured error	3 mm (0.118 inch)
Influence of ambient temperature	< 0.003 %/K
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ε_r	> 1.6, antenna and application dependent
Process temperature	-40 ... +200 °C (-40 ... +392 °F) (at process connection with FKM O-ring) -20 ... +200 °C (-4 ... +392 °F) (at process connection with FFKM O-ring)
Process pressure	Up to 40 bar g (580 psi g), process connection and temperature dependent. See Pressure/Temperature curves for more information
Design	
Enclosure	
• Material	Aluminum, polyester powder-coated
• Cable inlet	2 x M20x1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight	< 3 kg (6.6 lb) 3.75 mm (1½ inch) threaded connection with 1½" horn antenna
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Antenna	
• Material	316L stainless steel [optional alloy N06022/2.4602 (Hastelloy C-22 or equivalent)]
• Dimensions (nominal horn sizes)	Standard 1.5 inch (40 mm), 2 inch (48 mm), 3 inch (75 mm), 4 inch (95 mm) horn and optional 100 mm (4 inch) horn extension

Process connections	
• Process connection	1½", 2" or 3" NPT [(Taper), ANSI/ASME B1.20.1] R 1½", 2" or 3" [(BSPT), EN 10226] G 1½", 2" or 3" [(BSPP), EN ISO 228-1]
• Flange connection	2", 3", 4" (ANSI 150, 300 lb), 50, 80, 100 mm (PN 16, 40, JIS 10K)
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	• 15 mA • Per IEC 61158-2
FOUNDATION Fieldbus	• 20.0 mA • Per IEC 61158-2
Certificates and approvals	
General	$CSA_{US/C}$, CE, FM, NE 21, RCM
Radio	FCC, Industry Canada and Europe ETSI EN 302-372, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Flame Proof/Increased Safety (China)	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C
• Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C
• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia IIIC T100 °C Da
• Non-sparking (Europe)	ATEX II 3G Ex nA IIC T4 Gc
• Flame Proof (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
• Increased Safety (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (International)	IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIC T100 °C Da
• Explosion Proof (Russia)	GOST-R Ex d
• Increased Safety (Russia)	GOST-R Ex e
• Intrinsically Safe (Russia)	GOST-R Ex ia
• Marine	• Lloyd's Register of Shipping • ABS Type Approval • Bureau Veritas
• Functional Safety	SIL-2 suitable in accordance with IEC 61508/61511

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Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C T_a = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T_a = +50 °C IECEx SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	• SIMATIC PDM • Emerson AMS • SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

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SITRANS LR250 Horn Antenna

Selection and Ordering data		Article No.
SITRANS LR250 horn antenna	↗	**7ML5431-**
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependent). Ideal for small vessels and low dielectric media.		**0 -**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process Connection and Antenna Material		
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FKM seal[1]	⬟	**0**
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal[1]	⬟	**1**
Hastelloy C-22/2.4602 (or equivalent), PTFE emitter, FKM seal[2]		**2**
Hastelloy C-22/2.4602 (or equivalent), PTFE emitter, FFKM seal[2]		**3**
Process Connection Type		
Threaded connection 316L		
1½" NPT (ASME B1.20.1) (tapered thread)[3]	⬟	**A A**
R 1½" [(BSPT), EN 10226-1] (tapered thread)[3]	⬟	**A B**
G 1½" [(BSPP), EN ISO 228-1] (parallel thread)[3]	⬟	**A C**
2" NPT (ASME B1.20.1) (tapered thread)	⬟	**A D**
R 2" [(BSPT), EN 10226-1] (tapered thread)	⬟	**A E**
G 2" [(BSPP), EN ISO 228-1] (parallel thread)	⬟	**A F**
3" NPT (ASME B1.20.1) (tapered thread)		**A G**
R 3" [(BSPT), EN 10226-1] (tapered thread)		**A H**
G 3" [(BSPP), EN ISO 228-1] (parallel thread)		**A J**
Flanged connection 316L		
2" Class 150 ASME B16.5 flat faced[4]	⬟	**B A**
3" Class 150 ASME B16.5 flat faced[4]	⬟	**B B**
4" Class 150 ASME B16.5 flat faced[4]	⬟	**B C**
2" Class 300 ASME B16.5 flat faced[4]		**C A**
3" Class 300 ASME B16.5 flat faced[4]		**C B**
4" Class 300 ASME B16.5 flat faced[4]		**C C**
DN 50 PN 16 EN 1092-1 Type A flat faced[4]	⬟	**D A**
DN 80 PN 16 EN 1092-1 Type A flat faced[4]	⬟	**D B**
DN 100 PN 16 EN 1092-1 Type A flat faced[4]	⬟	**D C**
DN 50 PN 40 EN 1092-1 Type A flat faced[4]		**E A**
DN 80 PN 40 EN 1092-1 Type A flat faced[4]		**E B**
DN 100 PN 40 EN 1092-1 Type A flat faced[4]		**E C**
50A 10K JIS B 2220 flat faced[4]	⬟	**F A**
80A 10K JIS B 2220 flat faced[4]	⬟	**F B**
100A 10K JIS B 2220 flat faced[4]	⬟	**F C**
DN 50 PN 16 DIN EN 1092-1 Type B1 raised face		**G A**
DN 80 PN 16 DIN EN 1092-1 Type B1 raised face		**G B**
DN 100 PN 16 DIN EN 1092-1 Type B1 raised face		**G C**
DN 150 PN 16 DIN EN 1092-1 Type B1 raised face		**G D**
DN 50 PN 40 DIN EN 1092-1 Type B1 raised face		**H A**
DN 80 PN 40 DIN EN 1092-1 Type B1 raised face		**H B**
DN 100 PN 40 DIN EN 1092-1 Type B1 raised face		**H C**
DN 150 PN 40 DIN EN 1092-1 Type B1 raised face		**H D**

Selection and Ordering data		Article No.
SITRANS LR250 horn antenna		**7ML5431-**
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependent). Ideal for small vessels and low dielectric media.		**0 -**
Flanged connection Hastelloy C		
2" Class 150 ASME B16.5 raised faced[4]		**J A**
3" Class 150 ASME B16.5 raised faced[4]		**J B**
4" Class 150 ASME B16.5 raised faced[4]		**J C**
2" Class 300 ASME B16.5 raised faced[4]		**J D**
3" Class 300 ASME B16.5 raised faced[4]		**J E**
4" Class 300 ASME B16.5 raised faced[4]		**J F**
DN 50 PN 16 EN 1092-1 Type B1 raised faced[4]		**K A**
DN 80 PN 16 EN 1092-1 Type B1 raised faced[4]		**K B**
DN 100 PN 16 EN 1092-1 Type B1 raised faced[4]		**K C**
DN 50 PN 40 EN 1092-1 Type B1 raised faced[4]		**K D**
DN 80 PN 40 EN 1092-1 Type B1 raised faced[4]		**K E**
DN 100 PN 40 EN 1092-1 Type B1 raised faced[4]		**K F**
50A 10K JIS B 2220 raised faced[4]		**L A**
80A 10K JIS B 2220 raised faced[4]		**L B**
100A 10K JIS B 2220 raised faced[4]		**L C**
DN 50 PN 16 EN 1092-1 Type B1 raised face		**M A**
DN 80 PN 16 EN 1092-1 Type B1 raised face		**M B**
DN 100 PN 16 EN 1092-1 Type B1 raised face		**M C**
DN 150 PN 16 EN 1092-1 Type B1 raised face		**M D**
DN 50 PN 40 EN 1092-1 Type B1 raised face		**M E**
DN 80 PN 40 EN 1092-1 Type B1 raised face		**M F**
DN 100 PN 40 EN 1092-1 Type B1 raised face		**M G**
DN 150 PN 40 EN 1092-1 Type B1 raised face		**M H**
Communication/Output		
PROFIBUS PA	⬟	**1**
4 ... 20 mA, HART, start-up at < 3.6 mA	⬟	**2**
FOUNDATION Fieldbus	⬟	**3**
Enclosure/Cable inlet		
Aluminum, Epoxy painted		
2 x ½" NPT	⬟	**0**
2 x M20x1.5	⬟	**1**
Antenna		
1½" horn	⬟	**A**
2" horn (fits 2" ASME or DN 50 nozzles)	⬟	**B**
3" horn (fits 3" ASME or DN 80 nozzles)	⬟	**C**
4" horn (fits 4" ASME or DN 100 nozzles)	⬟	**D**
1½" horn with 100 mm extension	⬟	**E**
2" horn with 100 mm extension	⬟	**F**
3" horn with 100 mm extension	⬟	**G**
4" horn with 100 mm extension	⬟	**H**
Hastelloy C22 (or equivalent)		
2" horn (fits 2" ASME or DN 50 nozzles)		**J**
3" horn (fits 3" ASME or DN 80 nozzles)		**K**
4" horn (fits 4" ASME or DN 100 nozzles)		**L**
2" horn (fits 2" ASME or DN 50 nozzles) with 100 mm extension		**M**
3" horn (fits 3" ASME or DN 80 nozzles) with 100 mm extension		**N**
4" horn (fits 4" ASME or DN 100 nozzles) with 100 mm extension		**P**

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Selection and Ordering data	Article No.							
SITRANS LR250 horn antenna	**7ML5431-**							
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependent). Ideal for small vessels and low dielectric media.				**0**	**-**			
Approvals								
General Purpose, CE, CSA, FM, FCC, R&TTE, RCM ⬟						**A**		
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div.1, Groups E,F, G, Class III T4 FCC, Industry Canada ⬟						**B**		
Intrinsically Safe: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM ⬟						**C**		
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada ⬟						**D**		
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM ⬟						**E**		
Increased Safety: IECEx/ATEX II 1/2 GD,1D, 2D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM[5] ⬟						**F**		
Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM[5] ⬟						**G**		
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada[5] ⬟						**H**		
Non Sparking: NEPSI Ex nA IIC T4 Gc ⬟						**K**		
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C ⬟						**L**		
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C[5] ⬟						**M**		
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C[5] ⬟						**N**		
Pressure rating								
Rating per Pressure/Temperature curves in manual ⬟							**0**	
0.5 bar g (7.25 psi g) maximum ⬟							**1**	

1) Available with process connection options AA ... HD & Antenna Versions A ... H only

2) Available with process connection options JA ... MH & Antenna Versions J ... P only

3) Available For antenna versions A and E only, max. range 10 m (32.8 ft), dk > 3. Can measure dk >1.6 [20 m (65.6 ft)] when mounted in a stillpipe/ bypass.

4) Siemens Milltronics type flange (flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard), see operating instructions for details

5) Applicable with communication option 2 only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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SITRANS LR250 Horn Antenna

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Plug M12 with mating Connector[1)2)3)]	⬟	**A50**
Plug 7/8" with mating Connector[2)3)4)]	⬟	**A55**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	⬟	**Y15**
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Inspection certificate 3.1 of EN 10204	⬟	**C12**
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[3)5)]	⬟	**C20**
Namur NE43 compliant, device preset to failsafe < 3.6 mA[5)]	⬟	**N07**
Operating Instructions for HART/mA device		Article No.
English		**A5E32220602**
German		**A5E32376088**
French		**A5E35108592**
Note: The Operating Instructions should be ordered as a separate line item on the order.		
Compact Operating Instructions for HART/mA device		
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish		**A5E33469191**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian		**A5E33469171**
English, Portuguese (Brazil), Chinese		**A5E34046583**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		
Operating Instructions for PROFIBUS PA device		
English		**A5E32221386**
German		**A5E32376094**
French		**A5E35108597**
Note: The Operating Instructions should be ordered as a separate line item on the order.		
Compact Operating Instructions for PROFIBUS PA device		
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish		**A5E33469239**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian		**A5E33472685**
English, Portuguese (Brazil), Chinese		**A5E34046624**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		

Selection and Ordering data	Article No.
Operating Instructions for FOUNDATION Fieldbus device	
English	**A5E32221411**
German	**A5E32376112**
French	**A5E35108601**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for FOUNDATION Fieldbus device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	**A5E33472700**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	**A5E33472738**
English, Portuguese (Brazil), Chinese	**A5E34046626**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	**7ML1930-1BK**
HART modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required)	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (two are required)[6)]	**7ML1930-1AQ**
FDA approved FKM o-ring for 2" G (BSPP) process connections -28 ... +80 °C (-28 ... +176 °F)	**7ML1830-3AN**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

1) Available with enclosure option 1 only
2) To be used with communication options 1 and 3 only. Connector has IP67 rating.
3) Available with approval options A and B. Available with approval option C for use on intrinsically safe applications only. Not rated for dust Ex.
4) Available with enclosure option 0 only
5) Applicable to communication option 2 only
6) For use with communication option 1 and 3 only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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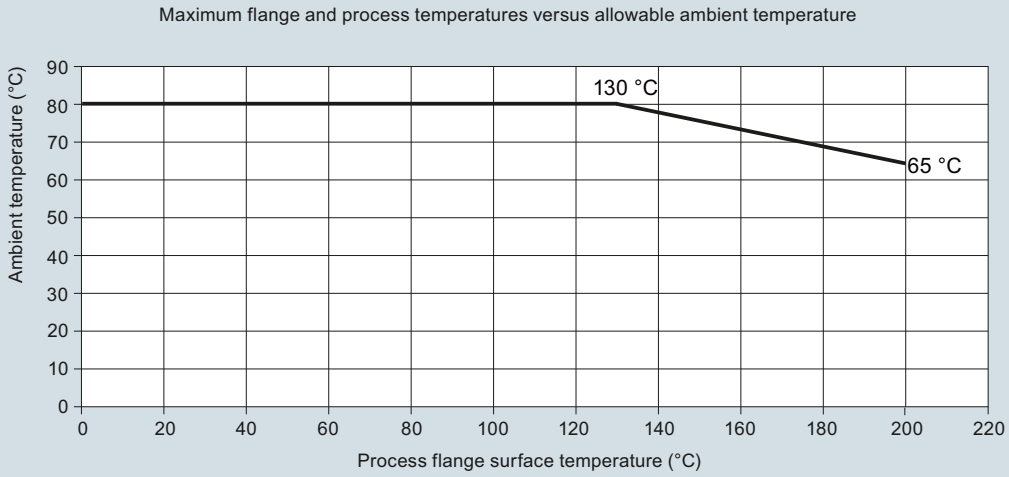
Characteristic curves



SITRANS LR250 Ambient/Process Flange Surface Temperature Curve

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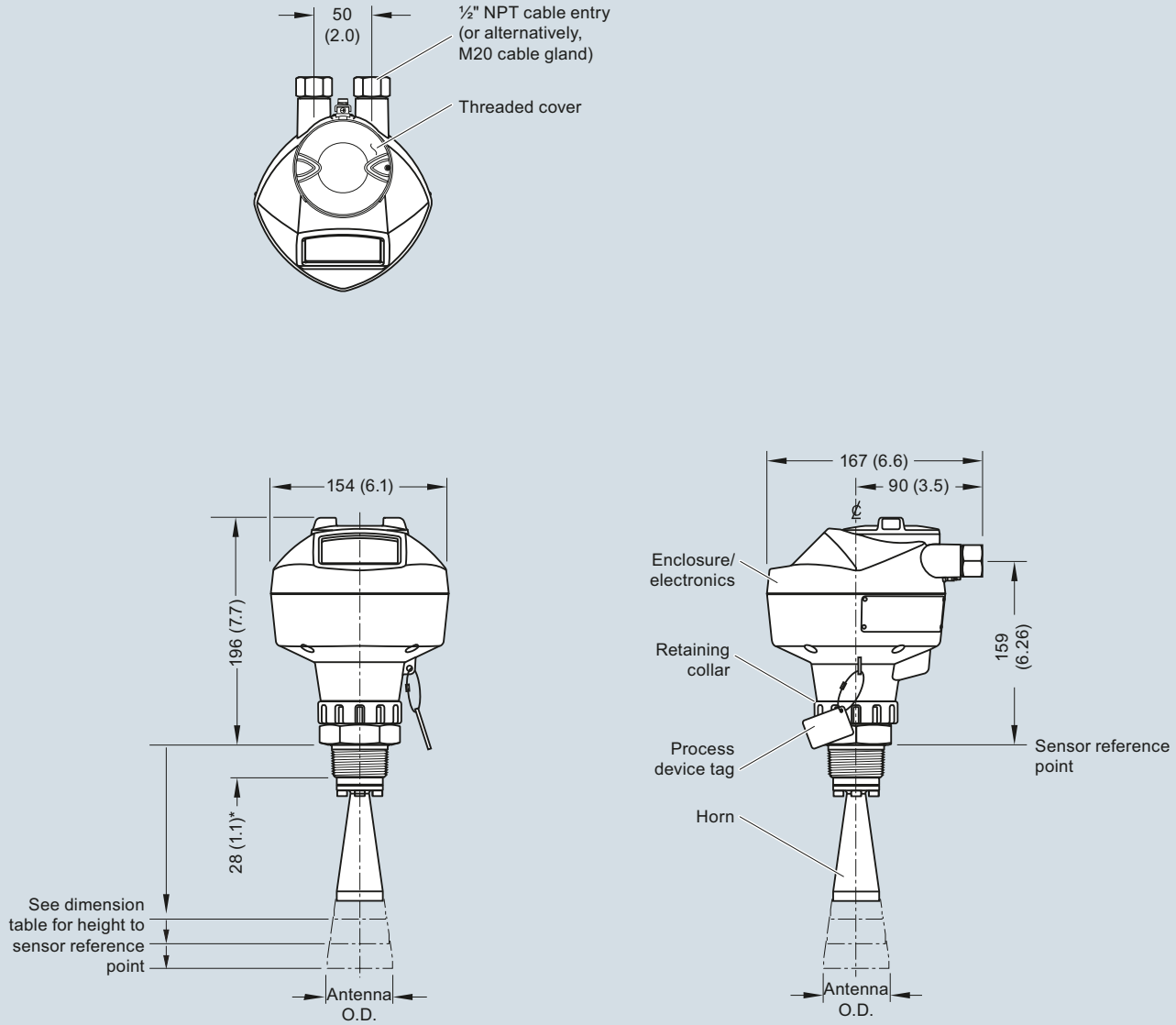
Dimensional drawings

Threaded Horn Antenna



*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
1.5" horn	139.8 (5.57)	135 (5.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	147.8 (5.88)	N/A	166 (6.55)	180 (7.09)	15 degrees	20 m (65.6 ft)
3" horn	174.8 (6.94)	N/A	199 (7.85)	213 (8.39)	10 degrees	20 m (65.6 ft)
4" horn	194.8 (7.73)	N/A	254 (10)	268 (10.55)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Threaded Horn Antenna, dimensions in mm (inch)

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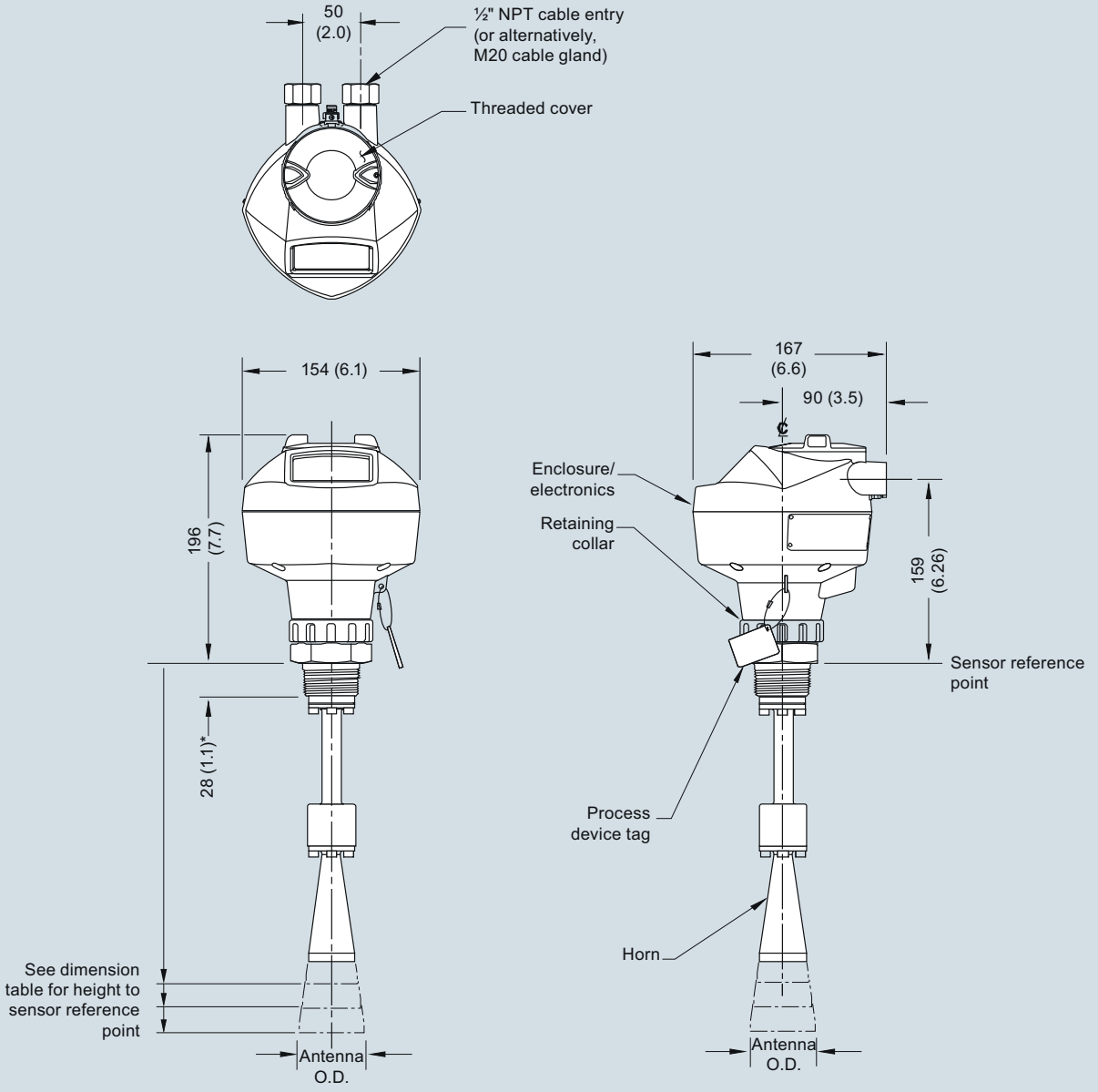
Threaded Horn Antenna with Extension



*28 mm (1.1) for 1.5 inch and 2 inch, 42 mm (1.65) for 3 inch

Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
1.5" horn	139.8 (5.57)	235 (9.3)	N/A	N/A	19 degrees	10 m (32.8 ft)
2" horn	147.8 (5.88)	N/A	266 (10.55)	280 (11.09)	15 degrees	20 m (65.6 ft)
3" horn	174.8 (6.94)	N/A	299 (11.85)	313 (12.39)	10 degrees	20 m (65.6 ft)
4" horn	194.8 (7.73)	N/A	354 (14)	368 (14.55)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Threaded Horn Antenna with Extension, dimensions in mm (inch)

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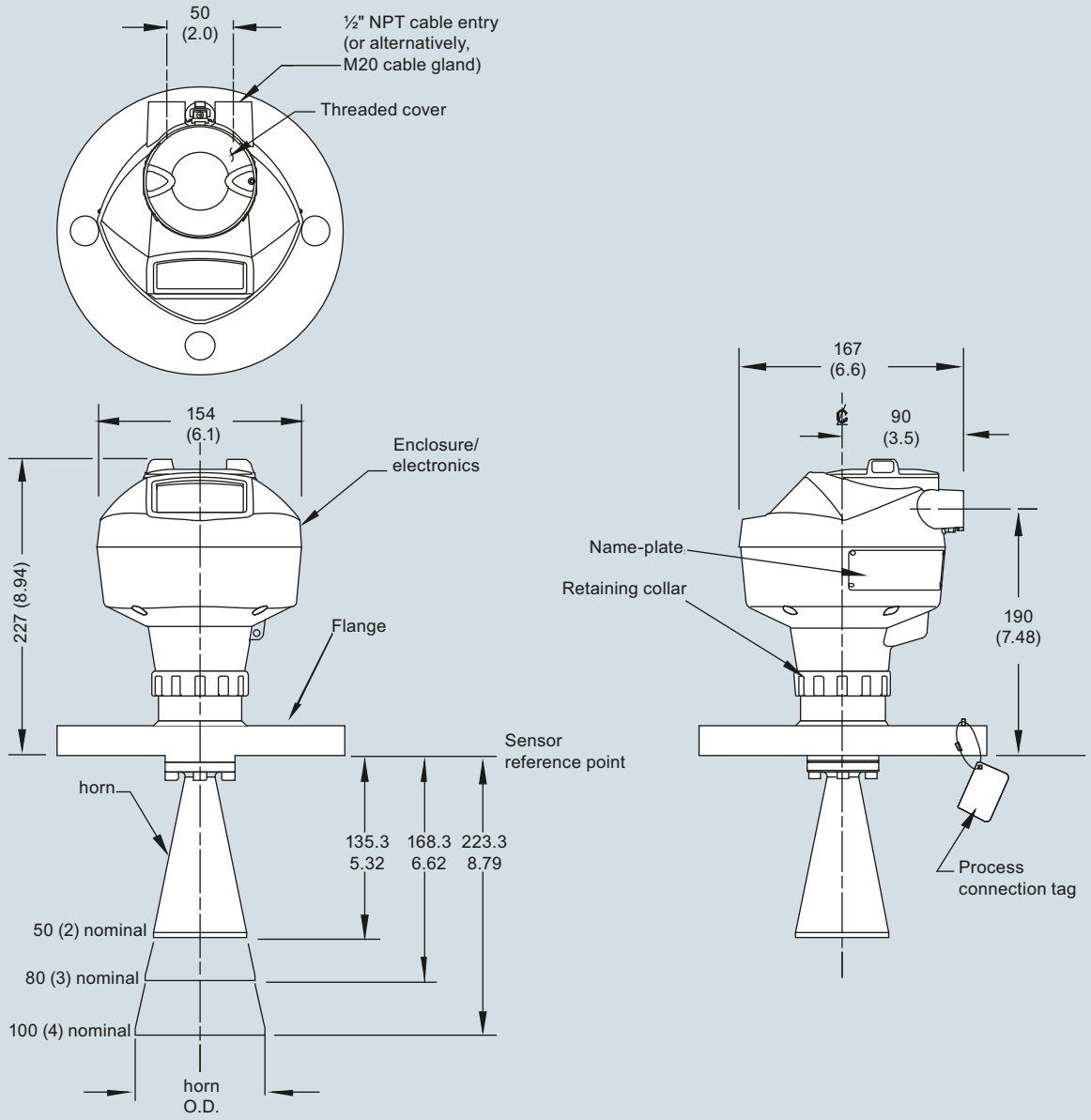
SITRANS LR250 Horn Antenna

Flanged Horn



Nominal Horn Size	Horn O.D.	Height to sensor reference point		Beam angle	Measurement range
		Stainless steel flange raised or flat-faced	Optional alloy flange		
50 (2)	147.8 (5.88)	135.3 (5.32)	138.3 (5.44)	15 degrees	20 m (65.6 ft)
80 (3)	174.8 (6.94)	168.3 (6.62)	171.3 (6.74)	10 degrees	20 m (65.6 ft)
100 (4)	194.8 (7.73)	223.3 (8.79)	226.3 (8.90)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Flanged Horn Antenna, dimensions in mm (inch)

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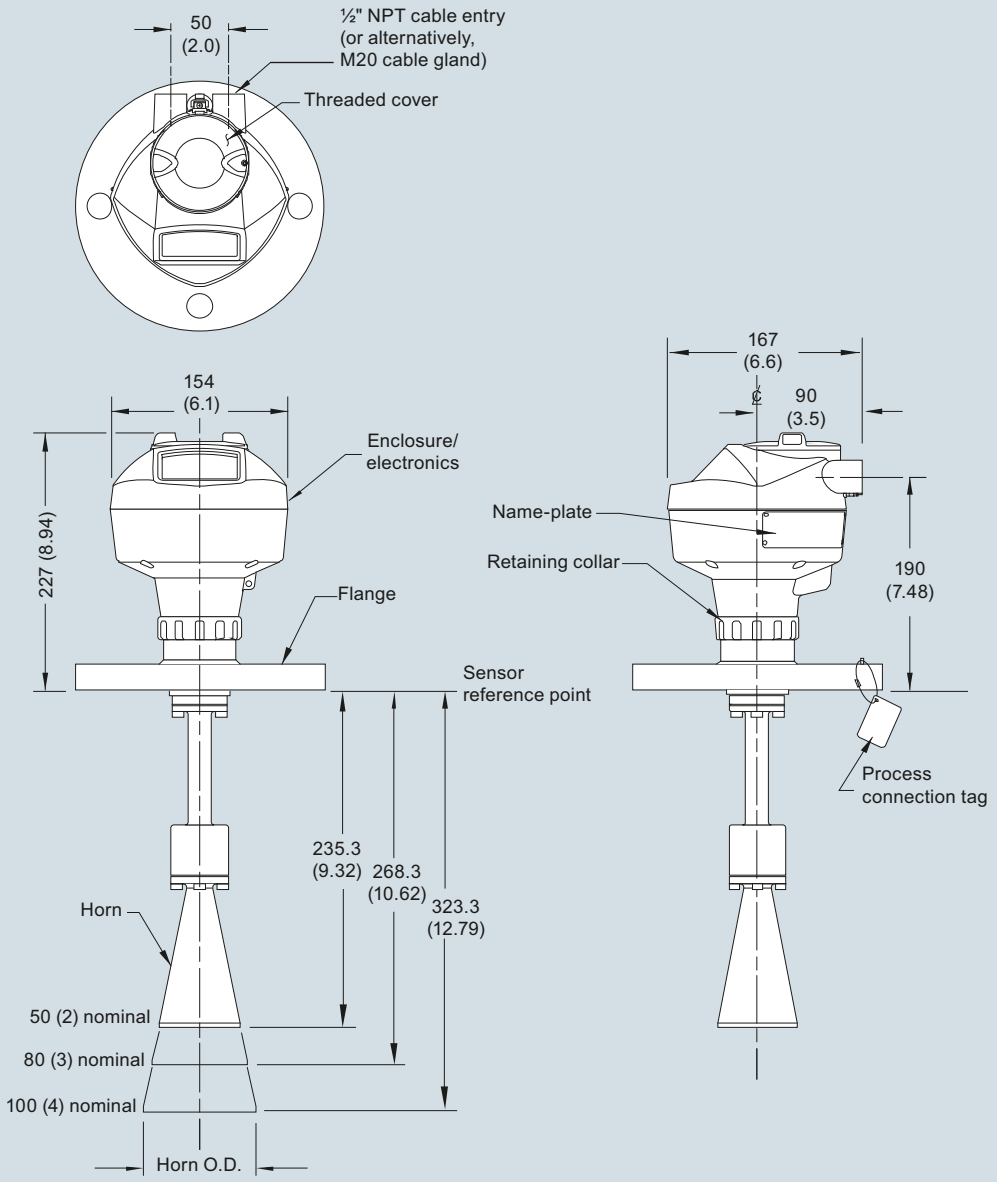
Flanged Horn with Extension



Nominal Horn Size	Horn O.D.	Height to sensor reference point		Beam angle	Measurement range
		Stainless steel flange raised or flat-faced	Optional alloy flange		
50 (2)	147.8 (5.88)	235.3 (9.32)	238.3 (9.44)	15 degrees	20 m (65.6 ft)
80 (3)	174.8 (6.94)	268.3 (10.62)	271.3 (10.74)	10 degrees	20 m (65.6 ft)
100 (4)	194.8 (7.73)	323.3 (12.79)	326.3 (12.90)	8 degrees	20 m (65.6 ft)

SITRANS LR250 Flanged Horn Antenna with Extension, dimensions in mm (inch)

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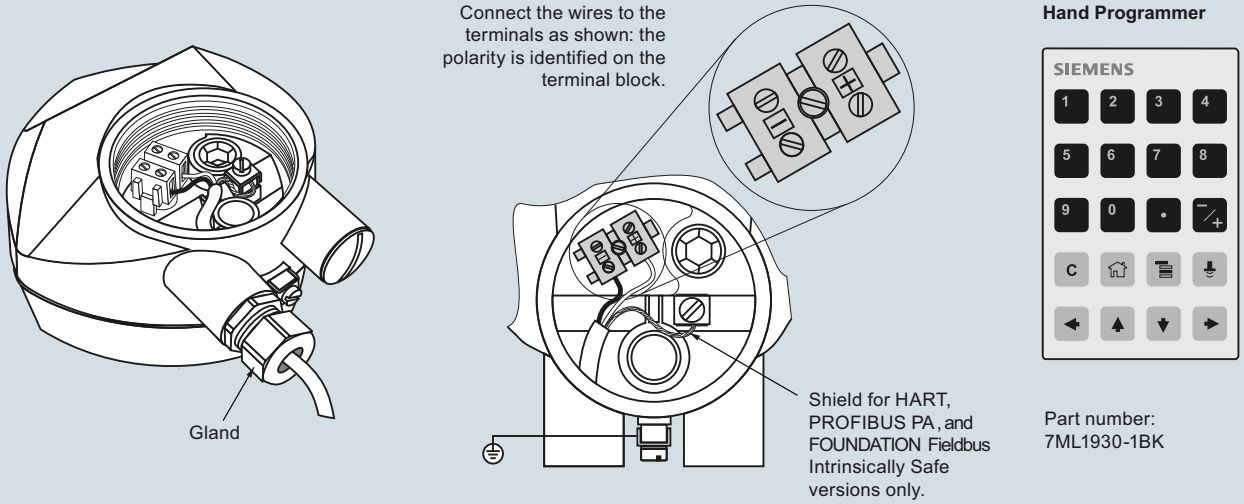
Schematics



Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

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Selection and ordering data

SITRANS LR250 Specials	Article No.
SITRANS LR250 horn version enclosures (PROFIBUS PA models)	
LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	**A5E01156836**
LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	**A5E01156838**
LR250 horn version enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	**A5E01156839**
LR250 horn version enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection	**A5E01156841**
LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection	**A5E01156843**
LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	**A5E01156844**
LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	**A5E01156846**
LR250 horn version enclosure with board stack, M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection	**A5E01156848**
LR250 enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION FIELDBUS communication, no process connection	**A5E03769538**
LR250 enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION FIELDBUS communication, no process connection	**A5E03769539**
LR250 enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION FIELDBUS communication, no process connection	**A5E03769543**
SITRANS LR250 horn version enclosures (FOUNDATION Fieldbus models)	
LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	**A5E02654608**
LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	**A5E02653792**
LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	**A5E02653793**
LR250 horn version enclosure with board stack, NPT cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	**A5E02654606**

SITRANS LR250 Specials	Article No.
SITRANS LR250 horn version enclosures (< 3.6 mA start-up HART)	
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	**A5E02956317**
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	**A5E02956319**
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	**A5E02956320**
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	**A5E02956322**
SITRANS LR250 horn version enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	**A5E02956323**
LR250 horn version enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	**A5E03441096**
LR250 horn version enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	**A5E03441097**
LR250 horn version enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	**A5E03441098**
LR250 horn version enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	**A5E03441099**
SITRANS LR250 horn antenna and extension kits	
38 mm (1.5 inch) horn antenna kit, 1.5" Process Connections only	**A5E01151539**
100 mm (4 inch) horn antenna extension kit, 1.5" Process Connections only	**A5E01151553**
50 mm (2 inch) stainless steel 316L horn antenna kit	**A5E01151569**
75 mm (3 inch) stainless steel 316L horn antenna kit	**A5E01151571**
100 mm (4 inch) stainless steel 316L horn antenna kit	**A5E01151573**
100 mm (4 inch) horn antenna extension kit, 50 mm (2 inch), 75 mm (3 inch) and 100 mm (4 inch) process connection	**A5E01151577**
50 mm (2 inch) horn antenna kit, Hastelloy C-22	**A5E01151584**
75 mm (3 inch) horn antenna kit, Hastelloy C-22	**A5E01151585**
100 mm (4 inch) horn antenna kit, Hastelloy C-22	**A5E01151587**
5 Dupont 1Gr Polyback, PTFE grease kit	**A5E01151626**
LR250 lid with O-ring	**A5E02465410**

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SITRANS LR250 threaded PVDF antenna

Overview

SITRANS LR250 with threaded PVDF antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 10 m (32.8 ft) or 20 m (66 ft) when used in a stilling pipe.

Benefits

- Fully insulated PVDF antenna design for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 50 mm (2 inch) process connection/antenna allow for easy mounting in nozzles
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART or PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM.
- Suitable for use in Safety Related Systems in accordance with IEC 61508/61511 (SIL-2)
- 3 mm (0.118 inch) accuracy in accordance with IEC 60770-1

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 10 m (32 ft) on materials with dk > 3 or 20 m (66 ft) when used in a stilling pipe with dk ≥ 1.6.

- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 80 °C (176 °F), corrosive and aggressive materials and applications requiring functional safety

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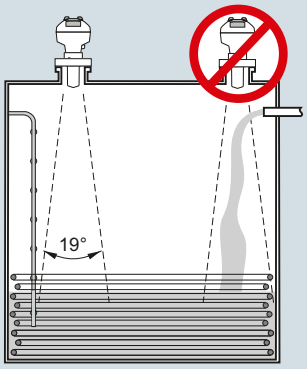
Configuration

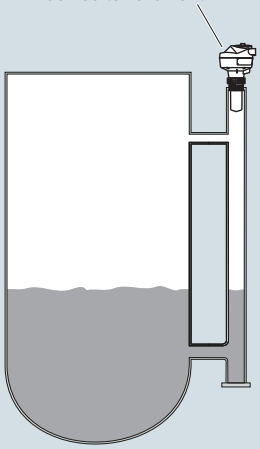
Installation

Note:
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



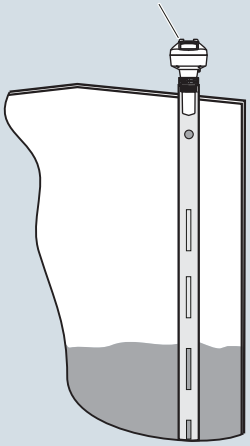
Mounting unit on bypass

Orient front or back of device toward vent.

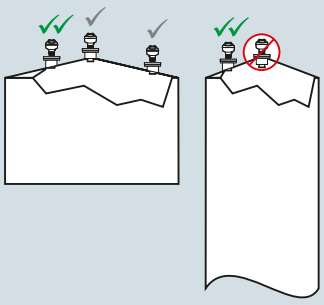


Mounting unit on stilling well

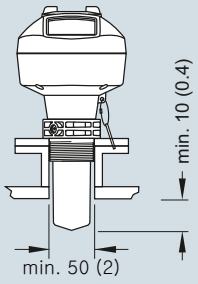
Orient front or back of device toward stillpipe slots.



Mounting unit on vessel



Mounting on a nozzle



SITRANS LR250 PVDF antenna installation, dimensions in mm (inch)

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SITRANS LR250 threaded PVDF antenna

Technical specifications

Mode of operation	
Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	10 m (32.8 ft) or 20 m (66 ft) when used in a stilling pipe with dk ≥ 1.6
Output	
HART	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	• Programmable as high low or hold (loss of echo) • NE 43 programmable
PROFIBUS PA	Profile 3.1
• Function blocks	2 Analog Input (AI)
FOUNDATION Fieldbus	H1
• Functionality	Basic or LAS
• Version	ITK 5.2.0
• Function blocks	2 Analog Input (AI)
Performance (according to reference conditions IEC60770-1)	
Maximum measured error	• > 500 mm from sensor reference point: 3 mm (0.118 inch) • < 500 mm from sensor reference point: 25 mm (1 inch)
Influence of ambient temperature	< 0.003 %/K
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ε_r	≥ 3 (1.6 in stillpipe)
Process temperature	-40 ... +80 °C (-40 ... +176 °F) at process connection (Is suitable for CIP at 120 °C for 1/2 hr max.)
Process pressure	Up to 5 bar g (72 psi g) temperature dependent. See Pressure/Temperature curves for more information
Design	
Enclosure	
• Material	Aluminum, polyester powder-coated
• Cable inlet	2 x M20x1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight	approximately 3.3 kg (7.27 lb)
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Antenna	
• Material	PVDF (Polyvinylidene fluoride)
• Dimensions (nominal sizes)	2 inch (48 mm)
Process connections	
• Process connection	2" NPT [(Taper), ASME B1.20.1] 2" [(BSPT), EN 10226] 2" [(BSPP), EN ISO 228-1]
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	• 15 mA • per IEC 61158-2
FOUNDATION Fieldbus	• 20.0 mA • per IEC 61158-2

Certificates and approvals	
General	$CSA_{US/C}$, CE, FM, NE 21, RCM
Radio	FCC, Industry Canada and Europe ETSI EN 302-372, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Flame Proof/Increased Safety (China)	Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C
• Intrinsically Safe (China)	Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C
• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia ta IIC T100 °C Da
• Non-sparking/Energy Limited (Europe)	ATEX II 3G Ex nA IIC T4 Gc
• Flame Proof (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
• Increased Safety (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (International)	IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIC T100 °C Da
• Explosion Proof (Russia)	GOST-R Ex d
• Increased Safety (Russia)	GOST-R Ex e
• Intrinsically Safe (Russia)	GOST-R Ex ia
• Marine	• Lloyd's Register of Shipping • ABS Type Approval • Bureau Veritas
Functional Safety	SIL-2 suitable in accordance with IEC 61508/61511
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C T_a = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T_a = +50 °C IECEx SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	• SIMATIC PDM • Emerson AMS • SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

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Selection and Ordering data		Article No.
SITRANS LR250 threaded PVDF antenna	↗	**7ML5431-**
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 10 m (32.8 ft) or 20m (66ft) when used in a stilling pipe.		**0 -**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process Connection and Antenna Material		
Threaded PVDF antenna	⬟	**4**
Process Connection Type		
Threaded connections PVDF		
2" NPT (ASME B1.20.1) (tapered thread)	⬟	**P A**
R 2" [(BSPT), EN 10226-1] (tapered thread)	⬟	**P B**
G 2" [(BSPP), EN ISO 228-1] (parallel thread)	⬟	**P C**
Communication/Output		
PROFIBUS PA	⬟	**1**
4 ... 20 mA, HART, start-up at < 3.6 mA	⬟	**2**
FOUNDATION Fieldbus	⬟	**3**
Enclosure/Cable inlet		
Aluminum, Epoxy painted		
2 x ½" NPT	⬟	**0**
2 x M20x1.5	⬟	**1**
Antenna		
2 inch(50 mm) threaded PVDF antenna	⬟	**R**
Approvals		
General Purpose, CE, CSA, FM, FCC, R&TTE, RCM	⬟	**A**
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div.1, Groups E ,F, G, Class III T4 FCC, Industry Canada	⬟	**B**
Intrinsically Safe: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM	⬟	**C**
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	⬟	**D**
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM	⬟	**E**
Increased Safety: IECEx/ATEX II 1/2 GD,1D, 2D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM[1)]	⬟	**F**
Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM[1)]	⬟	**G**
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada[1)]	⬟	**H**
Non Sparking: NEPSI Ex nA IIC T4 Gc	⬟	**K**
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C	⬟	**L**
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C[1)]	⬟	**M**
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C[1)]	⬟	**N**
Pressure rating		
Rating per Pressure/Temperature curves in manual	⬟	**2**

[1)] Applicable to Communication option 2 only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Plug M12 with mating Connector[1)2)3)]	⬟	**A50**
Plug 7/8" with mating Connector[2)3)4)]	⬟	**A55**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[5)6)]	⬟	**C20**
Namur NE43 compliant, device preset to failsafe < 3.6 mA[5)]	⬟	**N07**
Operating Instructions for HART/mA device		Article No.
English		**A5E32220602**
German		**A5E32376088**
French		**A5E35108592**
Note: The Operating Instructions should be ordered as a separate line item on the order.		
Compact Operating Instructions for HART/mA device		
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish		**A5E33469191**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian		**A5E33469171**
English, Portuguese (Brazil), Chinese		**A5E34046583**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		
Operating Instructions for PROFIBUS PA device		
English		**A5E32221386**
German		**A5E32376094**
French		**A5E35108597**
Note: The Operating Instructions should be ordered as a separate line item on the order.		
Compact Operating Instructions for PROFIBUS PA device		
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish		**A5E33469239**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian		**A5E33472685**
English, Portuguese (Brazil), Chinese		**A5E34046624**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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SITRANS LR250 threaded PVDF antenna

Selection and Ordering data	Article No.
Operating Instructions for FOUNDATION Fieldbus device	
English	**A5E32221411**
German	**A5E32376112**
French	**A5E35108601**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for FOUNDATION Fieldbus device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	**A5E33472700**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	**A5E33472738**
English, Portuguese (Brazil), Chinese	**A5E34046626**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	

Selection and Ordering data	Article No.
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	**7ML1930-1BK**
HART modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus[2)]	**7ML1930-1AQ**
FDA approved FKM o-ring for 2" G (BSPP) process connections -28 ... +80 °C (-28 ... +176 °F)	**7ML1830-3AN**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

1) Available with Enclosure option 1 only

2) To be used with Communication options 1 and 3 only. Connector has IP67 rating.

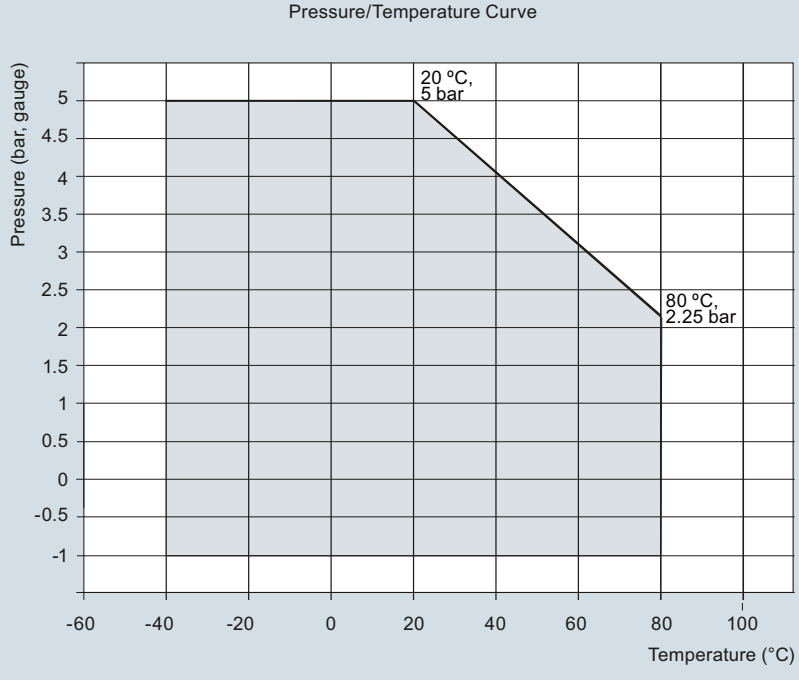
3) Available with Approval options A and B. Available with approval option C for use on intrinsically safe applications only. Not rated for dust Ex.

4) Available with Enclosure option 0 only

5) Available with communication option 2 only

6) Available with approval options A, B, C, D, E, K and L only

Characteristic curves



SITRANS LR250 PVDF antenna pressure/temperature curve

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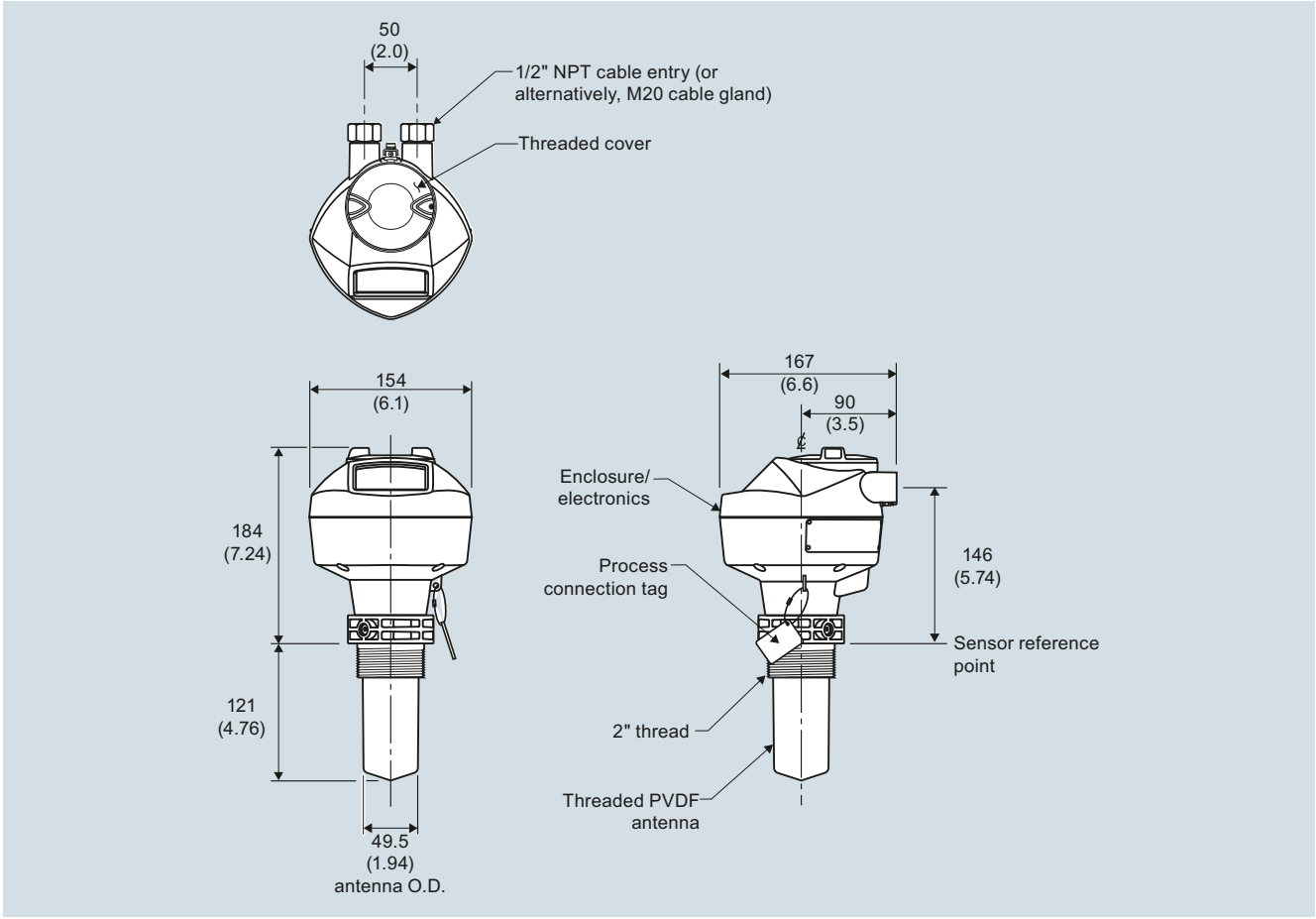
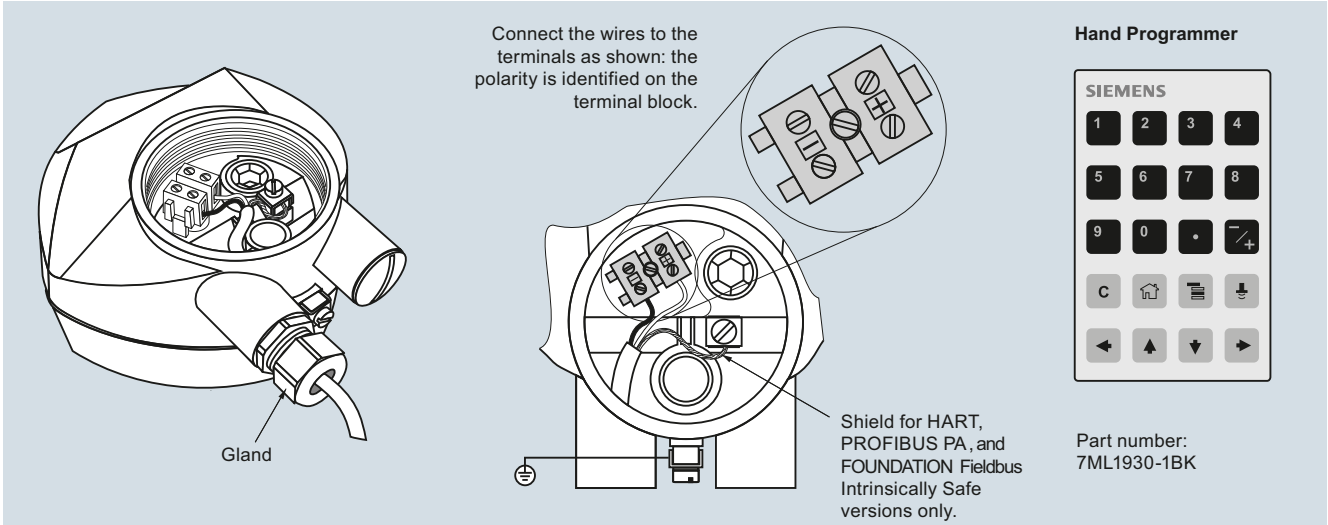
Dimensional drawings



SITRANS LR250 PVDF antenna, dimensions in mm (inch)

Schematics



Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

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Selection and ordering data

SITRANS LR250 threaded PVDF Specials	Article No.
SITRANS LR250 threaded PVDF antenna version enclosures (PROFIBUS PA models)	
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	**A5E03588171**
LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	**A5E03588253**
LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	**A5E03588512**
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	**A5E03589260**
LR250 threaded PVDF antenna version enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection	**A5E03589262**
LR250 threaded PVDF antenna version enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	**A5E03589264**
SITRANS LR250 threaded PVDF antenna version enclosures (FOUNDATION Fieldbus models)	
LR250 enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	**A5E03589266**
LR250 enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	**A5E03589275**
LR250 enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION Fieldbus communication, no process connection	**A5E03589277**
LR250 enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	**A5E03589280**
LR250 enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION Fieldbus communication, no process connection	**A5E03589281**
LR250 enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION Fieldbus communication, no process connection	**A5E03589283**

SITRANS LR250 threaded PVDF Specials	Article No.
SITRANS LR250 threaded PVDF antenna version enclosures (< 3.6 mA start-up HART models)	
LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	**A5E03569747**
LR250 enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	**A5E03586807**
LR250 enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	**A5E03586854**
LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	**A5E03586887**
LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	**A5E03586961**
LR250 enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	**A5E03587012**
LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	**A5E03587132**
LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	**A5E03587223**
LR250 enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	**A5E03588125**
SITRANS LR250 threaded PVDF antenna kits	
Antenna kit 2" NPT threaded PVDF	**A5E03528941**
Antenna kit 2" R (BSPT) threaded PVDF	**A5E03528943**
Antenna kit 2" G (BSPP) threaded PVDF	**A5E03528947**
Kit of hardware parts for LR250 threaded PVDF antenna: consists of O-rings, screws, wavewasher and loctite	**A5E03528948**

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Overview

SITRANS LR250 with flanged encapsulated antenna is a 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including corrosives or aggressive materials, to a range of 20 m (66 ft) (antenna dependent).

Benefits

- Fully encapsulated horn antenna design with FDA approved TFM 1600 PTFE lens for use in chemical and sanitary environments where aggressive and corrosive materials are used
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 50 mm (2 inch) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Short blanking distance for improved minimum measuring range to 50 mm (2 inch) from the end of the antenna
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves setup and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using Quick Start Wizard with a few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with dk > 1.6.

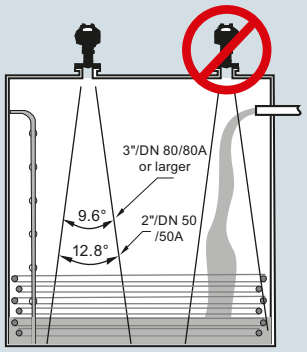
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, temperatures to 170 °C (338 °F), corrosive and aggressive materials and applications where ease of cleaning is required, such as food or fine chemicals.

Configuration

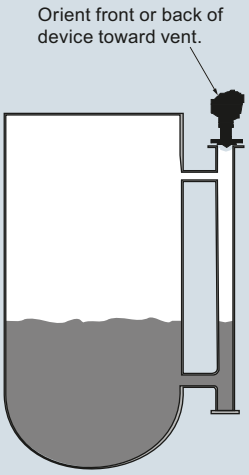
Installation

Note:

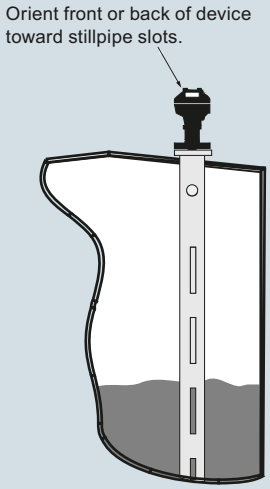
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



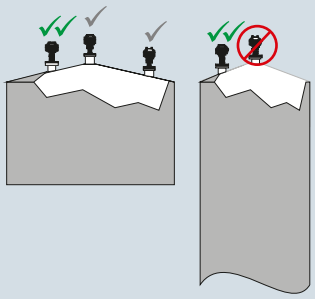
Mounting unit on bypass



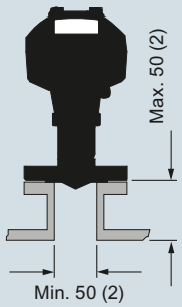
Mounting unit on stilling well



Mounting unit on vessel



Mounting on a nozzle



SITRANS LR250 flanged encapsulated antenna installation, dimensions in mm (inch)

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SITRANS LR250 Flanged Encapsulated Antenna

Technical specifications

Mode of operation	
Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	20 m (66 ft)
Output	
HART	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	• Programmable as high low or hold (loss of echo) • NE 43 programmable
PROFIBUS PA	Profile 3.01
• Function blocks	2 Analog Input (AI)
FOUNDATION Fieldbus	H1
• Functionality	Basic or LAS
• Version	ITK 5.2.0
• Function blocks	2 Analog Input (AI)
Performance (according to reference conditions IEC60770-1)	
Maximum measured error	• > 500 mm from sensor reference point: 3 mm (0.118 inch) • < 500 mm from sensor reference point: 25 mm (1 inch)
Influence of ambient temperature	< 0.003 %/K
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ε_r	≥ 1.6 (antenna dependent)
Process temperature	-40 ... +170 °C (-40 ... +338 °F) at process connection
Process pressure	See Pressure/Temperature curves for more information (page 4/237)
Design	
Enclosure	
• Material	Aluminum, polyester powder-coated
• Cable inlet	2 x M20x1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight (dependent on process connection)	• Approx. 7 kg (15.43 lb) for 2" Class 150 ASME B16.5 raised face flange (smallest size) • Approx. 17.7 kg (39.02 lb) for 6" Class 150 ASME B16.5 raised face flange (largest size)
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Antenna	
• Material	Stainless Steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part)
• Dimensions (nominal sizes)	48 mm (2 inch), 80 mm (3 inch), 100 mm (4 inch), 150 mm (6 inch)

Process connections	
Flanged connection	Raised Face • 2, 3, 4, 6" Class 150 ASME B16.5 • 50A, 80A, 100A, 150A 10K JIS B 2220 • DN 50, DN 80, DN 100 & DN 150 PN 10/16 EN 1092-1 type B1
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	• 15 mA • Per IEC 61158-2
FOUNDATION Fieldbus	• 20.0 mA • Per IEC 61158-2
Certificates and approvals	
General	$CSA_{US/C}$, CE, FM, NE 21, RCM
Radio	FCC, Industry Canada and Europe ETSI EN 302-372, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Flame Proof/Increased Safety (China)	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C
• Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C
• Non-sparking/Energy Limited (China)	NEPSI Ex nA IIC T4 Gc
• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia ta IIIC T100 °C Da
• Non-sparking/Energy Limited (Europe)	ATEX II 3G Ex nA IIC T4 Gc
• Flame Proof (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
• Increased Safety (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (International)	IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da
• Explosion Proof (Russia)	GOST-R Ex d
• Increased Safety (Russia)	GOST-R Ex e
• Intrinsically Safe (Russia)	GOST-R Ex ia
• Marine	• Lloyd's Register of Shipping • ABS Type Approval • Bureau Veritas
• Functional Safety	SIL-2 suitable in accordance with IEC 61508/61511

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Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld-programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C T_a = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T_a = 50 °C IECEx SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	• SIMATIC PDM • Emerson AMS • SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

Selection and Ordering data		Article No.
SITRANS LR250 flanged encapsulated antenna	↗	**7ML5432-**
2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, to a range of 20 m (66 ft) (antenna dependant). Ideal for corrosive, aggressive and low dielectric media.		**0 -**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Process Connection Material		
Stainless steel 1.4404/1.4435		**0**
Process Connection Type		
Flanged Process Connection Types (stainless steel 1.4404/1.4435)		
2" Class 150 ASME B16.5 raised face[1)]	⬟	**B F**
3" Class 150 ASME B16.5 raised face	⬟	**B G**
4" Class 150 ASME B16.5 raised face	⬟	**B H**
6" Class 150 ASME B16.5 raised face		**B J**
50A 10K JIS B 2220 raised face[1)]		**F D**
80A 10K JIS B 2220 raised face		**F E**
100A 10K JIS B 2220 raised face		**F F**
150A 10K JIS B 2220 raised face		**F G**
DN 50 PN 10/16 EN 1092-1 type B1 raised face[1)]	⬟	**G A**
DN 80 PN 10/16 EN 1092-1 type B1 raised face	⬟	**G B**
DN 100 PN 10/16 EN 1092-1 type B1 raised face	⬟	**G C**
DN 150 PN 10/16 EN 1092-1 type B1 raised face		**G D**
Communication/Output		
PROFIBUS PA	⬟	**1**
4 ... 20 mA, HART, start-up at < 3.6 mA	⬟	**2**
FOUNDATION Fieldbus	⬟	**3**
Enclosure/Cable inlet		
Aluminum, Epoxy painted		
2 x ½" NPT	⬟	**0**
2 x M20x1.5	⬟	**1**
Antenna lens material		
TFM 1600 PTFE Flush Lens	⬟	**A**
Approvals		
General Purpose, CE, CSA, FM, FCC, R&TTE, RCM	⬟	**A**
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div.1, Groups E, F, G, Class III T4 FCC, Industry Canada	⬟	**B**
Intrinsically Safe: IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEx/ATEX II 1D Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM	⬟	**C**
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	⬟	**D**
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM	⬟	**E**
Increased Safety: IECEx/ATEX II 1/2 GD,1D, 2D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM[2)]	⬟	**F**
Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM[2)]	⬟	**G**
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada[2)]	⬟	**H**
Non Sparking: NEPSI Ex nA IIC T4 Gc	⬟	**K**
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C	⬟	**L**
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C[2)]	⬟	**M**
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C[2)]	⬟	**N**
Pressure rating		
Rating per Pressure/Temperature curves in instruction manual	⬟	**0**

[1)] Maximum range 10 m (32.8 ft), dk > 3 [20 m (66 ft)] and dk > 1.6 when mounted in stillpipe]

[2)] Applicable with communication option 2 only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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SITRANS LR250 Flanged Encapsulated Antenna

Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Plug M12 with mating Connector[1)2)3)]	⬟	**A50**
Plug 7/8" with mating Connector[2)3)4)]	⬟	**A55**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204	⬟	**C12**
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[5)6)]	⬟	**C20**
Namur NE43 compliant, device preset to failsafe < 3.6 mA[5)]	⬟	**N07**
Operating Instructions for HART/mA device		Article No.
English		**A5E32220602**
German		**A5E32376088**
French		**A5E35108592**
Note: The Operating Instructions should be ordered as a separate line item on the order.		
Compact Operating Instructions for HART/mA device		
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish		**A5E33469191**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian		**A5E33469171**
English, Portuguese (Brazil), Chinese		**A5E34046583**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		
Operating Instructions for PROFIBUS PA device		
English		**A5E32221386**
German		**A5E32376094**
French		**A5E35108597**
Note: The Operating Instructions should be ordered as a separate line item on the order.		
Compact Operating Instructions for PROFIBUS PA device		
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish		**A5E33469239**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian		**A5E33472685**
English, Portuguese (Brazil), Chinese		**A5E34046624**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		

Selection and Ordering data	Article No.
Operating Instructions for FOUNDATION Fieldbus device	
English	**A5E32221411**
German	**A5E32376112**
French	**A5E35108601**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for FOUNDATION Fieldbus device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	**A5E33472700**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	**A5E33472738**
English, Portuguese (Brazil), Chinese	**A5E34046626**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	**7ML1930-1BK**
HART modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (2 are required)[6)]	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (2 are required)[2)]	**7ML1930-1AQ**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

1) Available with enclosure option 1 only
2) Available with communication options 1 and 3 only
3) Available with approval options A, B, C, and L only
4) Available with enclosure option 0 only
5) Applicable with communication option 2 only
6) Available with approval options A, B, C, D, E, K, and L only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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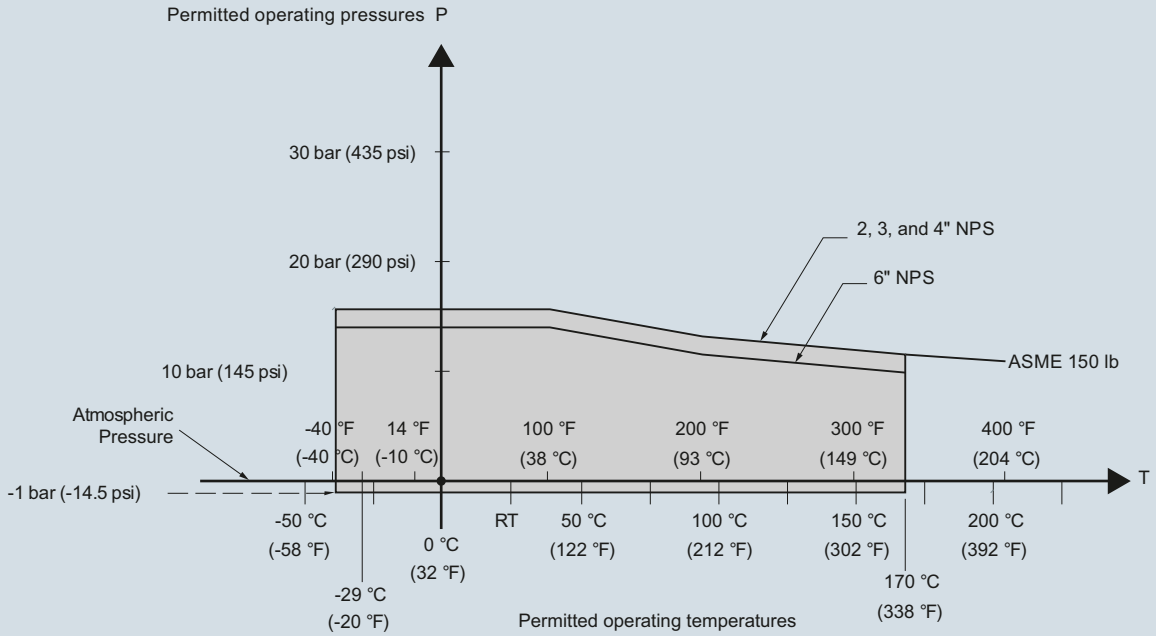
Characteristic curves

Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
ASME flanged process connections
(7ML5432)



SITRANS LR250 flanged encapsulated antenna pressure/temperature curve

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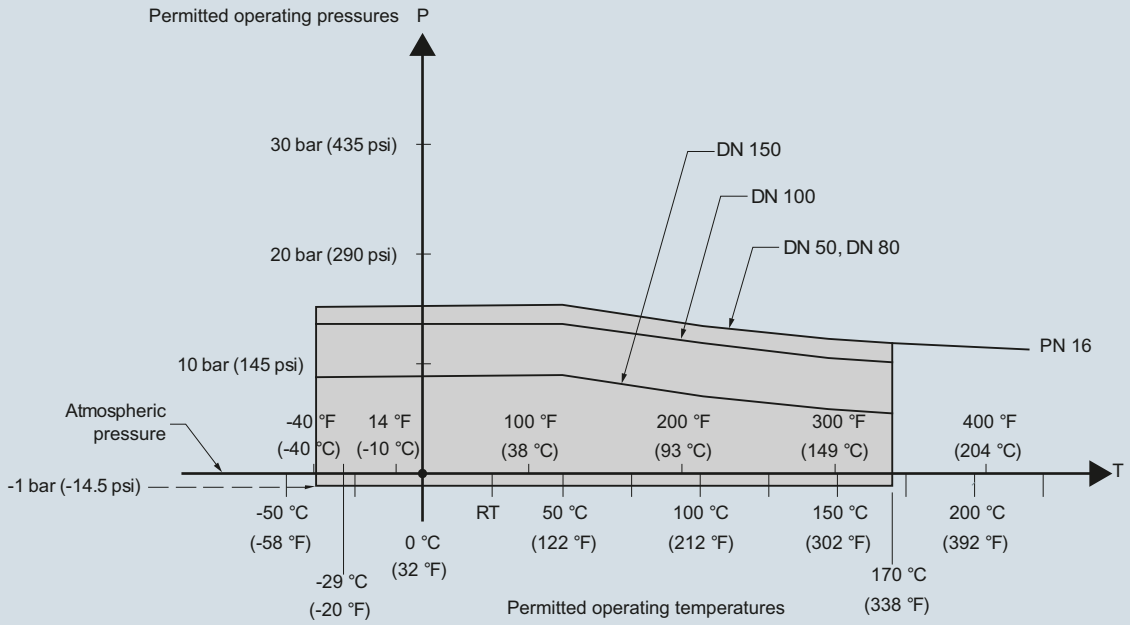
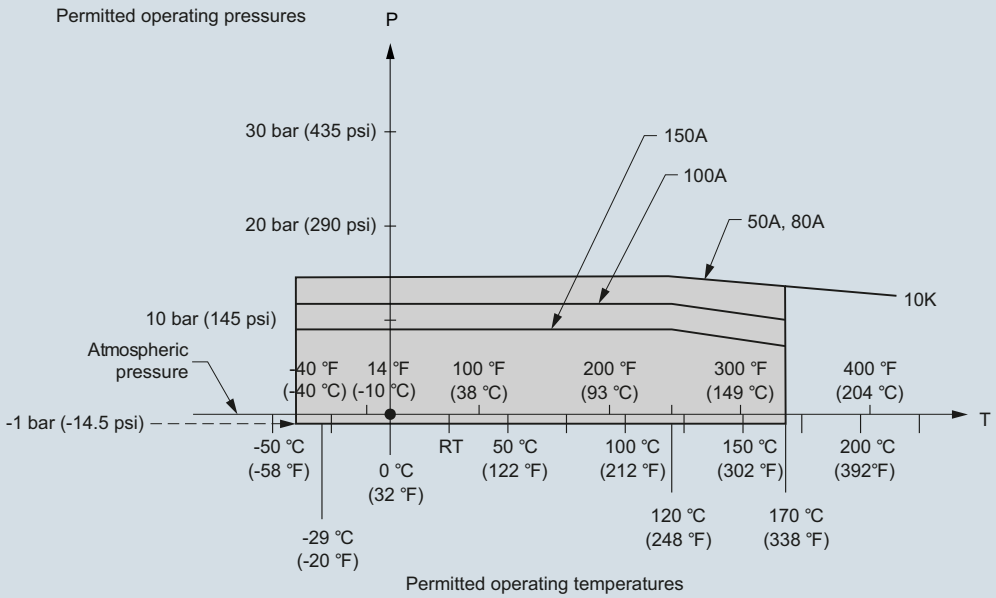
SITRANS LR250 Flanged Encapsulated Antenna

Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
EN 1092-1 flanged process connections
(7ML5432)



SITRANS LR250 flanged encapsulated antenna pressure/temperature curve

Pressure/ temperature curve
LR250 Flanged Encapsulated Antenna
JIS B 2220 flanged process connections
(7ML5432)



SITRANS LR250 flanged encapsulated antenna pressure/temperature curve

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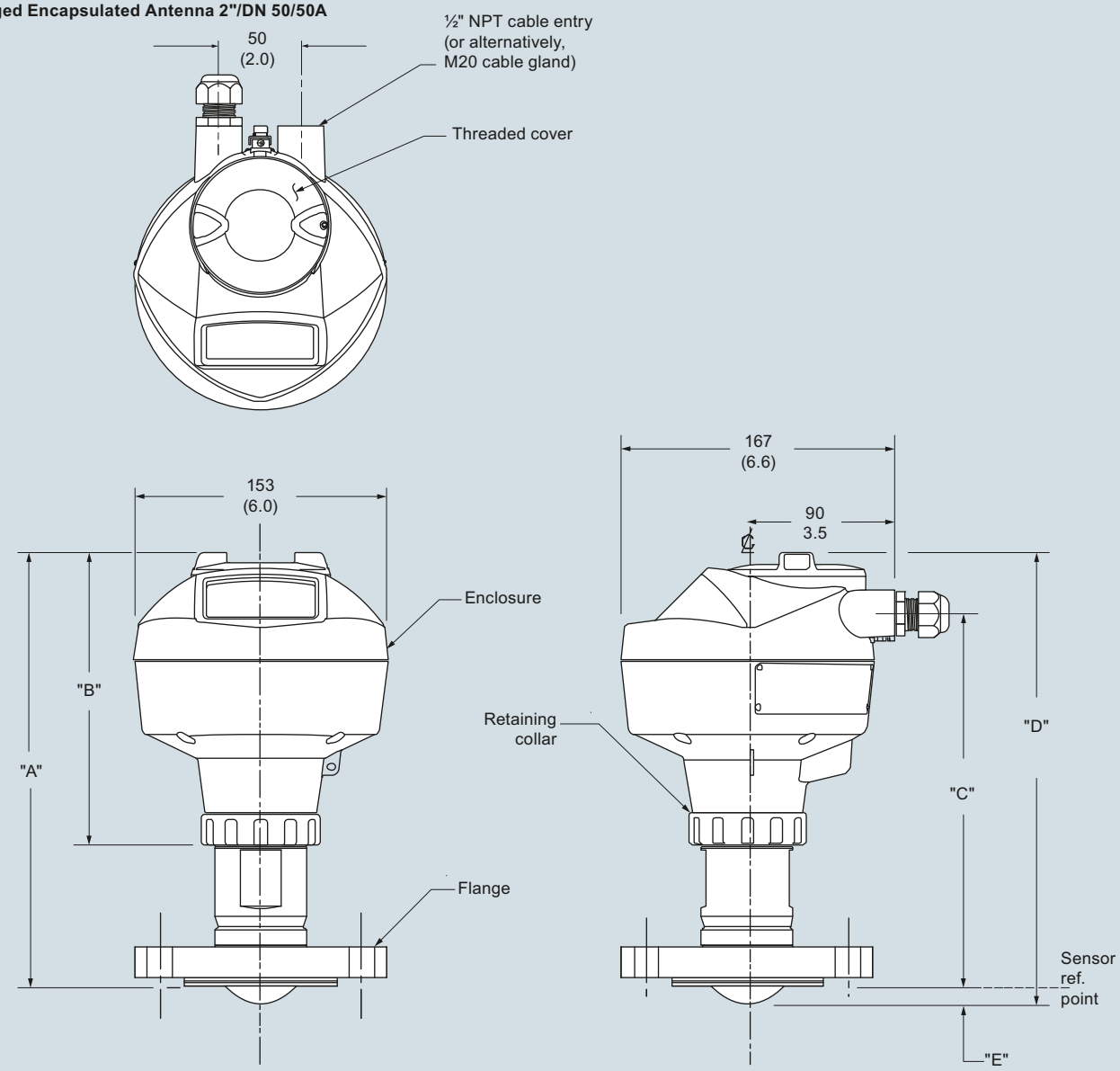
Dimensional drawings

Flanged Encapsulated Antenna 2"/DN 50/50A



Flange Size	Flange Class	Flange O.D.	Antenna aperture size	Height to Sensor reference point dimension E[1)]	Beam angle	Measurement Range	Dimension A	Dimension B	Dimension C	Dimension D
2"	150 lb	152 (5.98)	50 (1.97)	11 (0.43)	12.8°	10 m (32.8 ft)	263 (10.35)	178 (7)	223 (8.78)	274 (10.79)
DN 50	PN 10/16	165 (6.50)								
50A	10K	155 (6.10)								

[1)] Height from tip of lens to sensor reference point as shown.

SITRANS LR250 flanged encapsulated antenna, dimensions in mm (inch)

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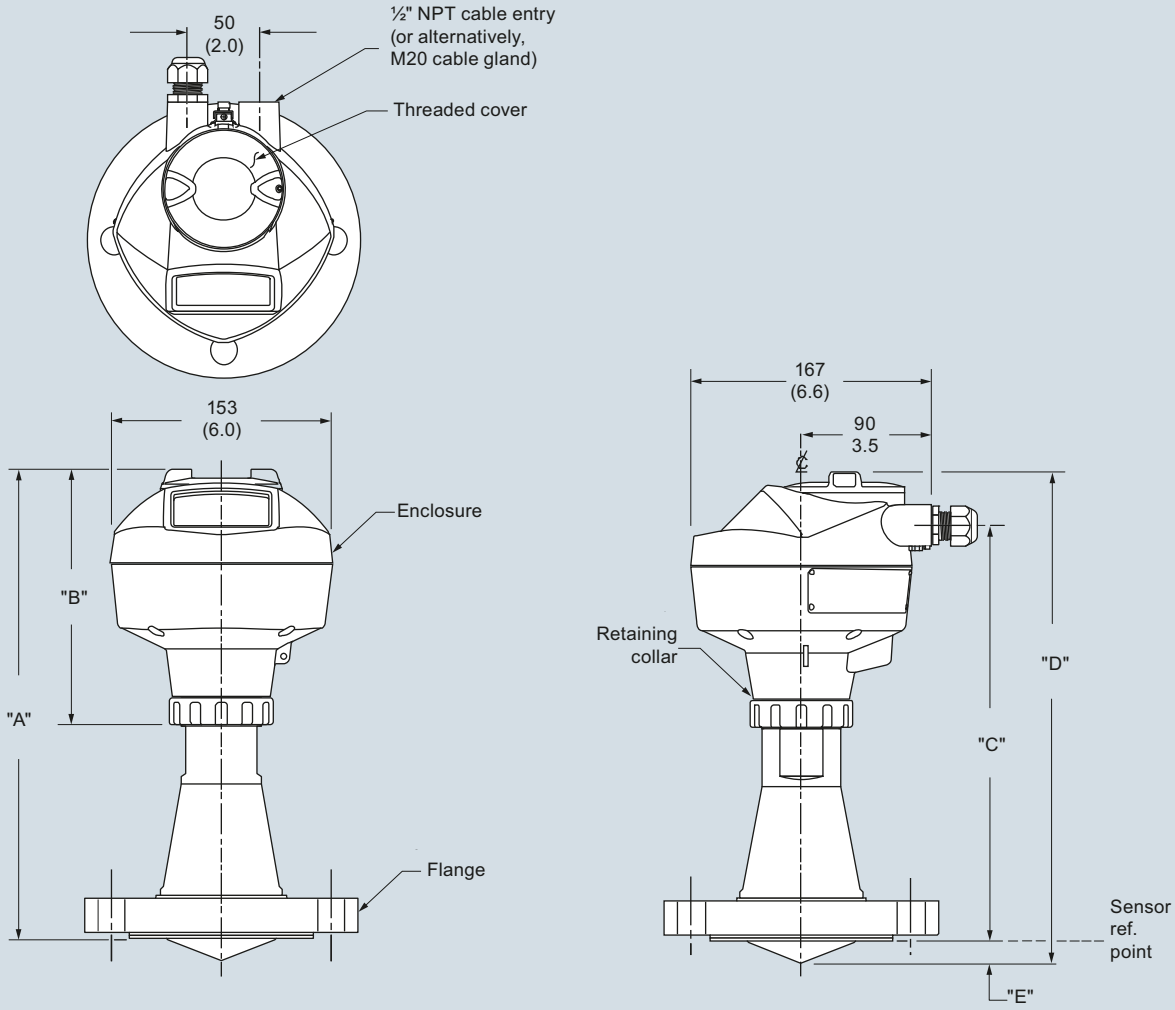
SITRANS LR250 Flanged Encapsulated Antenna

Flanged Encapsulated Antenna 3"/DN 50/80A or greater



Flange Size	Flange Class	Flange O.D.	Antenna aperture size	Height to Sensor reference point dimension E[1)]	Beam angle	Measurement Range	Dimension A	Dimension B	Dimension C	Dimension D
3"	150 lb	190 (7.48)	75 (2.95)	15 (0.59)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343 (13.54)
DN 80	PN 10/16	200 (7.87)								
80A	10K	185 (7.28)								
4"	150 lb	230 (9.06)	75 (2.95)	13 (0.51)	9.6°	20 m (65.6 ft)	328 (12.91)	178 (7)	288 (11.34)	343 (13.50)
DN 100	PN 10/16	220 (8.66)								
100A	10K	210 (8.27)								
6"	150 lb	280 (11.02)	75 (2.95)	15 (0.59)	9.6°	20 m (65.6 ft)	333 (13.11)	178 (7)	293 (11.54)	348 (13.70)
DN 150	PN 10/16	285 (11.25)								
150A	10K	280 (11.02)								

1) Height from tip of lens to sensor reference point as shown.

SITRANS LR250 flanged encapsulated antenna, dimensions in mm (inch)

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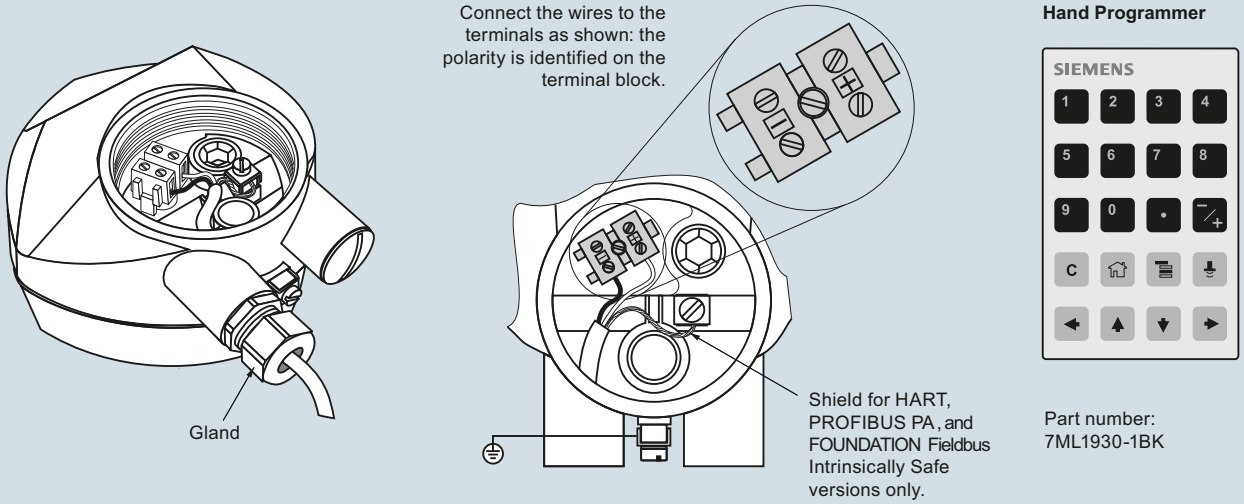
Schematics



Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

4

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4

Selection and ordering data

SITRANS LR250 flanged encapsulated Specials	Article No.
SITRANS LR250 flanged encapsulated antenna version enclosures (PROFIBUS PA models)	
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection	**A5E32462853**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection	**A5E32462854**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection	**A5E32462855**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection	**A5E32462856**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with PROFIBUS PA communication, no process connection	**A5E32462857**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with PROFIBUS PA communication, no process connection	**A5E32462858**
SITRANS LR250 flanged encapsulated antenna version enclosures (FOUNDATION Fieldbus models)	
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	**A5E32462859**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection	**A5E32462860**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with FOUNDATION Fieldbus communication, no process connection	**A5E32462861**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection	**A5E32462862**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with FOUNDATION Fieldbus communication, no process connection	**A5E32462863**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with FOUNDATION Fieldbus communication, no process connection	**A5E32462864**
SITRANS LR250 flanged encapsulated antenna version enclosures (< 3.6 mA start-up HART models)	
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	**A5E32462865**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option A, with HART communication start-up at < 3.6 mA, no process connection	**A5E32462866**

SITRANS LR250 flanged encapsulated Specials	Article No.
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option B, with HART communication start-up at < 3.6 mA, no process connection	**A5E32462867**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option C, with HART communication start-up at < 3.6 mA, no process connection	**A5E32462868**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option D, with HART communication start-up at < 3.6 mA, no process connection	**A5E32462869**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option E, with HART communication start-up at < 3.6 mA, no process connection	**A5E32462830**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option F, with HART communication start-up at < 3.6 mA, no process connection	**A5E32462831**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, M20 cable inlet, approval option G, with HART communication start-up at < 3.6 mA, no process connection	**A5E32462832**
LR250 flanged encapsulated antenna version (7ML5432) enclosure with board stack, NPT cable inlet, approval option H, with HART communication start-up at < 3.6 mA, no process connection	**A5E32462833**
SITRANS LR250 flanged encapsulated antenna lens kits	
Replacement TFM 1600 Lens and Spring Washer Kit for 2" Class 150 ASME B16.5 raised face	**A5E32462817**
Replacement TFM 1600 Lens and Spring Washer Kit for 3" Class 150 ASME B16.5 raised face	**A5E32462819**
Replacement TFM 1600 Lens and Spring Washer Kit for 4" Class 150 ASME B16.5 raised face	**A5E32462820**
Replacement TFM 1600 Lens and Spring Washer Kit for 6" Class 150 ASME B16.5 raised face	**A5E32462821**
Replacement TFM 1600 Lens and Spring Washer Kit for 50A 10K JIS B 2220 raised face	**A5E32462822**
Replacement TFM 1600 Lens and Spring Washer Kit for 80A 10K JIS B 2220 raised face	**A5E32462823**
Replacement TFM 1600 Lens and Spring Washer Kit for 100A 10K JIS B 2220 raised face	**A5E32462824**
Replacement TFM 1600 Lens and Spring Washer Kit for 150A 10K JIS B 2220 raised face	**A5E32462825**
Replacement TFM 1600 Lens and Spring Washer Kit for DN 50 PN 10/16 EN 1092-1 type B1 raised face	**A5E32462826**
Replacement TFM 1600 Lens and Spring Washer Kit for DN 80 PN 10/16 EN 1092-1 type B1 raised face	**A5E32462827**
Replacement TFM 1600 Lens and Spring Washer Kit for DN 100 PN 10/16 EN 1092-1 type B1 raised face	**A5E32462828**
Replacement TFM 1600 Lens and Spring Washer Kit for DN 150 PN 10/16 EN 1092-1 type B1 raised face	**A5E32462829**

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Overview

The SITRANS LR250 hygienic encapsulated antenna is a 2 wire 25GHz pulse radar level transmitter with sanitary and hygienic approvals for continuous monitoring of liquids, slurries and pastes within the Food, Beverage, chemical, and pharmaceutical industries to a range of 20 m (66 ft) - antenna dependent. (Pictures shown with accessories - sold separately)

Benefits

- Fully encapsulated horn antenna design with FDA approved and USP Class VI compliant, TFM 1600 PTFE lens.
- < 0.8 µ Ra surface finish for maximum cleanability and hygiene requirements commonly required in sanitary environments
- Chemically resistant TFM 1600 PTFE lens is also suitable for aggressive or corrosive materials
- Approved device in accordance with 3-A, EHEDG EL Class I and/or EHEDG EL Aseptic Class I
- Cost effective replacement for transmitters made of exotic materials
- Graphical local user interface (LUI) makes operation simple with plug-and-play set-up using the intuitive Quick Start Wizard
- Industry standard process connections including ISO 2852, DIN 11851, DIN 11864-1, DIN 11864-2, DIN 11864-3 and Tuchenhagen Varivent Type F and N
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency and 2 inch (50 mm) process connection/antenna allow for easy mounting
- Insensitive to mounting location and obstructions, and less sensitive to nozzle interference
- Communication using HART, PROFIBUS PA, or FOUNDATION Fieldbus
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or over a network using SIMATIC PDM, Emerson AMS, or Field Device Tools, such as PACTware or Fieldcare via SITRANS DTM.
- Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511

Application

SITRANS LR250 includes a graphical local user interface (LUI) that improves set-up and operation by including an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Start-up is easy using the Quick Start wizard with few parameters required for basic operation.

The 25 GHz frequency creates a narrow, focused beam allowing for smaller antenna options and decreasing sensitivity to obstructions.

SITRANS LR250's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

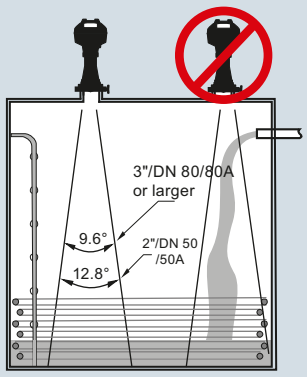
SITRANS LR250 measures superbly in small vessels and in tanks/vessels up to 20 m (66 ft) on materials with dk > 1.6.

- Key Applications: applications within the Food, Beverage, Chemical and Pharmaceutical industries where sanitary, aseptic or hygienic approvals are required or easy install/ clean flush antennas are preferable, such as ice cream, fruit juice, milk, beer and pharmaceutical or chemical additives and ingredients.

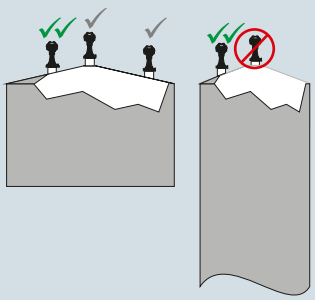
Configuration

Installation

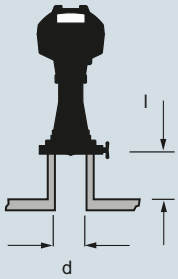
Note:
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



Mounting unit on vessel



Mounting on a nozzle



Nozzles should be maximum l/d ratio 1:1 (Eg. 50 mm length, 50 mm diameter)

LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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SITRANS LR250 Hygienic Encapsulated Antenna

Technical specifications

Mode of Operation	
Measuring principle	Radar level measurement
Frequency	K-band (25.0 GHz)
Minimum measuring range	50 mm (2 inch) from end of antenna
Maximum measuring range	20 m (66 ft)
Output	
HART	Version 5.1
• Analog output	4 ... 20 mA
• Accuracy	± 0.02 mA
• Fail-safe	• Programmable as high low or hold (loss of echo) • NE 43 programmable
PROFIBUS PA	Profile 3.01
• Function blocks	2 Analog Input (AI)
FOUNDATION Fieldbus	H1
• Functionality	Basic or LAS
• Version	ITK 5.2.0
• Function blocks	2 Analog Input (AI)
Performance (according to reference conditions IEC60770-1)	
Maximum measured error	• > 500 mm from sensor reference point: 3 mm (0.118 inch) • < 500 mm from sensor reference point: 25 mm (1 inch)
Influence of ambient temperature	< 0.003 %/K
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ε_r	≥ 1.6 (antenna dependent)
Process temperature	-40 ... +170 °C (-40 ... +338 °F) at process connection
Process pressure	See Pressure/Temperature curves for more information
Design	
Enclosure	
• Material	Aluminum, polyester powder coated
• Cable inlet	2 x M20x1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP67, IP68
Weight (dependent on process connection)	• Approx. 4.7 kg (10.4 lb) for 2" ISO 2852 (smallest size) • Approx. 7.9 kg (17.4 lb) for DN 100 DIN 11864-2 (largest size)
Display (local)	Graphic local user interface including quick start wizard and echo profile display
Antenna	
• Material	Stainless steel 316L (1.4435 or 1.4404) and TFM 1600 PTFE Lens (lens is the only wetted part)
• Lens surface finish (R_a)	0.8 µm

Process connections	
Hygienic/Sanitary connections	• 2", 3" & 4" Sanitary Clamp according to ISO 2852 • DN 50, DN 80 & DN 100 Aseptic/ Hygienic threaded to DIN 11864-1 [Form A] • DN 50, DN 80 & DN 100 Aseptic/ Hygienic flanged to DIN 11864-2 [Form A] • DN 50, DN 80 & DN 100 Aseptic/ Hygienic Clamp according to DIN 11864-3 [Form A] • DN 50, DN 80 & DN 100 Hygienic Union according to DIN 11851 • Type F (50 mm) & Type N (68 mm) Tuchenhagen Varivent
Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA	• 15 mA • Per IEC 61158-2
FOUNDATION Fieldbus	• 20.0 mA • Per IEC 61158-2
Certificates and approvals	
General	$CSA_{US/C}$, CE, FM, NE 21, RCM
Radio	FCC, Industry Canada and Europe ETSI EN 302-372, RCM
Hazardous	
• Explosion Proof (Brazil)	INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Increased Safety (Brazil)	INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (Brazil)	INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da
• Explosion Proof (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Intrinsically Safe (Canada/USA)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4
• Non-incendive (Canada/USA)	CSA/FM Class I, Div. 2, Groups A, B, C, D T5
• Flame Proof/Increased Safety (China)	NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C
• Intrinsically Safe (China)	NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 T_A90 °C
• Non-sparking (China)	NEPSI Ex nA IIC T4 Gc
• Intrinsically Safe (Europe)	ATEX II 1G Ex ia IIC T4 Ga ATEX II 1D Ex ia ta IIIC T100 °C Da
• Non-sparking (Europe)	ATEX II 3G Ex nA IIC T4 Gc
• Flame Proof (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIC T100 °C Da
• Increased Safety (International/Europe)	IECEx/ATEX II 1/2 GD, 1D, 2D, Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da
• Intrinsically Safe (International)	IECEx/ATEX II 1 G Ex ia IIC T4 Ga, IECEX/ATEX II 1D Ex ia ta IIIC T100 °C Da
• Explosion Proof (Russia)	GOST-R Ex d
• Increased Safety (Russia)	GOST-R Ex e
• Intrinsically Safe (Russia)	GOST-R Ex ia
Hygienic/Sanitary	EHEDG EL Class I EHEDG EL Aseptic Class I

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Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1 GD Ex ia IIC T4 Ga Ex ia D 20 T135 °C Ta = -20 ... +50 °C CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, T6 T_a = 50 °C IECEx SIR 09.0073
Handheld communicator	HART communicator 375/475
PC	• SIMATIC PDM • Emerson AMS • SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

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SITRANS LR250 Hygienic Encapsulated Antenna

Selection and Ordering data	Article No.
SITRANS LR250 hygienic encapsulated antenna ↗	**7ML5433-**
2-wire, 25 Ghz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, up to a range of 20 m (66 ft) (Antenna dependant). Ideal for Hygienic applications including small vessels and low dielectric media.	0 - A
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Hygienic/Sanitary Approvals	
EHEDG EL Class I[1]	1
EHEDG EL Aseptic Class I[1]	2
3-A (Tuchenhagen connections only - FC ... FF) [2][3]	3
EHEDG EL Class I & 3-A (excludes Tuchenhagen connections)[2][4]	4
Process Connection Types (all types have TFM1600 PTFE lens)	
316L st/st [1.4435 or 1.4404]	
2" Sanitary Clamp according to ISO 2852[5]	A A
3" Sanitary Clamp according to ISO 2852	A B
4" Sanitary Clamp according to ISO 2852	A C
316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301)	
DN 50 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A][5]	B A
DN 80 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A]	B B
DN 100 Aseptic/Hygienic nozzle/ slotted nut (instrument side) to DIN 11864-1 [Form A]	B C
316L st/st [1.4435 or 1.4404]	
DN 50 Aseptic/Hygienic flanged to DIN 11864-2 [Form A][5]	C A
DN 80 Aseptic/Hygienic flanged to DIN 11864-2 [Form A]	C B
DN 100 Aseptic/Hygienic flanged to DIN 11864-2 [Form A]	C C
316L st/st [1.4435 or 1.4404]	
DN 50 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A][5]	D A
DN 80 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A]	D B
DN 100 Aseptic/Hygienic Clamp according to DIN 11864-3 [Form A]	D C
316L st/st (1.4435 or 1.4404) & 304L st/st (1.4301)	
DN 50 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851[5]	E A
DN 80 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851	E B
DN 100 Hygienic nozzle/ slotted nut (instrument side) to DIN 11851	E C
316L st/st [1.4435 or 1.4404]	
Type F (50 mm) Tuchenhagen Varivent (EHEDG only)[5]	F A
Type N (68 mm) Tuchenhagen Varivent (EHEDG only)[5]	F B
Type F (50 mm) Tuchenhagen Varivent [3-A only & EPDM process seal -40 ... 120 °C (-40 ... 248 °F)][5]	F C
Type N (68 mm) Tuchenhagen Varivent [3-A only & EPDM process seal -40 ... 120 °C (-40 ... 248 °F)][5]	F D
Type F (50 mm) Tuchenhagen Varivent [3-A only & FKM process seal -20 ... 170 °C (-4 ... 338 °F)][5]	F E
Type N (68 mm) Tuchenhagen Varivent [3-A only & FKM process seal -20 ... 170 °C (-4 ... 338 °F)][5]	F F
EXCLUDE Process Connection - Electronics Head assembly spare only (select all other options as normal)	Y Y

Selection and Ordering data	Article No.
SITRANS LR250 hygienic encapsulated antenna	**7ML5433-**
2-wire, 25 Ghz pulse radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and pressure, up to a range of 20 m (66 ft) (Antenna dependant). Ideal for Hygienic applications including small vessels and low dielectric media.	0 - A
Communication	
PROFIBUS PA	1
4 ... 20 mA HART, start-up at < 3.6 mA	2
FOUNDATION Fieldbus	3
Enclosure (with Cable Inlets)	
Aluminum, Epoxy paint, 2 X ½" NPT	0
Aluminum, Epoxy paint, 2 X M20 x 1.5	1
Approvals	
General Purpose, CE, CSA, FM, FCC, R&TTE, RCM	A
Intrinsically Safe: CSA/FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G, Class III T4 FCC, Industry Canada	B
Intrinsically Safe: IECEx/ATEX II 1 GD Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, INMETRO Ex ia IIC T4 Ga, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM	C
Non-incendive: CSA/FM Class I, Div. 2, Groups A, B, C, D T5, FCC, Industry Canada	D
Non Sparking: ATEX II 3G Ex nA IIC T4 Gc, CE, R&TTE, RCM	E
Increased Safety: IECEx/ATEX II 1/2 GD, 1D, 2D Ex e mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex e ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM[6]	F
Flameproof: IECEx/ATEX II 1/2 GD 1D, 2D Ex d mb ia IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, INMETRO Ex d ia mb IIC T4 Ga/Gb, Ex ia ta IIIC T100 °C Da, CE, R&TTE, RCM[6]	G
Explosion proof: CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G, FCC, Industry Canada[6]	H
Non Sparking: NEPSI Ex nA IIC T4 Gc	K
Intrinsically Safe: NEPSI Ex ia IIC T4 Ga, Ex iaD 20 T90 IP67 DIP A20 TA 90 °C	L
Flameproof: NEPSI Ex d ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 TA 90 °C[6]	M
Increased Safety: NEPSI Ex e ia mb IIC T4 Ga/Gb, Ex iaD 20 T90 IP67 DIP A20 TA 90 °C[6]	N
Pressure Rating	
Rating per pressure/temperature curves in instruction manual	0

We can offer shorter delivery times for configurations designated with the Quick Ship Symbol . For details see page 9/5 in the appendix.

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Selection and Ordering data		Order code
Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Electrical Connection cable entry:		
Plug M12 (IP 67 rating) with mating connector[2)7)8)]	⬟	**A50**
Plug 7/8" (IP 67 rating) with mating Connector[2)8)9)]	⬟	**A55**
Test Certificates		
Manufacturer's Test Certificate M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Inspection Certificate 3.1 of EN 10204	⬟	**C12**
Functional Safety		
Functional Safety (SIL 2). Device suitable for use in accordance with IEC 61508 and IEC 61511[6)10)]	⬟	**C20**
Namur		
Namur NE43 compliant, device preset to failsafe < 3.6 mA[6)]	⬟	**N07**
Tagging		
Stainless steel tag [69 mm x 50 mm (2.71 x 1.97 inch)]		
Measuring-point number / identification (max. 27 characters) specify in plain text	⬟	**Y15**
Operating Instructions for HART/mA device		Article No.
English		**A5E32220602**
German		**A5E32376088**
French		**A5E35108592**
Note: The Operating Instructions should be ordered as a separate line item on the order.		
Compact Operating Instructions for HART/mA device		
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish		**A5E33469191**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian		**A5E33469171**
English, Portuguese (Brazil), Chinese		**A5E34046583**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		
Operating Instructions for PROFIBUS PA device		
English		**A5E32221386**
German		**A5E32376094**
French		**A5E35108597**
Note: The Operating Instructions should be ordered as a separate line item on the order.		
Compact Operating Instructions for PROFIBUS PA device		
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish		**A5E33469239**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian		**A5E33472685**
English, Portuguese (Brazil), Chinese		**A5E34046624**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.		

Selection and Ordering data	Article No.
Operating Instructions for FOUNDATION Fieldbus device	
English	**A5E32221411**
German	**A5E32376112**
French	**A5E35108601**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Compact Operating Instructions for FOUNDATION Fieldbus device	
English, French, German, Spanish, Italian, Dutch, Danish, Finnish, Greek, Portuguese (Portugal), Swedish	**A5E33472700**
English, Bulgarian, Czech, Estonian, Hungarian, Latvian, Lithuanian, Polish, Romanian, Slovakian, Slovenian	**A5E33472738**
English, Portuguese (Brazil), Chinese	**A5E34046626**
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Compact Operating Instructions and Operating Instructions library.	
Accessories	
Handheld programmer, Intrinsically safe, EEx ia (LUI enabled)	**7ML1930-1BK**
HART modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART (two are required)[6)]	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA and FOUNDATION Fieldbus (two are required)[8)]	**7ML1930-1AQ**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) Available with process connection options AA ... FB & YY only
2) Available with Approval options A, B, C, L only
3) Available with Process connection FC ... FF only
4) Available with process connection options AA ... EC & YY only
5) Max. range 10 m (32.8 ft), dk > 3 [20 m (66 ft) and dk > 1.6 if installed in a stillpipe]
6) Applicable with Communication option 2 only
7) Available with Enclosure option 1 only
8) Available with Communication options 1 and 3 only.
9) Available with Enclosure option 0 only
10) Available with Approval options A, B, C, D, E, K, L only

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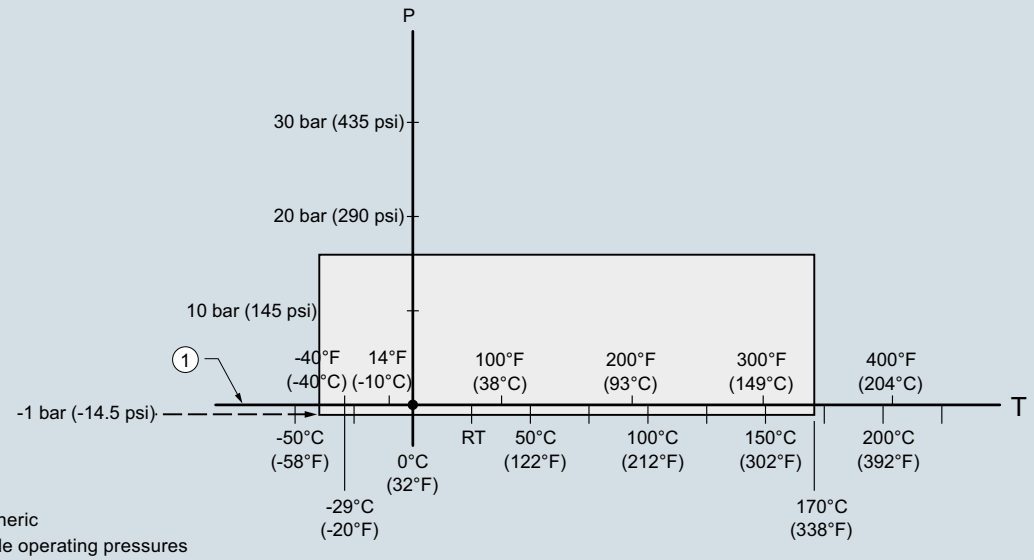
SITRANS LR250 Hygienic Encapsulated Antenna

Characteristic curves

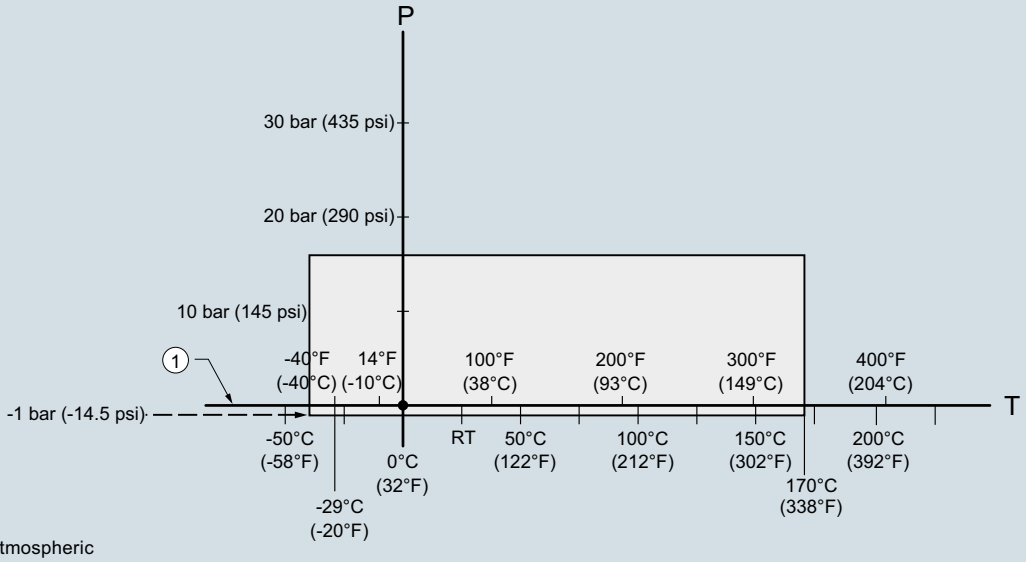
DIN 11851 Sanitary/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100
DIN 11864-1 Aseptic/Hygienic nozzle/slotted nut: DN 50, DN 80, and DN 100



1 Atmospheric
P Allowable operating pressures
T Allowable operating temperatures

SITRANS LR250 Hygienic Encapsulated Antenna, pressure/temperature curves

DIN 11864-2 Aseptic/Hygienic flanged: DN 50, DN 80, and DN 100



1 Atmospheric
P Allowable operating pressures
T Allowable operating temperatures

Note: For pressure applications, all attachment hardware must be suitably rated.

SITRANS LR250, Hygienic Encapsulated Antenna, pressure/temperature curves

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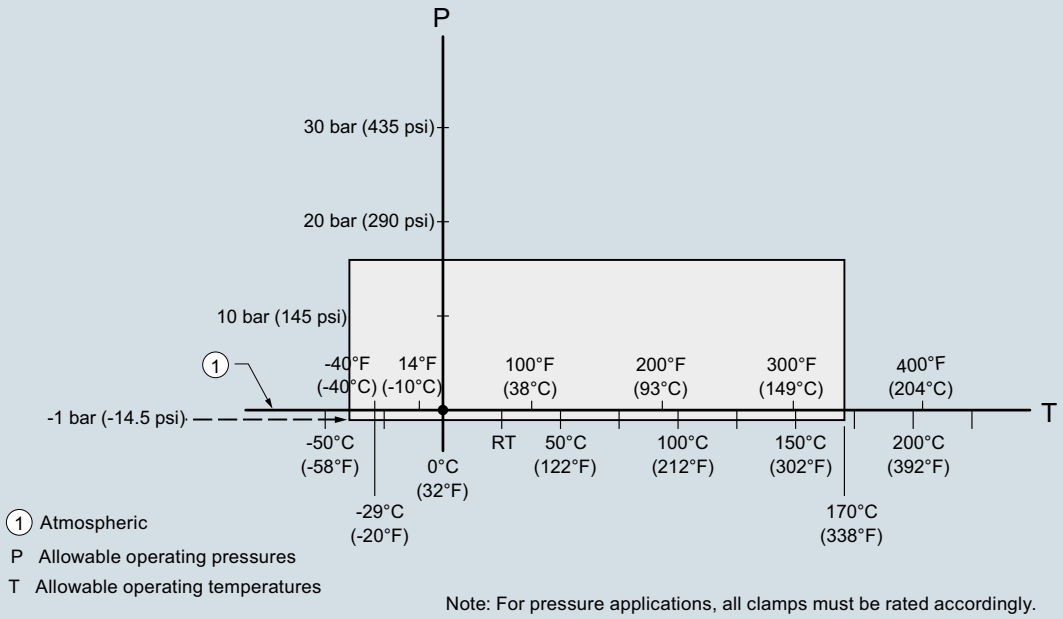
DIN 11864-3 Aseptic/Hygienic clamp: DN 50, DN 80, and DN 100
IS0 2852 Sanitary/Hygienic clamp: 2", 3", and 4"
Tuchenhagen Varivent face seal clamp: Type N (68 mm) and Type F (50 mm)



Note: For pressure applications, all clamps must be rated accordingly.

SITRANS LR250 Hygienic Encapsulated Antenna, pressure/temperature curves

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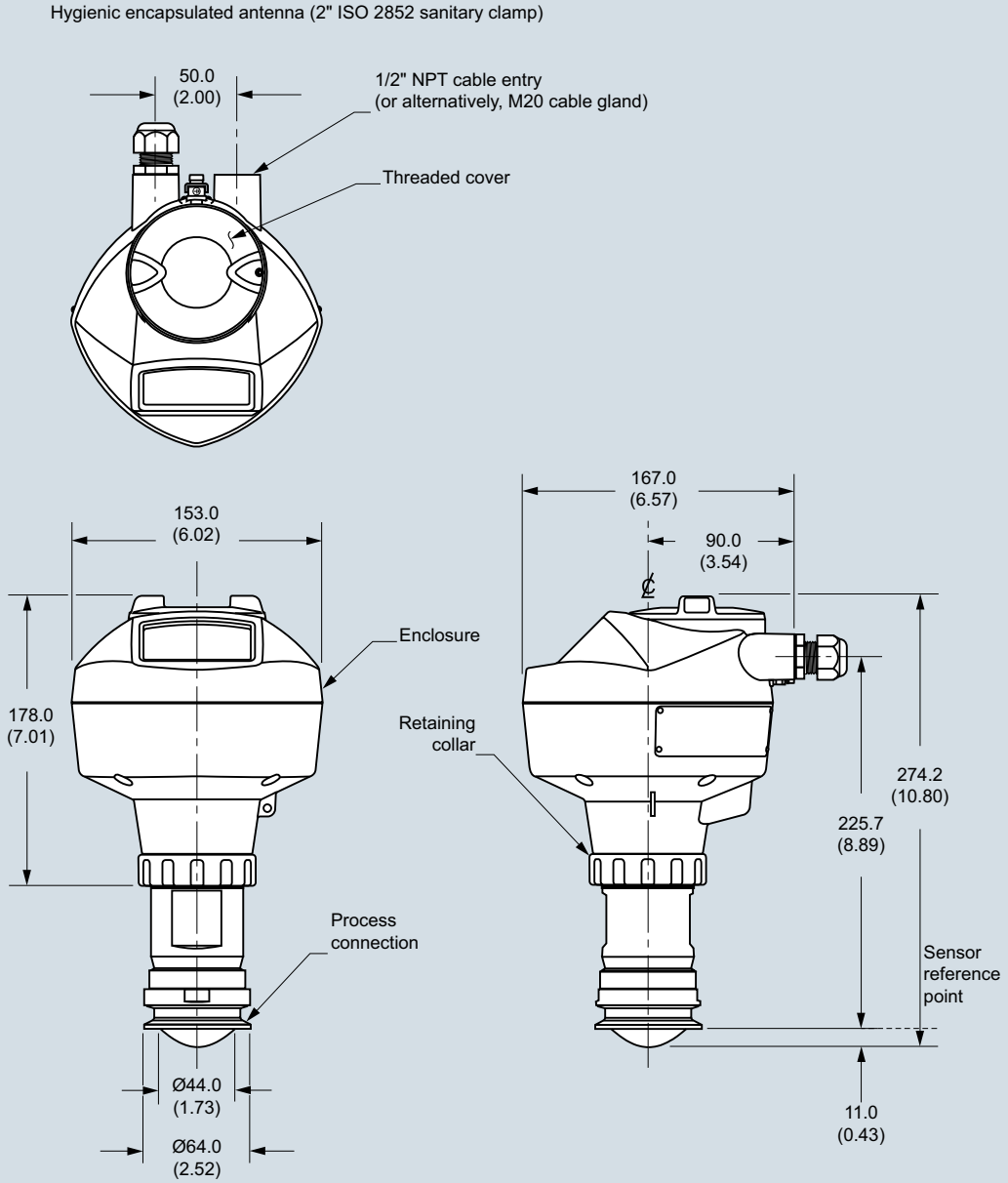
4

Dimensional drawings



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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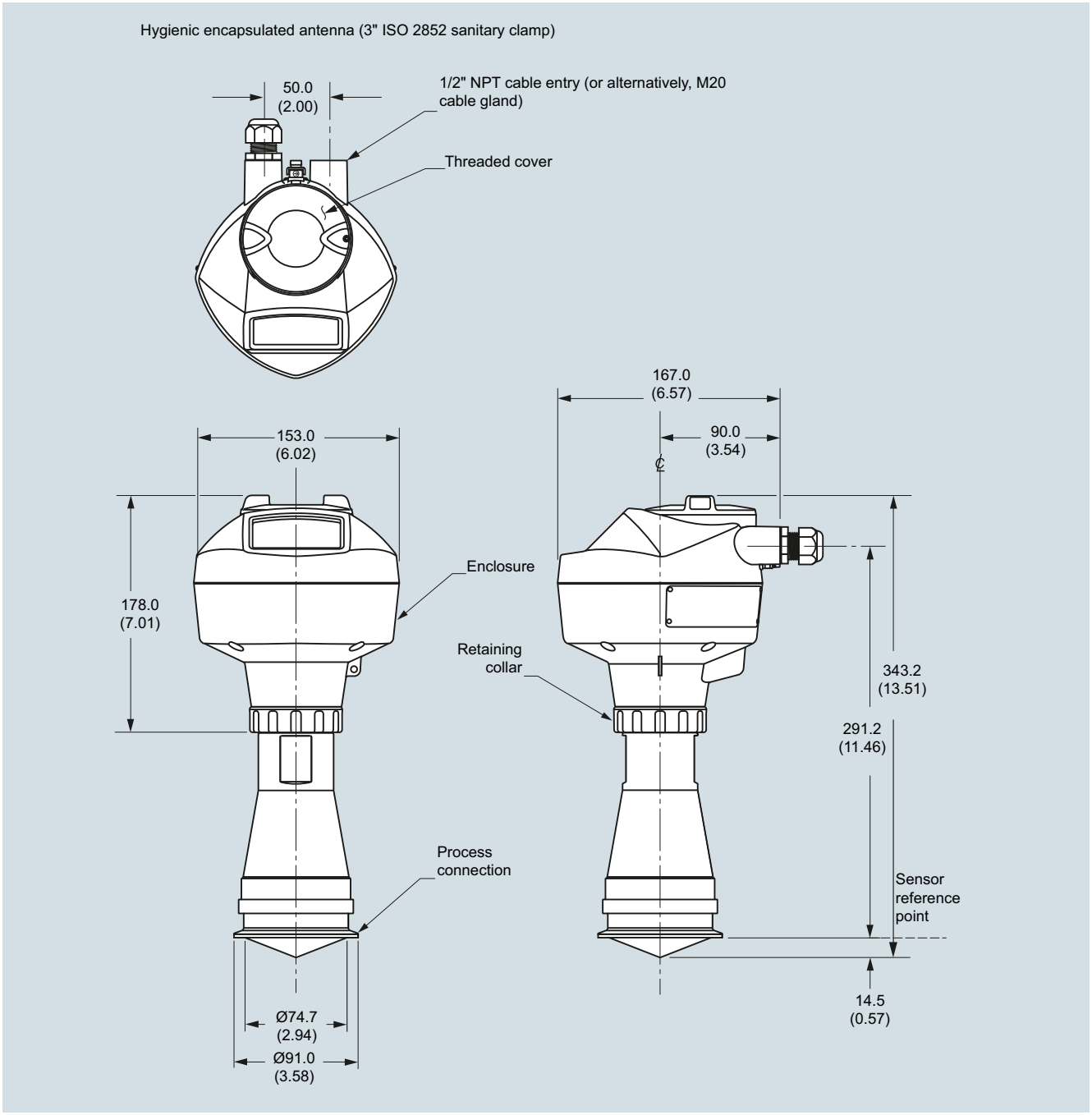

SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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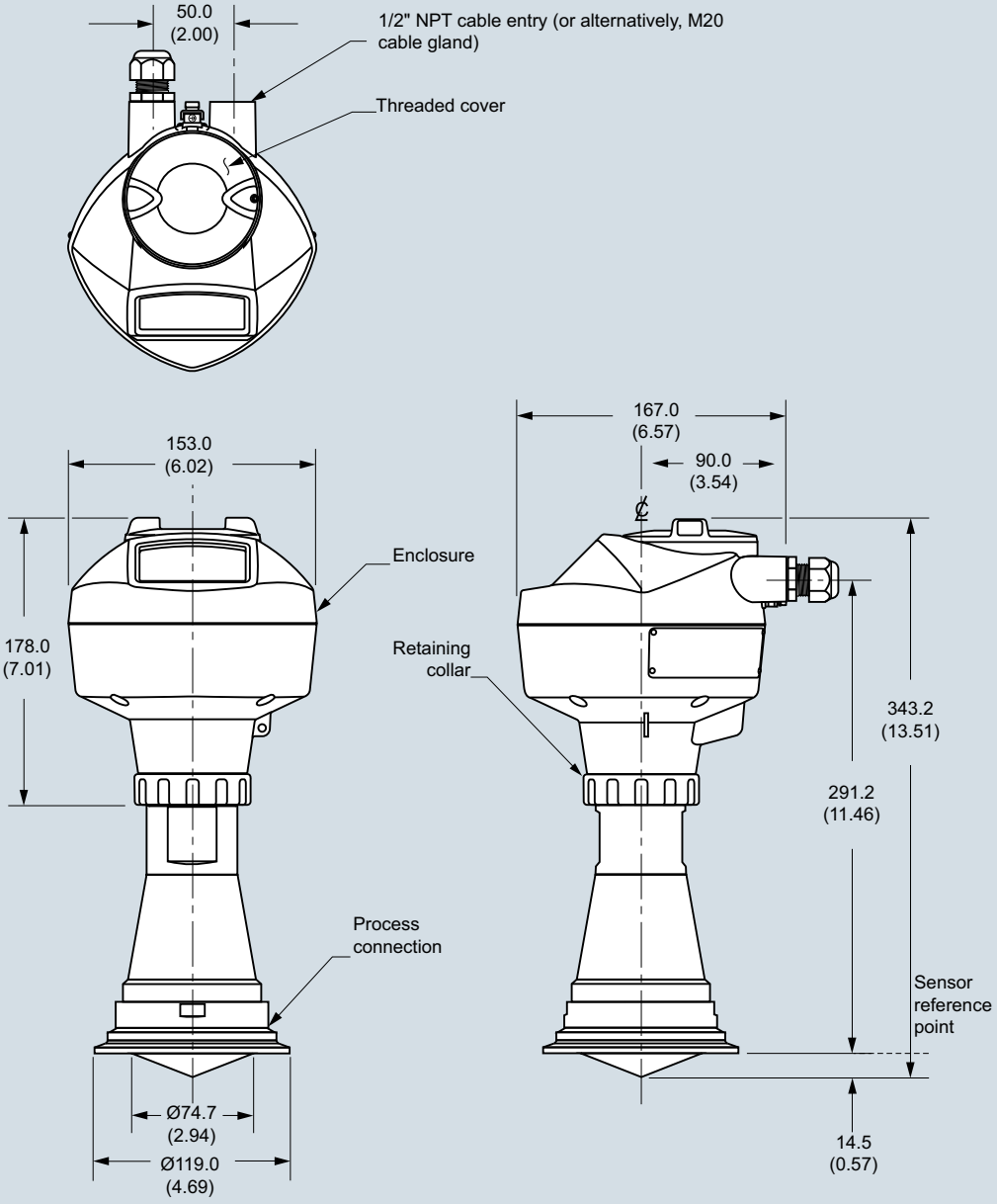
SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (4" ISO 2852 sanitary clamp)



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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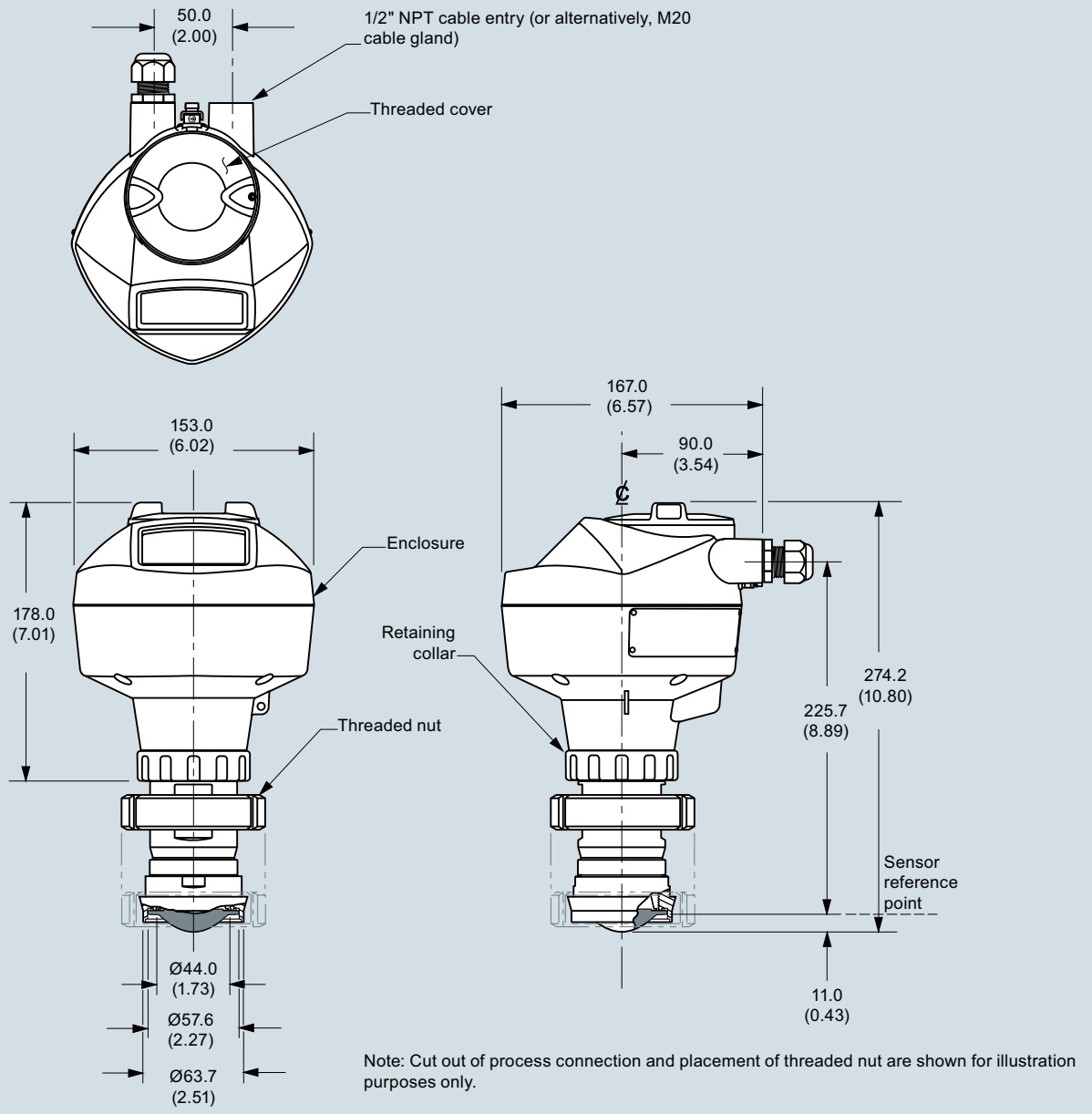
Hygienic encapsulated antenna (DN 50 nozzle/slotted nut to DIN 11851)



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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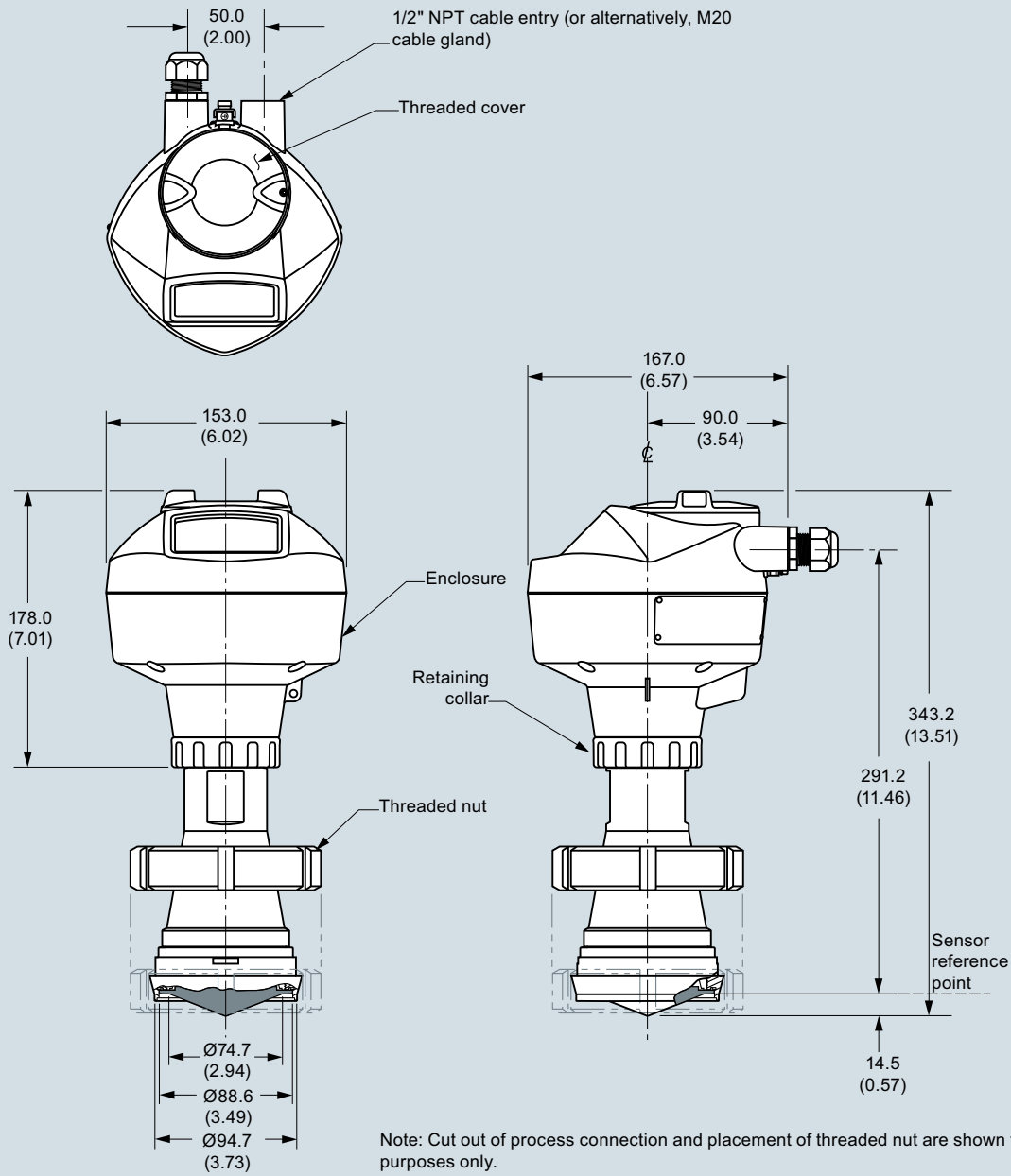
SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 80 nozzle/slotted nut to DIN 11851)



Note: Cut out of process connection and placement of threaded nut are shown for illustration purposes only.

SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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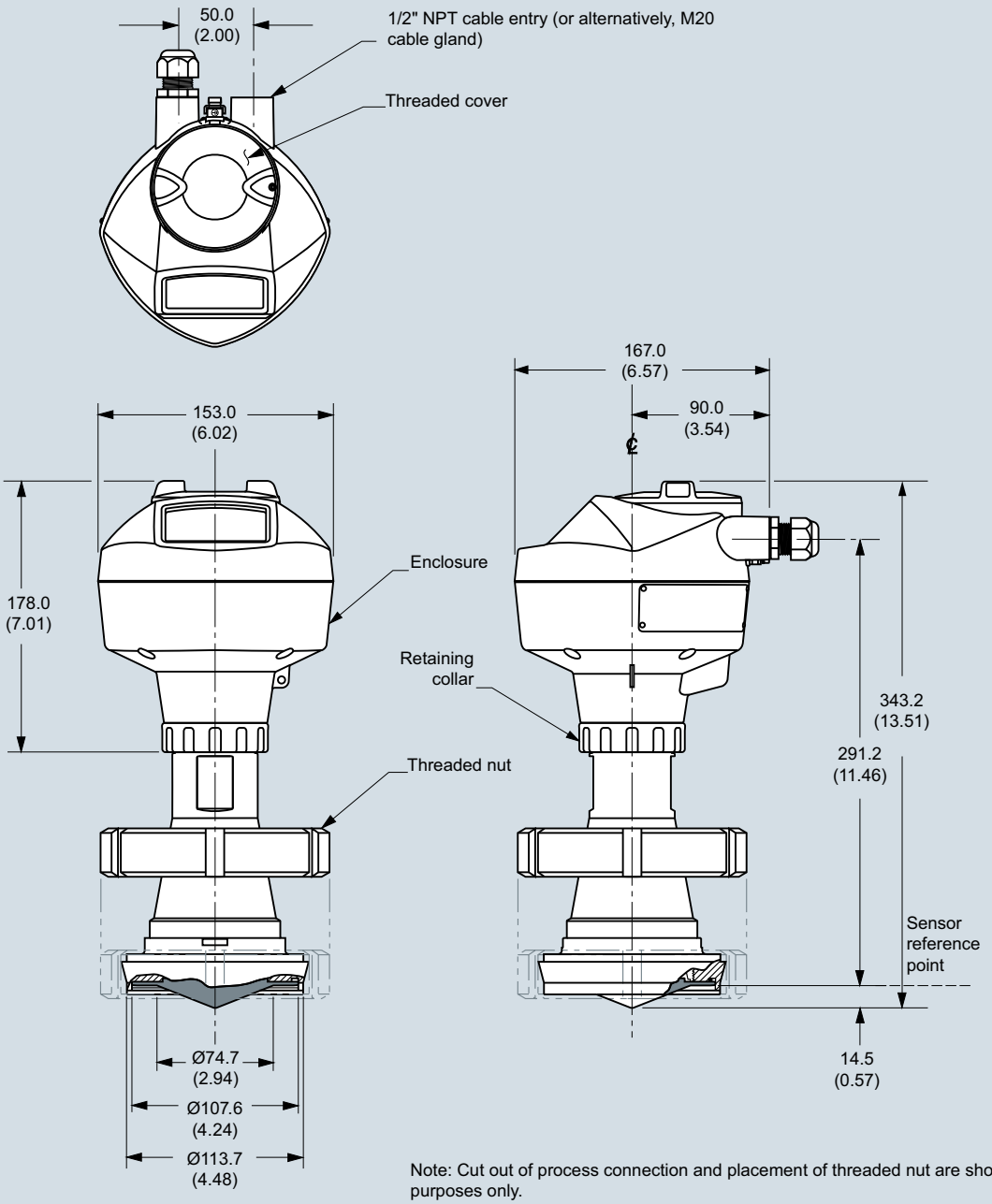
Hygienic encapsulated antenna (DN 100 nozzle/slotted nut to DIN 11851)



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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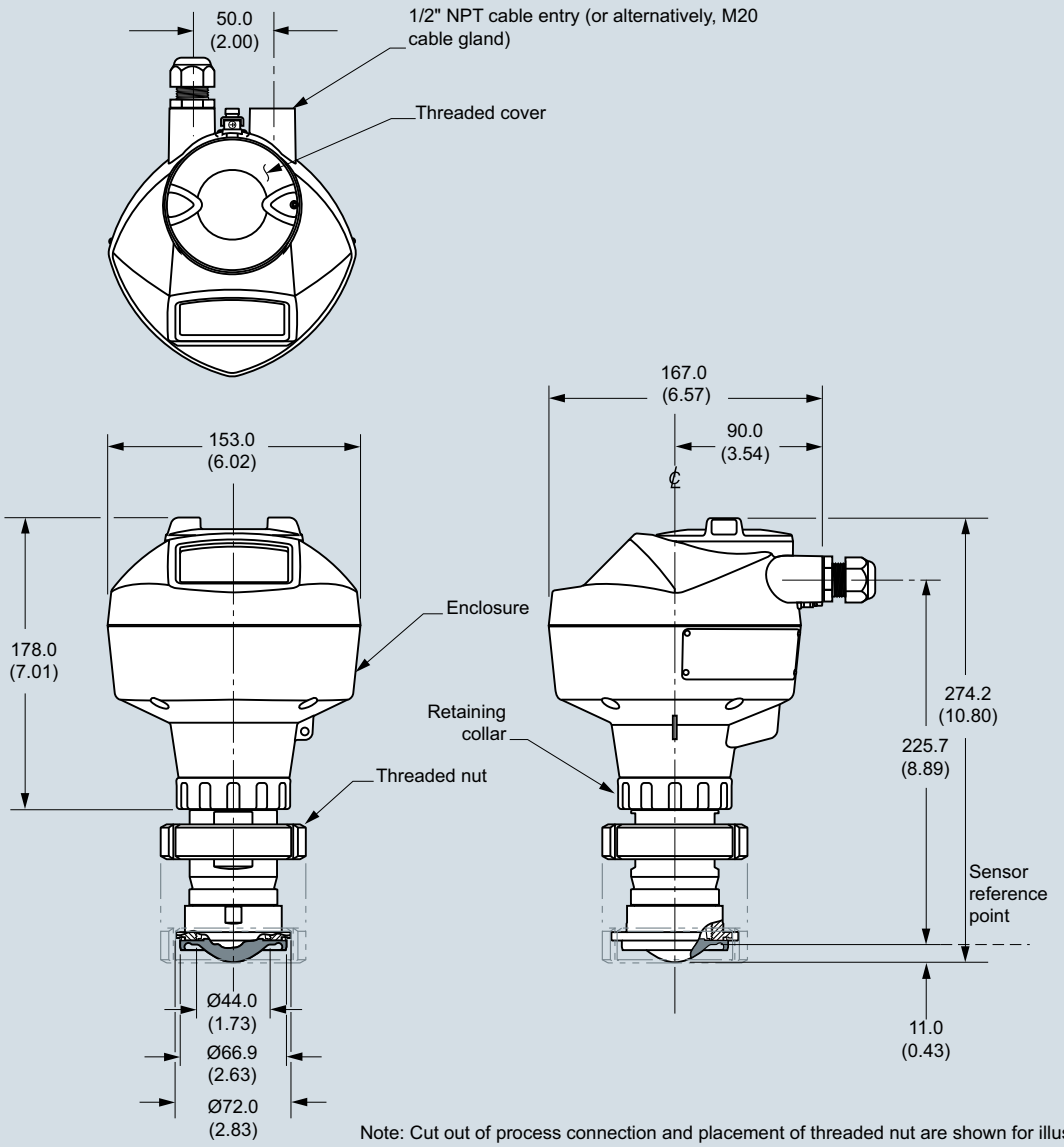
SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 50 aseptic clamp to DIN 11864-1)



Note: Cut out of process connection and placement of threaded nut are shown for illustration purposes only.

SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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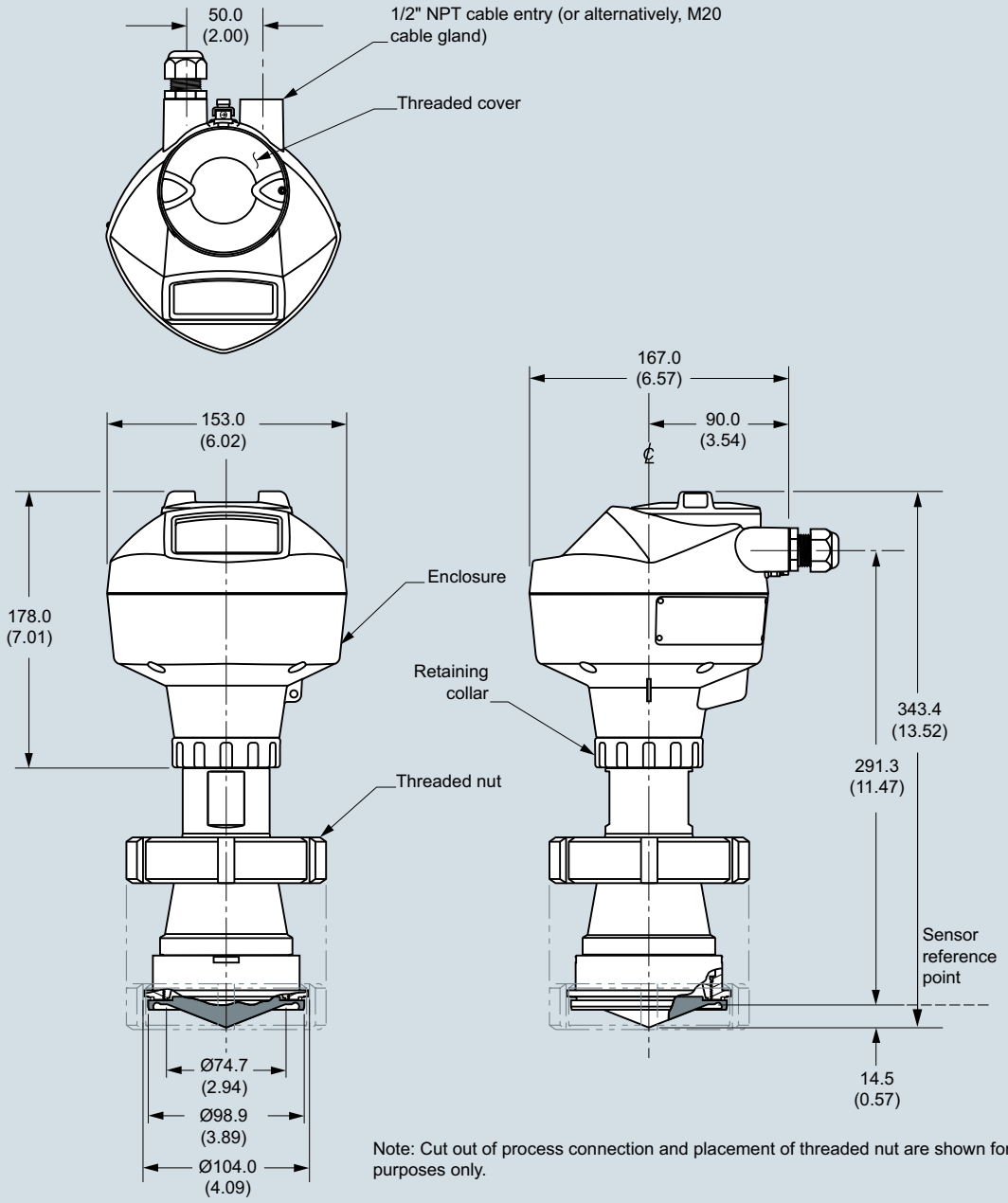
Hygienic encapsulated antenna (DN 80 aseptic clamp to DIN 11864-1)



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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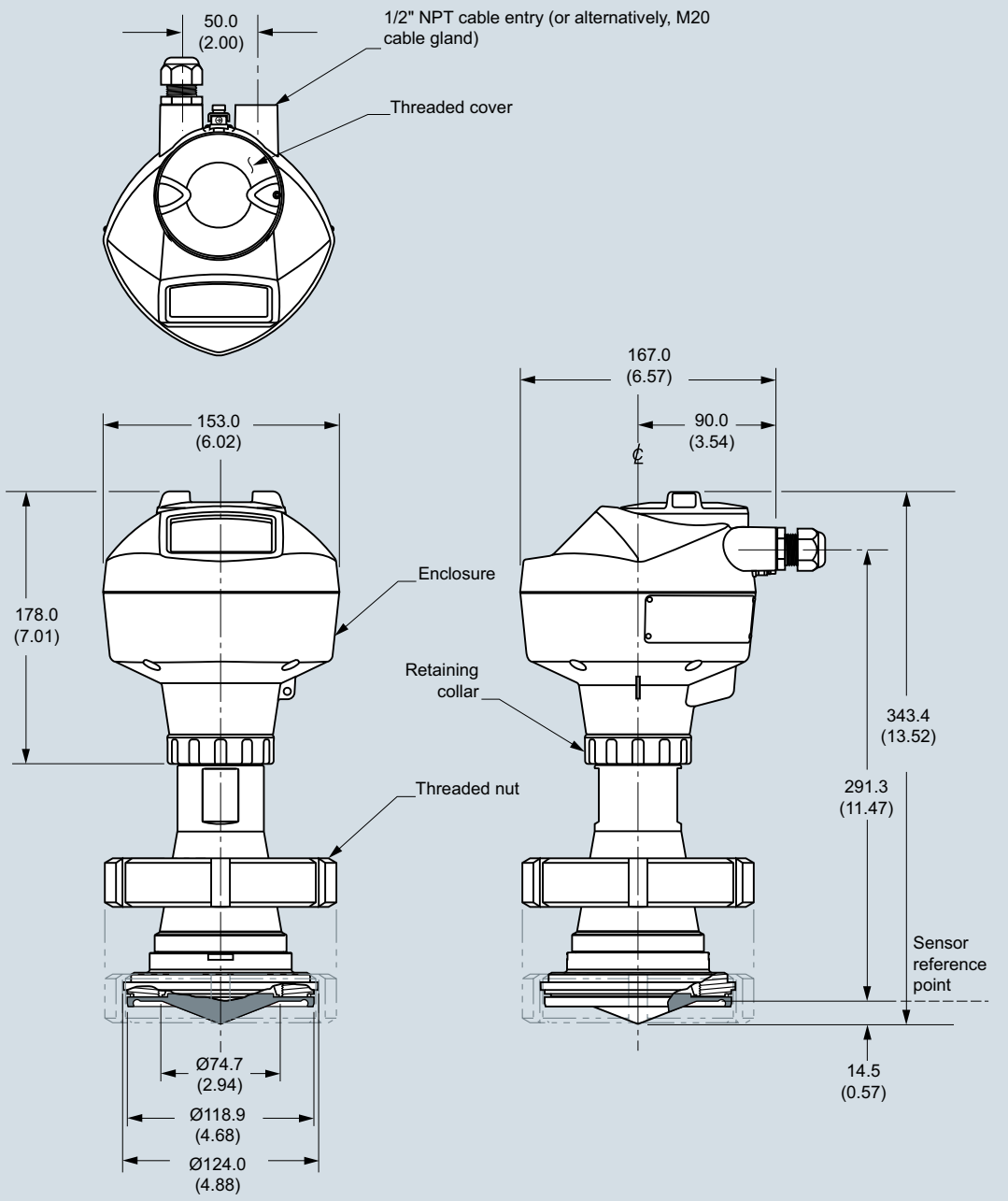
SITRANS LR250 Hygienic Encapsulated Antenna

Hygienic encapsulated antenna (DN 100 aseptic clamp to DIN 11864-1)



Note: Cut out of process connection and placement of threaded nut are shown for illustration purposes only.

SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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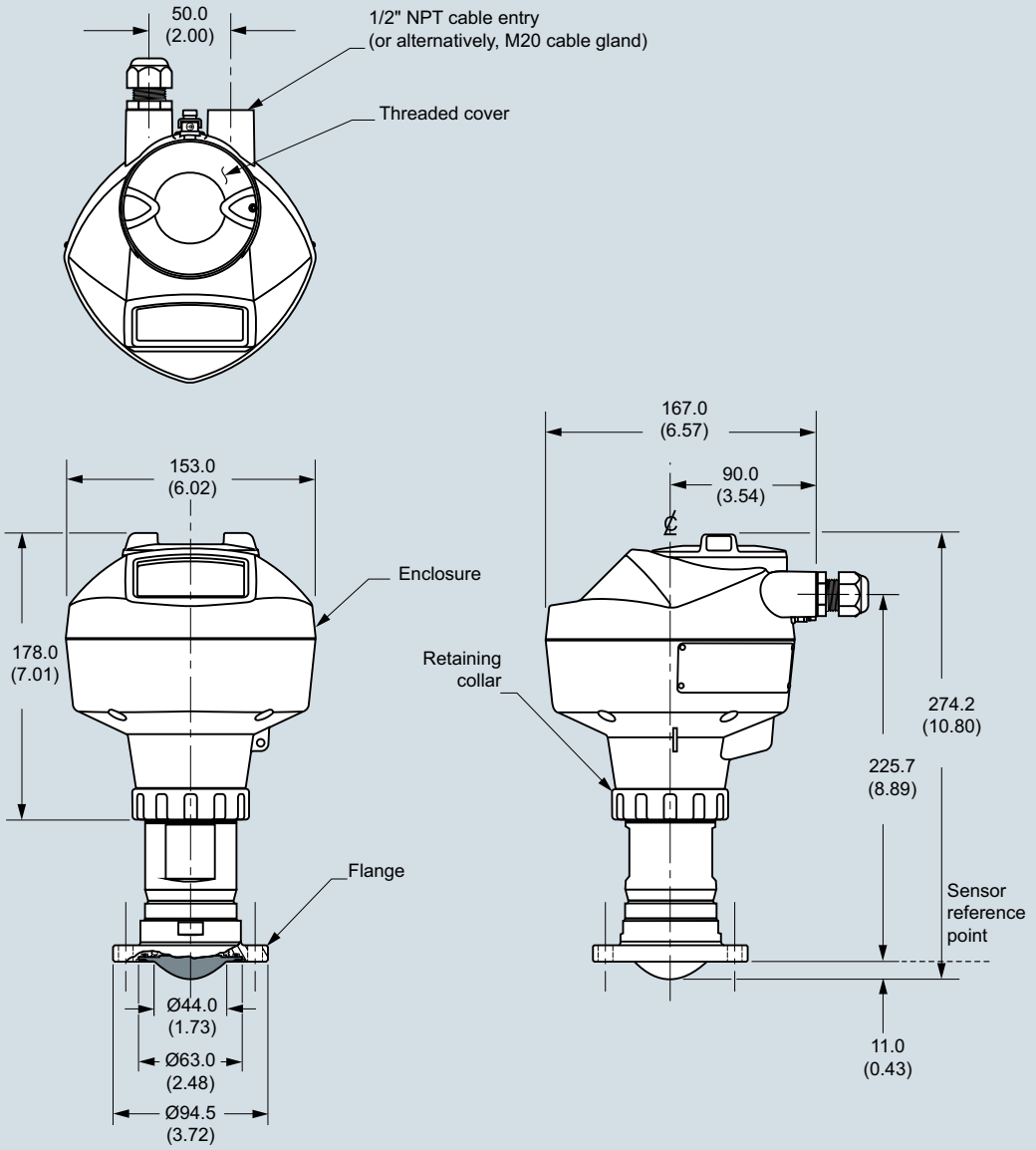
Hygienic encapsulated antenna (DN 50 aseptic flange to DIN 11864-2)



Note: Cut out of process connection and flange are shown for illustration purposes only.

SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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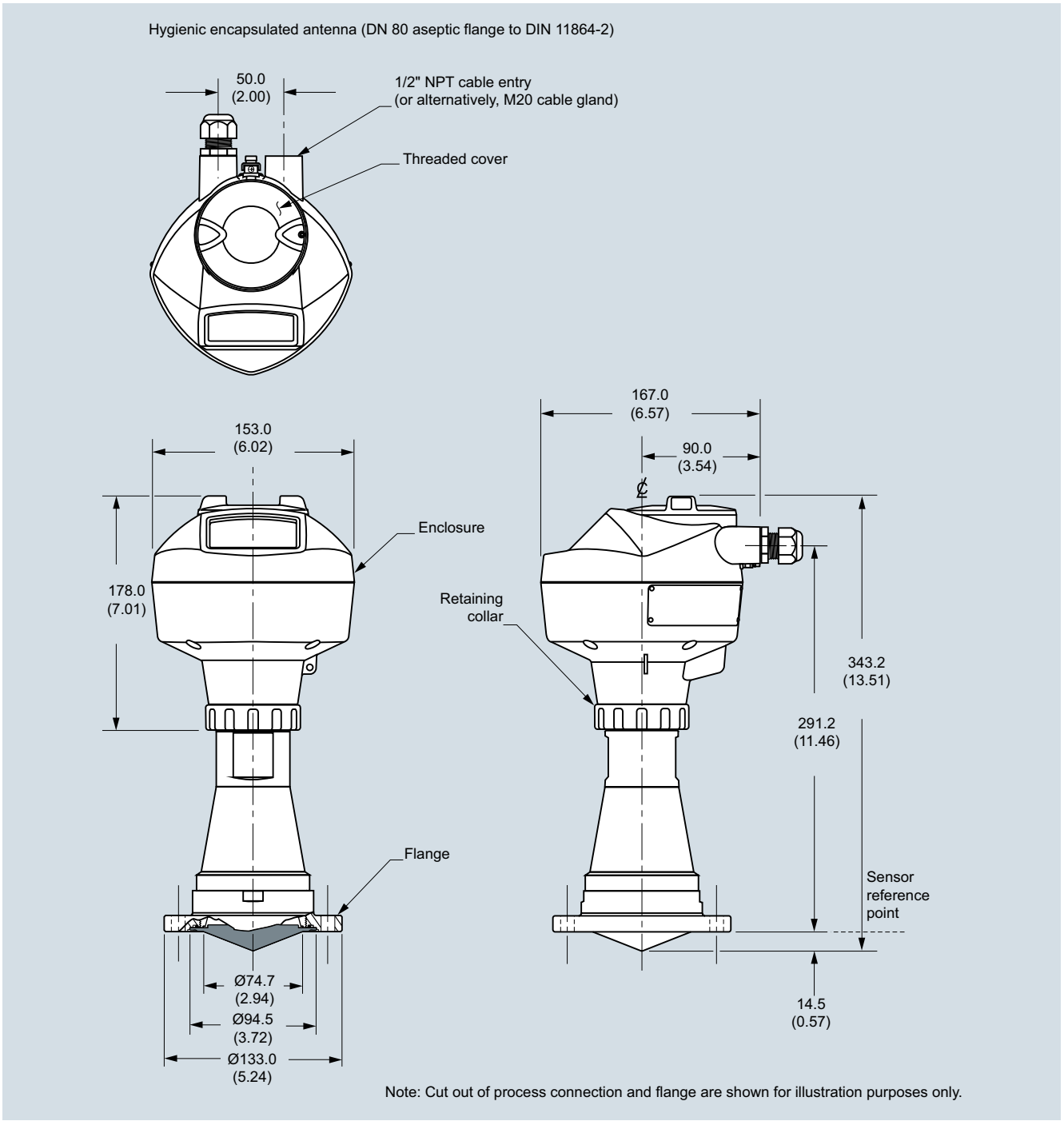
SITRANS LR250 Hygienic Encapsulated Antenna



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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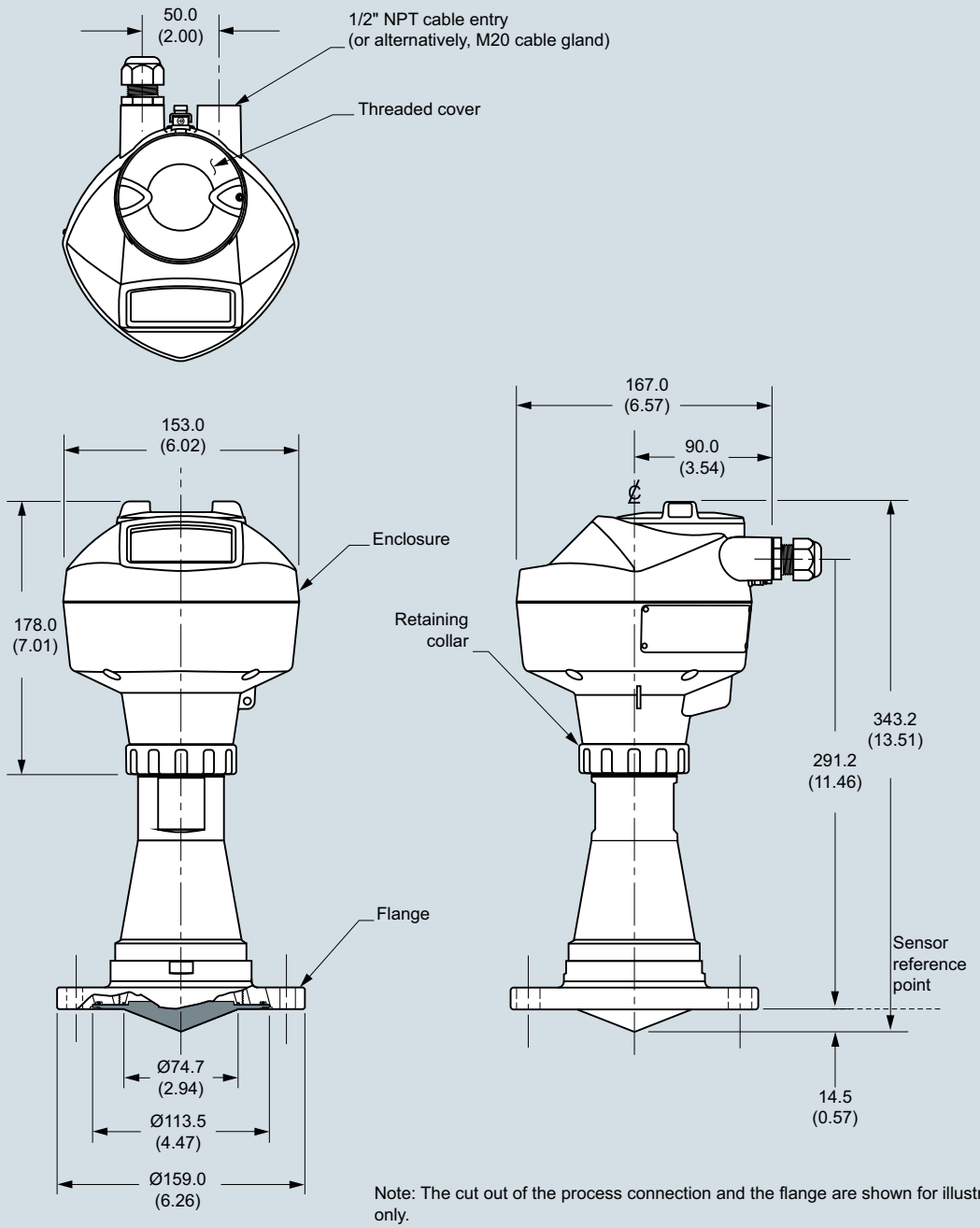
Hygienic encapsulated antenna (DN 100 aseptic flange to DIN 11864-2)



Note: The cut out of the process connection and the flange are shown for illustration purposes only.

SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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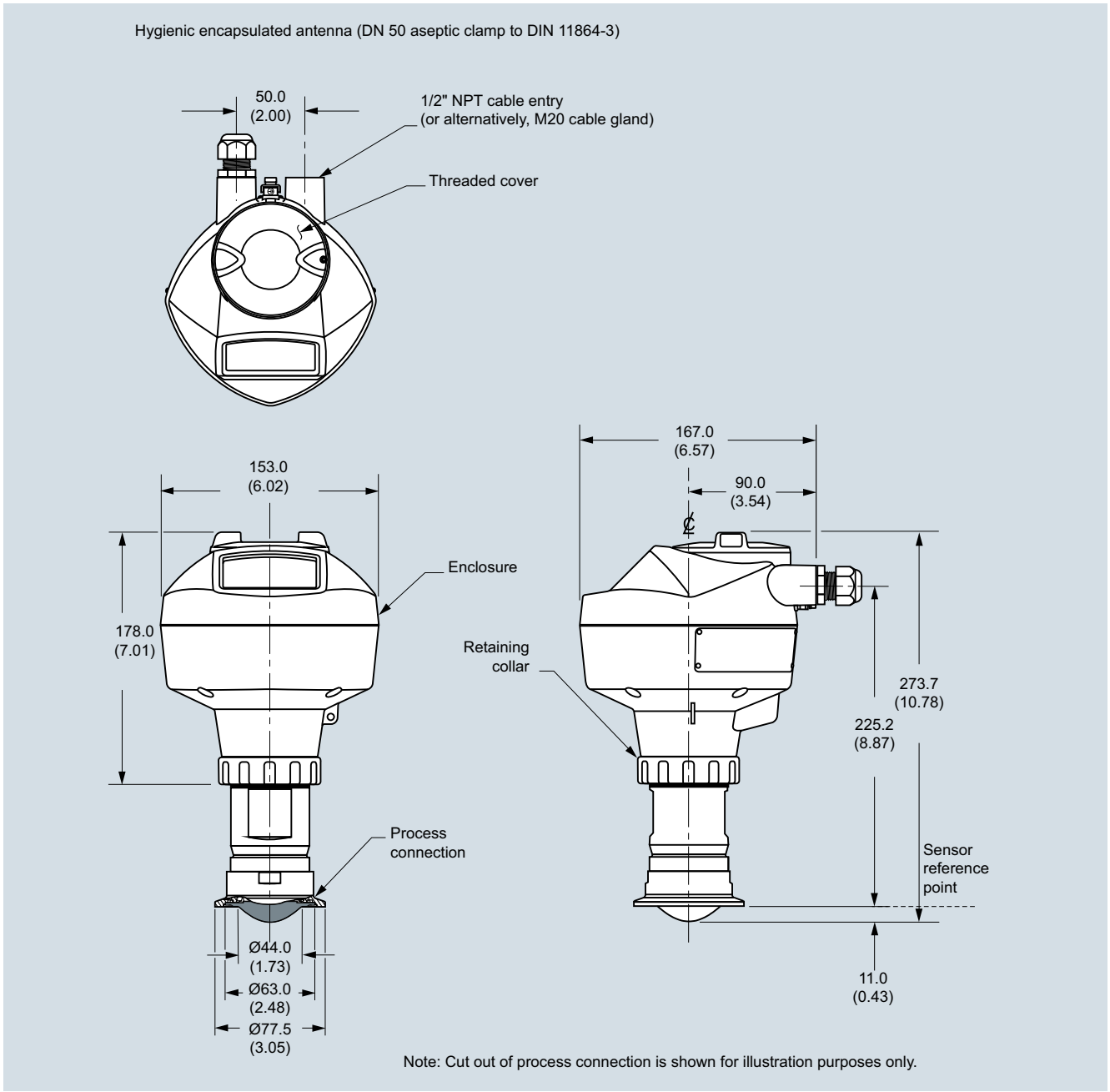
SITRANS LR250 Hygienic Encapsulated Antenna



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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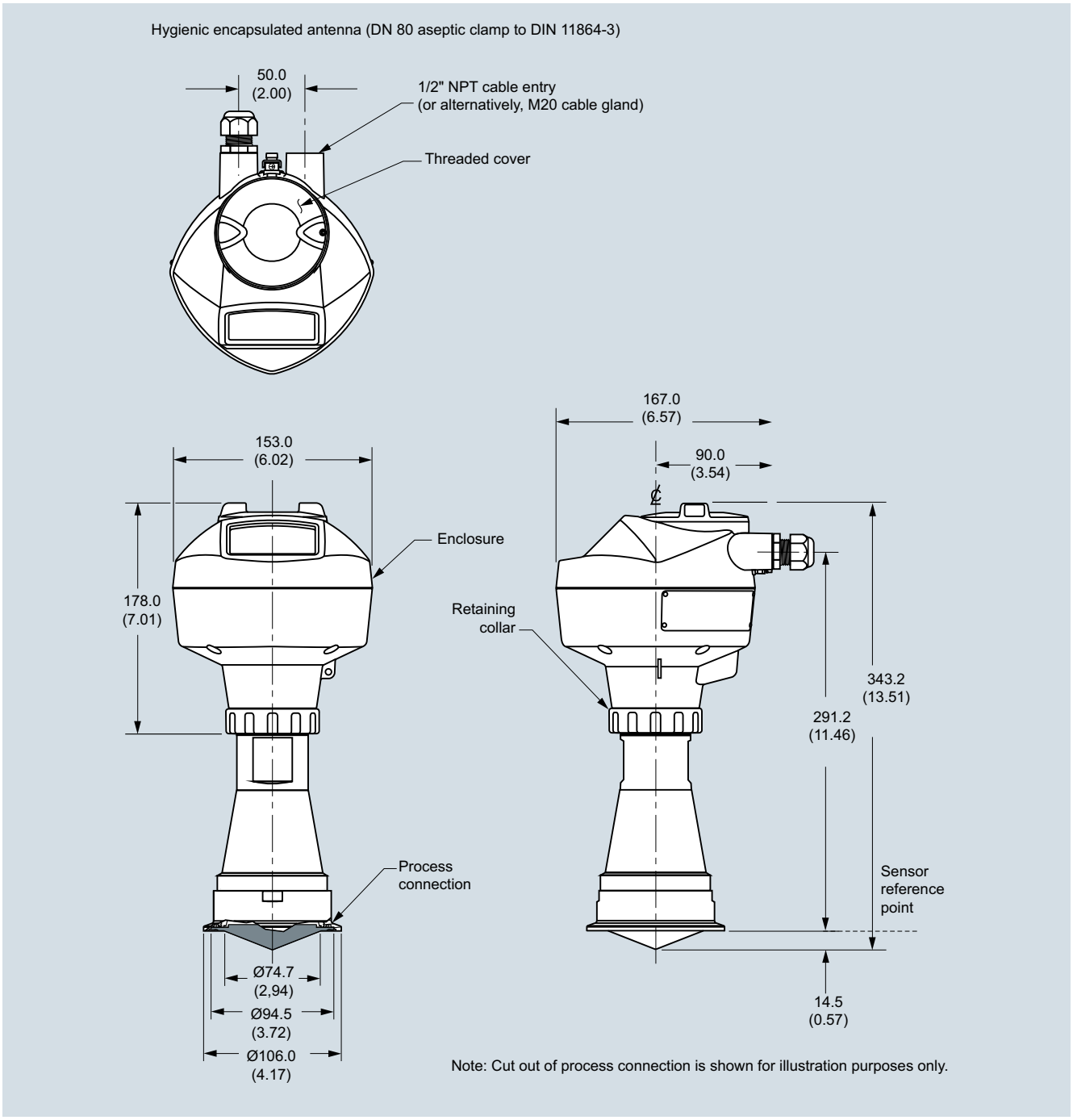

SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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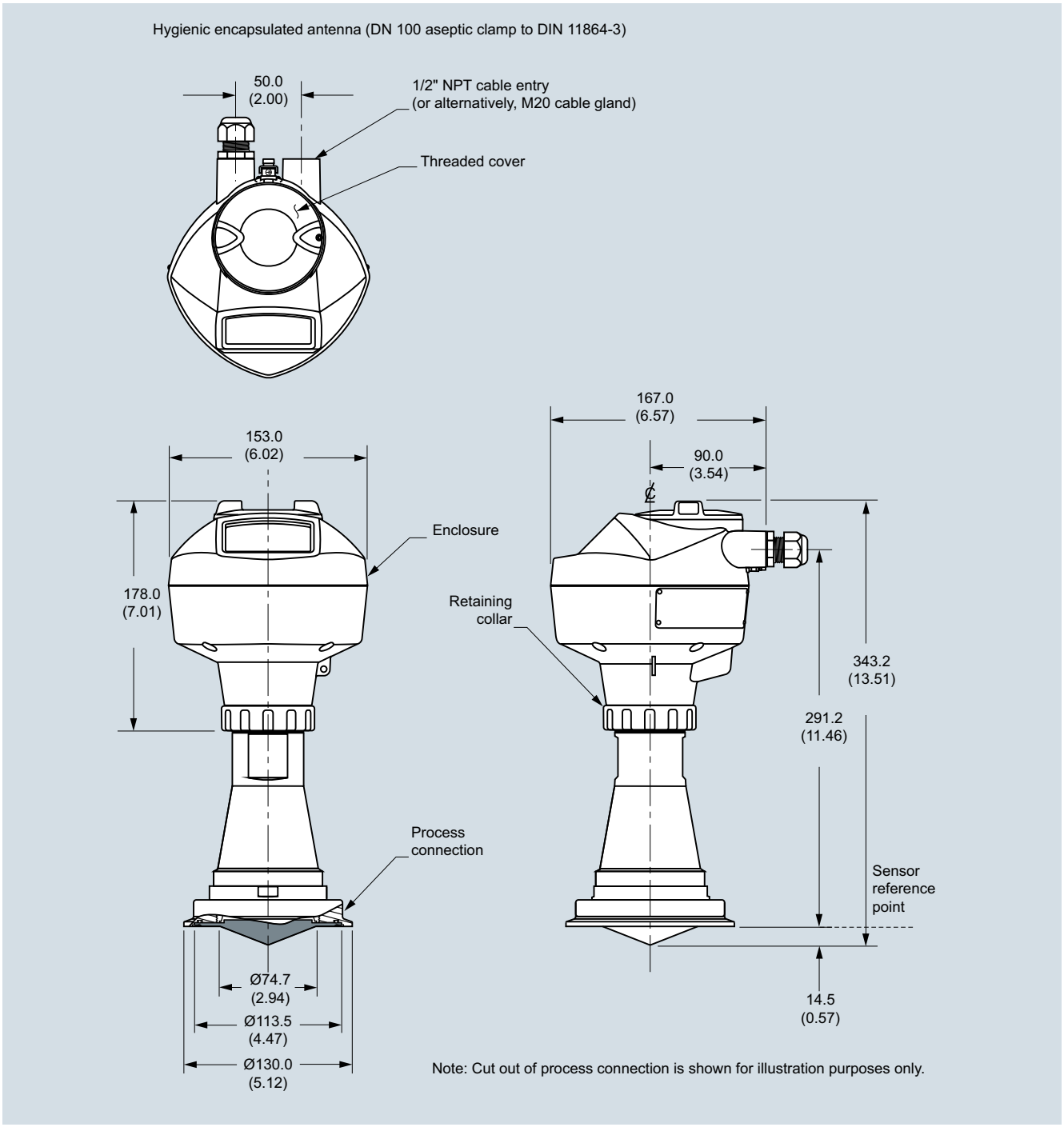
SITRANS LR250 Hygienic Encapsulated Antenna



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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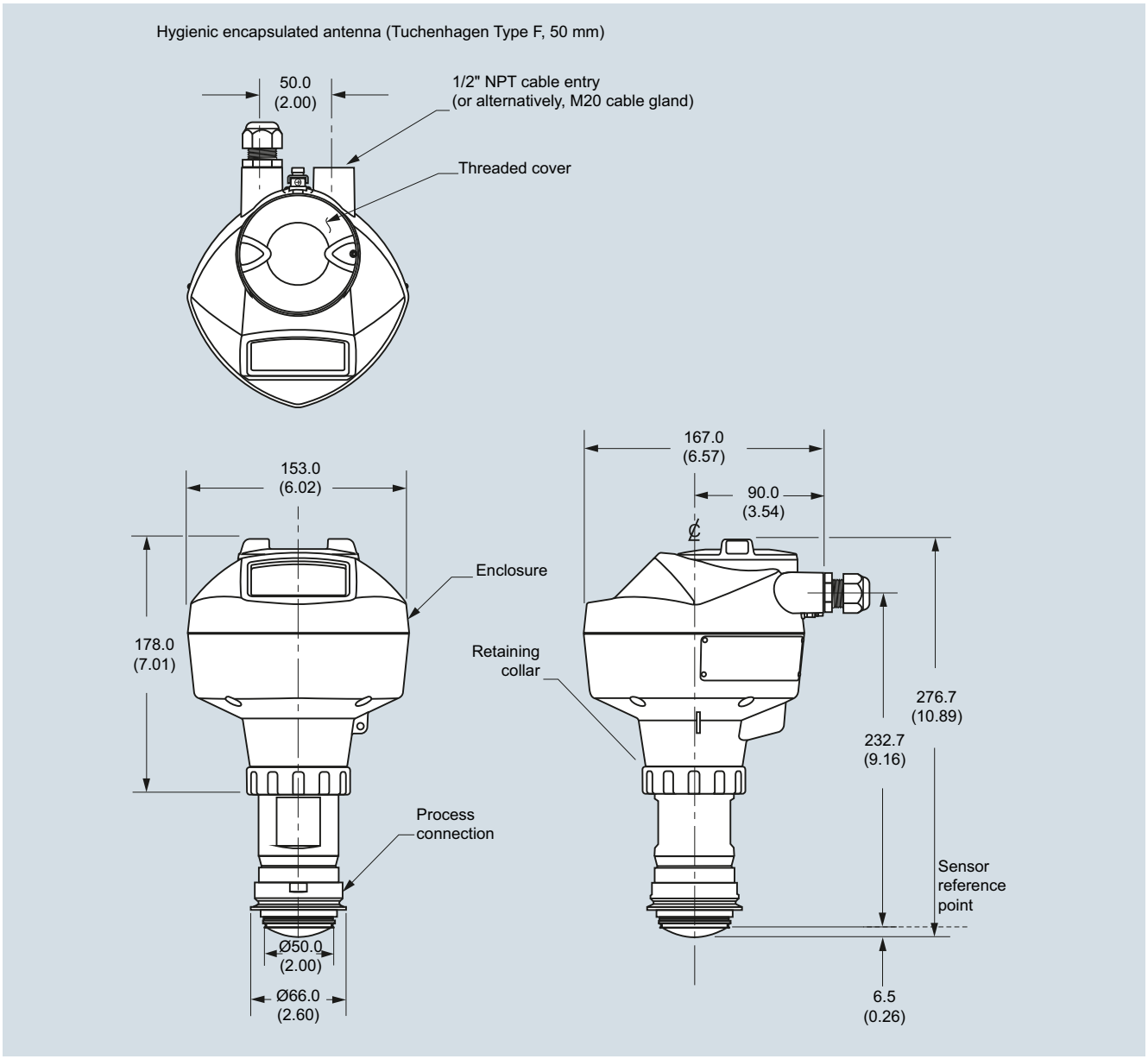

SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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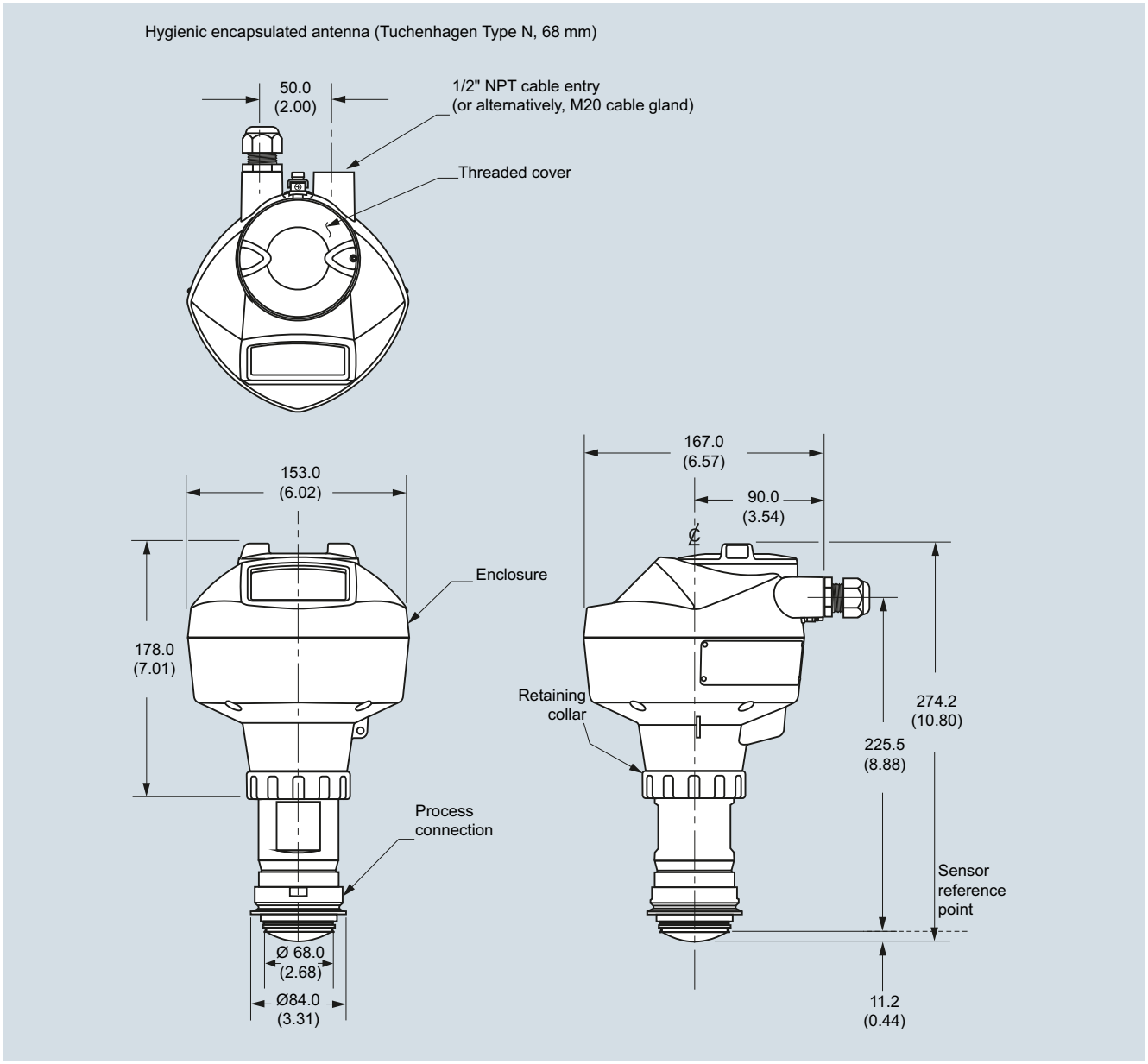
SITRANS LR250 Hygienic Encapsulated Antenna



SITRANS LR250 Hygienic Encapsulated Antenna, dimensions in mm (inch)

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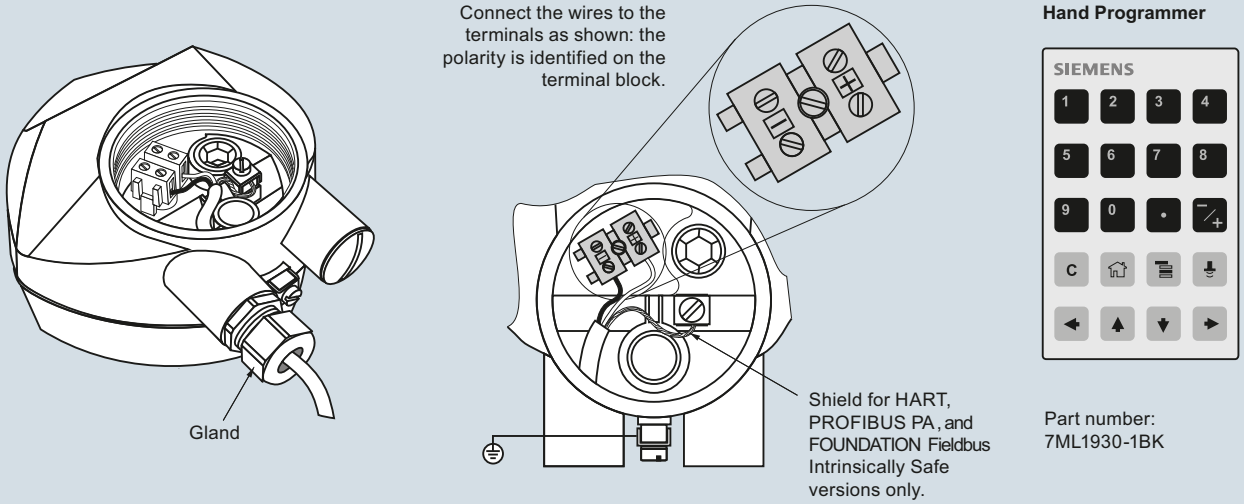
Schematics



Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR250 connections

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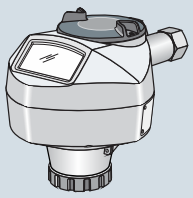
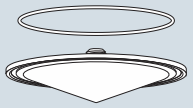
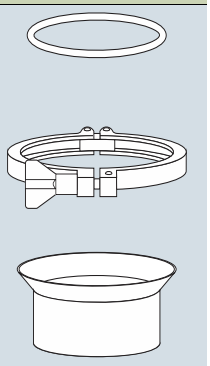
Selection and ordering data

SITRANS LR250 hygienic encapsulated Specials	Article No.
For "Electronics Head only" follow the standard configuration and choose YY option on positions 9 and 10 of the full part number. **For example: 7ML5433-1YY20-1AA0 will order an electronics head for the following:** **EHEDG EL Class 1 approval, 4 ... 20mA HART, M20 cable entries, General purpose Haz Loc approval, pressure rating as per manual.**	
Spare Lens Kits (Lens and O-ring)	
Kit, 2 inch, ISO2852, HEA, Lens, silicone secondary O-ring	**A5E32572731**
Kit, 3 inch, ISO2852, HEA, Lens, silicone secondary O-ring	**A5E32572745**
Kit, 4 inch, ISO2852, HEA, Lens, silicone secondary O-ring	**A5E32572747**
Kit, DN 50, DIN11851, HEA, Lens, silicone secondary O-ring	**A5E32572758**
Kit, DN 80, DIN11851, HEA, Lens, silicone secondary O-ring	**A5E32572770**
Kit, DN 100, DIN11851, HEA, Lens, silicone secondary O-ring	**A5E32572772**
Kit, DN 50, DIN11864-1, HEA, Lens, silicone secondary O-ring	**A5E32572773**
Kit, DN 80, DIN11864-1, HEA, Lens, silicone secondary O-ring	**A5E32572779**
Kit, DN 100, DIN11864-1, HEA, Lens, silicone secondary O-ring	**A5E32572782**
Kit, DN 50, DIN11864-2/3, HEA, Lens, silicone secondary O-ring	**A5E32572785**
Kit, DN 80, DIN11864-2/3, HEA, Lens, silicone secondary O-ring	**A5E32572790**
Kit, DN 100, DIN11864-2/3, HEA, Lens, silicone secondary O-ring	**A5E32572791**
Kit, Tuchenhagen, Type F, HEA, Lens, silicone secondary O-ring	**A5E32572794**
Kit, Tuchenhagen, Type N, HEA, Lens, silicone secondary O-ring	**A5E32572795**
Accessories (customer side process connection and FKM and EPDM seal for each size and type)	
Kit DN 50 DIN 11864-1 GS Form A tank connection, EPDM Seal Class II	**A5E32910638**
Kit, DN 80 DIN 11864-1 GS Form A tank connection, EPDM Seal Class II	**A5E32910649**
Kit, DN 100 DIN 11864-1 GS Form A tank connection, EPDM Seal Class II	**A5E32910657**

SITRANS LR250 hygienic encapsulated Specials	Article No.
Kit DN 50 DIN 11864-1 GS Form A tank connection, FKM Seal Class I	**A5E32910658**
Kit, DN 80 DIN 11864-1 GS Form A tank connection, FKM Seal Class I	**A5E32910671**
Kit, DN 100 DIN 11864-1 GS Form A tank connection, FKM Seal Class I	**A5E32910681**
Kit 2" ISO 2852 tank connection, Clamp, Cleanable EPDM Seal Class II	**A5E32910686**
Kit 3" ISO 2852 tank connection, Clamp, Cleanable EPDM Seal Class II	**A5E32910697**
Kit 4" ISO 2852 tank connection, Clamp, Cleanable EPDM Seal Class II	**A5E32910708**
Kit DN 50 DIN 11851 SC tank connection, EPDM Seal Class II[11)]	**A5E32910746**
Kit DN 80 DIN 11851 SC tank connection, EPDM Seal Class II[11)]	**A5E32910771**
Kit DN 100 DIN 11851 SC tank connection, EPDM Seal Class II[11)]	**A5E32910780**
Kit DN 50 DIN 11851 SC tank connection, FKM Seal Class II	**A5E32910784**
Kit DN 80 DIN 11851 SC tank connection, FKM Seal Class II	**A5E32910789**
Kit DN 100 DIN 11851 SC tank connection, FKM Seal Class II	**A5E32910790**
Kit DN 50 DIN 11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), EPDM Seal Class II	**A5E32910791**
Kit DN 80 DIN 11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II	**A5E32910793**
Kit DN 100 DIN 11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), EPDM Seal Class II	**A5E32910799**
Kit DN 50 DIN 11864-2 Form A tank connection, M8 Hardware (nut/bolt/washer), FKM Seal Class I	**A5E32910805**
Kit DN 80 DIN 11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	**A5E32910809**
Kit DN 100 DIN 11864-2 Form A tank connection, M10 Hardware (nut/bolt/washer), FKM Seal Class I	**A5E32910812**
Kit DN 50 DIN 11864-3 Form A tank connection, Clamp, EPDM Seal Class II	**A5E32910813**
Kit DN 80 DIN 11864-3 Form A tank connection, Clamp, EPDM Seal Class II	**A5E32910814**
Kit DN 100 DIN 11864-3 Form A tank connection, Clamp, EPDM Seal Class II	**A5E32910815**
Kit DN 50 DIN 11864-3 Form A tank connection, Clamp, FKM Seal Class I	**A5E32910816**
Kit DN 80 DIN 11864-3 Form A tank connection, Clamp, FKM Seal Class I	**A5E32910817**
Kit DN 100 DIN 11864-3 Form A tank connection, Clamp, FKM Seal Class I	**A5E32910818**
Kit Type F, Tuchenhagen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	**A5E33489537**
Kit Type N, Tuchenhagen, Clamp, EPDM Seal Class II (EHEDG only) - no tank connection	**A5E33489543**
Kit Type F, Tuchenhagen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	**A5E33489828**
Kit Type N, Tuchenhagen, Clamp, FKM Seal Class I (EHEDG only) - no tank connection	**A5E33489830**

[11)] Class II for low fat applications when EPMD seal used on DIN 11851.

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Overview

SITRANS LR260 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids and liquids in storage vessels including extreme levels of dust and high temperatures, to a range of 30 m (98.4 ft).

Benefits

- Graphical local user interface (LUI) makes operation simple with plug-and-play setup using the intuitive Quick Start Wizard
- LUI displays echo profiles for diagnostic support
- 25 GHz high frequency allows for small horn antennas mounted easily in nozzles
- Communication using HART or PROFIBUS PA
- Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions
- Programming using infrared Intrinsically Safe handheld programmer or SIMATIC PDM

Application

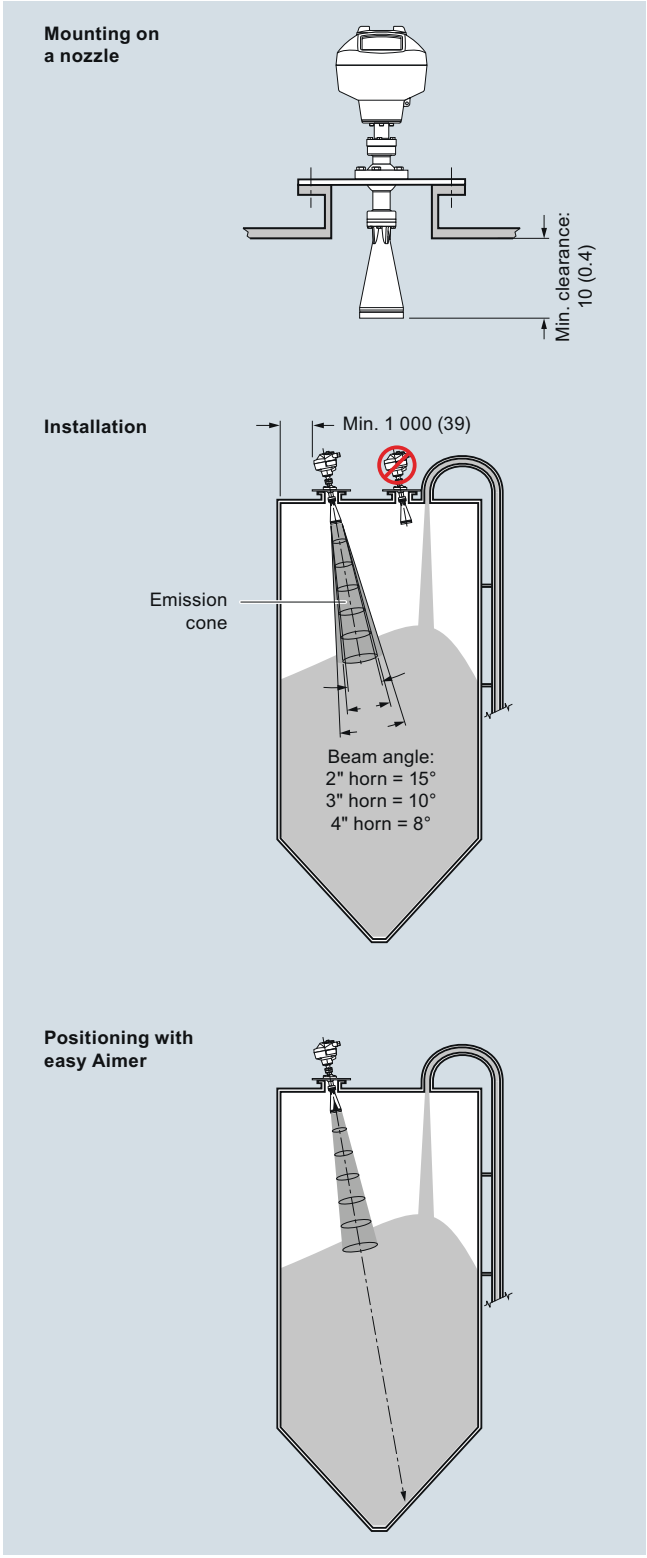
SITRANS LR260 includes a graphical local user interface (LUI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile displays for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.

SITRANS LR260's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR260 measures virtually any solids material to a range of 30 m (98.4 ft).

- Key Applications: cement powder, plastic powder/pellets, grain, flour, coal, solids and liquids bulk storage vessels, and other applications.

Configuration



SITRANS LR260 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Pulse radar level measurement
Frequency	K-band (25.0 GHz)
Minimum detectable distance	0.05 m (2 inch) from end of horn
Maximum measuring range [1]	
Solids	• 2" horn: 10 m (32.8 ft) • 3" horn: 20 m (65.6 ft) • 4" horn: 30 m (98.4 ft)
Liquids	• 2" horn: 20 m (65.6 ft) • 3" horn: 30 m (98.4 ft) • 4" horn: 30 m (98.4 ft)
Output - HART	
Power	4 ... 20 mA (± 0.02 mA accuracy)
Fail signal	Nominal 24 V DC (max. 30 V DC)
Load	3.6 mA ... 23 mA; or last value 230 ... 600 Ω
Output - PROFIBUS PA	• Per IEC 61158-2 • 15.0 mA • Profile version 3.01, Class B
Performance (according to reference conditions IEC60770-1)	
Maximum measured error (including hysteresis and non-repeatability)	• 25 mm (1 inch) from minimum detectable distance to 300 mm (11.8 inch) • Remainder of range = 10 mm (0.39 inch) or 0.1 % of spa (whichever is greater)
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ε_r	ε_r > 1.6, antenna and application dependent
Process temperature	-40 ... +200 °C (-40 ... +392 °F)
Process pressure	• 0.5 bar g (7.25 psi g) maximum • 3 bar g (43.5 psi g) optional with 80 °C (176 °F) temperature max

Design	
Enclosure	
• Construction	Aluminum, polyester powder-coated
• Conduit entry	2 x M20x1.5 or 2 x ½" NPT
Degree of protection	Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68
Weight	< 8.14 kg (17.9 lb) including 4" flange and standard Easy Aimer with 4" horn antenna
Display (local)	Graphic LCD, with bar graph representing level
Flange and horn (easy aimer model)	
• Material	304 stainless steel
• Horn antenna	2" horn 3" horn 4" horn
Process connections	
• Universal flanges [2]	2 inch/50 mm, 3 inch/80 mm, 4 inch/100 mm, 6 inch/150 mm
Mechanical (Threaded Connection model)	
Threaded connection	2" NPT (ASME B1.20.1), R (BSPT, EN 10226-1) or G (BSPP, EN ISO 228-1)
Materials	316L/1.4404 or 316L/1.4435 stainless steel PTFE emitter
Certificates and approvals	
General	$CSA_{US/C}$, CE, FM
Radio	Europe (R&TTE), FCC, Industry Canada, RCM
Hazardous	CSA/FM Class II, Div. 1, Groups E, F, G, Class III ATEX II 1D, 1/2D, 2D Ex ta IIIC T100 °C Da IECEx/ATEX II 1 GD Ex ia IIC T4 Ga, Ex ta IIIC T100 °C Da CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G SABS ARP0108 Ex ia IIC T4 Ga
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C Ta = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1, Groups A,B,C,D,E,F,G, T6 Ta = 50 °C
Handheld communicator	HART communicator 375
PC	SIMATIC PDM
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

[1] From sensor reference point

[2] Universal flange mates with EN 1092-1 (PN 16)/ASME B16.5 (150 lb)/ JIS 2220 (10K) bolt hole pattern

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Selection and Ordering data	Article No.
SITRANS LR260 2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids to a range of 30 m (98.4 ft).	↗ **7ML5427-** **0** ■ ■ ■ **0** - ■ ■ ■ ■
Order handheld programmer separately	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Universal flat faced flange fits ANSI/DIN/JIS flanges, Easy Aimer with integral (Easy Aimer ball)	
2 inch/50 mm	**A**
3 inch/80 mm	**B**
4 inch/100 mm	**C**
6 inch/150 mm	**D**
Threaded connection	
2" NPT (ASME B1.20.1) (tapered thread)[1)2)5)]	**E**
R 2" [(BSPT), EN 10226-1] (tapered thread)[1)2)5)]	**F**
G 2" [(BSPT), EN ISO 228-1] (parallel thread)[1)2)5)]	**G**
Antenna	
2" Horn antenna, fits 50 mm or 2" nozzles[1)]	**A**
2" Horn antenna with 100 mm extension[1)]	**B**
2" Horn antenna with 200 mm extension[1)]	**C**
2" Horn antenna with 500 mm extension[1)2)]	**D**
2" Horn antenna with 1 000 mm extension[1)2)]	**E**
3" Horn antenna, fits 80 mm or 3" nozzles[3)]	**F**
3" Horn antenna with 100 mm extension[3)]	**G**
3" Horn antenna with 200 mm extension[3)]	**H**
3" Horn antenna with 500 mm extension[2)3)]	**J**
3" Horn antenna with 1 000 mm extension[2)3)]	**K**
4" Horn antenna, fits 100 mm or 4" nozzles	**L**
4" Horn antenna with 100 mm extension	**M**
4" Horn antenna with 200 mm extension	**N**
4" Horn antenna with 500 mm extension[2)]	**P**
4" Horn antenna with 1 000 mm extension[2)]	**Q**
Purge (self cleaning) connection	
No purge connection	**0**
Purge connection	**1**
Output/communication	
4 ... 20 mA, HART	**0**
PROFIBUS PA	**1**
Cable inlet	
2 x M20x1.5	**A**
2 x ½" NPT	**B**
Note: Polymeric cable glands will be provided with M20 devices.	
Approvals	
General purpose, $CSA_{US/C}$, FM, Industry Canada, FCC, CE, R&TTE, RCM	**A**
CSA/FM Class II, Div. 1, Groups E, F, G, Class III, Industry Canada, FCC, RCM	**B**
ATEX II 1D, 1/2D, 2D Ex ta IIIC T100 °C Da, CE, R&TTE, RCM, INMETRO	**C**
Non-incendive, CSA/FM Class I, Div. 2, Groups A, B, C, D, Industry Canada, FCC, RCM	**D**
Intrinsically safe, IECEx/ATEX II 1 GD Ex ia IIC T4 Ga, Ex ta IIIC T100 °C Da, R&TTE, RCM	**E**
Intrinsically safe, CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, Industry Canada, FCC, RCM	**F**
Intrinsically safe, South Africa ARP0108 Ex ia IIC T4 Ga	**G**
Pressure rating	
Rating per Pressure/Temperature curves in manual[6)]	**0**
0.5 bar g (7.25 psi g) maximum	**1**

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204[4)]	**C12**
Operating Instructions for HART/mA device	Article No.
English	**7ML1998-5KE03**
German Note: The Operating Instructions should be ordered as a separate line item on the order.	**A5E34942821**
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E32106122**
Operating Instructions for PROFIBUS PA device	
English	**7ML1998-5KF03**
German Note: The Operating Instructions should be ordered as a separate line item on the order.	**A5E34957877**
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E32114443**
Accessories	
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA	**7ML1930-1AQ**
Handheld programmer, Infrared, Intrinsically Safe	**7ML1930-1BK**
Dust cap, PTFE, for 2 inch/50 mm horn	**7ML1930-1DE**
Dust cap, PTFE, for 3 inch/75 mm horn	**7ML1930-1BL**
Dust cap, PTFE, for 4 inch/100 mm horn	**7ML1930-1BM**
HART modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	
Note: Products shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.	

1) Maximum measurement range 10 m (32.8 ft) solids or 20 m (65.6 ft) liquids
2) Available with Purge option 0 only
3) Maximum measurement range 20 m (65.6 ft) solids or 30 m (98.4 ft) liquids
4) Available with pressure option 0 only
5) Available with Antenna Options A, B, F, G, L, and M only
6) Available with pressure option 0 only

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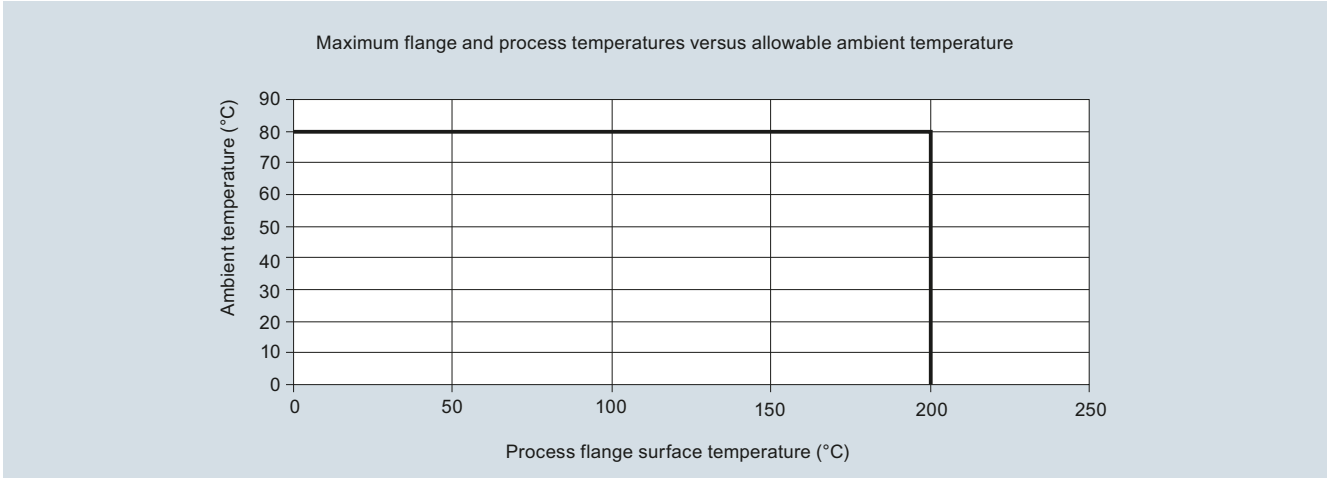
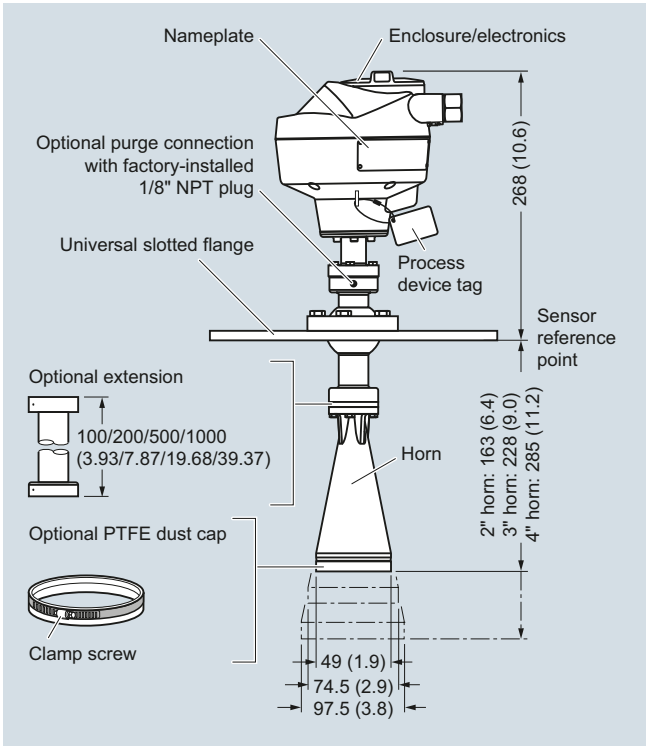
Characteristic curves



SITRANS LR260 Ambient/Process Flange Surface Temperature Curve

Dimensional drawings



SITRANS LR260, dimensions in mm (inch)

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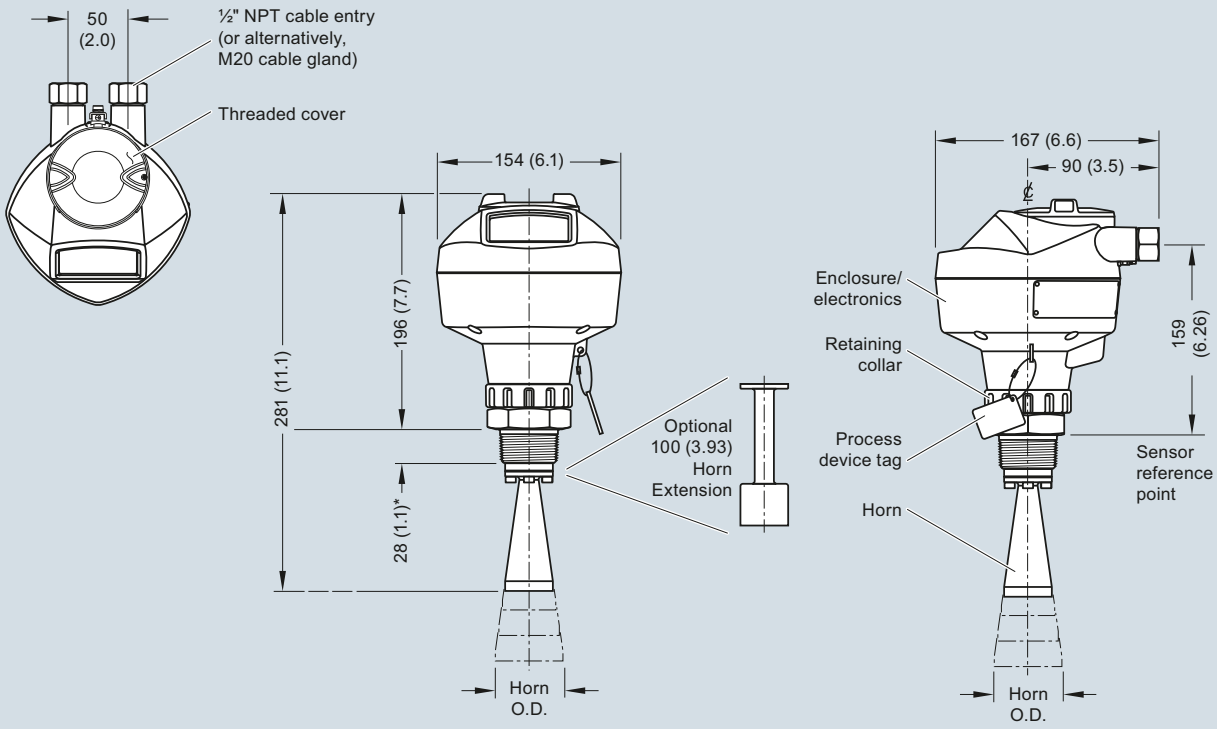
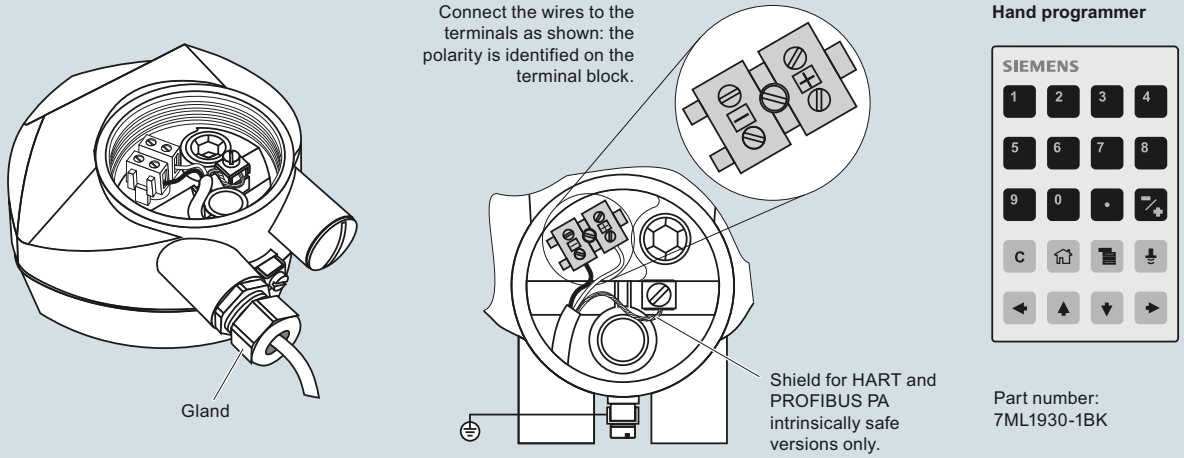
SITRANS LR260



Antenna Type	Antenna O.D.	Height to sensor reference point			Beam angle	Measurement range
		1-1/2" threaded connection	2" threaded connection	3" threaded connection		
2" horn	47.8 (1.88)	N/A	166 (6.55)	180 (7.09)	15 degrees	20 m (65.6 ft)
3" horn	74.8 (2.94)	N/A	199 (7.85)	213 (8.39)	10 degrees	20 m (65.6 ft)
4" horn	94.8 (3.73)	N/A	254 (10)	268 (10.55)	8 degrees	20 m (65.6 ft)

SITRANS LR260, dimensions in mm (inch)

Schematics



Notes:

1. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
2. All field wiring must have insulation suitable for rated input voltages.
3. Use shielded twisted pair cable (14 ... 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR260 connections

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SITRANS LR460

Overview

The SITRANS LR460 is a 4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.

Benefits

- Process Intelligence for advanced signal processing and quick and easy adjustment
- Self-guided quick start wizard for plug and play start-up
- 24 GHz provides superior reflective properties on solids surfaces
- 100 m (328 ft) range for long-range and difficult applications
- Easy Aimer optimizes signal quality on sloped surfaces
- Programming using infrared Intrinsically Safe handheld programmer or with SIMATIC PDM or HART handheld device

Application

SITRANS LR460 provides excellent results even during conditions of extreme dust. The integral Easy Aimer included on the SITRANS LR460 allows for easy positioning for optimum measurement on solids.

Process Intelligence onboard SITRANS LR460 means advanced signal processing is harnessed for reliable operation on both simple and difficult solids application.

SITRANS LR460 features a robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

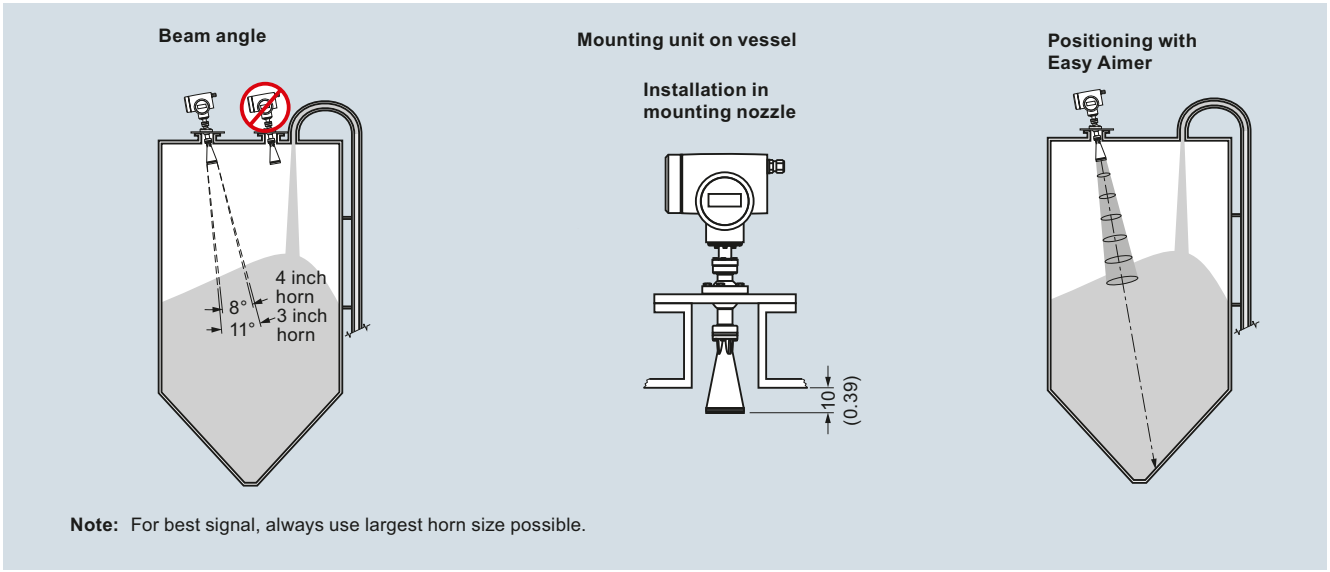
An optional dust cap is available for sticky solids. Optional air purging is also available for extremely sticky applications.

Safe on-site local programming is simple using the Intrinsically Safe handheld programmer. SIMATIC PDM can be used for easy remote programming using HART or PROFIBUS PA.

The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

- Key Applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics

Configuration



Note: For best signal, always use largest horn size possible.

SITRANS LR460 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	FMCW radar level measurement
Frequency	24.2 ... 25.2 GHz FMCW
Measuring range	0.35 ... 100 m (1.15 ... 328.08 ft)
Output	
Analog output (HART)	
• Signal range	Optically isolated
• Load	Max. 600 Ω
• Fail-safe	mA signal programmable as high, low or hold (LOE)
Communication	HART, optional PROFIBUS PA
Digital output	Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.01
Performance (Reference conditions according to IEC 60770-1)	
Non-linearity	Greater of 25 mm (1 inch) or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range
Non-repeatability	≤ 10 mm (0.4 inch)
Rated operating conditions	
Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)
Location	Indoor/outdoor
Installation category	II
Pollution degree	4
Medium conditions	
Dielectric constant	$\varepsilon_r > 1.4$
Process temperature range	-40 ... +200 °C (-40 ... +392 °F)
Vessel pressure	0.5 bar g (7.25 psi g) maximum
Design	
Weight	Approx. 6.1 kg (13.4 lb) with 3 inch universal flange
Materials	
• Enclosure	Die-cast aluminum, painted
• Degree of protection	IP67/Type 4X/NEMA 4X/ Type 6/NEMA 6
• Cable inlet	2x M20x1.5 or ½" NPT
Process connections	
• Universal flanges, 304 stainless steel, flat faced, with integral Easy Aimer	3 inch/80 mm, 4 inch/100 mm, 6 inch/150 mm (mates with flange EN 1092-1, ASME B16.5, or JIS B2238 bolt pattern), 0.5 bar g (7.25 psi g) max. pressure

Programming	
Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
• Approvals for handheld programmer	IS model with ATEX II 1G EEx ia IIC T4, CSA/FM Class I, Div. 1, Groups A, B, C, D T6 at max. ambient temperature of 40 °C (104 °F)
Handheld communicator	HART Communicator 375
PC	SIMATIC PDM
Display (local)	Alphanumeric LCD for readout and entry
Power supply	100 ... 230 V AC ± 15 % (50/60 Hz), 6 W (12 VA) or 24 V DC +25/-20 %, 6 W (optional)
Certificates and approvals	
General	$CSA_{US/C}$, CE, FM, RCM
Radio	European Radio (R&TTE), Industry Canada, FCC, RCM
Hazardous Areas	CSA/FM Class II, Div. 1, Groups E, F and G, Class III ATEX II 1D, 1/2 D, 2D T85 °C INMETRO ExtD A20 IP67 T85 °C GOST Ex DIP A20 T_a 85 °C IP67
Optional equipment	
Dust cap	PTFE
Air purge connection	1/8" NPT

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SITRANS LR460

Selection and Ordering data	Article No.
SITRANS LR460 ↗	**7ML5426-**
4-wire, 24 GHz FMCW radar level transmitter with extremely high signal-to-noise ratio and advanced signal processing for continuous monitoring of solids up to 100 m (328 ft). It is ideal for measurement in extreme dust.	0 ■ ■ ■ 0 - ■ ■ ■ 0
Order handheld programmer separately	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Universal, flat faced, 0.5 bar g (7.25 psi g) maximum with integral Easy Aimer ball	
3 inch (80 mm)	A
4 inch (100 mm)	B
6 inch (150 mm)	C
Antenna	
3" horn antenna, fits 80 mm (3 inch) nozzles	A
3" horn antenna, fits 80 mm (3 inch) nozzles with 100 mm extension	B
3" horn antenna, fits 80 mm (3 inch) nozzles with 200 mm extension	C
3" horn antenna, fits 80 mm (3 inch) nozzles with 500 mm extension[1]	D
3" horn antenna, fits 80 mm (3 inch) nozzles with 1 000 mm extension[1]	E
4" horn antenna, fits 100 mm (4 inch) nozzles	F
4" horn antenna, fits 100 mm (4 inch) nozzles with 100 mm extension	G
4" horn antenna, fits 100 mm (4 inch) nozzles with 200 mm extension	H
4" horn antenna, fits 100 mm (4 inch) nozzles with 500 mm extension[1]	J
4" horn antenna, fits 100 mm (4 inch) nozzles with 1 000 mm extension[1]	K
Purge (self-cleaning) connection	
No purge connection	0
Purge connection	1
Output/Communication	
4 ... 20 mA, HART	0
PROFIBUS PA	1
Power supply/cable inlet	
100 ... 230 V AC	
• 2 x M20x1.5	A
• 2 x ½" NPT	B
24 V DC	
• 2 x M20x1.5	C
• 2 x ½" NPT	D
Approvals	
General Purpose, CSA$_{US/C}$, Industry Canada, FM, FCC, CE and R&TTE, RCM	A
CSA/FM Class II, Div. 1, Groups E, F, and G, Class III	B
ATEX II 1/2 D T6, CE, R&TTE	C

[1] Available with Purge option 0 only

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Operating Instructions	Article No.
English	**7ML1998-5JM02**
French	**7ML1998-5JM11**
German	**7ML1998-5JM32**
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E32007360**
Accessories	
Handheld programmer, Infra-red, Intrinsically Safe, EEx ia	**7ML5830-2AJ**
Dust cap, PTFE, for 3 inch/80 mm horn	**7ML1930-1BL**
Dust cap, PTFE, for 4 inch/100 mm horn	**7ML1930-1BM**
HART modem/USB (for use with a PC and SIMATIC PDM)	**7MF4997-1DB**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[1]	**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA[1]	**7ML1930-1AQ**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

[1] Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

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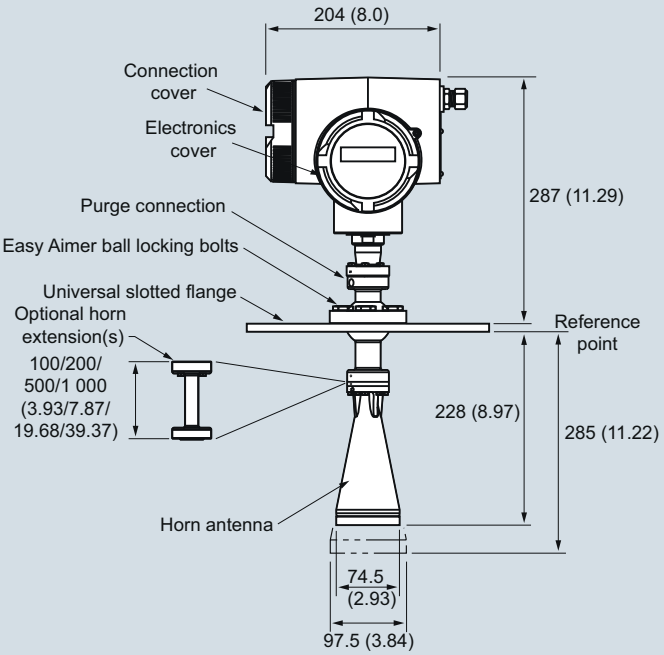
Dimensional drawings

SITRANS LR460 (7ML5426)



SITRANS LR460, dimensions in mm (inch)

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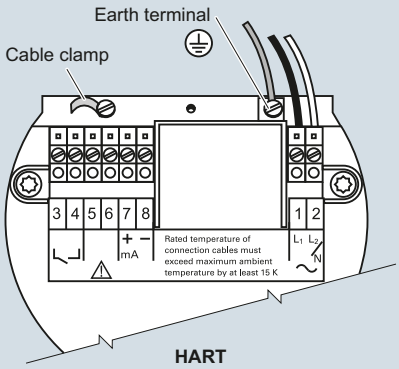
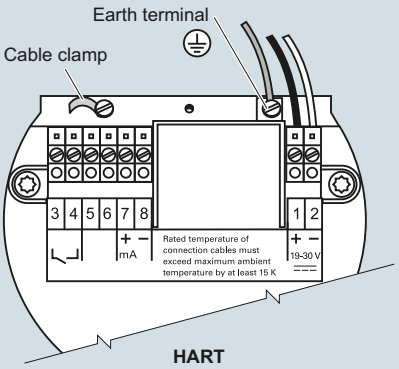
4

Schematics

AC version

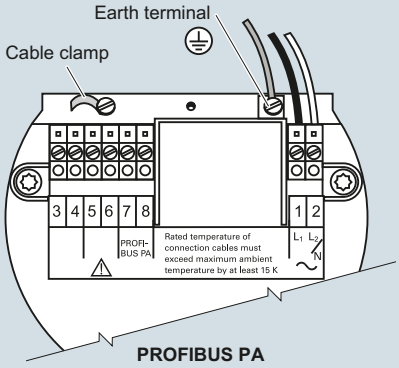


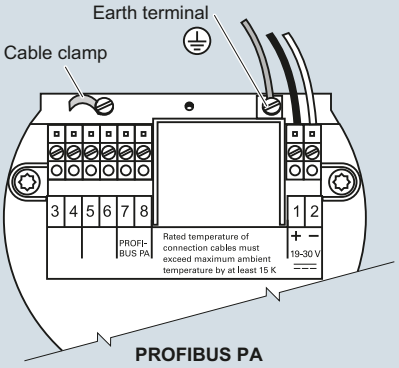
DC version



Hand programmer

SITRANS LR460
Part number:
7ML5830-2AJ





Notes

- Recommended torque on terminal clamping screws, 0.5 ... 0.6 Nm
- 4 ... 20 mA, PROFIBUS PA, DC input circuits, 14 ... 20 AWG, shielded copper wire
- AC input circuit, min. 14 AWG copper wire
- All field wiring must have insulation suitable for at least 250 V
- The equipment must be protected by a 15 A fuse or circuit breaker in the building installation

SITRANS LR460 connections

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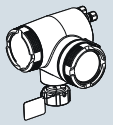
Selection and ordering data

SITRANS LR260/LR460 Specials	Article No.
Process connection part kits - non-pressure-rated	
LR260/LR460,100 mm extension for horn antenna, no purge[1)]	**A5E01087872**
LR260/LR460, 200 mm extension for horn antenna, no purge[1)]	**A5E01091262**
LR260/LR460,100 mm extension for horn antenna with purge[1)]	**A5E01261979**
LR260/LR460, 200 mm extension for horn antenna with purge[1)]	**A5E01261981**
LR260/LR460, horn 2", no purge, no emitter[1)]	**A5E02083905**
LR260/LR460, horn 3", no purge, no emitter[1)]	**A5E01623511**
LR260/LR460, horn 4", no purge, no emitter[1)]	**A5E01623512**
LR260/LR460, horn 2", with purge, no emitter[1)]	**A5E02083906**
LR260/LR460, horn 3", with purge, no emitter[1)]	**A5E01623513**
LR260/LR460, horn 4", with purge, no emitter[1)]	**A5E01623514**
LR260/LR460, 3" universal flat faced flange[1)]	**A5E02303897**
LR260/LR460, 4" universal flat faced flange[1)]	**A5E01259467**
LR260/LR460, 6" universal flat faced flange[1)]	**A5E01261834**
LR260/LR460 O-rings for Easy Aimer[1)]	**A5E01261836**
Kit, Emitter for LR260/LR460[1)]	**A5E02360694**
LR260 lid with O-ring	**A5E02465410**
Purge conversion kit – non-pressure-rated (no flange or extension included)	
LR260/LR460 purge conversion, 2" horn[1)]	**A5E02083914**
LR260/LR460 purge conversion, 3" horn[1)]	**A5E02083915**
LR260/LR460 purge conversion, 4" horn[1)]	**A5E02083916**
Enclosure with electronics	
LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option A, no process connection	**A5E02203605**
LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option A, no process connection	**A5E02213423**
LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option A, no process connection	**A5E02165924**
LR260 enclosure with board stack, PROFIBUS PA communication, NPT cable inlet, approval option A, no process connection	**A5E02213428**
Sitrans LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option D, no process connection	**A5E03934184**
Sitrans LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option E, no process connection	**A5E03934187**
LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option F, no process connection	**A5E03934191**
LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option F, no process connection	**A5E31820689**

SITRANS LR260/LR460 Specials	Article No.
Enclosure with electronics (LR460)	
LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection	**A5E02182085**
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, M20 cable inlet, approval option A, no process connection	**A5E02212422**
LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection	**A5E02212423**
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, NPT cable inlet, approval option A, no process connection	**A5E02212424**
LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection	**A5E02212425**
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, M20 cable inlet, approval option A, no process connection	**A5E02212426**
LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection	**A5E02212428**
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, NPT cable inlet, approval option A, no process connection	**A5E02212429**

[1)] Available with no pressure rating, 0.5 bar g maximum. Please contact ceg.smpi@siemens.com for special requests.

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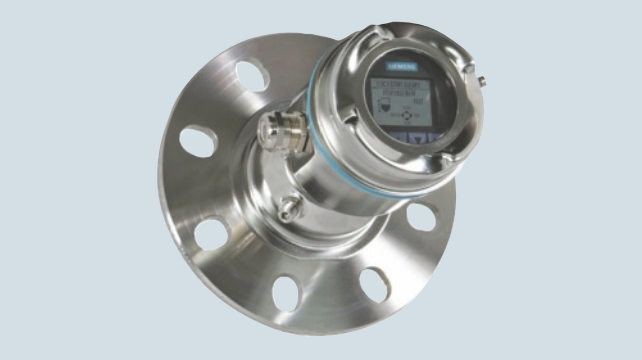
SITRANS LR560

Overview



SITRANS LR560 2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft).

Benefits

- Rugged stainless steel design for industrial applications
- 78 GHz high frequency provides very narrow beam, virtually no mounting nozzle noise, and optimal reflection from sloped solids
- Aimer option to direct beam to area of interest, such as draw point of cone
- Lens antenna is highly resistant to product build-up
- Air purge connection is included for self-cleaning of extremely sticky solids
- Local display interface (LDI) allows local programming and diagnostics

Application

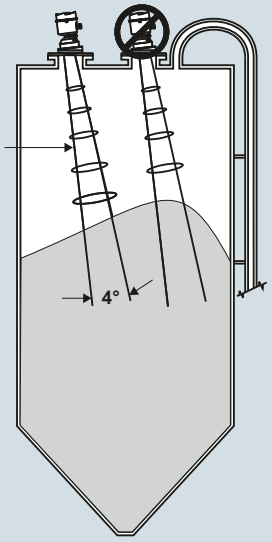
SITRANS LR560's plug and play performance is ideal for most solids applications, including those with extreme dust and high temperatures to 200 °C (392 °F). Unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.
SITRANS LR560 includes an optional graphical local display interface (LDI) that improves setup and operation using an intuitive Quick Start Wizard, and echo profile display for diagnostic support. Startup is easy using the Quick Start wizard with a few parameters required for basic operation.
SITRANS LR560 measures practically any solids material to a range of 100 m (328 ft).

- Key Applications: cement powder, plastic powder/pellets, grain, coal, wood powder, fly ash

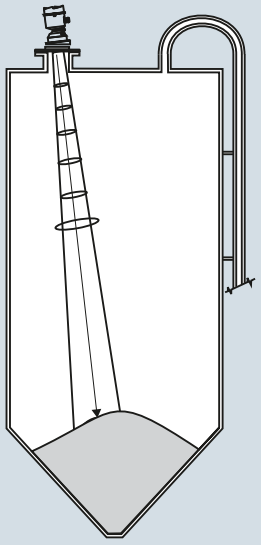
Configuration

Installation

Note:
- Beam angle is the width of the cone where the energy density is half of the peak energy density
- The peak energy density is directly in front of and in line with the antenna
- There is signal transmitted outside of the beam angle; therefore false targets may be detected



Aiming will assist in measuring material in the cone



SITRANS LR560 installation, dimensions in mm (inch)

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Technical specifications

Mode of operation	
Measuring principle	Radar level measurement
Frequency	78 GHz FMCW
Minimum detectable distance	400 mm (15.75 inch) from sensor reference point
Maximum measuring range[1)]	• 40 m (131 ft) version • 100 m (328 ft) version
Output	
Analog output	4 ... 20 mA
Communications	• HART • Optional: PROFIBUS PA • Optional: FOUNDATION Fieldbus
Fail-safe	• Programmable as high, low or hold (Loss of Echo) • NE43 programmable
Performance (according to reference conditions IEC60770-1)	
Maximum measured error (including hysteresis and non-repeatability)[2)]	5 mm (0.2 inch)
Rated operating conditions (according to reference conditions IEC60770-1)	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions (enclosure)	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F)
• Installation category	I
• Pollution degree	4
Medium conditions	
Dielectric constant ε_r	> 1.6
Process temperature and pressure	See chart below
Design	
Enclosure	
• Construction	316L/1.4404 stainless steel
• Conduit entry	M20x1.5, or ½" NPT via adapter
• Purge inlet	1/8" NPT, 30 cfm at max. 100 psi
• Lens material	• 40 m version: PEI • 100 m version: PEEK Damage to lens could result from continuous purging/cleaning due to abrasive solids. Recommended purging/cleaning only a few seconds every hour
Degree of protection	Type 4X/NEMA 4X, Type 6/NEMA 6, IP68 with lid closed
Weight	3.15 kg (6.94 lb) including 3 inch flange
Optional local display interface	Graphic LCD, with bar graph representing level
Process connections	
• Universal flat-faced flanges[3)]	• 3, 4, 6 inch/80, 100, 150 mm, 304 stainless steel • 3, 4, 6 inch/80, 100, 150 mm, 316L/1.4404 or 316L/1.4435 stainless steel
• Aimer flanges[3)]	3, 4, 6 inch/80, 100, 150 mm, polyurethane powder-coated cast aluminum

Power supply	
4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
PROFIBUS PA/ FOUNDATION Fieldbus	13.5 mA 9 ... 32 V DC, per IEC 61158-2
Certificates and approvals	
General	$CSA_{US/C}$, CE, FM
Radio	Europe (R&TTE), FCC, Industry Canada, RCM
Hazardous	
• Europe/International	IECEx SIR 09.0149X ATEX II 1D, 1/2D, 2D Ex ta IIIC T139 °C Da IP68 ATEX II 3G Ex nA II T4 Gc Ex nL IIC T4 Gc
• US/Canada	FM/CSA Class II, Div. 1, Groups E, F, G Class III T4 FM/CSA Class I, Div. 2, Groups A, B, C, D, T4
• China	NEPSI Ex nA II T4 Ex nL IIC T4 DIP A20 TA, T139 °C, IP68
• Brazil	INMETRO BR-Ex nA/nL II T4 IP68
Programming	
Intrinsically Safe Siemens handheld programmer	Infrared receiver
• Approvals for handheld programmer	IS model: ATEX II 1GD Ex ia IIC T4 Ga Ex iaD 20 T135 °C T_a = -20 ... +50 °C CSA/FM Class I, II, and III, Div. 1, Groups A, B, C, D, E, F, G, T6 T_a = 50 °C
Handheld communicator	HART communicator 375/475
PC	SIMATIC PDM, AMS, PACTware
Display (local)	Graphic local user interface including quick start wizard and echo profile displays

1) From sensor reference point

2) Under severe EMI/EMC environments per IEC61326-1 or NAMUR NE21, the device error may increase to a maximum of 25 mm (1 inch)

3) Universal flange mates with EN 1092-1 (PN16)/ASME B16.5 (150 lb)/ JIS 2220 (10K) bolt hole pattern.

Process temperature and pressure

Version	Stainless steel	Aimer flange: -1 ... 0.5 bar	Aimer flange: -1 ... 3.0 bar
40 m	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)	-40 ... +100 °C (-40 ... +212 °F)
100 m	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +200 °C (-40 ... +392 °F)	-40 ... +120 °C (-40 ... +248 °F)

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Selection and Ordering data — Article No.

SITRANS LR560 ↗ **7ML5440-**

2-wire, 78 GHz FMCW radar level transmitter for continuous monitoring of solids in silos to a range of 100 m (329 ft). **0 0 -**

Order handheld programmer separately

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Measurement and process temperature range		
40 m (131 ft) max range, -40 ... +100 °C	⬟	**0**
100 m (329 ft) max range, -40 ... +200 °C	⬟	**1**
Process connection		
Universal flat-faced flange fits ANSI/DIN/JIS flanges		
3 inch/80 mm, 304 stainless steel	⬟	**A**
4 inch/100 mm, 304 stainless steel	⬟	**B**
6 inch/150 mm, 304 stainless steel	⬟	**C**
3 inch/80 mm, 316L stainless steel	⬟	**D**
4 inch/100 mm, 316L stainless steel	⬟	**E**
6 inch/150 mm, 316L stainless steel	⬟	**F**
3 inch/80 mm, painted aluminum, with integral aimer[1]	⬟	**G**
4 inch/100 mm, painted aluminum, with integral aimer[1]	⬟	**H**
6 inch/150 mm, painted aluminum, with integral aimer[1]	⬟	**J**
Enclosure (with cable inlet)		
Stainless steel, 1 X ½" NPT	⬟	**A**
Stainless steel, 1 X M20 x 1.5 (plastic gland included)	⬟	**B**
Pressure rating		
0.5 bar g (7.5 psi g) maximum	⬟	**0**
3 bar g (40 psi g) maximum	⬟	**1**
Output/communication		
4 ... 20 mA, HART	⬟	**A**
PROFIBUS PA	⬟	**B**
FOUNDATION Fieldbus	⬟	**C**
Approvals		
General Purpose, $CSA_{US/C}$, Industry Canada, FCC, CE, R&TTE, RCM	⬟	**A**
CSA/FM Class I, Div. 2, Groups A, B, C, D, Class II, Div.1, Groups E, F, G, Class III	⬟	**B**
ATEX II 1 D, ½ D, 2 D, 3G Ex nA/nL, CE, R&TTE, RCM	⬟	**C**
Local display interface		
Without LDI (local display interface)	⬟	**1**
With LDI (local display interface)	⬟	**2**

[1] Rated to 120 °C max. when used with Pressure rating option 1

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix

Selection and Ordering data — Order code

Further designs		
Please add "**-Z**" to Article No. and specify Order code(s).		
Plug M12 with mating connector[1)2)3)]	⬟	**A50**
Plug 7/8" with mating connector[1)3)7)]	⬟	**A55**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters); specify in plain text	⬟	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	⬟	**C11**
Inspection Certificate Type 3.1 per EN 10204[4)]	⬟	**C12**
NAMUR NE43 compliant, device preset to failsafe < 3.6 mA[5)]	⬟	**N07**
Operating Instructions for HART device		Article No.
English		**A5E34647946**
German		**7ML1998-5KB32**
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.		**A5E32052143**
Operating Instructions for PROFIBUS PA device		
English		**A5E34648471**
German		**7ML1998-5LT32**
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.		**A5E32043113**
Operating Instructions for FOUNDATION Fieldbus device		
English		**A5E34648692**
German		**7ML1998-5LY32**
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.		**A5E32034712**
Accessories		
Hand Programmer, Intrinsically safe		**7ML1930-1BK**
Local display interface		**7ML1930-1FJ**
Sun Shield Cover, 304 stainless steel		**7ML1930-1FK**
Housing lid with window		**7ML1930-1FL**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART[6)]		**7ML1930-1AP**
One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA[6)]		**7ML1930-1AQ**
SITRANS RD100, loop powered display - see Chap. 7		**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7		**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7		**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7		**7ML5750-...**
For applicable back up point level switch - see point level measurement section		

[1)] Available with Approval option A only
[2)] Available with Enclosure option B only
[3)] Available with Output/communication options B and C only
[4)] Available with Pressure rating option 1 only
[5)] Available with Output/communication option A only
[6)] Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended
[7)] Only available with enclosure option A (NPT thread)

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix

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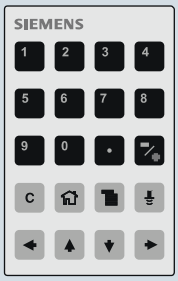
Options

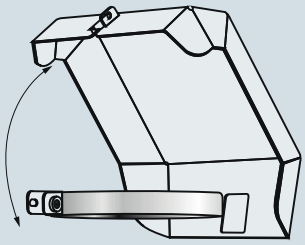
Handheld programmer

Part number:
7ML1930-1BK



Sun shield cover
(304 stainless steel)

Part number:
7ML1930-1FK



SITRANS LR560 handheld programmer and sun shield cover

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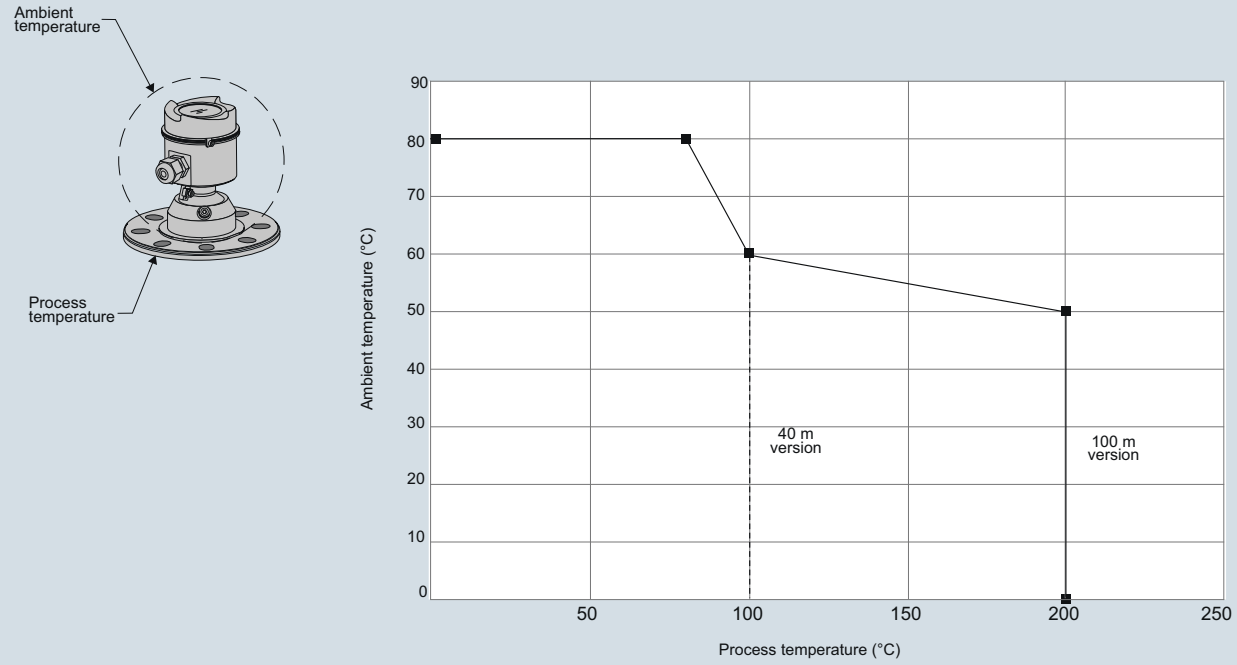
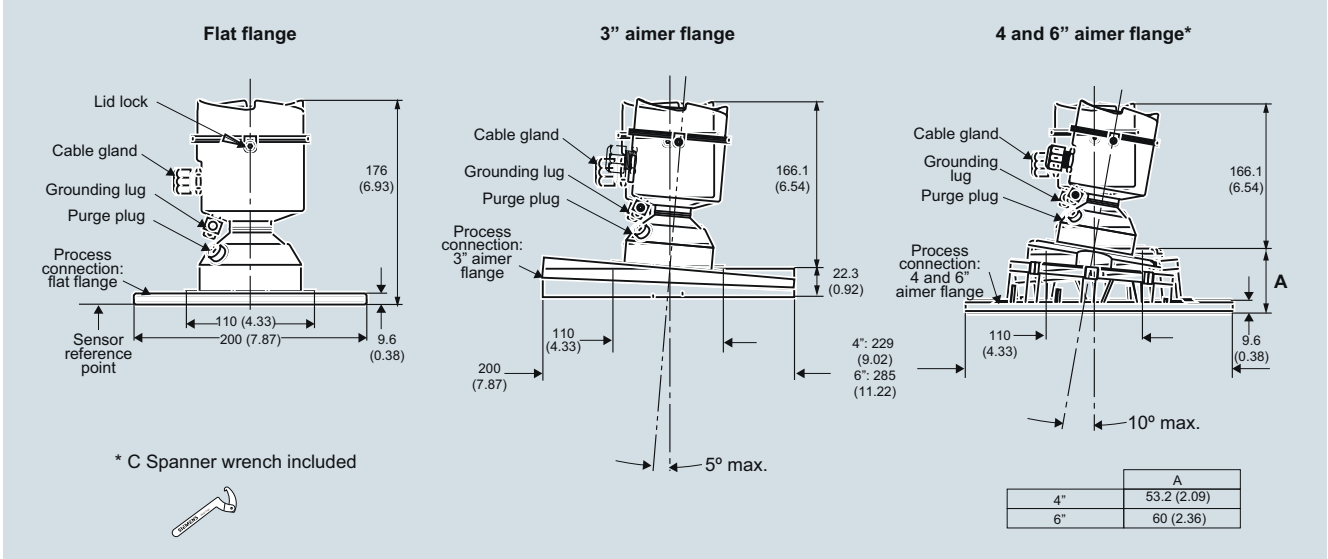
Characteristic curves

Temperature derating curve



SITRANS LR560 temperature derating curve

Dimensional drawings



SITRANS LR560, dimensions in mm (inch)

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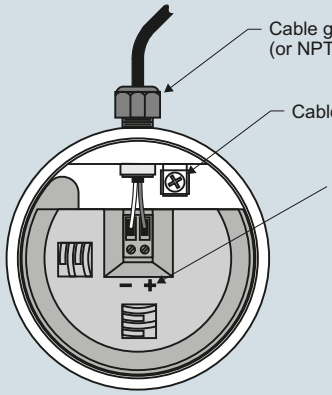
Schematics



Notes:
1. Depending on the approval rating, glands and plugs may be supplied with your instrument.
2. DC terminal shall be supplied from a source providing electrical isolation between the input and output, to meet the applicable safety requirements of IEC 61010-1.
3. All field wiring must have insulation suitable for rated input voltages.
4. Use shielded twisted pair cable (14 ... 22 AWG) for HARTversion.
5. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

SITRANS LR560 connections

Selection and ordering data

SITRANS LR560 Specials	Article No.
LR560 Electronics Modules	
LR560 Electronics Module, HART, 100 m range, compatible with 7ML54401XX00XAXX, no enclosure or process connection included.	**7ML1830-3AC**
LR560 Electronics Module, PROFIBUS PA, 100 m range, compatible with 7ML54401XX00XBXX, no enclosure or process connection included.	**7ML1830-3AH**
LR560 Electronics Module, FOUNDATION Fieldbus,100 m range, compatible with 7ML54401XX00XCXX, no enclosure or process connection included.	**7ML1830-3AJ**
LR560 Electronics Module, HART, 40 m range, compatible with 7ML54400XX00XAXX, no enclosure or process connection included.	**7ML1830-3AK**
LR560 Electronics Module, PROFIBUS PA, 40 m range, compatible with 7ML54400XX00XBXX, no enclosure or process connection included.	**7ML1830-3AL**
LR560 Electronics Module, FOUNDATION Fieldbus, 40 m range, compatible with 7ML54400XX00XCXX, no enclosure or process connection included.	**7ML1830-3AM**
LR560 Miscellaneous Spare Kits	
Kit, Lid Gasket, EPDM, LR560	**7ML1830-3AA**
Kit, Wrench for 4" and 6" Aimers, LR560	**7ML1830-3AB**
Kit, O-rings for 3" Aimer, LR560	**7ML1830-3AD**
Kit, O-rings for 4" Aimer, LR560	**7ML1830-3AE**
Kit, O-rings for 6" Aimer, LR560	**7ML1830-3AF**
Kit, Lid Screw and Purge Plug set with Hex Keys, LR560	**7ML1830-3AG**
Kit, Lid, No Window, LR560	**7ML1830-3AP**

Please contact ceg.smpi@siemens.com for special requests.

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4

Overview

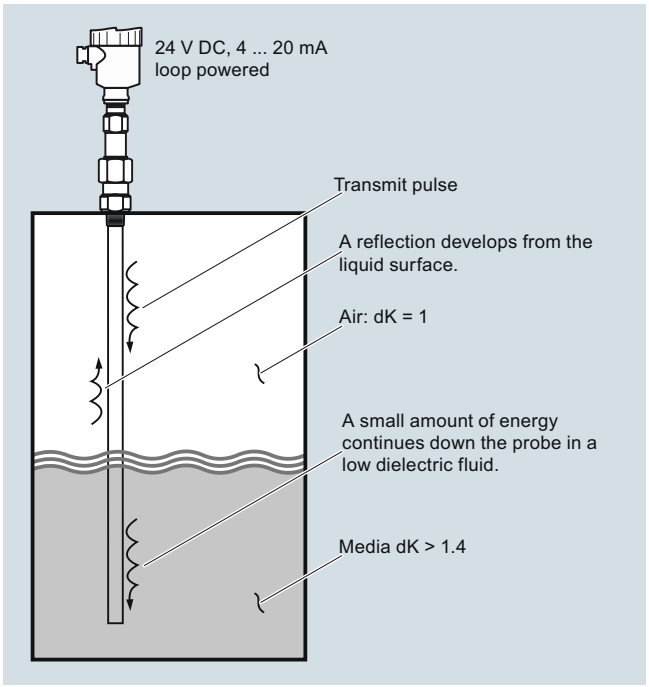
Introduction

Guided Wave Radar transmitters use TDR (time domain reflectometry).

Time Domain Reflectometry (TDR)

TDR uses pulses of electromagnetic (EM) energy to measure distances or levels. When a pulse reaches a dielectric discontinuity (created by media surface), part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

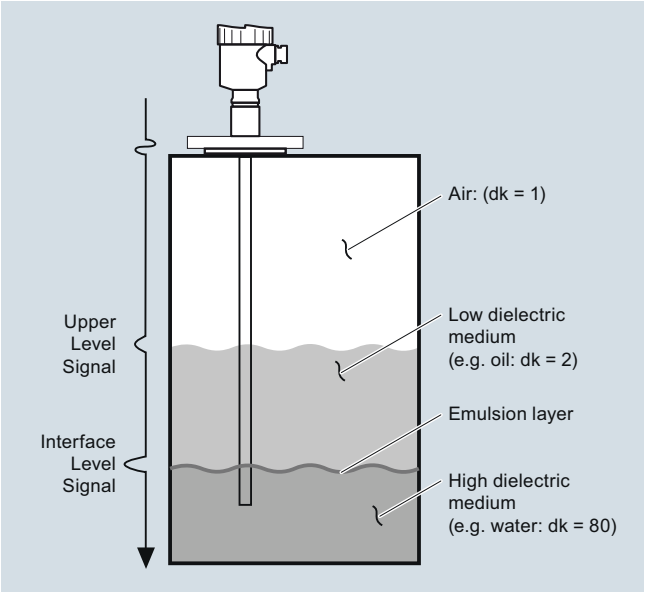
The SITRANS LG includes a transmitter and waveguide that has a characteristic impedance in air and is used as a probe. When part of the probe is immersed in a material other than air, there is lower impedance due to the increase in the dielectric. When an EM pulse is sent down the probe and meets the dielectric discontinuity, a reflection is generated.



Mode of operation

Interface Detection

The SITRANS LG, is a transmitter capable of measuring both an upper level and an interface level. The upper liquid must have a dielectric constant between 1.6 and 10 and the two liquids have a difference in dielectric constants greater than 10. A typical application would be oil over water, with the upper layer of oil being non-conductive with a dielectric constant of approximately 2 and the lower layer of water being very conductive with a dielectric constant of approximately 80. This interface measurement can only be accomplished when the dielectric constant of the upper medium is lower than the dielectric constant of the lower medium.



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Guided Wave Radar (Level) Application Questionnaire

Customer information

Contact: _____ Prepared By: _____

Company: _____ Date: _____

Address: _____ Notes on the Application: _____

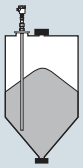
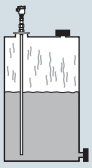
City: _____ Country: _____

Zip/Postal Code: _____ Phone: ( )

E-mail: _____ Fax: ( )

Tank/Vessel Information

(supply sketch where possible) ☐ Sketch attached

☐ Solids  ☐ Liquids 

Tank top:
- ☐ Open
- ☐ Flat
- ☐ Conical
- ☐ Parabolic

Tank bottom:
- ☐ Sloped
- ☐ Flat
- ☐ Conical
- ☐ Parabolic

Mounting location:
- ☐ Top mount
- ☐ Thread mount
- ☐ Flange mount
- ☐ Bypass/Sidepipe mount
- ☐ Pipe mount
- ☐ Displacer replacement *(please supply drawings)*

Tank dimensions:

Height: _____ m/ft

Diameter: _____ m/ft

Nozzle Length: _____ cm/inch

Nozzle Diameter: _____ cm/inch

Process connection type: _____

Process connection size: _____

Distance to sidewall: _____ cm/inch

Pressure:

Normal: _____

Maximum (relief): _____

Material

Material being measured: _____ ☐ Liquid ☐ Solid ☐ Slurry

Material temperature: Norm: _____ °C/°F Max: _____ °C/°F

Measurement type: ☐ Continuous level ☐ Interface level

Dielectric constant value: _____

Coating buildup: ☐ Yes ☐ No **Turbulence:** ☐ Yes ☐ No

Maximum viscosity: _____ **Density:** _____ kg/m³

Kinematic Viscosity (cSt) = Dynamic Viscosity (cP) / Density (kg/m³)

- ☐ 1 ... 5 cSt (like water)
- ☐ 5 ... 20 cSt (like machine oil)
- ☐ 20 ... 50 cSt (like cooking oil)
- ☐ 50 ... 100 cSt (like honey)
- ☐ 100 ... 500 cSt (like syrup/molasses)
- ☐ >500 cSt (like tar)

Particle size:
- ☐ Fine dust/powder, <0.5 cm (0.2 inch)
- ☐ Grains (rice, corn), <2 cm (0.8 inch)
- ☐ Small stones/gravel, <2 cm (0.8 inch)
- ☐ Small rocks/chunks, >2 cm (0.8 inch)
- ☐ Large particles, <9 cm (3.5 inch)

Foam type:
- ☐ None ☐ Wet
- ☐ Dry ☐ Wet/dense

Installation

(indicate all that apply)

Power available: _____

Communications:
- ☐ HART /4 ... 20 mA

Outputs required:
- ☐ 4 ... 20 mA
- ☐ Other *(please specify)* _____

Products recommended:

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Guided Wave Radar (Interface) Application Questionnaire

Customer information

Contact: _____ Prepared By: _____
Company: _____ Date: _____
Address: _____ Notes on the Application: _____
City: _____ Country: _____
Zip/Postal Code: _____ Phone: ( ) _____
E-mail: _____ Fax: ( ) _____

Tank/Vessel Information (supply sketch where possible) ☐ Sketch attached

Tank top:
☐ Open
☐ Flat
☐ Conical
☐ Parabolic

Tank bottom:
☐ Sloped
☐ Flat
☐ Conical
☐ Parabolic

Mounting location:
☐ Top mount
☐ Thread mount
☐ Flange mount
☐ Bypass/Sidepipe Mount
☐ Pipe mount
☐ Displacer replacement (please supply drawings)

Tank dimensions:
Height: _____ m/ft
Diameter: _____ m/ft
Nozzle Length: _____ cm/inch
Nozzle Diameter: _____ cm/inch
Process connection type: _____
Process connection size: _____
Distance to sidewall: _____ cm/inch

Pressure:
Normal: _____
Maximum (relief): _____

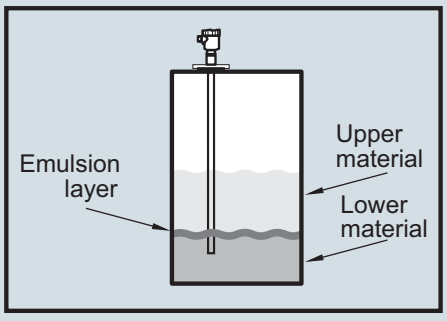
Interface Data

Upper material: _____ Lower material: _____ Emulsion layer: ☐ Yes
Upper material thickness: _____ cm/inch Lower material thickness: _____ cm/inch ☐ No (preferred)
Upper material dielectric: _____ Lower material dielectric: _____ Emulsion thickness: _____ cm/inch

Material

Material being measured: _____ ☐ Liquid ☐ Slurry
Material temperature: Norm: _____ °C/°F Max: _____ °C/°F
Coating buildup: ☐ Yes ☐ No **Turbulence:** ☐ Yes ☐ No
Maximum Viscosity: _____ **Density:** _____ kg/m³
Kinematic Viscosity (cSt) = Dynamic Viscosity (cP) / Density (kg/m³)

☐ 1 ... 5 cSt (like water)
☐ 5 ... 20 cSt (like machine oil)
☐ 20 ... 50 cSt (like cooking oil)
☐ 50 ... 100 cSt (like honey)
☐ 100 ... 500 cSt (like syrup/molasses)
☐ >500 cSt (like tar)



Installation

Power available: _____
Communications: ☐ HART/ 4 ... 20 mA
Outputs required: ☐ 4 ...20 mA
☐ Other (please specify) _____

Products recommended:

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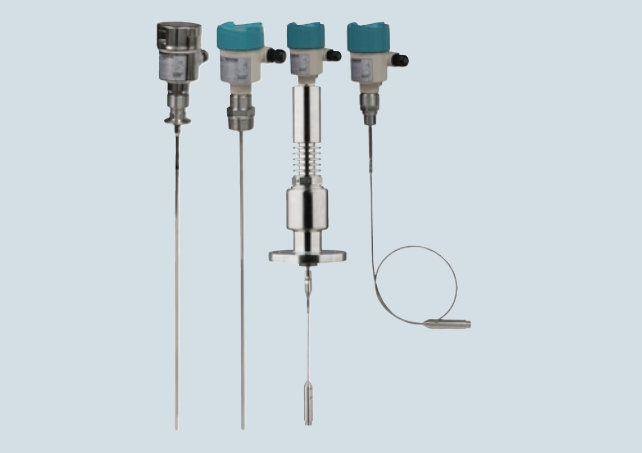
Overview



The Siemens SITRANS LG series are guided wave radar transmitters for level, level/interface, and volume measurement of liquids and solids. The Sitrans LG product line can handle changes in process conditions, high temperatures and pressures, and steam.

Benefits

- High accuracy to +/- 2 mm
- Advanced Diagnostics available for high degree of safety
- Simple menu driven display offers ease of setup
- Large range of options offers reliability in most continuous measurement applications
- Ease of maintenance through module design and field replaceable and adjustable probe options
- Perfect solution for wide range of applications from storage to interface with options for extreme pressure and temperature conditions
- Universally applicable in liquids, interface, slurries and solids
- Highly immune to build-up using auto learn function
- Wide range of Hygienic options

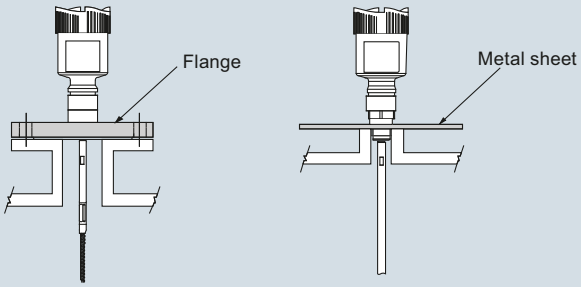
Application

The SITRANS LG series comes in four different models, depending on the applications, level of performance, and functionality required:

- SITRANS LG240 offers configuration options for your hygienic and corrosive application requirements
- SITRANS LG250 Highly flexible solution for liquid level and interface applications. Extremely versatile offering solutions for storage, separation of materials or difficult ammonia applications
- SITRANS LG260 Ideal for measuring level in medium range solids applications including; grains, plastics, and cement
- SITRANS LG270 offers configuration options for extreme conditions including high temperature and high pressure applications such as: harsh applications found in chemical, HPI and energy industries for example, LPG gas tanks, steam boilers and distillation columns

Configuration

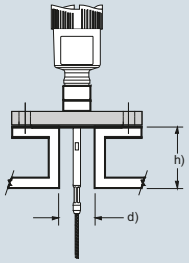
Mounting on nozzle



Installation in non-metal vessel

The guided microwave principle requires a metal surface on the process fitting. Therefore, use in plastic vessels etc. an instrument version with flange (from DN 50) or place a metal sheet, Ø > 200 mm (8 inch), beneath the process fitting when screwing it in.
Make sure that the plate has direct contact with the process fitting

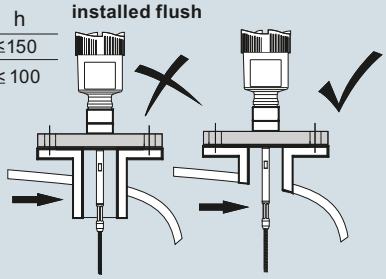
Mounting socket



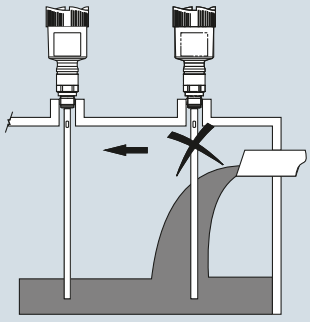
If possible, avoid sockets, mount the sensor flush with the vessel top. If this is not possible, use short sockets with small diameter.
Higher sockets or sockets with a bigger diameter can generally be used. They simply increase the upper blocking distance. Check if this is relevant for your measurement.
In such cases, always carry out a false signal suppression after installation.

d	h
DN 40 ... DN 150	≤150
> DN 150 ... DN 200	≤ 100

Socket must be installed flush



When welding the socket, make sure that the socket is flush to the vessel top.
Before beginning the welding work, remove the electronics module from the sensor. By doing this, you avoid damage to the electronics through inductive coupling.



Inflowing medium

Do not mount the instruments in or above the filling stream. Make sure that you detect the product surface, not the inflowing product.

SITRANS LG Series installation

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Technical specifications

Mode of operation	
Measuring principle	Guided wave radar measurement
Measuring range	300 ... 75 000 mm (11.81 ... 2 952.75 inch)
Output	
mA analog output with HART digital signal	4 ... 20 mA/HART (SIL optional)
Output range	
• Analog	Current: minimum 3.8 mA, maximum 20.5 mA
• Start-up current	≤ 10 mA for 5 ms after switching on, ≤ 3.6 mA
Diagnostic alarm	Failure signal current output (adjustable): last valid measured value, ≥ 21 mA, ≤ 3.6 mA
Digital communication	HART Version 7 x and multidrop compatible
Modbus	Modbus RTU, Modbus ASCII
PROFIBUS PA	
Performance	Process reference conditions according to DIN EN 61298-1
Non-linearity	
• Coaxial	
• Single rod probes	
• Interface models	See manual for more details
Resolution and repeatability	Accuracy +/- 2 mm (0.08 inch)
Accuracy	
• Coaxial/rod/cable probes	± 2 mm (0.08 inch)
• Interface models	± 5 mm (0.197 inch) (Note: Typical deviation, Interface measurement) See manual for more details
Electromagnetic compatibility (check if needed)	
• Measuring cycle time	< 500 ms
• Step response time	≤ 3 s
• Temperature Effects	The measurement error from the process conditions is in the specified pressure and temperature range of below 1 %
Rated operating conditions	
• Ambient temperature for enclosure	-40 ... +80 °C (-40 ... +176 °F)
• LCD readable temperature range	-40 ... +80 °C (-40 ... +176 °F) with display heated option
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	2
• Relative Humidity	20 ... 85 %
Medium conditions	
Dielectric constant	dK ≥ 1.4 (configuration dependent) Note: for measurement below 1.4 use probe end tracking.
Process temperature range	-196 ... +450 °C (-321 ... +842 °F)
Vessel pressure	-1 … +400 bar (-100 … +40 000 kPa)

Design	
Instrument weight (dependent on process fitting) - see manual for further details	Approx. 0.8 ... 8 kg (0.176 ... 17.64 lb)
Materials	
• Enclosure	• Plastic housing plastic PBT (Polyester) • Aluminum die-casting housing, aluminum die-casting AlSi10 mg, powder-coated- basis: polyester • Stainless steel housing, precision casting 316L • Stainless steel housing, electropolished 316L
• Degree of protection	• Type 4/NEMA 4, IP65 • Plastic housing IP66/IP67 • Aluminum and stainless steel housings are IP 66/68
• Cable inlet	2x M20x1.5 or 2 x ½" NPT
Process connections	
• Pipe thread, cylindrical (ISO 228 T1)	G¾" A, G1" A, G1½" A according to DIN 3852-A
• American pipe thread, conical (ASME B1.20.1)	¾" NPT, 1" NPT, 1½" NPT
• Flanged	DIN from DN 25, ANSI from 1"
• Hygienic	Hygienic fittings
Programming	
Local	Four button, menu-driven data entry
Handheld communicator	Hart communicator
PC	SIMATIC PDM, AMS, PACTware
Power	
2 wire Hart version	9.6 ... 35 V DC
4 wire versions	9.6 … 48 V DC, 20 … 42 V AC, 50/60 Hz and 90 … 253 V AC, 50/60 Hz
Modbus	8 … 30 V DC
PROFIBUS PA	9 ... 32 V DC
	Note: see manual for specific power based on ordered options
Certificates and approvals	
Hazardous approvals:	ATEX, FM, CSA, IECex
Hygienic approvals:	EHEDG
Overfill protection	WHG
Ship approval	ABS, CCS, GL

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	SITRANS LG240	**SITRANS LG250**	**SITRANS LG260**	**SITRANS LG270**
Industries	**Food, Beverage and Pharmaceutical**	**Chemical/HPI/Power/General**	**Cement, power generation, food, processing, mineral processing, mining**	**Chemical/HPI/Power/General**
Applications	Hygienic and corrosive applications	Liquids, storage and process vessels with agitators, vaporous liquids, interface	Cement, fly ash, grain, coal, flour, plastics	Aggressive applications in liquids, storage and process vessels with agitators, vaporous liquids, high temperatures and pressures, low dielectric media
Range	32 m	75 m	60 m	60 m
Performance	+/- 2 mm	+/- 2 mm	+/- 2 mm	+/- 2 mm
Temperature	-40 … +150 °C (-40 ... +302 °F)	-40 … +200 °C (-40 ... +392 °F)	-40 … +200 °C (-40 ... +392 °F)	-196 … +450 °C (-320.8 ... +842 °F)
Communications	• 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare	• 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare	• 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare	• 4 ... 20 mA/HART • Modbus: Modbus RTU, Modbus ASCII • PROFIBUS PA • SIMATIC PDM • DTM/FDT for PACTware • Fieldcare

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4

Selection and Ordering data	Article No.	Order Code
SITRANS LG240 ↗	**7ML5880-**	
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.	■■■■■ - ■■■■	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
Ordinary location CE[9)]	0 A	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6[9)]	0 E	
ATEX II 1G,1/2G 2G Ex ia IIC + ATEX II 1D,1/2D, 1/3D, 2D, Ex t IIIC IP66 T[11)13)15)24)]	0 H	
ATEX II 1/2G, 2G Ex d ia IIC T6[1)12)]	0 J	
ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x[1)11)12)13)15)24)]	0 K	
ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 T[11)13)15)24)]	0 N	
IEC Ex ia IIC T6[9)]	0 P	
IEC Ex ia IIC T6 + IEC IP6x T tD[11)13)15)24)]	0 Q	
IEC Ex d ia IIC T6[1)12)]	0 R	
IEC Ex d ia IIC T6 + IEC IP6x T tD[1)11)12)13)15)24)]	0 S	
FM (NI) Class I, Div. 2, Groups A, B, C, D	1 A	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F	1 B	
FM(XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[1)12)]	1 C	
CSA (NI) Class I, Div. 2, Groups A, B, C, D (DIP) Class II, III, Div. 1, Groups E, F, G[11)13)15)]	1 E	
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G	1 F	
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[1)12)]	1 G	
Probe version/Material		
Probe cable ø4 mm (0.16 inch) with gravity weight/PFA[2)7)]	A	
Probe exchangeable rod (ø8 mm) / 1.4435 (BN2), can be autoclaved (Ra < 0.76 µm)[3)7)]	B	
Probe exchangeable rod (ø8 mm) / 1.4435 (BN2), (Ra < 0.76 µm)[3)7)]	C	
Probe rod ø10 mm (0.39 inch)/PFA[2)7)]	D	
Process fitting/Material		
Clamp 2" PN 16 (ø64 mm) DIN 32676, ISO2852/1.4435 (BN2)[4)]	0 0	
Clamp 2" PN 16 (ø64 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0 1	
Clamp 2 1/2" PN 10 (ø77.5 mm) DIN 32676, ISO2852/1.4435 (BN2)[4)]	0 2	
Clamp 2 1/2" PN 10 (ø77.5 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0 3	
Clamp 3" PN 10 (ø91 mm) DIN 32676, ISO2852/1.4435 (BN2)[4)]	0 4	
Clamp 3" PN 10 (ø91 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0 5	
Clamp 4" PN6 (ø119 mm) DIN 32676, ISO2852/1.4435(BN2)[4)]	0 6	
Clamp 4" PN6 (ø119 mm) DIN 32676, ISO2852/PTFE-TFM 1600	0 7	
Bolting DN 32, PN 40 DIN11851/ 1.4435(BN2)[4)]	0 8	
Bolting DN 32, PN 40 DIN11851/PTFE-TFM 1600	1 0	
Bolting DN 40, PN 40 DIN11851/1.4435 (BN2)[4)]	1 1	
Bolting DN 40, PN 40 DIN11851/PTFE-TFM 1600	1 2	

Selection and Ordering data	Article No.	Order Code
SITRANS LG240	**7ML5880-**	
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.	■■■■■ - ■■■■	■■■
Bolting DN 50, PN 25 DIN11851/ 1.4435(BN2)[4)]	1 3	
Bolting DN 50, PN 25 DIN11851/PTFE-TFM 1600	1 4	
Bolting DN 65, PN 25 DIN11851/PTFE-TFM 1600	1 5	
Flange DN 25, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 0	
Flange DN 40, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 1	
Flange DN 50, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 2	
Flange DN 50, PN 40 Form V13, DIN 2513/ PTFE-TFM 1600	2 3	
Flange DN 65, PN 40 Form C, DIN 2513/ PTFE-TFM 1600	2 4	
Flange DN 80, PN 40 Form C, DIN 2501/ PTFE-TFM 1600	2 5	
Flange DN 100, PN 16 Form C, DIN 2501/ PTFE-TFM 1600	2 6	
Flange DN 80, PN 40 EN1092-1 Form B1/ PTFE-TFM 1600	2 7	
Flange DN 100, PN 40 EN1092-1 Form B1/ PTFE-TFM 1600	2 8	
Flange 2" 150 lb RF, ANSI B16.5/PTFE-TFM 1600	3 0	
Flange 2" 300 lb RF, ANSI B16.5/PTFE-TFM 1600	3 1	
Flange 3" 150 lb RF, ANSI B16.5/PTFE-TFM 1600	3 2	
Flange 4" 150 lb RF, ANSI B16.5/PTFE-TFM 1600	3 3	
Note: The pressure limit for all PTFE coated versions is 16 bar (per manual).		
Electronics		
Two-wire 4 ... 20mA/HART	0	
Four-wire Modbus[19)20)21)22)]	1	
Two-wire 4...20mA/HART with SIL qualification[17)18)]	2	
Four-wire 4...20mA/HART; 90...253V AC; 50/ 60 Hz[1)8)10)]	3	
Four-wire 4...20mA/HART; 9.6...48V DC; 20...42 V AC[1)8)10)]	4	
PROFIBUS PA	5	
Seal/Process temperature		
Without glass seal/-40 ... +150 °C (-40 ... +302 °F)[5)11)]	A	
FFKM (Kalrez 6221)/-20...150 °C (-4... +302 °F)	B	
EPDM (Freudenberg 70 EPDM 291)/ -20 ...130 °C (-4 ... +266 °F)	C	
Housing/Protection/Cable		
Plastic IP66/IP67 M20x1.5/blind stopper	A	
Plastic IP66/IP67 1/2" NPT/blind stopper	B	
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	C	
Aluminium/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	D	
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	E	
Aluminium double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	F	
Stainless steel (precision casting) 316L/IP66/ IP68 (0.2 bar) M20x1.5/blind stopper	G	

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Selection and Ordering data	Article No.	Order Code
SITRANS LG240	**7ML5880-**	
Guided Wave Radar sensor for Hygienic and corrosive continuous level and interface measurement of liquids.	■■■■■ -	■■■■ ■■■
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		**H**
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20x1.5/blind stopper		**J**
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		**K**
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper		**L**
Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		**M**
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/ cable gland stainless steel		**N**
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel		**P**
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20x1.5/Cable gland stainless steel		**Q**
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel		**R**
Aluminium single chamber / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass nickel-plated		**W**
Aluminium double chamber / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass nickel-plated		**X**
Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass nickel-plated		**Y**
Lengths		
Rod ø8 mm (0.31 inch)/1.4435 (Basle standard 300 ... 4 000 mm)		
300 ... 1 000 mm (11.81 ... 39.37 inch)[14]		**0**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[14]		**1**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[14]		**2**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[14]		**3**
Rod ø10 mm (0.24 inch)/PFA (300 ... 4 000 mm)		
300 mm (11.81 inch)[14]		**9 R 1 A**
500 mm (19.69 inch)[14]		**9 R 1 B**
300 ... 1 000 mm (11.81 ... 39.37 inch)[14]		**9 R 1 C**
1 001 ... 5 000 mm (39.41 ... 78.74 inch)[14]		**9 R 1 D**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[14]		**9 R 1 E**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[14]		**9 R 1 F**
Cable ø4 mm (0.16 inch)/PFA (500 ... 32 000 mm)		
500 mm (9.69 inch)		**9 R 1 G**
501 ... 1 000 mm (19.72 ... 39.37 inch)		**9 R 1 H**
1 001 ... 2 000 mm (39.37 ... 196.85 inch)		**9 R 1 J**
2 001 ... 4 000 mm (196.89 ... 393.70 inch)		**9 R 1 K**
4 001 ... 5 000 mm (393.74 ... 590.55 inch)		**9 R 1 L**
5 001 ... 10 000 mm (590.59 ... 787.40 inch)		**9 R 1 M**
10 001 ... 15 000 mm (787.44 ... 984.25 inch)		**9 R 1 N**
15 001 ... 20 000 mm (984.29 ... 1 181.10 inch)		**9 R 1 P**
20 001 ... 25 000 mm (1 181.14 ... 1 377.95 inch)		**9 R 1 Q**
25 001 ... 32 000 mm (1 377.99 ... 1 574.80 inch)		**9 R 1 R**

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "**-Z**" to Article No. and specify Order code(s).	
Supplementary electronics	
Without	**A00**
Additional current output 4 ... 20 mA[1)23)]	**A01**
Local display interface	
Without	**E00**
Mounted	**E01**
Laterally mounted[1)]	**E02**
Language of display	
German	**L00**
English	**L01**
French	**L02**
Dutch	**L03**
Italian	**L04**
Spanish	**L05**
Portuguese	**L06**
Russian	**L07**
Chinese	**L08**
Japanese	**L09**
Operating instructions	
German	**M00**
English	**M01**
French	**M02**
Spanish	**M03**

Selection and Ordering data	Order code
Further designs (optional)	
Please add "**-Z**" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	**Y01**
Enter the total length of rigid part	**Y02**
Cleaning included certificate: oil, grease and silicone free	**W01**
Identification Label (measurement loop) stainless steel	**Y17**
Identification Label (measurement loop) Foil	**Y18**
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175)[16)]	**D07**
3.1-Inspection Certificate for instrument with test data (EN 10204)[16)]	**C25**
2.2-Factory certificate for material (EN 10204)[16)]	**C15**
Quality and test plan[16)]	**C26**
Dye penetration test + 3.1 certificate/instrument[16)]	**C13**
X-ray test + 3.1 certificate/instrument[16)]	**C14**
Positive material identification test + 3.1 certificate/instrument[16)]	**C16**
Roughness test + 3.1 certificate/instrument[16)]	**C18**
Pressure test + 3.1 certificate/instrument[16)]	**C31**
Helium leak test + 3.1 certificate/instrument[16)]	**C32**
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument[16)]	**C60**
Pressure test according to Norsok + 3.1 certificate/instrument[16)]	**C61**
5 point calibration certificate + 3.1 certificate/instrument[16)]	**C62**

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Selection and Ordering data	Article No.
Additional Operating Instructions	
German	
4 … 20 mA/HART - two-wire, PFA insulated	**PBD:51041000**
4 … 20 mA/HART - two-wire, Polished version	**PBD:51041001**
4 … 20 mA/HART - four-wire PFA insulated	**PBD:51041002**
4 … 20 mA/HART - four-wire Polished version	**PBD:51041003**
Modbus- PFA insulated	**PBD:51041004**
Modbus protocol, Polished version	**PBD:51041005**
PROFIBUS PA, PFA insulated	**PBD:51041006**
PROFIBUS PA, polished version	**PBD:51041007**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
English	
4 … 20 mA/HART - two-wire PFA insulated	**PBD:51041037**
4 … 20 mA/HART - two-wire Polished version	**PBD:51041038**
4 … 20 mA/HART - four-wire PFA insulated	**PBD:51041039**
4 … 20 mA/HART - four-wire Polished version	**PBD:51041040**
Modbus, PFA insulated	**PBD:51041041**
Modbus protocol, Polished version	**PBD:51041042**
PROFIBUS PA, PFA insulated	**PBD:51041043**
PROFIBUS PA, Polished version	**PBD:51041044**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
French	
4 … 20 mA/HART - two-wire PFA insulated	**PBD:51041111**
4 … 20 mA/HART - two-wire Polished version	**PBD:51041112**
4 … 20 mA/HART - four-wire PFA insulated	**PBD:51041113**
4 … 20 mA/HART - four-wire Polished version	**PBD:51041114**
Modbus, PFA insulated	**PBD:51041115**
Modbus protocol, Polished version	**PBD:51041116**
PROFIBUS PA, PFA insulated	**PBD:51041117**
PROFIBUS PA, Polished version	**PBD:51041118**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Spanish	
4 … 20 mA/HART - two-wire PFA insulated	**PBD:51041074**
4 … 20 mA/HART - two-wire Polished version	**PBD:51041075**
4 … 20 mA/HART - four-wire PFA insulated	**PBD:51041076**
4 … 20 mA/HART - four-wire Polished version	**PBD:51041077**
Modbus, PFA insulated	**PBD:51041078**
Modbus protocol, Polished version	**PBD:51041079**
PROFIBUS PA, PFA insulated	**PBD:51041080**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	

Selection and Ordering data	Article No.
Accessories	
SITRANS LG, GWR sensor Display Module	**A5E34143449**
SITRANS LG, USB communicator	**A5E35192015**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

1) Available with Housing/Protection/Cable options E,F, L, M only
2) Available only with Process fitting/Material options 01, 03, 05, 07, 10, 12, 14 ... 33 (PTFE versions)
3) Available only with Process Fitting/Material options 00, 02, 04, 06, 08, 11, and 13 [1.4435 (BN2) options]
4) Available with Length options 0, 1, 2, 3 only (Rod ø8 mm 1.4435 options)
5) Available with Length options R1A ... R1R only (Rod ø10 mm/PFA and Cable ø4 mm/PFA options)
7) Available only with the same rod or cable diameter in Length options
8) Available with Supplementary electronic option A00 and Local display interface options E00, E01
9) Available with Supplementary electronic option A01 and approval options 0A,0E, and 0P
10) Available with Approval options 0A, 0J, 0K, 0N, 0R, OS, 1A,1 C, 1E, 1F, and 1G
11) Available with Version/Material options A and D only
12) Available with Local display interface options E00 and E01
13) Available with Seal/Process temperature C only
14) Not available with Y02
15) Available with Housing/Protection options C, D, E, F, G, H, L, M
16) Listed Certificates are not available with all configurations, please contact factory for more information
17) SIL electronic option 2 available with Approval options 0A, 0E, 0H, 0N, 0P, 0Q, 1A, 1B, 1E and 1F
18) Available with Supplementary electronic option A00, SIL electronics
19) Only available with Approval options 0A, 0J, 0K, 0R, 0S, 1A, 1C, 1E, and 1G
20) Available with housings/protection/cable options E, F, L, M and P
21) Available with supplementary electronic option A00
22) Available with Local display interface options E00, E01
23) Not available with Local display interface option E02
24) Available with Housing/protection options D, F, H and M

Note: Please consult manual for further details.

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Selection and Ordering data	Article No.	Order Code
SITRANS LG250 ↗	**7ML5881-**	
A guided wave radar sensor for continuous level and interface measurement of liquids.	■■■■■ - ■■■■	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
Ordinary location CE[16)]	**0 A**	
Shipping approval[19)28)29)]	**0 B**	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6[16)]	**0 E**	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval[19)28)29)]	**0 G**	
ATEX II 1G,1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66[16)23)40)]	**0 H**	
ATEX II 1/2G, 2G Ex d ia IIC T6[1)21)]	**0 J**	
ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 T[1)21)23)40)]	**0 K**	
ATEX II 1/2G, 2G Ex d IIC T6[14)20)]	**0 L**	
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 T[14)20)23)40)]	**0 M**	
ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 T[20)23)40)]	**0 N**	
IEC Ex ia IIC [16)]	**0 P**	
IEC Ex ia IIC T6 + IEC IP6x T tD[16)20)23)40)]	**0 Q**	
IEC Ex d ia IIC T6[1)21)23)40)]	**0 R**	
IEC Ex d ia IIC T6 + IEC IP6x T tD[1)20)21)40)]	**0 S**	
IEC Ex d IIC T6[14)20)]	**0 T**	
IEC Ex d IIC T6 + IEC IP6x T tD[14)20)23)40)]	**0 U**	
FM (NI) Class I, Div. 2, Groups A, B, C, D	**1 A**	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F	**1 B**	
FM(XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[1)21)]	**1 C**	
FM (XP) Class I, Div. 1, Groups A, B, C, D[20)]	**1 D**	
CSA (NI) Class I, Div. 2, Groups A, B, C ,D (DIP) Class II, III, Div. 1, Groups E, F, G	**1 E**	
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C,D, E, F, G	**1 F**	
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[1)21)]	**1 G**	
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[14)20)]	**1 H**	
Probe version/Material		
Probe exchangeable cable ø2 mm (0.08 inch) with gravity weight/316L[8)9)11)26)]	**A**	
Probe exchangeable cable ø2 mm (0.08 inch) center weight/316L[8)9)12)26)]	**B**	
Probe exchangeable cable ø4 mm (0.16 inch) with gravity weight/316L[8)9)11)26)]	**C**	
Probe exchangeable cable ø4 mm (0.16 inch) with center weight/316L[8)9)12)26)]	**D**	
Probe exchangeable rod ø8 mm (0.31 inch)/316L[2)8)10)11)26)]	**E**	
Probe exchangeable rod ø12 mm (0.47 inch)/316L[3)8)10)11)24)26)]	**F**	
Probe coax version ø21.3 mm (0.84 inch) with single hole/316L[8)9)11)26)27)]	**G**	
Probe coax version ø21.3 mm (0.84 inch) with multiple hole/316L[8)9)11)26)27)]	**H**	
Probe coax version ø42.2 mm (1.66 inch) with multiple hole/316L [5)8)9)11)24)26)27)]	**K**	

Selection and Ordering data	Article No.	Order Code
SITRANS LG250	**7ML5881-**	
A guided wave radar sensor for continuous level and interface measurement of liquids.	■■■■■ - ■■■■	■■■
Process fitting/Material		
Thread G 3/4" (DIN 3852-A) PN 6/316L	**0 0**	
Thread 3/4" NPT (ASME B1.20.1) PN 6/316L	**0 1**	
Thread G 3/4" (DIN 3852-A) PN 40/316L	**0 2**	
Thread 3/4" NPT (ASME B1.20.1) PN 40/316L	**0 3**	
Thread G 3/4" (DIN 3852-A) PN 100 / 316L[42)]	**0 4**	
Thread 3/4" NPT (ASME B1.20.1) PN 100/ 316L[42)]	**0 5**	
Thread G 1" (DIN 3852-A) PN 40/316L	**0 6**	
Thread 1" NPT (ASME B1.20.1) PN 40/316L	**0 7**	
Thread G 1" (DIN 3852-A) PN 100/316L[42)]	**0 8**	
Thread 1" NPT (ASME B1.20.1) PN 100/316L[42)]	**1 0**	
Thread G 1 1/2" (DIN 3852-A) PN 40/316L	**1 1**	
Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L	**1 2**	
Thread G1 1/2" (DIN 3852-A) PN 100/316L[42)]	**1 3**	
Thread 1 1/2" NPT (ASME B1.20.1) PN 100/ 316L[42)]	**1 4**	
Thread 2 NPT PN 40, ASME B1.20.1/316L[37)38)]	**1 5**	
Flange DN 25 PN 40 Form C, DIN 2501/316L	**2 0**	
Flange DN 25 PN 40 Form F, DIN 2501/316L	**2 1**	
Flange DN 40 PN 40 Form C, DIN 2501/316L	**2 2**	
Flange DN 50 PN 40 Form C, DIN 2501/316L	**2 3**	
Flange DN 50 PN 40 form V13, DIN 2513/316L	**2 4**	
Flange DN 80 PN 40 Form C, DIN 2501/316L	**2 5**	
Flange DN 80 PN 40 Form V13, DIN 2501/316L	**2 6**	
Flange DN 100 PN 16 Form C, DIN 2501/316L	**2 7**	
Flange DN 100 PN 16 Form C, DIN 2501/ 316L	**2 8**	
Flange DN 100 PN 40 Form C, DIN 2501 /316L	**3 0**	
Flange DN 100 PN 40 Form V13, DIN 2513/316L	**3 1**	
Flange DN 150 PN 16 Form C, DIN 2501/316L	**3 2**	
Flange DN 50 PN 40 EN1092-1 Form B1/316L	**3 3**	
Flange DN 80 PN 40 EN1092-1 Form B1/316L	**3 4**	
Flange 1 1/2" 150 lb RF, ANSI B16.5/316L	**3 5**	
Flange 2" 150 lb RF, ANSI B16.5/316L	**3 6**	
Flange 2" 300 lb RF, ANSI B16.5/316L	**3 7**	
Flange 3" 150 lb RF, ANSI B16.5/316L	**3 8**	
Flange 3" 300 lb RF, ANSI B16.5/316L	**4 0**	
Flange 4" 150 lb RF, ANSI B16.5/316L	**4 1**	
Flange 4" 300 lb RF, ANSI B16.5/316L	**4 2**	
Flange 6" 150 lb RF, ANSI B16.5 /316L	**4 3**	
Flange 6" 300lb RF, ANSI B16.5/316L	**4 4**	
Flange 1 1/2" 150 lb RF, ANSI B16.5/316L	**4 5**	
Electronics		
Two-wire 4 ... 20mA/HART		**0**
Four-wire Modbus[33)34)35)36)]		**1**
Two-wire 4...20mA/HART with SIL qualification[24)32)]		**2**
Four-wire 4...20mA/HART; 90...253V AC; 50/ 60Hz[1)15)17)]		**3**
Four-wire 4...20mA/HART; 9.6...48V DC; 20...42V AC[1)15)17)]		**4**
PROFIBUS PA		**5**

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Selection and Ordering data	Article No.	Order Code
SITRANS LG250	**7ML5881-**	
A guided wave radar sensor for continuous level and interface measurement of liquids.		-
Seal/Second line of defense/ Process temperature		
FKM (SHS FPM 70C3 GLT)/ without glass seal/-40 ... +80 °C (-40 ... +176 °F)[6]		A
FKM (SHS FPM 70C3 GLT)/ without glass seal/ -40 ... +150 °C (-40 ... +302 °F)		B
FKM (SHS FPM 70C3 GLT)/ with glass seal/ -40 ... +150 °C (-40 … +302°F)		C
EPDM (A+P 75.5/KW75F)/ without glass seal/ -40 ... +80 °C (-40 ... +176 °F)		D
EPDM (A+P 75.5/KW75F)/ with glass seal/ -40 ... +150 °C (-40 ... +302 °F)		E
FFKM (Kalrez 6375)/ with glass seal/ -20 ... +200 °C (-4 ... +392 °F)		F
EPDM (A+P 75.5/KW75F)/ without glass seal/ -40 ... +80 °C (-40 ... +176 °F)[6]		G
EPDM (A+P 75.5/KW75F)/ without glass seal/ -40 ... +150 °C (-40 ... +302 °F)		H
EPDM (A+P 75.5/KW75F)/ with glass seal/ -40 ... +150 °C (-40 ... +302 °F)		J
Silicone FEP coated (A+P FEP-O-SEAL)/ without glass seal/ -40 ... +80 °C (-40 ... +176 °F)[6]		K
Silicone FEP coated (A+P FEP-O-SEAL)/ without glass seal/ -40 ... +150 °C (-40 ... +302 °F)		L
Silicone FEP coated (A+P FEP-O-SEAL)/ with glass seal/ -40 ... +150 °C (-40 ... +302 °F)		M
With borosilicate glass lead through/ with glass seal/ -60 ... +150 °C (-76 ... +302 °F)		N
FFKM (Kalrez 6375)/ without glass seal/ -20 … +200 °C (-4 ... +392 °F)		P
FKM (SHS FPM 70C3 GLT)/ with glass seal/ -40 ... 80 °C (-40 ... +176 °F)[6]		Q
Housing/Protection/Cable		
Plastic IP66/IP67 M20x1.5/blind stopper		A
Plastic IP66/IP67 1/2" NPT/blind stopper		B
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/blind stopper		C
Aluminium/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		D
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper		E
Aluminium double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		F
Stainless steel (precision casting) 316L/IP66/ IP68 (0.2 bar) M20x1.5/blind stopper		L
Stainless steel (precision casting) 316L/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper		M
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20x1.5/blind stopper		N
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper		P
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper		Q
Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		R
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/ cable gland stainless steel		S
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel		T
Stainless steel (precision casting) 316L/IP66/ IP68 (0.2 bar) M20x1.5/cable gland stainless steel		U
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20x1.5/cable gland stainless steel		V
Aluminium single chamber / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass nickel-plated		W
Aluminium double chamber / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass nickel-plated		X
Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar) M20x1.5 / Cable gland brass nickel-plated		Y
Lengths		
Rod ø8 mm/316L		
300 ... 1 000 mm (11.81 ... 39.37 inch)[22]		0
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[22]		1
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[22]		2
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[22]		3
4 001 ... 5 000 mm (157.52 ... 196.85 inch)[22]		4
5 001 ... 6 000 mm (196.89 ... 236.22 inch)[22]		5
Rod ø12 mm/316L		
300 ... 1 000 mm (11.81 ... 39.37 inch)[22]		9 R 2 A
1 001 ... 2 000 mm (39.41 ... 196.85 inch)[22]		9 R 2 B
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[22]		9 R 2 C
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[22]		9 R 2 D
Cable lengths ø2 or 4 mm/316L		
501 ... 1 000 mm (19.72 ... 39.37 inch)		9 R 2 E
1 000 ... 5 000 mm (39.37 ... 196.85 inch)		9 R 2 F
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		9 R 2 G
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		9 R 2 H
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		9 R 2 J
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		9 R 2 K
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		9 R 2 L
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		9 R 2 M
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		9 R 2 N
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		9 R 2 P
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		9 R 2 Q
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		9 R 2 R
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		9 R 2 S
60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)		9 R 2 T
65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)		9 R 2 U
70 001 ... 75 000 mm (2 759.94 ... 2 952.76 inch)		9 R 2 V

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Selection and Ordering data	Article No.	Order Code
SITRANS LG250	**7ML5881-**	
A guided wave radar sensor for continuous level and interface measurement of liquids.	■■■■■ - ■■■■	■■■
Coax ø21.3 mm/316L		
300 ... 1 000 mm (11.81 ... 39.37 inch)[22]		**9 R 3 A**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[22]		**9 R 3 B**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[22]		**9 R 3 C**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[22]		**9 R 3 D**
4 001 ... 5 000 mm (157.52 ... 196.85 inch)[22]		
5 001 … 6 000 mm (196.89 … 236.22 inch)[22]		**9 R 3 F**
Coax ø42.2 mm/316L		
300 ... 1 000 mm (11.81 ... 39.37 inch)[22]		**9 R 3 G**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[22]		**9 R 3 H**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[22]		**9 R 3 J**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[22]		**9 R 3 K**
4 001 ... 5 000 mm (157.52 … 196.85 inch)[22]		**9 R 3 L**
5 001 … 6 000 mm (196.89 … 236.22 inch)[22]		**9 R 3 M**

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "**-Z**" to Article No. and specify Order code(s).	
Supplementary electronics	
Without[13]	**A00**
Additional current output 4 ... 20 mA[1)39]	**A01**
Dimensions centering weight (diameter/height)	
Without	**B00**
ø40/30 mm	**B01**
ø45/30 mm (for 2 inch tubes)	**B02**
ø75/30 mm (for 3 inch tubes)	**B03**
ø95/30 mm (for 4 inch tubes)	**B04**
ø1.57/1.18 inch (for 2 inch schedule 160)	**B05**
ø1.77/1.18 inch (for 2 inch schedule 40/80)	**B06**
ø2.95/1.18 inch (for 3 inch schedule 10/40)	**B07**
ø3.74/1.18 inch (for 4 inch schedule 80)	**B08**
Rod mounted	
Without Rod, applicable for coax or cable probe types only[18]	**C00**
Mounted	**C01**
Not mounted	**C02**
Local display interface	
Without[13]	**E00**
Mounted	**E01**
Laterally mounted[1]	**E02**
Language of display	
German	**L00**
English	**L01**
French	**L02**
Dutch	**L03**
Italian	**L04**
Spanish	**L05**
Portuguese	**L06**
Russian	**L07**
Chinese	**L08**
Japanese	**L09**
Operating instructions	
German	**M00**
English	**M01**
French	**M02**
Spanish	**M03**

Selection and Ordering data	Order code
Further designs (optional)	
Please add "**-Z**" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	**Y01**
Enter the total length of rigid part	**Y02**
Cleaning included certificate: oil, grease and silicone free	**W01**
Identification Label (measurement loop) stainless steel	**Y17**
Identification Label (measurement loop) Foil	**Y18**
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175)[30]	**D07**
3.1-Inspection Certificate for instrument with test data (EN 10204)[30]	**C25**
2.2-Factory certificate for material (EN 10204)[30]	**C15**
Quality and test plan[30]	**C26**
Dye penetration test + 3.1 certificate/instrument[30]	**C13**
X-ray test + 3.1 certificate/instrument[30]	**C14**
Positive material identification test + 3.1 certificate/instrument[30]	**C16**
Roughness test + 3.1 certificate/instrument[30]	**C18**
Pressure test + 3.1 certificate/instrument[30]	**C31**
Helium leak test + 3.1 certificate/instrument[30]	**C32**
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument[30]	**C60**
Pressure test according to Norsok + 3.1 certificate/instrument[30]	**C61**
5 point calibration certificate + 3.1 certificate/instrument[30)41]	**C62**
Additional Operating Instructions	Article No.
German	
4 … 20 mA/HART - two-wire	**PBD:51041010**
4 … 20 mA/HART - two-wire coax probe	**PBD:51041011**
4 … 20 mA/HART - four-wire	**PBD:51041012**
4 … 20 mA/HART - four-wire coax probe	**PBD:51041013**
Modbus	**PBD:51041014**
Modbus- coax probe	**PBD:51041015**
PROFIBUS PA	**PBD:51041016**
PROFIBUS PA - coax probe	**PBD:51041017**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
English	
4 … 20 mA/HART - two-wire	**PBD:51041047**
4 … 20 mA/HART - two-wire Coax probe	**PBD:51041048**
4 … 20 mA/HART - four-wire	**PBD:51041049**
4 … 20 mA/HART - four-wire Coax probe	**PBD:51041050**
Modbus	**PBD:51041051**
Modbus - coax probe	**PBD:51041052**
PROFIBUS PA	**PBD:51041053**
PROFIBUS PA - coax probe	**PBD:51041054**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	

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Selection and Ordering data	Article No.
French	
4 … 20 mA/HART - two-wire	**PBD:51041121**
4 … 20 mA/HART - two-wire Coax probe	**PBD:51041122**
4 … 20 mA/HART - four-wire	**PBD:51041123**
4 … 20 mA/HART - four-wire Coax probe	**PBD:51041124**
Modbus	**PBD:51041125**
Modbus- coax probe	**PBD:51041126**
PROFIBUS PA	**PBD:51041127**
PROFIBUS PA - coax probe	**PBD:51041128**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Spanish	
4 … 20 mA/HART - two-wire	**PBD:51041084**
4 … 20 mA/HART - two-wire Coax probe	**PBD:51041085**
4 … 20 mA/HART - four-wire	**PBD:51041086**
4 … 20 mA/HART - four-wire Coax probe	**PBD:51041087**
Modbus	**PBD:51041088**
Modbus- Coax probe	**PBD:51041089**
PROFIBUS PA	**PBD:51041090**
PROFIBUS PA - coax probe	**PBD:51041091**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Accessories	
SITRANS LG, GWR sensor Display Module	**A5E34143449**
SITRANS LG, USB communicator	**A5E35192015**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

1) Available with Housing/Protection cable options E, F, Q, and R only
2) Not available with Process fitting/Material options 04, 05, 08, 10, 13, and 14
3) Available only with Process Fitting/Material options 00 ... 10, 11, 12, 23 ... 34 and 37 ... 45 (Not available with threaded connections less than 1.5 inch and flanges < DN 50/2 inch)
4) Available with Seal option N only
5) Not available with Process fitting/Material options 00 ... 10, 11, 12, 23 ... 34 and 37 ... 45. (Not available with threaded connections less than 1.5 inch and flanges < DN 50/2 inch)
6) Available only with Process fitting/Material options 00 and 01 (options with max temp of 80 °C (176 °F) only available with PN 6 rated threaded connections)
7) Available with Version/Material option J only
8) Available only with the same diameter probe lengths
9) Available with Rod mounted option C00 only (Coax and cable version only)
10) Available with Rod mounted options C01, C02 only (rod versions only)
11) Available only with Centering weight option B00 (no centering weight option)
12) Available with Centering weight options B01 ... B08 only
13) Available only with Housing/Protection cable options E,F, Q, R, T (double chamber options only)
14) Available only with Housing/Protection cable options C, D, L, M
15) Available with Supplementary electronic option A00 and Local display interface options E00, E01
16) Available with Supplementary electronic option A01 and Approval options 0A,0E, and 0P
17) Not Available with Approval options 0B ... 0H 0P, 0Q,1B, and 1F (not available with Intrinsically Safe and shipping approvals)
19) Not available with Length options 3, 4, 5, R2C and R2D
20) Available only with Seal options C, E, F, J, M, N and Q [second line of defense (with glass seal) for all explosion proof options]
21) Available with Local display interface options E00 and E01
22) Not available with Y02
23) Available with Housing/Protection options C, D, E, F, L, M, Q, R (dust approvals)
24) SIL electronics option 2 available with Approval options 0A, 0E, 0G, 0H, 0L, 0M, 0N, 0P, 0U, 0Q, 0T, 1A, 1B, 1D, 1E, 1F and 1H
25) Available with Process Fitting/Material options 04, 05, 08, 10, 13 ... 45
26) Not available with Process fitting /Material options 04, 05, 08, 10, 13, and 14
27) Not available with Process Fitting/Material options 00 and 01
28) Available with Housing/Protection/Cable options A, B, C, D, E, F, L, M, R, S, T, and U
29) Available with Electronic option 0 only
30) Listed Certificates are not available with all configurations, please contact factory for more information
31) Not available with Process fitting/Material options 02, 03, 06, 07, 11, and 12 or threaded options below PN 100
32) Available with supplementary electronic option A00, SIL electronics
33) Available with Approvals options 0A,0J,0K,0R,0S,1A,1C,1E,and 1G
34) Available with housings/protection/cable options E,F,L,M and P
35) Available with supplementary electronic option A00
36) Available with Local display interface options E00, E01
37) Not available with version/material option K
38) Not available with Seal/Process temperature options A, G, K and Q
39) Not available with Local display interface option E02
40) Available with Housing/protection options D, F, M, R (dust approvals)
41) Available with Version/Material A, B, C, D, E and F
42) Only available with Seal/Process temperature N

Note: Please consult manual for further details.

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Selection and Ordering data	Article No.	Order Code
SITRANS LG260 ↗	**7ML5882-**	
A guided wave radar sensor for level measurement of solids.	■■■■■ -	■■■ ■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Approvals		
Ordinary location CE[4)12)]	0 A	
Shipping approval[9)10)]	0 B	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6[4)12)]	0 E	
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval[9)]	0 G	
ATEX II 1G,1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66 T[8)10)12)21)]	0 H	
ATEX II 1/2G, 2G Ex d ia IIC T6[1)7)12)]	0 J	
ATEX II 1/2G, 2G Ex d ia IIC + shipping approval[1)7)9)10)]	0 L	
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66[7)8)12)21)]	0 M	
ATEX II 1D, 1/2D, 1/3D, 2D, Ex t IIIC IP66[11)12)]	0 N	
ATEX II 1/2G, 2G Ex d IIC + shipping approval[9)10)11)]	0 Q	
ATEX II 1/2G 2G Ex d IIC + II 1D, 1/2D, 1/3D, 2D IP66[8)11)12)21)]	0 R	
ATEX II 1D, 1/2D, 2D IP6x T[8)11)12)21)]	0 S	
IEC Ex ia IIC T6[4)12)]	0 T	
IEC Ex ia IIC T6 + IEC IP6x T tD[8)11)12)21)]	0 U	
IEC Ex d ia IIC T6[1)7)12)]	1 A	
IEC Ex d ia IIC T6 + IEC IP6x T tD[7)8)12)21)]	1 B	
IEC Ex d IIC T6[11)12)]	1 C	
IEC Ex d IIC T6 + IEC IP6x T tD[8)11)12)21)]	1 D	
FM (NI) Class I, Div. 2, Groups A, B, C, D[12)]	1 F	
FM (NI) Class I, Div. 2, Groups A, B, C, D + shipping approval[9)10)]	1 G	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F[12)]	1 H	
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval[9)10)]	1 J	
FM (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[1)7)12)]	1 K	
FM (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval[1)7)9)10)]	1 L	
FM (XP) Class I, Div. 1, Groups A, B, C, D[11)12)]	1 M	
CSA (NI) Class I, Div. 2,Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G[8)12)]	1 N	
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[12)]	1 P	
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[1)7)12)]	1 Q	
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[11)12)]	1 R	
Probe version/Material		
Probe exchangeable cable ø 4 mm (0.16 inch) with gravity weight/316	A	
Probe exchangeable cable ø 6 mm (0.24 inch) with gravity weight/316[2)]	B	
Probe exchangeable rod ø 16 mm (0.63 inch) / 316L[2)6)]	E	
Process fitting/Material		
Thread G 3/4" (DIN 3852-A) PN 40/316L	0 0	
Thread 3/4" NPT (ASME B1.20.1) PN 40/316L	0 1	
Thread G 1" (DIN 3852-A) PN 40/316L	0 2	
Thread 1" NPT (ASME B1.20.1) PN 40/316L	0 3	
Thread G 1 1/2" (DIN 3852-A) PN 40/316L	0 4	
Thread 1 1/2" NPT (ASME B1.20.1) PN 40/316L	0 5	
Thread G 2" (DIN 3852-A) PN 40/316L	0 6	
Flange DN 50 PN 40 Form C, DIN 2501/316L	1 0	
Flange DN 80 PN 40 Form C, DIN 2501/316L	1 2	
Flange DN 100 PN 16 Form C, DIN 2501/316L	1 3	
Flange DN 100 PN 40 Form C, DIN 2501/316L	1 4	
Flange DN 150 PN 16 Form C, DIN 2501/316L	1 5	
Flange DN 50 PN 40 EN1092-1 Form B1/316L	1 6	
Flange DN 80 PN 40 EN1092-1 Form B1/316L	1 7	
Flange DN 100 PN16 EN1092-1 Form B1/316L	1 8	
Flange 2" 150 lb RF, ANSI B16.5/316L	3 0	
Flange 2" 300 lb RF, ANSI B16.5/316L	3 2	
Flange 3" 150 lb RF, ANSI B16.5/316L	3 3	
Flange 3" 300 lb RF, ANSI B16.5/316L	3 4	
Flange 4" 150 lb RF, ANSI B16.5/316L	3 5	
Flange 4" 300 lb RF, ANSI B16.5/316L	3 6	
Flange 6" 150 lb RF, ANSI B16.5/316L	3 7	
Electronics		
Two-wire 4 ... 20mA/HART	0	
Four-wire Modbus[16)17)18)19)]	1	
Two-wire 4...20mA/HART with SIL qualification[14)15)]	2	
Four-wire 4...20mA/HART; 90...253V AC; 50/60Hz[1)3)5)]	3	
Four-wire 4...20mA/HART; 9.6...48V DC; 20...42 V AC[1)3)5)]	4	
PROFIBUS PA	5	
Seal/Process temperature		
FKM (SHS FPM 70C3 GLT)/-40 ... +80 °C (-40 ... +176 °F)	A	
FKM (SHS FPM 70C3 GLT)/-40 ... +150 °C (-40 ... +302 °F)	B	
FFKM (Kalrez 6375)/-20 ... +200 °C (-4 ... +392 °F)	C	
EPDM (A+P 75.5/KW75F)/-40 ... +80 °C (-40 ... +176 °F)	D	
EPDM (A+P 75.5/KW75F)/-40 ... +150 °C (-40 ... +392 °F)	E	
Housing/Protection/Cable		
Plastic IP66/IP67 M20x1.5/blind stopper	A	
Plastic IP66/IP67 1/2" NPT/blind stopper	B	
Plastic 2-chamber/IP66/IP67/M20x1.5/blind stopper	C	
Plastic 2-chamber/IP66/IP67 /1/2" NPT/blind stopper	D	
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	E	
Aluminium/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	F	
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	G	
Aluminium double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	H	
Stainless Steel (precision casting) 316L/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	J	
Stainless steel (precision casting) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	K	
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	L	
Stainless steel (electropolished) 316L/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	M	
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	N	

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Selection and Ordering data	Article No.	Order Code
SITRANS LG260	**7ML5882-**	
A guided wave radar sensor for level measurement of solids.	■■■■■ -	■■■
Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper		**P**
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/ cable gland stainless steel		**Q**
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel		**R**
Stainless steel (precision casting) 316L/ IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel		**S**
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20x1.5/cable gland stainless steel		**T**
Aluminium single chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated		**W**
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated		**X**
Stainless steel single chamber (precision casting)/IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated		**Y**
Lengths		
Rod ø16 mm/316L		
500 mm (19.69 inch)		**0**
501 ... 1 000 mm (19.72 ... 39.37 inch)		**1**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)		**2**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)		**3**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)		**4**
4 001 ... 5 000 mm (157.52 ... 196.85 inch)		**5**
5 001 ... 6 000 mm (196.89 ... 216.53 inch)		**6**
Cable lengths ø2 or 4 mm/316		
501 ... 1 000 mm (19.72 ... 39.37 inch)		**9 R 2 E**
1 001 ... 5 000 mm (39.41 ... 196.85 inch)		**9 R 2 F**
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		**9 R 2 G**
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		**9 R 2 H**
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		**9 R 2 J**
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		**9 R 2 K**
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		**9 R 2 L**
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		**9 R 2 M**
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		**9 R 2 N**
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		**9 R 2 P**
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		**9 R 2 Q**
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		**9 R 2 R**
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		**9 R 2 S**

Selection and Ordering data	Article No.	Order Code
SITRANS LG260	**7ML5882-**	
A guided wave radar sensor for level measurement of solids.	■■■■■ -	■■■
Cable lengths ø6 mm/316L		
500 mm (19.69 inch)		**9 R 4 A**
501 ... 1 000 mm (19.72 ... 39.37 inch)		**9 R 4 B**
1 001 ... 5 000 mm (39.41 ... 196.85 inch)		**9 R 4 C**
5 001 ... 10 000 mm (196.89 ... 393.70 inch)		**9 R 4 D**
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		**9 R 4 E**
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		**9 R 4 F**
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		**9 R 4 G**
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		**9 R 4 H**
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		**9 R 4 J**
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		**9 R 4 K**
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		**9 R 4 L**
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		**9 R 4 M**
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		**9 R 4 N**
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		**9 R 4 P**

Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "**-Z**" to Article No. and specify Order code(s).	
Supplementary electronics	
Without[1]	**A00**
Additional current output 4 ... 20 mA[1)20)]	**A01**
Rod mounted	
Without Rod, applicable for coax or cable probe types only	**C00**
Mounted	**C01**
Not mounted	**C02**
Local display interface	
Without	**E00**
Mounted	**E01**
Laterally mounted[1]	**E02**
Language of display	
German	**L00**
English	**L01**
French	**L02**
Dutch	**L03**
Italian	**L04**
Spanish	**L05**
Portuguese	**L06**
Russian	**L07**
Chinese	**L08**
Japanese	**L09**
Operating instructions	
German	**M00**
English	**M01**
French	**M02**
Spanish	**M03**

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Selection and Ordering data	Order code
Further designs (optional)	
Please add "**-Z**" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	**Y01**
Cleaning included certificate: oil, grease and silicone free	**W01**
Identification Label (measurement loop) stainless steel	**Y17**
Identification Label (measurement loop) Foil	**Y18**
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175)[13]	**D07**
3.1-Inspection Certificate for instrument with test data (EN 10204)[13]	**C25**
2.2-Factory certificate for material (EN 10204)[13]	**C15**
Quality and test plan[13]	**C26**
Dye penetration test + 3.1 certificate/instrument[13]	**C13**
X-ray test + 3.1 certificate/instrument[13]	**C14**
Positive material identification test + 3.1 certificate/instrument [13]	**C16**
Roughness test + 3.1 certificate/instrument[13]	**C18**
Pressure test + 3.1 certificate/instrument[13]	**C31**
Helium leak test + 3.1 certificate/instrument[13]	**C32**
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument[13]	**C60**
Pressure test according to Norsok + 3.1 certificate/instrument[13]	**C61**
5 point calibration certificate + 3.1 certificate/instrument[13]	**C62**
Operating Instructions	Article No.
German	
4 … 20 mA/HART - two-wire	**PBD:51041020**
4 … 20 mA/HART - four-wire	**PBD:51041021**
Modbus	**PBD:51041022**
PROFIBUS PA	**PBD:51041023**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
English	
4 … 20 mA/HART - two-wire	**PBD:51041057**
4 … 20 mA/HART - four-wire	**PBD:51041058**
Modbus	**PBD:51041059**
PROFIBUS PA	**PBD:51041060**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
French	
4 … 20 mA/HART - two-wire	**PBD:51041131**
4 … 20 mA/HART - four-wire	**PBD:51041132**
Modbus	**PBD:51041133**
PROFIBUS PA	**PBD:51041134**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	

Selection and Ordering data	Article No.
Spanish	
4 … 20 mA/HART - two-wire	**PBD:51041094**
4 … 20 mA/HART - four-wire	**PBD:51041095**
Modbus	**PBD:51041096**
PROFIBUS PA	**PBD:51041097**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Accessories	
SITRANS LG, GWR sensor Display Module	**A5E34143449**
SITRANS LG, USB communicator	**A5E35192015**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

1) Available only with Housing/Protection/Cable Options G, H, N, P
2) Not available with Process/Fitting/Material options 00, 01, 02, and 03
3) Available with Supplementary electronic option A00 and Local display interface options E00, E01
4) Available with Supplementary electronic option A01
5) Not Available with Approval options 0B ... 0H 0L, 0Q, 1B, 1F, 1G, 1J, 1L (not available with Intrinsically Safe and shipping approvals)
6) Available with Rod Mounted options C01 and C02
7) Available with Local display interface options E00 and E01
8) Available with Housing Protection options E, F, G, H, J, K, N, P
9) Not available with Housing/Protection/Cable options L, M, and T
10) Available with Electronic option 0 only
11) Available with Seal/Process temperature option C only
12) Available with Version/Material option E only
13) Listed Certificates are not available with all configurations, please contact factory for more information
14) SIL electronics option 2 available with Approval options 0A, 0E, 0G, 0H, 0N, 0Q, 0R, 0S, 0T, 0U, 1C, 1D, 1F, 1H, 1M, 1N, 1P, and 1R
15) Available with supplementary electronic option A00, SIL electronics
16) Available with Approvals options 0A, 0J, 0K, 0R, 0S,1A,1C,1E and 1G
17) Available with housings/protection/cable options E, F, L, M and P
18) Available with supplementary electronic option A00
19) Available with Local display interface options E00, E01
20) Not available with Local display interface option E02
21) Available with Housing Protection F, H, P and K

Note: Please consult manual for further details.

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Selection and Ordering data	Article No. Order Code
SITRANS LG270 ↗	**7ML5883-**
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications	■■■■■ - ■■■■ ■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Approvals	
Ordinary location CE[3)]	**0 A**
Shipping approval[17)18)19)]	**0 B**
ATEX II 1G, 1/2G, 2G Ex ia IIC T6[3)]	**0 E**
ATEX II 1G, 1/2G, 2G Ex ia IIC T6 + shipping approval[17)18)19)]	**0 G**
ATEX II 1G,1/2G 2G Ex ia IIC + ATEX II 1D, 1/2D, 2D IP6x[16)28)]	**0 H**
ATEX II 1/2G, 2G Ex d ia IIC T6[1)10)14)]	**0 J**
ATEX II 1/2G, 2G Ex d ia IIC + ship[1)10)14)17)18)19)]	**0 L**
ATEX II 1/2G, 2G Ex d ia IIC + ATEX II 1/2D, 2D IP6x[10)14)16)28)]	**0 M**
ATEX II 1/2G, 2G Ex d IIC T6[11)]	**0 N**
ATEX II 1/2G, 2G Ex d IIC + ship approval[17)18)19)]	**0 Q**
ATEX II 1/2G, 2G Ex d IIC + ATEX II 1/2D, 2D IP6x[11)16)28)]	**0 R**
ATEX II 1D, 1/2D, 2D IP6x T[16)28)]	**0 S**
IEC Ex ia IIC T6[3)]	**0 T**
IEC Ex ia IIC T6 + IEC IP6x T tD[16)28)]	**0 U**
IEC Ex d ia IIC T6[1)10)14)]	**1 A**
IEC Ex d ia IIC T6 + IEC IP6x T tD[10)14)16)28)]	**1 B**
IEC Ex d IIC T6[11)]	**1 C**
IEC Ex d IIC T6 + IEC IP6x T tD[11)16)28)]	**1 D**
FM (NI) Class I, Div. 2, Groups A, B, C, D	**1 F**
FM (NI) Class I, Div. 2, Groups A, B, C, D + ship approval[17)18)19)]	**1 G**
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F	**1 H**
FM (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + ship approval[17)18)19)]	**1 J**
FM (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[1)10)14)]	**1 K**
FM (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G + shipping approval[1)10)17)18)19)]	**1 L**
FM (XP) Class I, Div. 1, Groups A, B, C, D	**1 M**
CSA (NI) Class I, Div. 2, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G[16)]	**1 N**
CSA (IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G	**1 P**
CSA (XP-IS) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[1)10)14)]	**1 Q**
CSA (XP) Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G[11)]	**1 R**
Version/Material	
Probe exchangeable cable ø 2 mm (0.08 inch) with gravity weight/316L[4)7)]	**A**
Probe exchangeable cable ø2 mm (0.08 inch) center weight/316L[5)7)]	**B**
Probe exchangeable cable ø4 mm (0.16 inch) with gravity weight/316L[4)7)]	**C**
Probe exchangeable cable ø4 mm (0.16 inch) with center weight/316L[5)7)]	**D**
Probe exchangeable rod ø 16 mm (0.63 inch) /316L[4)7)9)]	**E**
Probe coax version ø 42.2 mm (1.66 inch) with multiple hole/316L[4)7)]	**F**
Probe coax version ø 42.2 mm (1.66 inch); multiple hole; reference distances/ 316L[4)7)13)30)]	**G**

Selection and Ordering data	Article No. Order Code
SITRANS LG270	**7ML5883-**
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications	■■■■■ - ■■■■ ■■■
Process fitting/Material	
Thread G 1 1/2" (DIN 3852-A) PN 400/316L	**0 0**
Thread 1 1/2" NPT (ASME B1.20.1) PN 400/ 316L	**0 1**
Flange DN 50 PN 40 Form C, DIN 2501/316L	**1 0**
Flange DN 50 PN 40 form V13, DIN 2513/316L	**1 1**
Flange DN 65 PN 64 Form V13, DIN 2501/ 316L	**1 2**
Flange DN 80 PN 40 Form C, DIN 2501/316L	**1 3**
Flange DN 80 PN 40 Form V13, DIN 2501/ 316L	**1 4**
Flange DN 80 PN 100 Form L, DIN 2501/316L	**1 5**
Flange DN 100 PN 16 Form C, DIN 2501/316L	**1 6**
Flange DN 100 PN 16 Form C, DIN 2501/316L	**1 7**
Flange DN 100 PN 40 Form C, DIN 2501/316L	**1 8**
Flange DN 100 PN 40 Form V13, DIN 2513/ 316L	**2 0**
Flange DN 150 PN 16 Form C, DIN 2501/316L	**2 1**
Flange DN 50 PN 40 EN1092-1 Form B1/316L	**2 2**
Flange DN 100 PN 160 GOST 12815-80.7/ 316L	**2 3**
Flange DN 80 PN 160 Form C, DIN 2501/316L	**6 0**
Flange DN 80 PN 250 Form L, DIN 2501/316L	**6 1**
Flange DN 50 PN 160, EN1092-1 Form B1/ 316L	**6 2**
Flange DN 50 PN 160, EN1092-1 Form B2/ 316L	**6 3**
Flange DN 50 PN 320, EN1092-1 Form B1/ 316L	**6 4**
Flange DN 65 PN 250, EN1092-1 Form B1/ 316L	**6 5**
Flange DN 100 PN 160, EN1092-1 Form B2/ 316L	**6 6**
Flange 2" 150 lb RF, ANSI B16.5/316L	**3 0**
Flange 2" 300 lb RF, ANSI B16.5/316L	**3 1**
Flange 2" 600 lb RF, ANSI B16.5/316L	**3 2**
Flange 2" 1 500 lb RF, ANSI B16.5/316L	**3 3**
Flange 3" 150 lb RF, ANSI B16.5/316L	**3 4**
Flange 3" 300 lb RF, ANSI B16.5/316L	**3 5**
Flange 3" 600 lb RF, ANSI B16.5/316L	**3 6**
Flange 3" 900 lb RF, ANSI B16.5/316L	**3 7**
Flange 3" 2 500 lb RF, ANSI B16.5/316L	**3 8**
Flange 3 1/2" 600 lb RF, ANSI B16.5/316L	**4 0**
Flange 4" 150 lb RF, ANSI B16.5/316L	**4 1**
Flange 4" 300 lb RF, ANSI B16.5/316L	**4 2**
Flange 4" 600 lb RF, ANSI B16.5/316L	**4 3**
Flange 6" 150 lb RF, ANSI B16.5/316L	**4 4**
Flange 6" 300 lb RF, ANSI B16.5/316L	**4 5**
Flange 6" 600 lb RF, ANSI B16.5/316L	**4 6**
Flange 2"150 lb Fisher special return/316L	**4 7**
Flange 2" 900 lb RF, ANSI B16.5/316L	**5 0**
Flange 3" 1 500 lb RF, ANSI B16.5/316L	**5 1**
Flange 4" 900 lb RF, ANSI B16.5/316L	**5 2**
Flange 4" 1 500 lb RF, ANSI B16.5/316L	**5 3**
Flange 4" 2 500 lb RJF, ANSI B16.5/316L	**5 4**
Flange 4" 1500 lb RJF, ASME B16.5/316L	**5 5**

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Selection and Ordering data	Article No. Order Code
SITRANS LG270	**7ML5883-**
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications	-
Electronics	
Two-wire 4 ... 20mA/HART	0
Four-wire Modbus[23)24)25)26)]	1
Two-wire 4... 20mA/HART with SIL qualification[21)22)]	2
Four-wire 4... 20mA/HART; 90 ... 253V AC; 50/60Hz[1)2)6)]	3
Four-wire 4 ... 20mA/HART; 9.6 ... 48V DC; 20 ... 42 V AC[1)2)6)]	4
PROFIBUS PA	5
Seal/Second line of defense/ Process temperature	
Ceramic-graphite/with glass seal/ -196 ... +280 °C (-321 ... +536 °F)	A
Ceramic-graphite /with glass seal/ -196 ... +450 °C (-321 ... +842 °F)	B
Housing/Protection/Cable	
Plastic IP66/IP67 M20x1.5/blind stopper	A
Plastic IP66/IP67 1/2" NPT/blind stopper	B
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	C
Aluminium/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	D
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	E
Aluminium double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	F
Stainless steel (precision casting) 316L/IP66/ IP68 (0.2 bar) M20x1.5/blind stopper	L
Stainless steel (precision casting) 316L/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper	M
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20x1.5/blind stopper	N
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) 1/2" NPT/blind stopper	P
Stainless steel double chamber/IP66/IP68 (0.2 bar) M20x1.5/blind stopper	Q
Stainless steel double chamber/IP66/IP68 (0.2 bar) 1/2" NPT/blind stopper	R
Aluminium/IP66/IP68 (0.2 bar) M20x1.5/ cable gland stainless steel	S
Aluminium double chamber/IP66/IP68 (0.2 bar) M20x1.5/cable gland stainless steel	T
Stainless steel (precision casting) 316L/IP66/ IP68 (0.2 bar) M20x1.5/cable gland stainless steel	U
Stainless steel (electropolished) 316L/IP66/ IP68 (0.2 bar) M20x1.5/cable gland stainless steel	V
Aluminium single chamber / IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated	W
Aluminium double chamber / IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated	X
Stainless steel single chamber (precision casting) / IP66/IP68 (0.2 bar) M20x1.5/cable gland brass nickel-plated	Y

Selection and Ordering data	Article No. Order Code
SITRANS LG270	**7ML5883-**
A guided wave radar sensor for continuous level and interface measurement of liquids in aggressive applications	-
Lengths	
300 mm (11.81 inch)[15)]	0
500 mm (19.69 inch)[15)]	1
501 ... 1 000 mm (19.72 ... 39.37 inch)[15)]	2
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[15)]	3
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[15)]	4
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[15)]	5
4 001 ... 5 000 mm (157.52 ... 196.85 inch)[15)]	6
5 001 ... 6 000 mm (196.89 ... 216.53 inch)[15)]	7
300 mm (11.81 inch)[15)]	9 R 2 E
Cable lengths ø2 or 4 mm/316L	
501 ... 1 000 mm (19.72 ... 39.37 inch)	9 R 2 F
1 000 ... 5 000 mm (39.37 ... 196.85 inch)	9 R 2 G
5 001 ... 10 000 mm (196.89 ... 393.70 inch)	9 R 2 H
10 001 ... 15 000 mm (393.74 ... 590.55 inch)	9 R 2 J
15 001 ... 20 000 mm (590.59 ... 787.40 inch)	9 R 2 K
20 001 ... 25 000 mm (787.44 ... 984.25 inch)	9 R 2 L
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)	9 R 2 M
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)	9 R 2 N
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)	9 R 2 P
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)	9 R 2 Q
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)	9 R 2 R
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)	9 R 2 S
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)	
Coax ø42.2 mm/316L	
300 ... 1 000 mm (11.81 ... 39.37 inch)[15)]	9 R 3 G
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[15)30)]	9 R 3 H
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[15)]	9 R 3 J
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[15)]	9 R 3 K
4 001 ... 5 000 mm (157.52 ... 196.85 inch)[15)]	9 R 3 L
5 001 ... 6 000 mm (196.89 ... 236.22 inch)[15)]	9 R 3 M

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Selection and Ordering data	Order code
Further designs (mandatory)	
Please add "**-Z**" to Article No. and specify Order code(s).	
Supplementary electronics	
Without	**A00**
Additional current output 4 ... 20 mA[1)27)]	**A01**
Dimensions centering weight (diameter/height)	
Without	**B00**
ø40/30 mm	**B01**
ø45/30 mm (for 2 inch tubes)	**B02**
ø75/30 mm (for 3 inch tubes)	**B03**
ø95/30 mm (for 4 inch tubes)	**B04**
ø1.57/1.18 inch (for 2 inch schedule 160)	**B05**
ø1.77/ 1.18 inch (for 2 inch schedule 40/80)	**B06**
ø2.95/1.18 inch (for 3 inch schedule 10/40)	**B07**
ø3.74/ 1.18 inch (for 4 inch schedule 80)	**B08**
Rod mounted	
Without Rod, applicable for coax or cable probe types only[8)]	**C00**
Mounted	**C01**
Not mounted	**C02**
Local display interface	
Without	**E00**
Mounted	**E01**
Laterally mounted[1)]	**E02**
Language of display	
German	**L00**
English	**L01**
French	**L02**
Dutch	**L03**
Italian	**L04**
Spanish	**L05**
Portuguese	**L06**
Russian	**L07**
Chinese	**L08**
Japanese	**L09**
Operating instructions	
German	**M00**
English	**M01**
French	**M02**
Spanish	**M03**
Russian	**L07**
Chinese	**L08**
Japanese	**L09**

Selection and Ordering data	Order code
Further designs (optional)	
Please add "**-Z**" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	**Y01**
Enter the total length of rigid part [to a maximum of 100 mm (4 inch) (cable version only)]	**Y02**
Cleaning included certificate: oil, grease and silicone free	**W01**
Identification Label (measurement loop) stainless steel	**Y17**
Identification Label (measurement loop) Foil	**Y18**
3.1-Inspection Certificate for material (EN 10204 NACE MR 0175)[20)]	**D07**
3.1-Inspection Certificate for instrument with test data (EN 10204)[20)]	**C25**
2.2-Factory certificate for material (EN 10204)[20)]	**C15**
Quality and test plan[20)]	**C26**
Dye penetration test + 3.1 certificate/instrument[20)]	**C13**
X-ray test + 3.1 certificate/instrument[20)]	**C14**
Positive material identification test + 3.1 certificate/instrument[20)]	**C16**
Roughness test + 3.1 certificate/instrument[20)]	**C18**
Pressure test + 3.1 certificate/instrument[20)]	**C31**
Helium leak test + 3.1 certificate/instrument[20)]	**C32**
Ferrite measuring accuracy to DIN32514-1 + 3.1 certificate/instrument[20)]	**C60**
Pressure test according to Norsok + 3.1 certificate/instrument[20)]	**C61**
5 point calibration certificate + 3.1 certificate/instrument[20)29)]	**C62**
Additional Operating Instructions	Article No.
German	
4 … 20 mA/HART - two-wire	**PBD:51041025**
4 … 20 mA/HART - two-wire coax probe	**PBD:51041026**
4 … 20 mA/HART - four-wire	**PBD:51041027**
4 … 20 mA/HART - four-wire coax probe	**PBD:51041028**
Modbus	**PBD:51041029**
Modbus, Coax probe	**PBD:51041030**
PROFIBUS PA	**PBD:51041031**
PROFIBUS PA, Coax probe	**PBD:51041032**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
English	
4 … 20 mA/HART - two-wire	**PBD:51041062**
4 … 20 mA/HART - two-wire coax probe	**PBD:51041063**
4 … 20 mA/HART - four-wire	**PBD:51041064**
4 … 20 mA/HART - four-wire coax probe	**PBD:51041065**
Modbus	**PBD:51041066**
Modbus, Coax probe	**PBD:51041067**
PROFIBUS PA	**PBD:51041068**
PROFIBUS PA, Coax probe	**PBD:51041069**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	

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Selection and Ordering data	Article No.
French	
4 … 20 mA/HART - two-wire	**PBD:51041136**
4 … 20 mA/HART - two-wire coax probe	**PBD:51041137**
4 … 20 mA/HART - four-wire	**PBD:51041138**
4 … 20 mA/HART - four-wire coax probe	**PBD:51041139**
Modbus	**PBD:51041140**
Modbus, Coax probe	**PBD:51041141**
PROFIBUS PA	**PBD:51041142**
PROFIBUS PA, Coax probe	**PBD:51041143**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Spanish	
4 … 20 mA/HART - two-wire	**PBD:51041099**
4 … 20 mA/HART - two-wire coax probe	**PBD:51041100**
4 … 20 mA/HART - four-wire	**PBD:51041101**
4 … 20 mA/HART - four-wire coax probe	**PBD:51041102**
Modbus	**PBD:51041103**
Modbus, Coax probe	**PBD:51041104**
PROFIBUS PA	**PBD:51041105**
PROFIBUS PA, Coax probe	**PBD:51041105**
Note: Operating instructions should be ordered as a separate line on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the operating instructions library.	
Accessories	
SITRANS LG, GWR sensor Display Module	**A5E34143449**
SITRANS LG, USB communicator	**A5E35192015**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

1) Available with Housing/Protection/Cable options E, F, Q, R, and T
2) Available with Supplementary electronic option A00 and Local display interface options E00, E01
3) Available with Supplementary electronics A01
4) Available with Centering weight option B00 only
5) Available with Centering weight options B01 ... B08 only
6) Available with Approval options 0A, 0B, 0J, 0K, 0N, 0R, OS,1A, 1C, 1E, 1F, and 1G
7) Available only with the same diameter probe lengths
8) Available with Version/Material options A, B, C, D, F, G
9) Available with Rod Mounted options C01 and C02
10) Available with Local display interface options E00 and E01
11) Available with Housing/Protection Cable options C, D, L, M only
12) Version/Material Hastelloy C22, temperature is limited to 400 °C (752 °F)
13) Minimum probe length (Y01) is 1 250 mm (49 inch)
14) Available with Housing/Protection Cable options E, F, Q, and R
15) Not available with Y02
16) Available with Housing protection options C, D, E, F, L, M, Q, and R
17) Not available with Housing/Protection/Cable options N, P, and V
18) Available with Electronic option 0 only
19) Not available with Version/Material options E, F, and G
20) Listed Certificates are not available with all configurations, please contact factory for more information
21) SIL electronics option 2 available with Approval options 0A, 0E, 0G, 0H, 0N, 0Q, 0R, 0S, 0T, 0U, 1C, 1D, 1F, 1H, 1M, 1N, 1P, and 1R
22) Available with Supplementary electronic option A00, SIL electronics
23) Available with Approval options 0A, 0H, 0K, 0R, 0S, 0U, 1A, 1C, 1D, 1E, 1F, 1H, 1N, 1P, and 1R
24) Available with housings/protection/cable options E, F, L, M and P
25) Available with supplementary electronic option A00
26) Available with Local display interface options E00, E01
27) Not available with Local display interface option E02
28) Available with Housing protection options D, F, M, and R
29) Available with Version/Material A, B, C, D, and E
30) Accuracy is application dependent, please consult factory

Note: Please consult manual for further details.

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Selection and Ordering data	Article No.
SITRANS LG Replacement Probes ↗	**7ML5841-** ■■■■■ - ■■■ **0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Instrument	
LG240[4)5)]	**0**
LG250[6)]	**1**
LG260[7)]	**2**
LG270[9)10)]	**3**
Probe Type	
Exchangeable cable ø 2 mm with gravity weight/316[1)]	**A A**
Exchangeable cable ø2 mm center weight/316[2)]	**A C**
Exchangeable cable ø4 mm without weight/316[1)]	**A D**
Exchangeable cable ø4 mm with gravity weight/316[1)]	**A E**
Exchangeable cable ø 4 mm with center weight/316[2)]	**A G**
Exchangeable cable ø 6 mm with gravity weight/316[1)8)]	**A H**
Exchangeable rod ø8 mm / 316L[1)]	**A P**
Exchangeable rod ø 8 mm/1.4435 (acc. to Basle Standard)[1)]	**A Q**
Exchangeable rod ø12 mm / 316L[1)]	**A U**
Exchangeable rod ø16 mm / 316L[1)]	**A W**
Process fitting	
Thread to 1 1/2 inch	**0**
Thread to 2 inch	**1**
Flange less than DN 50 or 2 inch	**2**
Flange greater or equal to DN 50 or 2 inch or hygienic fitting (not for safety in gold 25 x 46 mm)	**3**
Dimension centering weight	
Without	**0**
ø40 mm/ 30 mm	**1**
ø45 mm/ 30 mm (for 2 inch tubes)	**2**
ø75 mm/ 30 mm (for 3 inch tubes)	**3**
ø95 mm/ 30 mm (for 4 inch tubes)	**4**
ø1.57 inch/ 1.18 inch (for 2 inch Schedule 160)	**5**
ø1.77 inch/ 1.18 inch (for 2 inch Schedule 40/80)	**6**
ø2.95 inch/ 1.18 inch (for 3 inch Schedule 10/40)	**7**
ø3.74 inch/ 1.18 inch (for 4 inch Schedule 80)	**8**
Certificates	
Without	**0**
2.2 Material certificate	**1**
3.1 Material certificate	**2**
Lengths	
Rod ø8 mm	
300 ... 1 000 mm (11.81 ... 39.37 inch)	**A A**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**A B**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	**A C**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	**A D**
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	**A E**
5 001 ... 6 000 mm (196.89 ... 236.22 inch)	**A F**

Selection and Ordering data	Article No.
SITRANS LG Replacement Probes	**7ML5841-** ■■■■■ - ■■■ **0**
Rod ø12 mm	
300 ... 1 000 mm (11.81 ... 39.37 inch)	**A G**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**A H**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	**A J**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	**A K**
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	**A L**
5 001 ... 6 000 mm (196.89 ... 236.22 inch)	**A M**
Rod ø16 mm	
300 ... 1 000 mm (11.81 ... 39.37 inch)	**A N**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**A P**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	**A Q**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	**A R**
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	**A S**
5 001 ... 6 000 mm (196.89 ... 236.22 inch)	**A T**
Cable Lengths ø2mm and 4 mm/316	
501 ... 1000 mm (19.72 ... 39.37 inch)	**A U**
1 001 ... 5 000 mm (39.41 ... 196.85 inch)	**A V**
5 000 ... 10 000 mm (196.89 ... 393.70 inch)	**A W**
10 001 ... 15 000 mm (393.74 ... 590.55 inch)	**A X**
15 001 ... 20 000 mm (590.59 ... 787.40 inch)	**A Y**
20 001 ... 25 000 mm (787.44 ... 984.25 inch)	**B A**
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)	**B B**
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)	**B C**
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)	**B D**
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)	**B E**
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)	**B F**
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)	**B G**
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)	**B H**
60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)	**B J**
65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)	**B K**
70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch)	**B L**

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Selection and Ordering data	Article No.	
SITRANS LG Replacement Probes	**7ML5841-** ■■■■■ - ■■■ **0**	
Cable Lengths ø6mm/316		
501 ... 1000 mm (19.72 ... 39.37 inch)		**B M**
1 001 ... 5 000 mm (39.41 ... 196.85 inch)		**B N**
5 000 ... 10 000 mm (196.89 ... 393.70 inch)		**B P**
10 001 ... 15 000 mm (393.74 ... 590.55 inch)		**B Q**
15 001 ... 20 000 mm (590.59 ... 787.40 inch)		**B R**
20 001 ... 25 000 mm (787.44 ... 984.25 inch)		**B S**
25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)		**B T**
30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)		**B U**
35 001 ... 40 000 mm (1 377.99 ... 1 574.80 inch)		**B V**
40 001 ... 45 000 mm (1 574.84 ... 1 771.65 inch)		**B W**
45 001 ... 50 000 mm (1 771.69 ... 1 968.50 inch)		**B X**
50 001 ... 55 000 mm (1 968.54 ... 2 165.35 inch)		**B Y**
55 001 ... 60 000 mm (2 165.39 ... 2 362.20 inch)		**C A**
60 001 ... 65 000 mm (2 362.24 ... 2 559.06 inch)		**C B**
65 001 ... 70 000 mm (2 559.09 ... 2 755.91 inch)		**C C**
70 001 ... 75 000 mm (2 755.94 ... 2 952.76 inch)		**C D**

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Enter the total insertion length in plain text description	**Y01**
Enter the total length of rigid part (cable version only)	**Y02**

1) Available with Dimension centering weight: Without Option 0
2) Available with Dimension centering weight: Option 1 ... 8
3) All Probe types are only available with corresponding Probe lengths
4) Available with Probe type Option AQ
5) Available with Process fitting option 2 and 3
6) Not available with Probe type option AQ and AW
7) Available with Probe type option AE, AH, and AW
8) Not available with Process fitting option 2
9) Available with Probe type option AA, AC, AE, AG and AW
10) Available with Process fitting 0 and 3

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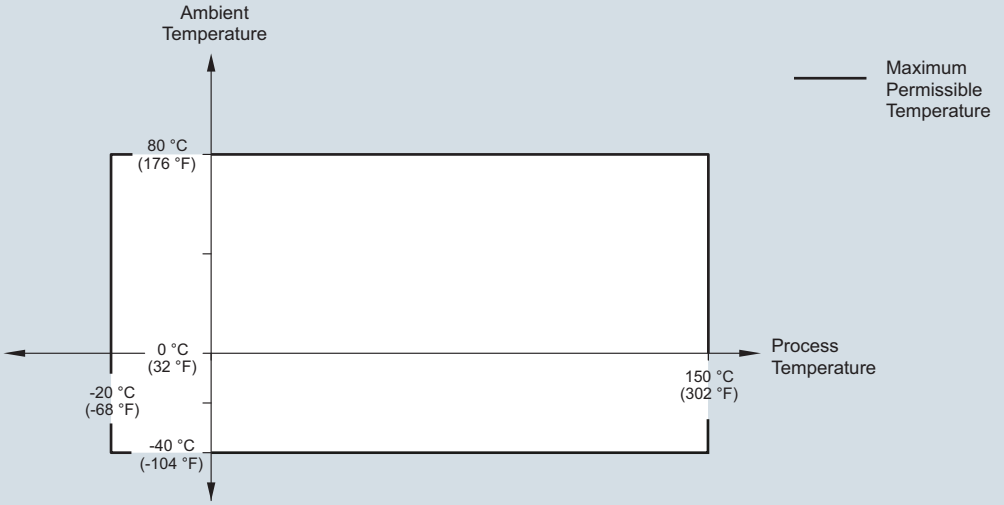
Characteristic curves

SITRANS LG240, Ambient temperature/process temperature, standard version



SITRANS LG240, Ambient temperature/process temperature curve

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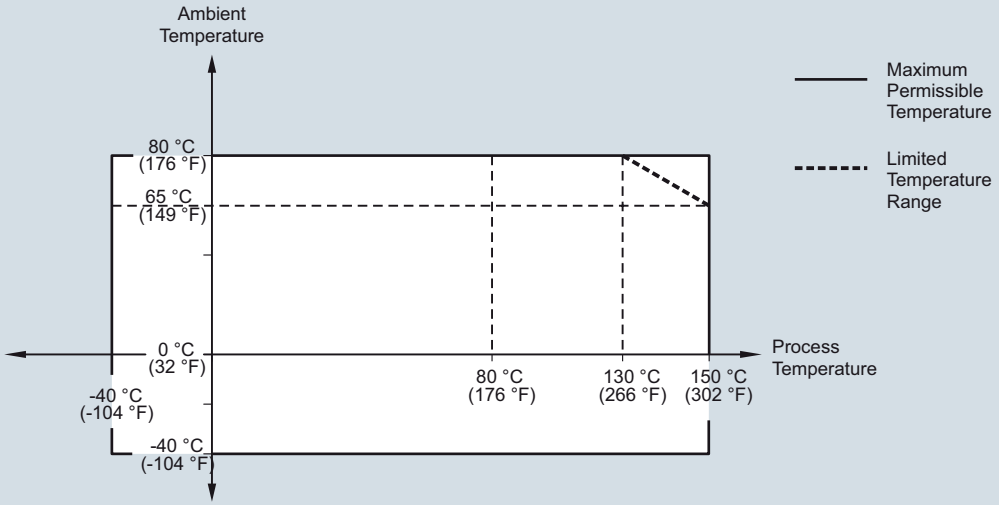
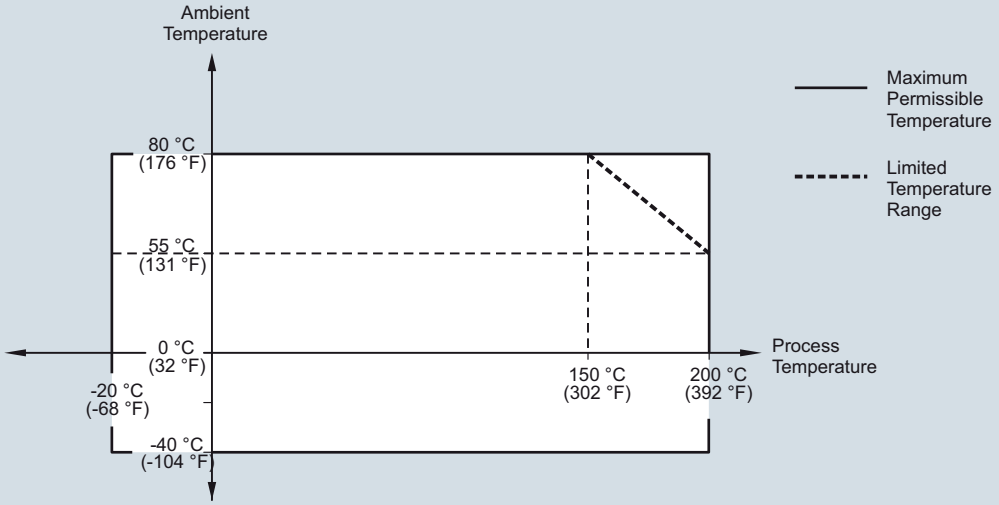
SITRANS LG250, Ambient temperature/process temperature, standard version



SITRANS LG250, Ambient temperature/process temperature, temperature adapter version



SITRANS LG250, Ambient temperature/process temperature curves

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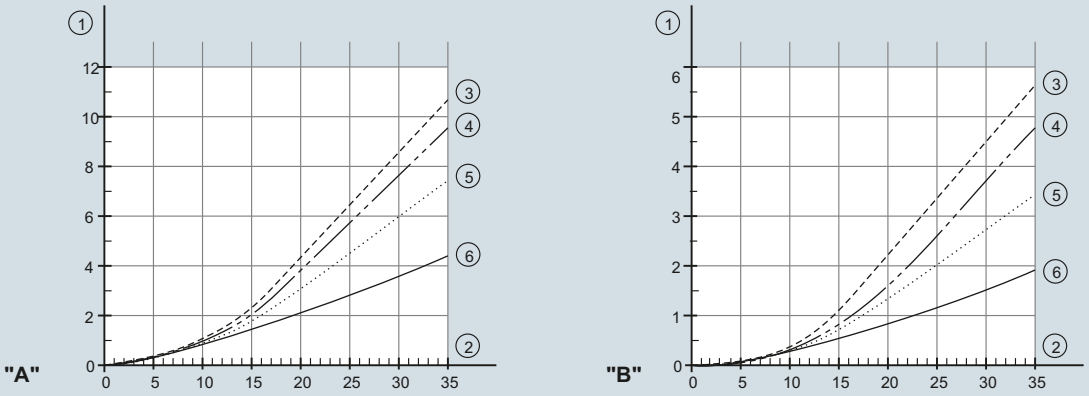
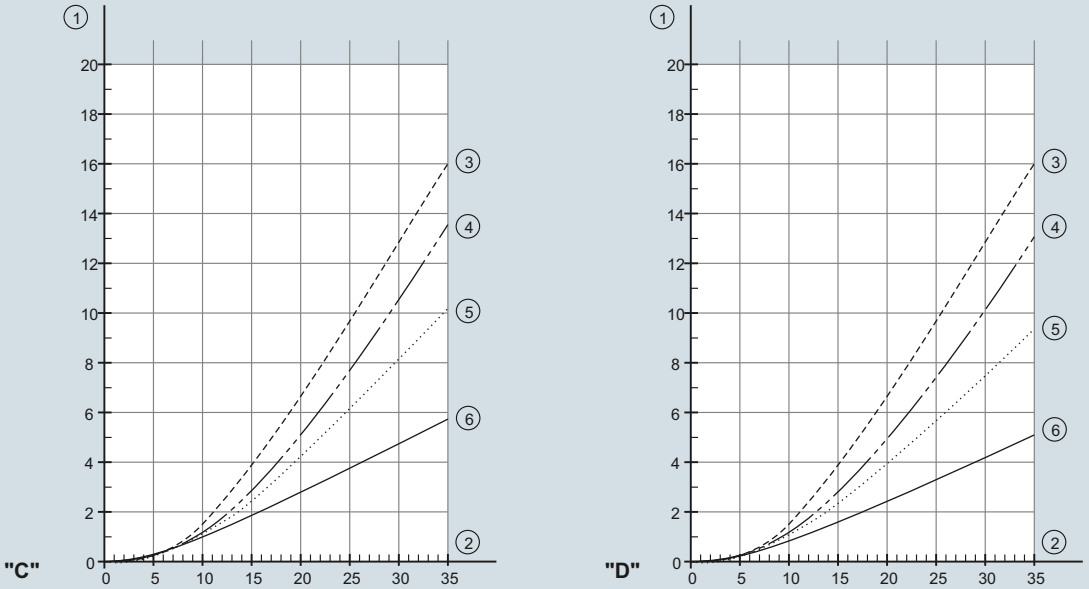
SITRANS LG260, Maximum tensile load with cereals and plastic granules - cable: ø 4 mm (0.157 inch)



A. Cereals
B. Plastic granules
1. Tensile force in kN (the determined value must be multiplied with safety factor 2)
2. Cable length in m
3. Vessel diameter 12 m (39.37 ft)
4. Vessel diameter 9 m (29.53 ft)
5. Vessel diameter 6 m (19.69 ft)
6. Vessel diameter 3 m (9.843 ft)

SITRANS LG260, Maximum tensile load with sand and cement - cable: ø 4 mm (0.157 inch)



C. Sand
D. Cement
1. Tensile force in kN (the determined value must be multiplied with safety factor 2)
2. Cable length in m
3. Vessel diameter 12 m (39.37 ft)
4. Vessel diameter 9 m (29.53 ft)
5. Vessel diameter 6 m (19.69 ft)
6. Vessel diameter 3 m (9.843 ft)

SITRANS LG260, Maximun tensile load curves

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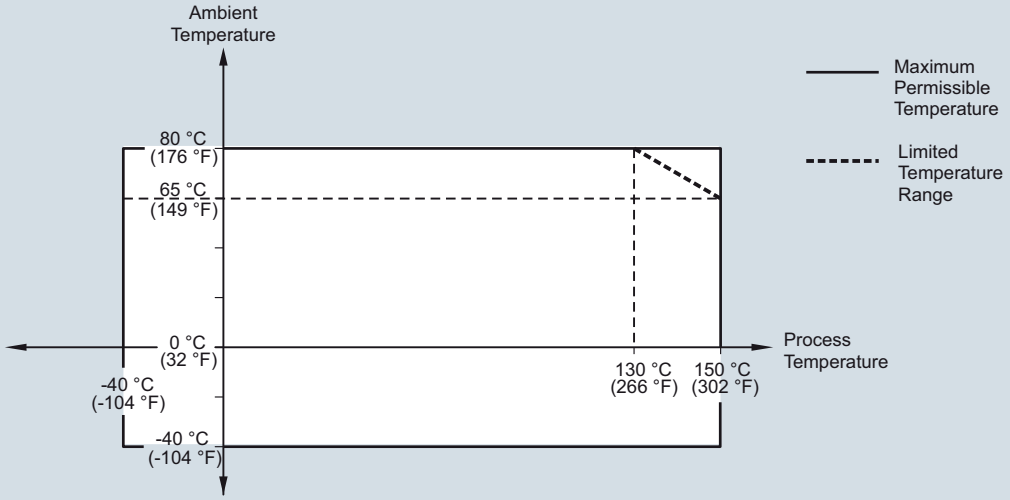
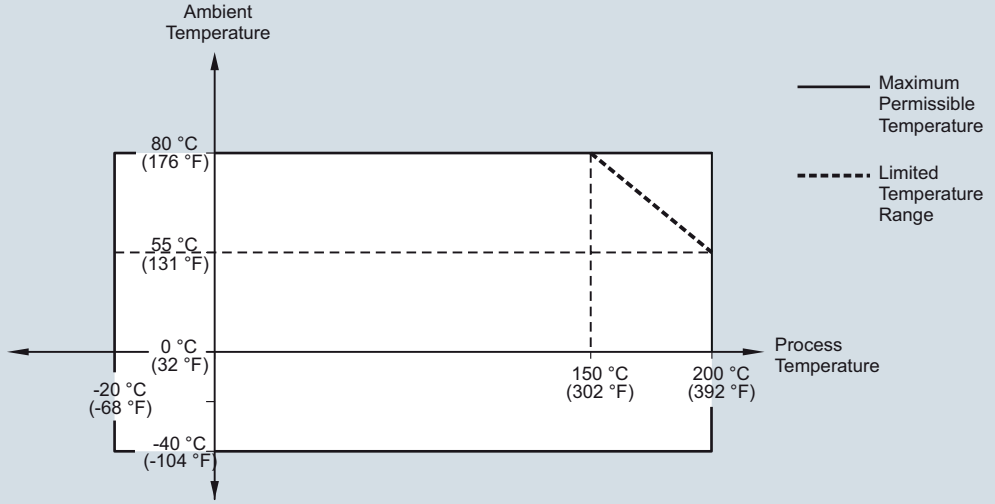
SITRANS LG260, Ambient temperature/process temperature, standard version
Cable version with ø 4 mm (0.157 inch)
Cable version, PA coated with ø 6 mm (0.236 inch)



SITRANS LG260, Ambient temperature/process temperature, temperature adapter version
Cable version with ø 4 mm (0.157 inch)
Cable version, PA coated with ø 6 mm (0.236 inch)



SITRANS LG260, Ambient temperature/process temperature curves

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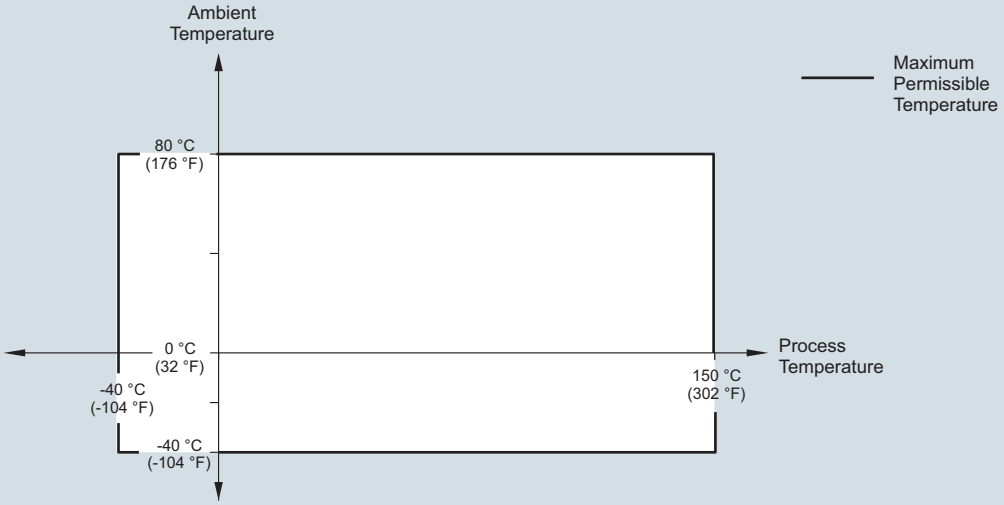
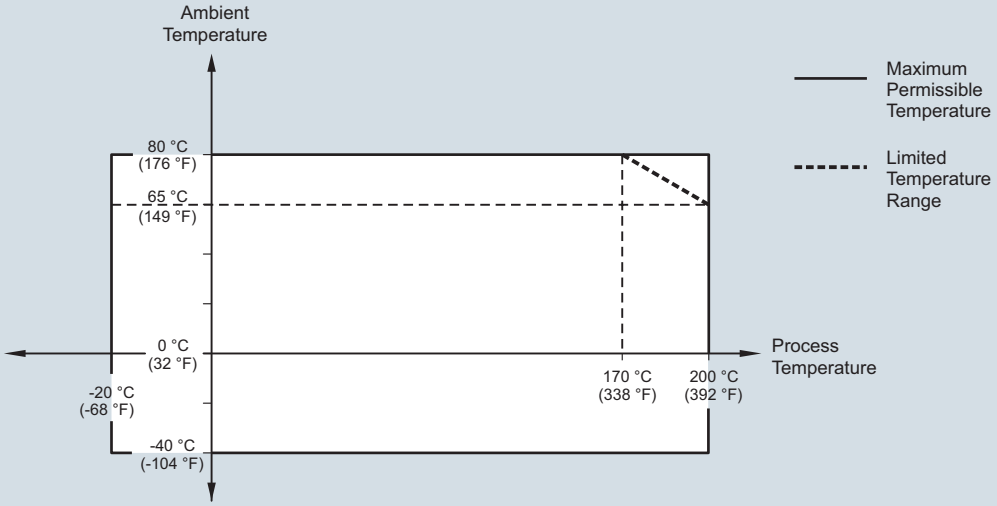
4

SITRANS LG260, Ambient temperature/process temperature, standard version
Cable version with ø 6 mm (0.236 inch)
Cable version, PA coated with ø 11 mm (0.433 inch)



SITRANS LG260, Ambient temperature/process temperature, temperature adapter version
Cable version with ø 6 mm (0.236 inch)
Cable version, PA coated with ø 11 mm (0.433 inch)



SITRANS LG260, Ambient temperature/process temperature curves

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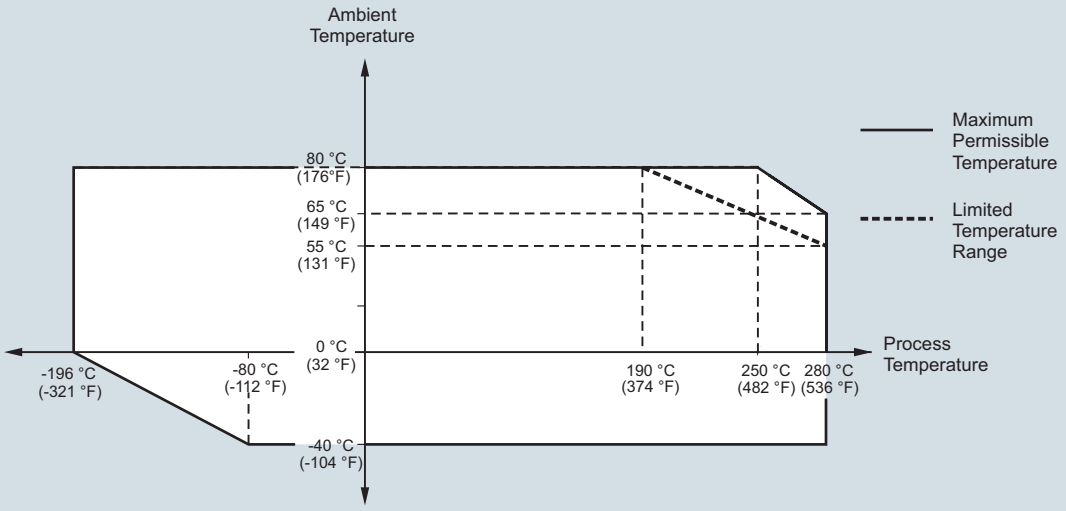
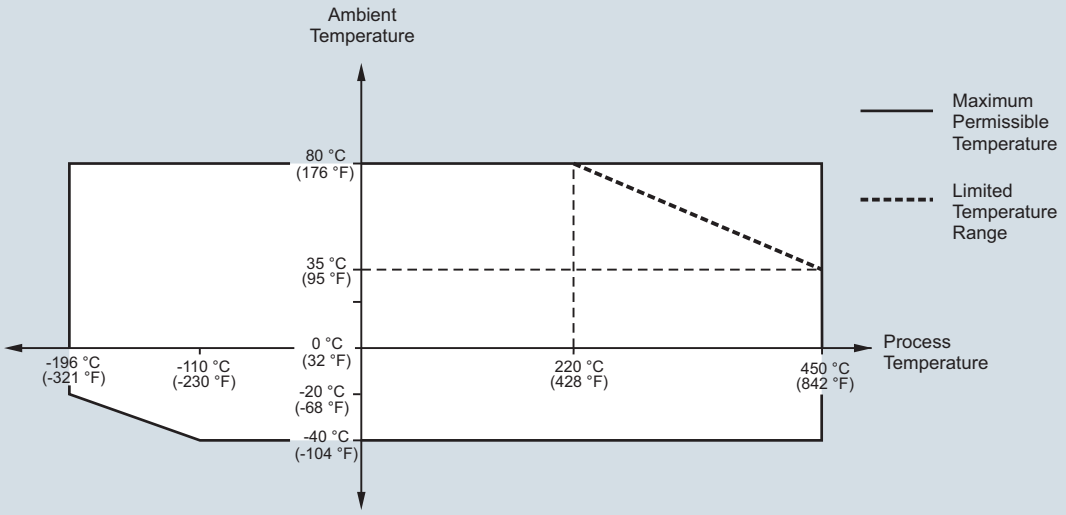
SITRANS LG270, Ambient temperature/process temperature (-196 ... +280 °C/-321 ... +536 °F version)



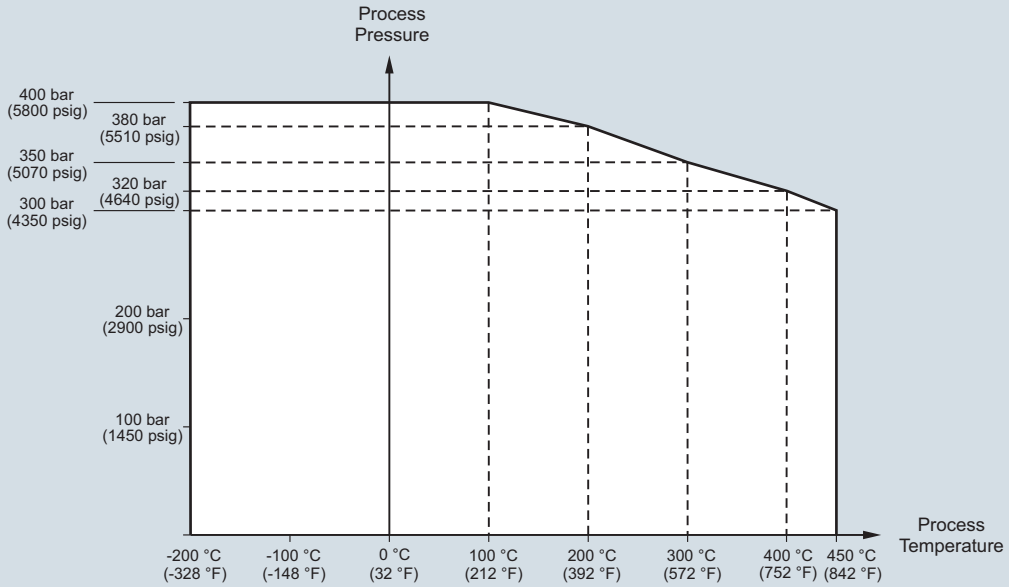
SITRANS LG270, Ambient temperature/process temperature (-196 ... +450 °C/-321 ... +842 °F version)



SITRANS LG270, Ambient temperature/process temperature curves

© Siemens AG 2015

SITRANS LG270, Process pressure/process temperature (-196 … +450 °C/-321 … +842 °F version)

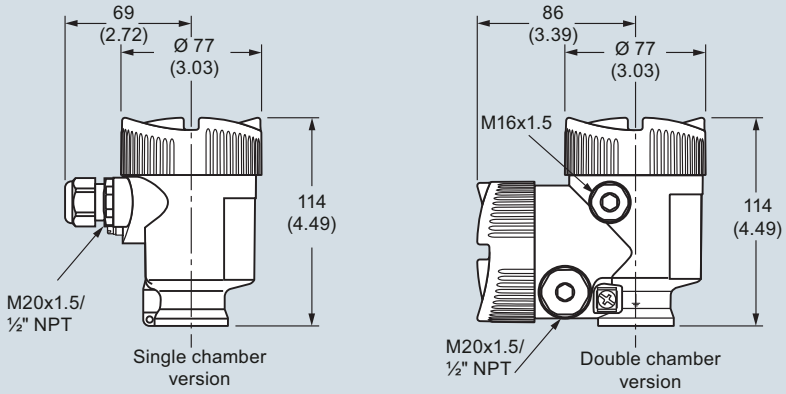


SITRANS LG270, Process pressure/process temperature curve

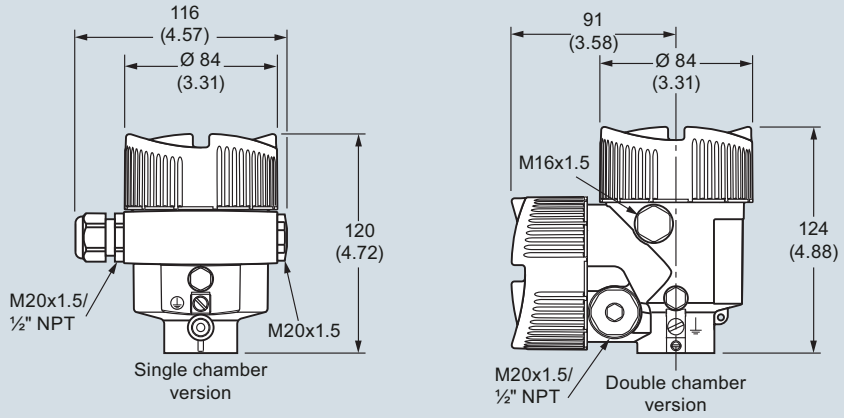
© Siemens AG 2015

Dimensional drawings

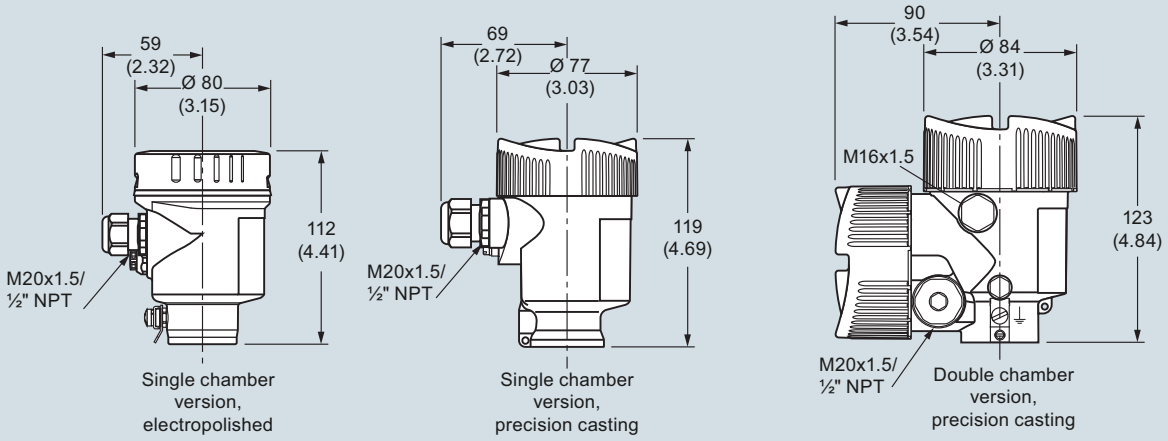
LG Series plastic housing



LG Series aluminum housing



LG Series stainless steel housing



Note: For integrated display and adjustment module the housing is 9 (0.35) higher for all housing options

SITRANS LG series, dimensions in mm (inch)

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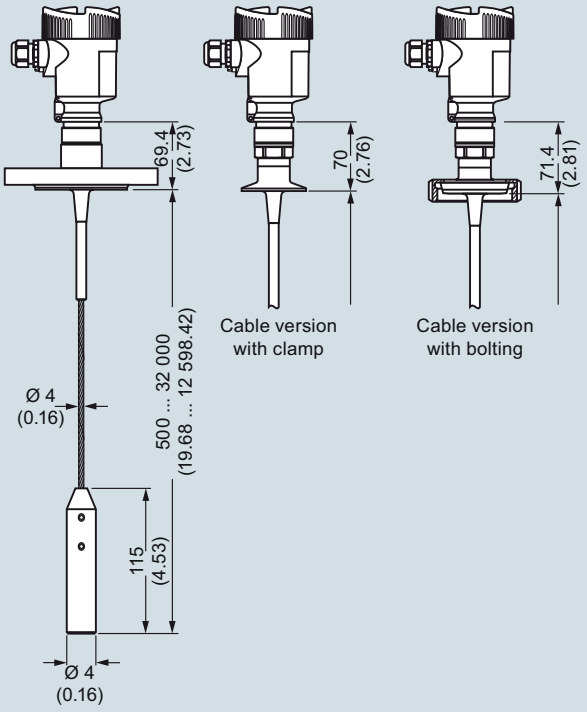
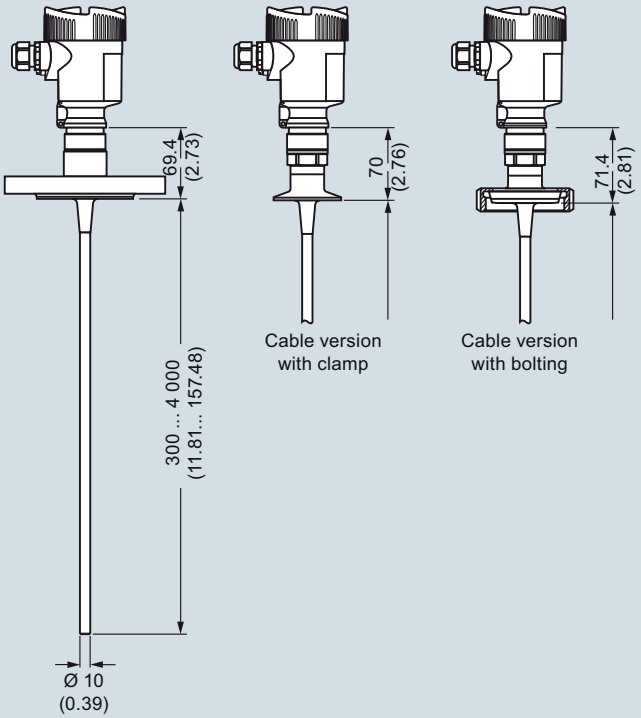
4

SITRANS LG240

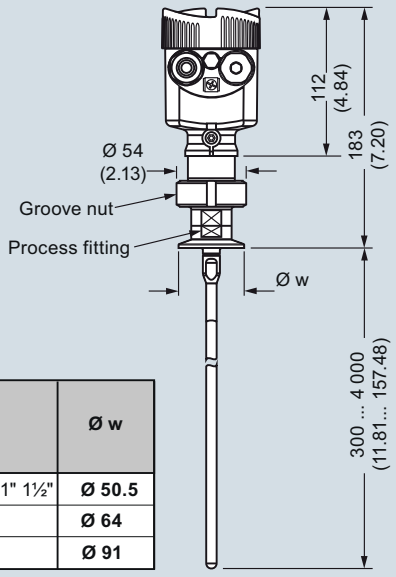
Cable version Ø 4 (0.157), PFA coated



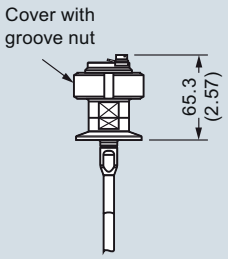
Rod version Ø 10 (0.394), PFA coated



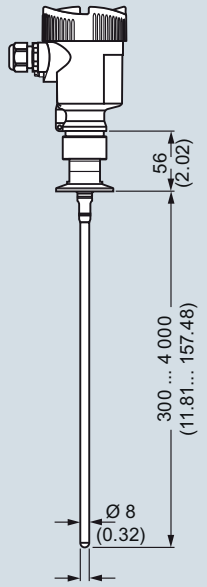
Autoclaved version



	Ø w
DIN DN 25 DN 32 DN 40/ 1" 1½"	**Ø 50.5**
DIN DN 50/ 2"	**Ø 64**
DIN DN 65/ 3"	**Ø 91**



Rod version Ø 8 (0.315), polished



SITRANS LG240, dimensions in mm (inch)

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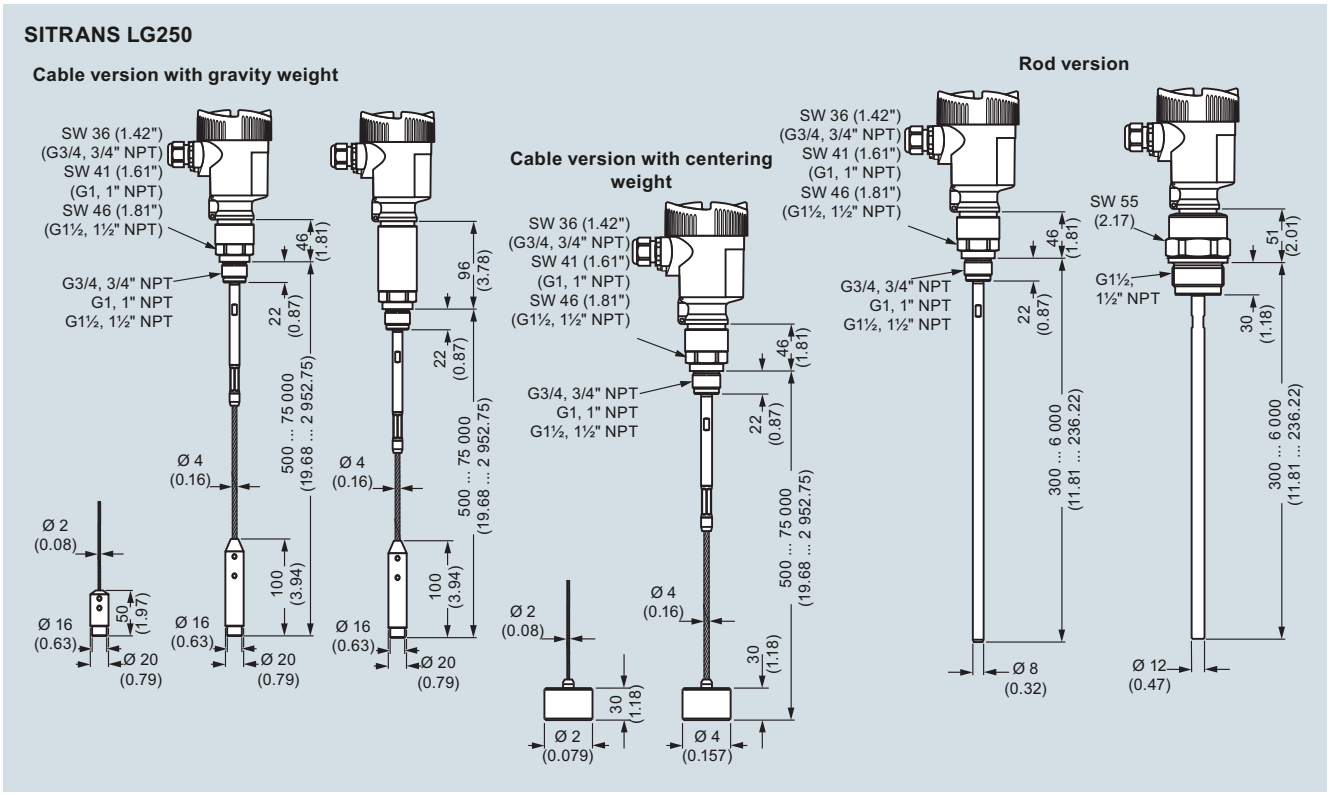
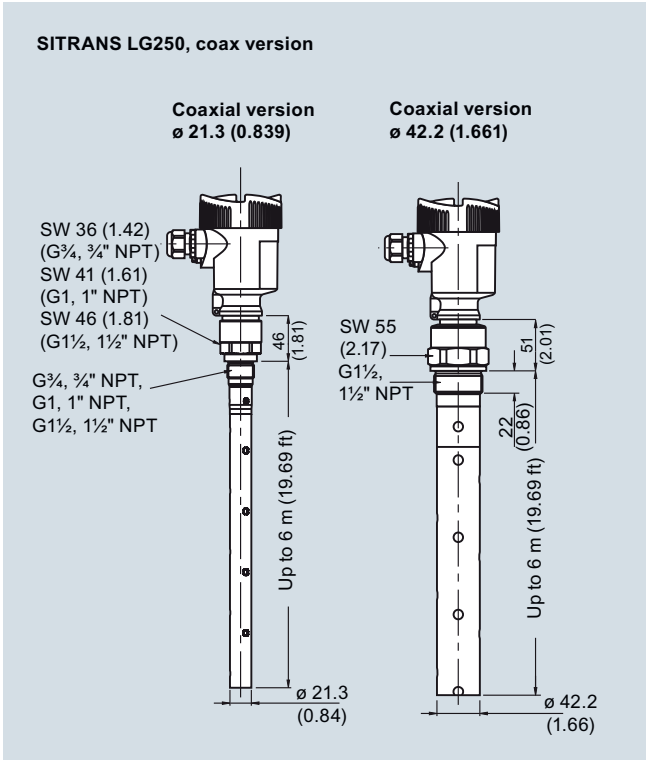


SITRANS LG250, dimensions in mm (inch)



SITRANS LG250, dimensions in mm (inch)

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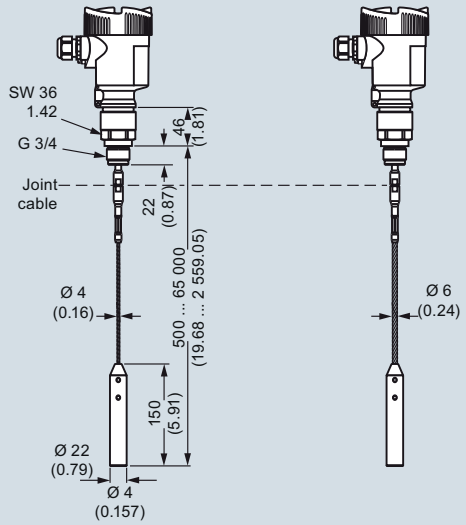
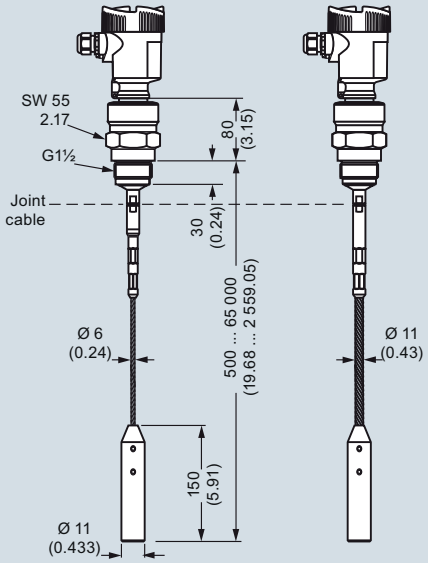
SITRANS LG260

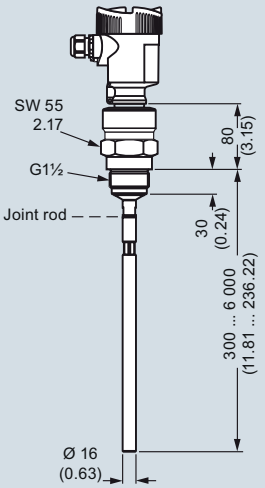
Cable version Ø 4 (0.157)/ Ø 6 (0.236)- PA coated



Cable version Ø 6 (0.236)/ Ø 11 (0.433)- PA coated



Rod version Ø 16 (0.63)



SITRANS LG260, dimensions in mm (inch)

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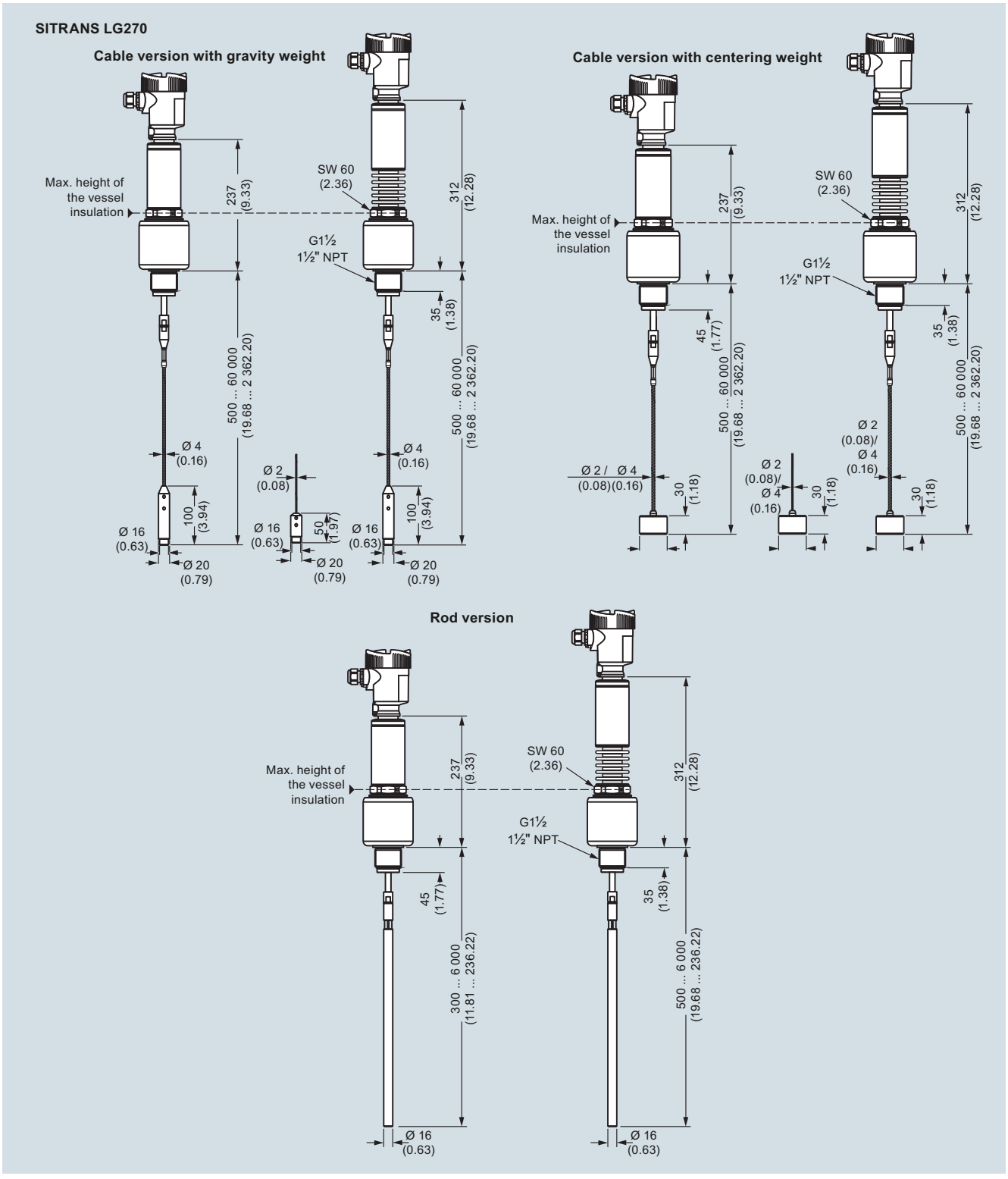

SITRANS LG270, dimensions in mm (inch)

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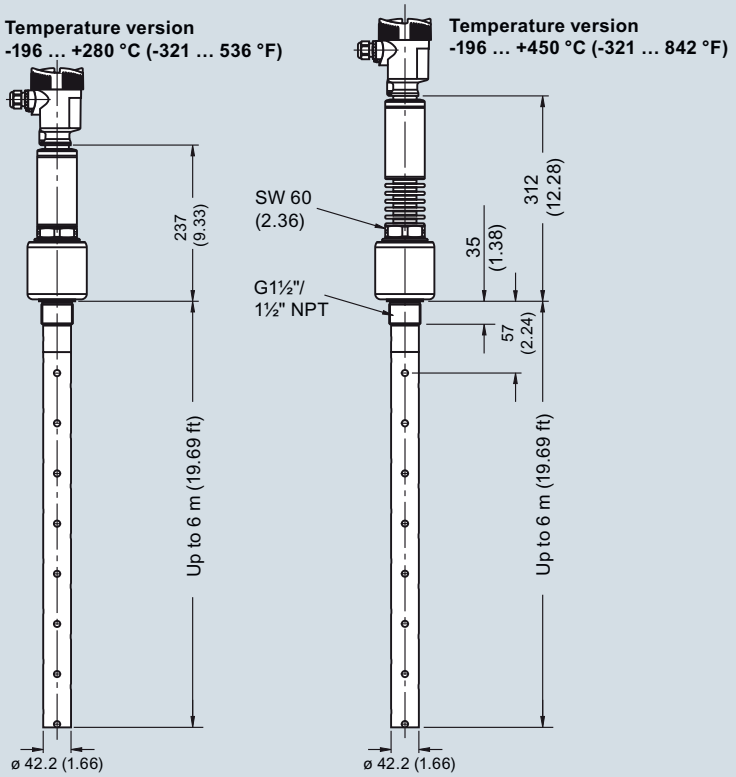
SITRANS LG270, coax version



SITRANS LG270, dimensions in mm (inch)

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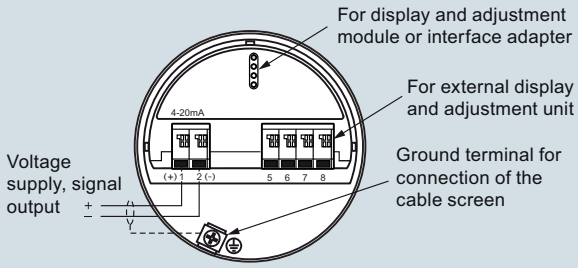
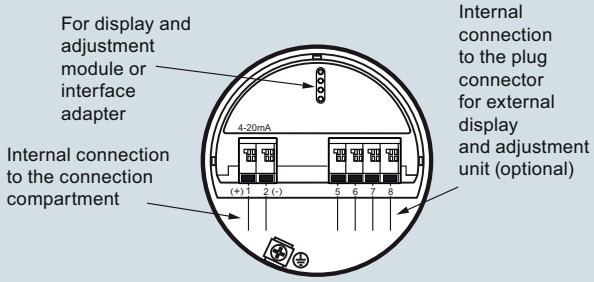
Schematics

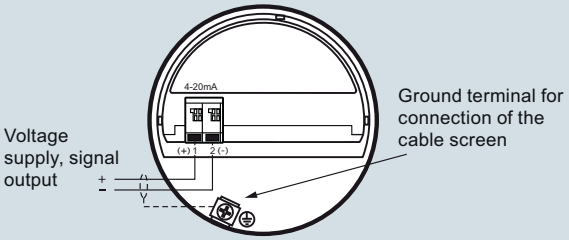
2-wire HART electronic option, electronics and connection compartment, single chamber housing



2-wire HART electronic option, electronics compartment, double chamber housing



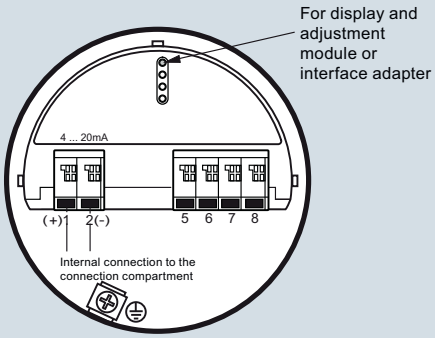
2-wire HART electronic option, connection compartment, Ex-d-ia double chamber housing



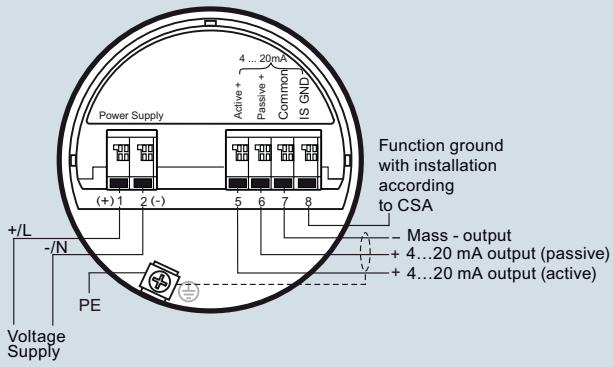
Note: All 2-wire HART connections and electronics are also available with SIL

SITRANS LG series, connections

4-wire HART electronic option, electronics compartment, double chamber housing



4-wire electronic option, connection compartment with double chamber housing with mains voltage



SITRANS LG series, connections

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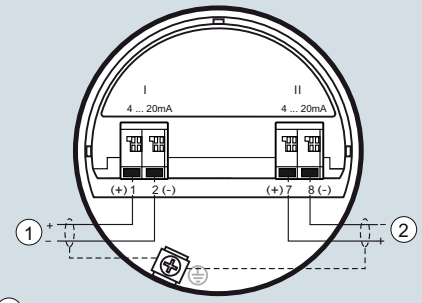
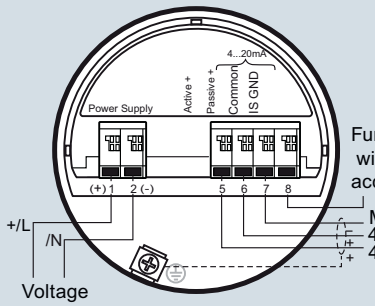
Supplementary electronics



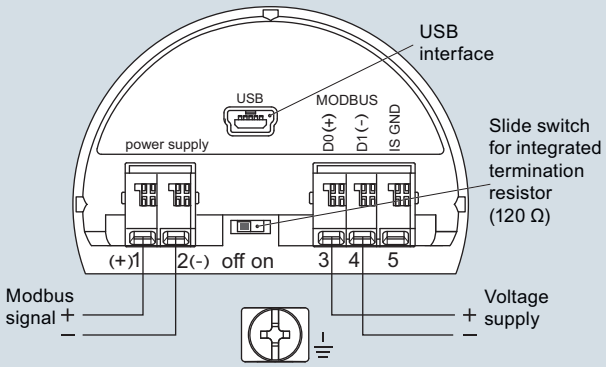
1 First current output (I) - Voltage supply and signal output (HART)
2 Second current output (II) - Voltage supply and signal output (without HART)

Connection compartment with low voltage

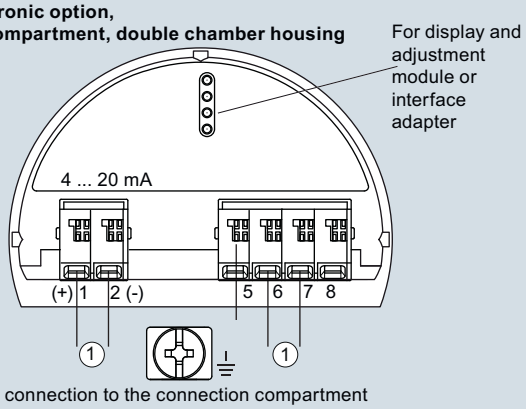


SITRANS LG series, connections

Modbus electronic option, connection compartment



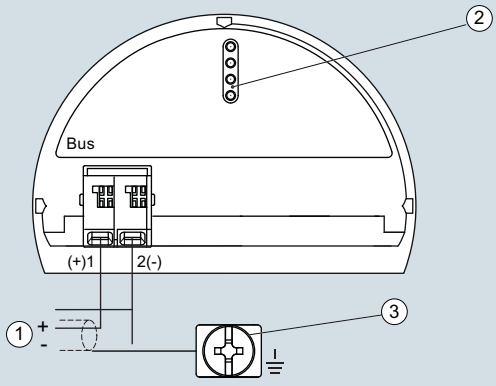
Modbus electronic option, electronics compartment, double chamber housing



1 Internal connection to the connection compartment

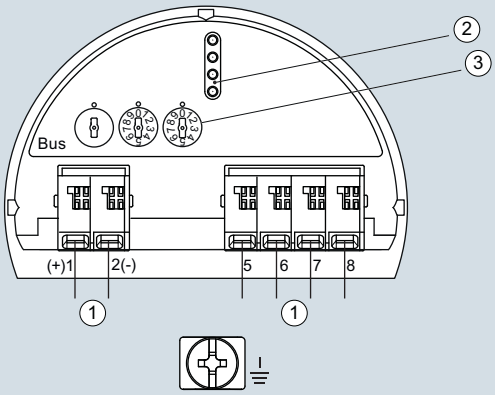
SITRANS LG series, connection

PROFIBUS electronic option, connection compartment, double chamber housing



1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 Ground terminal for connection of the cable screen

PROFIBUS electronic option, electronics compartment, double chamber housing



1 Internal connection to the connection compartment
2 Contact pins for the display and adjustment module or interface adapter
3 Selection switch for bus address

LG series, connection

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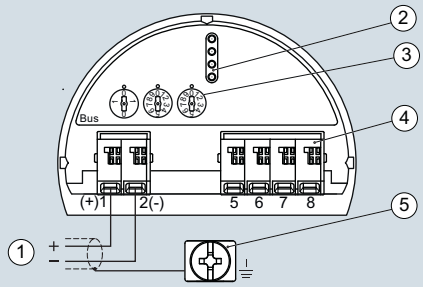
PROFIBUS electronic option, electronics and connection compartment, single chamber housing



1 Voltage supply, signal output
2 For display and adjustment module or interface adapter
3 Selection switch for bus address
4 For external display and adjustment unit
5 Ground terminal for connection of the cable screen

LG series, connection

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SITRANS LC300

Overview

SITRANS LC300 is an inverse frequency shift capacitance continuous level transmitter for liquids and solids applications. It is ideal for standard industrial applications in chemical, hydrocarbon processing, food and beverage, water, wastewater, and mining, aggregate, and cement industries.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup in active shield section
- Highly accurate and reliable PFA-lined probes
- Integrated local LCD display
- 2-wire (4 to 20 mA) current loop design
- Current signaling according to NAMUR NE 43
- Push-button calibration and programming
- Stilling well (ground tube) version for low dielectric media and non-metallic vessels

Application

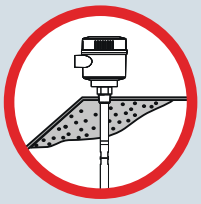
SITRANS LC300 is a 2-wire level measurement instrument combining a sophisticated, yet easy-to-adjust microprocessor with field-proven probes. It is available in four versions: rod, rod with stilling well, cable with PFA insulation, and cable without PFA insulation.

Materials with low or high dielectric properties are accurately measured and Active-Shield technology helps in ignoring the effects of buildup or condensation near vessel nozzle.

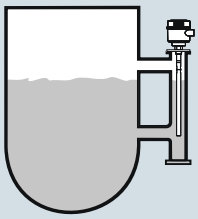
- Key Applications: conductive and non-conductive media including: liquids and solids in standard industrial processes, bulk solids applications involving dust, and chemical processes involving vapor

Configuration

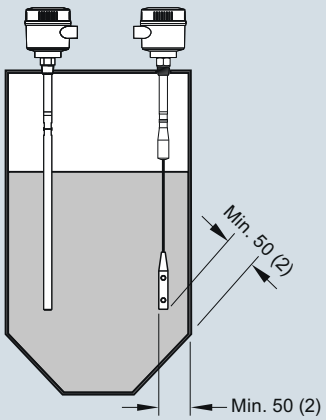
Installation



Build up of material in active shield area does not affect switch operation.



Mounting on a bypass



Install probe at least 50 (2) from tank wall.
Note angle of repose and adjust accordingly.

SITRANS LC300 installation, dimensions in mm (inch)

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Technical specifications

Input	
Measuring range	1.66 ... 3 300 pF
Span	Min. 3.3 pF
Output	
Loop current	Continuous signal 4 ... 20 mA/ 20 ... 4 mA according to NAMUR 43
Accuracy (transmitter)	
Temperature stability	0.25 % of actual capacitance value
Non-linearity and repeatability	< 0.4 % of full scale and actual measurement value
Accuracy	Deviation < 0.5 % of actual measurement value
Rated operating conditions[1]	
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F)[2]
• Installation category	I
• Pollution degree	4
• Ingress protection	Type 4/NEMA 4/IP65 (optional IP68)
Installation conditions	
• Location	Indoor/outdoor
Process pressure	-1 ... +35 bar g (-14.6 ... +511 psi g)
Process temperature	-40 ... +200 °C (-40 ... +392 °F)[3]
Min. dielectric constant ε_r	1.5
Design	
Material	
• Enclosure	Aluminum, epoxy-coated
Probe diameter	
• Rod version	19 mm (0.75 inch) with PFA jacket
• Cable version	9 mm (0.35 inch) with PFA jacket, 6 mm (0.24 inch) without PFA jacket
Active shield length	
• Rod version	Threaded: 120 mm (4.72 inch) Flanged: 100 mm (3.94 inch)
• Cable version	Threaded: 125 mm (4.92 inch) Flanged: 105 mm (4.13 inch)
Process connection of probe	
• Threaded rod mounting	¾",1",1¼", 1½" NPT [(Taper), ANSI/ASME B1.20.1] R ¾",1", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G ¾",1", 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Threaded cable mounting	1½" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Flange mounting	1 ... 4" ASME, DN 25 ... 100
Enclosure cable inlet	2 x ½" NPT or 2 x M20x1.5
Power supply	12 ... 30 V DC any polarity, 2-wire current loop circuit
User Interface	
Display	Local LCD, 4 digit, each 0 ... 9 and limited alpha characters

Safety	
Measurement current signaling	According to NAMUR NE 43, signal 3.8 ... 20.5 mA, fault ≤ 3.6 or ≥ 21 mA (22 mA)
Certificates and approvals	
General	CE, $CSA_{US/C}$, FM, RCM
Dust Ignition Proof (Intrinsically Safe probe circuit)	
• Canada/USA	FM/CSA: Class II, Div. 1, Groups E, F, G Class III T4
• Europe	ATEX 1/2 D T100 °C
Flame Proof (Intrinsically Safe probe circuit)	
• Europe	ATEX II 1/2 G EEx d [ia] IIC T6 ... T1 ATEX II 1/2 D T100 °C
Explosion Proof (Intrinsically Safe probe circuit)	
• Canada/USA	Class I, Div. 1, Groups A, B, C, D Class II, Div. 1, Groups E, F, G Class III T4
Marine	Bureau Veritas Type Approval ABS Type Approval
Overfill Protection	AIB-Vincotte
Other	Pattern Approval (China)

1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/16.

2) Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F)

3) Not suitable for steam environments

Design: Probe			
	Rod version	**Stilling well version**	**Cable version**
Length	Min. 300 mm (12 inch), max. 5 000 mm (197 inch)	Min. 300 mm (12 inch), max. 5 000 mm (197 inch)	Min. 1 000 mm (40 inch), max. 25 000 mm (984 inch)
Sensor wetted parts	PFA, 316L stainless steel	PFA, 316L stainless steel	316L stainless steel or 316L stainless steel with PFA insulation
O-ring seal material	FKM or FFKM	FKM or FFKM	FKM or FFKM
Thermal isolator	Optional	Optional	Optional
Options	N/A	N/A	Mounting eye for PFA insulated cable version

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SITRANS LC300

Selection and Ordering data	Article No.
SITRANS LC300, rod version ↗	**7ML5670-**
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	■■■■ - ■■■ 0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Threaded, 316L stainless steel	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	0 A
1" NPT [(Taper), ANSI/ASME B1.20.1]	0 B
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
Welded flange, 316L stainless steel, raised face[1]	
1" ASME, 150 lb	5 A
1" ASME, 300 lb	5 B
1" ASME, 600 lb	5 C
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
Welded flange, 316L stainless steel, Type A flat faced[1]	
DN 25, PN 16	6 A
DN 25, PN 40	6 B
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
Probe Length (from flange face or including process thread)	
Add Order code Y01 and plain text: "Insertion length ... mm"	
300 ... 1 000 mm (11.81 ... 39.37 inch)	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	B
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	C
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	D
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	E
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1

Selection and Ordering data	Article No.
SITRANS LC300, rod version	**7ML5670-**
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	■■■■ - ■■■ 0
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod	0
Approvals	
General Safety (CSA, FM, CE, RCM)	A
Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C	B
Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C	C
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	D
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	E
Enclosure	
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D

[1] Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	Article No.
English	**7ML1998-5HE03**
French	**7ML1998-5HE11**
German	**7ML1998-5HE33**
Spanish	**7ML1998-5HE21**
Multi-language Quick Start manual Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**A5E32268590**
Accessories	
Electronic transmitter kit (includes transmitter and driver)	**7ML1830-1KN**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

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4

Selection and Ordering data	Article No.
SITRANS LC300, stilling well version ↗	**7ML5671-**
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	■■■■ - ■■■ 0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
Welded flange, 316L stainless steel, raised face[1]	
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
Welded flange, 316L stainless steel, Type A flat faced[1]	
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
Probe Length (from flange face or including process thread)	
Add Order code Y01 and plain text: "Insertion length ... mm"	
300 ... 1 000 mm (11.81 ... 39.37 inch)	A
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	B
2 001 ... 3 000 mm (78.78 ... 118.11 inch)	C
3 001 ... 4 000 mm (118.15 ... 157.48 inch)	D
4 001 ... 5 000 mm (157.52 ... 196.85 inch)	E
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
35 mm (1.38 inch) diameter stilling well, with 19 mm (0.75 inch) diameter 316L stainless steel, PFA lined rod with PTFE spacers	1
Approvals	
General Safety (CSA, FM, CE, RCM)	A
Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C	B
Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6 ... T1, ATEX II 1/2 D T100 °C	C

Selection and Ordering data	Article No.
SITRANS LC300, stilling well version	**7ML5671-**
An inverse frequency shift capacitance continuous level transmitter for liquid applications.	■■■■ - ■■■ 0
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	D
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	E
Enclosure	
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D

[1] Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	Article No.
English	**7ML1998-5HE03**
French	**7ML1998-5HE11**
German	**7ML1998-5HE33**
Spanish	**7ML1998-5HE21**
Multi-language Quick Start manual Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5QH81**
Accessories	
Electronic transmitter kit (includes transmitter and driver)	**7ML1830-1KN**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

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Selection and Ordering data	Article No.
SITRANS LC300, cable version ↗	**7ML5672-**
An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.	■■■■■ - ■■■ 0
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
Welded flange, 316L stainless steel, raised face[1]	
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
Welded flange, 316L stainless steel, Type A flat faced[1]	
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
Probe Length (from flange face or including process thread)	
Add Order code Y01 and plain text: "Insertion length ... mm"	
1 000 ... 2 000 mm (39.37 ... 78.74 inch)	A
2 001 ... 4 000 mm (78.78 ... 157.48 inch)	B
4 001 ... 6 000 mm (157.52 ... 236.22 inch)	C
6 001 ... 8 000 mm (236.26 ... 314.96 inch)	D
8 001 ... 10 000 mm (315.00 ... 393.70 inch)	E
10 001 ... 12 000 mm (393.74 ... 472.44 inch)	F
12 001 ... 14 000 mm (472.48 ... 551.18 inch)	G
14 001 ... 16 000 mm (551.22 ... 629.92 inch)[2]	H
16 001 ... 18 000 mm (629.96 ... 708.66 inch)[2]	J
18 001 ... 20 000 mm (708.70 ... 787.40 inch)[2]	K
20 001 ... 22 000 mm (787.44 ... 866.14 inch)[2]	L
22 001 ... 24 000 mm (866.18 ... 944.88 inch)[2]	M
24 001 ... 25 000 mm (944.92 ... 984.25 inch)[2]	N
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1
Probe material	
Bare 316L stainless steel cable and 316L stainless steel cable weight, tinned copper crimp, PTFE backing ring, PEEK isolator and PFA lined active shield	0

Selection and Ordering data	Article No.
SITRANS LC300, cable version	**7ML5672-**
An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.	■■■■■ - ■■■ 0
Approvals	
General Safety (CSA, FM, CE, RCM)	A
Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C	B
Flame Proof Enclosure With IS Probe CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C	C
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	D
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	E
Enclosure	
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D

[1] Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

[2] Cable lengths from 15 000 mm (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.

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SITRANS LC300

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	Article No.
English	**7ML1998-5HE03**
French	**7ML1998-5HE11**
German	**7ML1998-5HE33**
Spanish	**7ML1998-5HE21**
Multi-language Quick Start manual Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	**7ML1998-5QH81**
Accessories	
Electronic transmitter kit (includes transmitter and driver)	**7ML1830-1KN**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

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Selection and Ordering data	Article No.
SITRANS LC300, PFA coated cable version ↗	**7ML5673-**
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	■■■■ - ■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Process connection	
Threaded, 316L stainless steel	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
Welded flange, 316L stainless steel, raised face[1]	
1½" ASME, 150 lb	5 D
1½" ASME, 300 lb	5 E
1½" ASME, 600 lb	5 F
2" ASME, 150 lb	5 G
2" ASME, 300 lb	5 H
2" ASME, 600 lb	5 J
3" ASME, 150 lb	5 K
3" ASME, 300 lb	5 L
3" ASME, 600 lb	5 M
4" ASME, 150 lb	5 N
4" ASME, 300 lb	5 P
4" ASME, 600 lb	5 Q
Welded flange, 316L stainless steel, Type A flat faced[1]	
DN 40, PN 16	6 C
DN 40, PN 40	6 D
DN 50, PN 16	6 E
DN 50, PN 40	6 F
DN 80, PN 16	6 G
DN 80, PN 40	6 H
DN 100, PN 16	6 J
DN 100, PN 40	6 K
Probe Length (from flange face or including process thread)	
Add Order code Y01 and plain text: "Insertion length ... mm"	
1 000 ... 2 000 mm (39.37 ... 78.74 inch)	A
2 001 ... 4 000 mm (78.78 ... 157.48 inch)	B
4 001 ... 6 000 mm (157.52 ... 236.22 inch)	C
6 001 ... 8 000 mm (236.26 ... 314.96 inch)	D
8 001 ... 10 000 mm (315.00 ... 393.70 inch)	E
10 001 ... 12 000 mm (393.74 ... 472.44 inch)	F
12 001 ... 14 000 mm (472.48 ... 551.18 inch)	G
14 001 ... 16 000 mm (551.22 ... 629.92 inch)[2]	H
16 001 ... 18 000 mm (629.96 ... 708.66 inch)[2]	J
18 001 ... 20 000 mm (708.70 ... 787.40 inch)[2]	K
20 001 ... 22 000 mm (787.44 ... 866.14 inch)[2]	L
22 001 ... 24 000 mm (866.18 ... 944.88 inch)[2]	M
24 001 ... 25 000 mm (944.92 ... 984.25 inch)[2]	N
Thermal isolator	
Without thermal isolator	0
With thermal isolator [for process connection temperatures over 85 °C (185 °F)]	1
Wetted seals	
FKM	0
FFKM [for process temperatures above -20 °C (-4 °F)]	1

Selection and Ordering data	Article No.
SITRANS LC300, PFA coated cable version	**7ML5673-**
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	■■■■ - ■■■■
Probe material	
PFA coated cable and 316L stainless steel cable weight, PEEK isolator and PFA lined active shield	1
Approvals	
General Safety (CSA, FM, CE, RCM)	A
Dust Ignition Proof With IS Probe CE, RCM, ATEX II 1/2 D T100 °C	B
Flame Proof Enclosure With IS Probe	C
CE, RCM, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C	
Dust Ignition Proof With IS Probe CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	D
Explosion Proof Enclosure With IS Probe CSA/FM Class I, Div. 1, Groups A, B, C, D CSA/FM Class II, Div. 1, Groups E, F, G CSA/FM Class III T4	E
Enclosure	
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65	A
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65	B
Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68	C
Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68	D
Mounting eye	
Without Mounting eye	0
With mounting eye	1

[1] Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.

[2] Cable lengths from 15 000 mm (590.55 inch) to 25 000 mm (984.25 inch) can be used in non-conductive media. Contact Factory for assistance.

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SITRANS LC300

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's Test Certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	Article No.
English	**7ML1998-5HE03**
French	**7ML1998-5HE11**
German	**7ML1998-5HE33**
Spanish	**7ML1998-5HE21**
Multi-language Quick Start manual	**7ML1998-5QH81**
Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	**7ML1830-1KN**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

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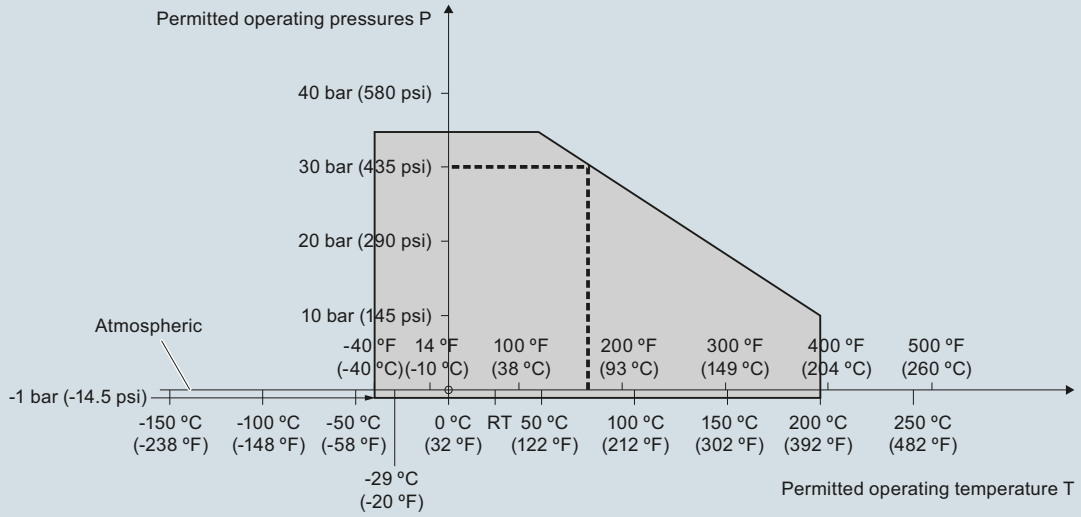
Characteristic curves

Pressure/temperature curve
LC300 standard, extended rod and cable probes
Threaded process connections
(7ML5670, 7ML5671, 7ML5672 and 7ML5673)



---- Example:
Permitted operating pressure = 30 bar (435 psi) at 75 °C

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5625)

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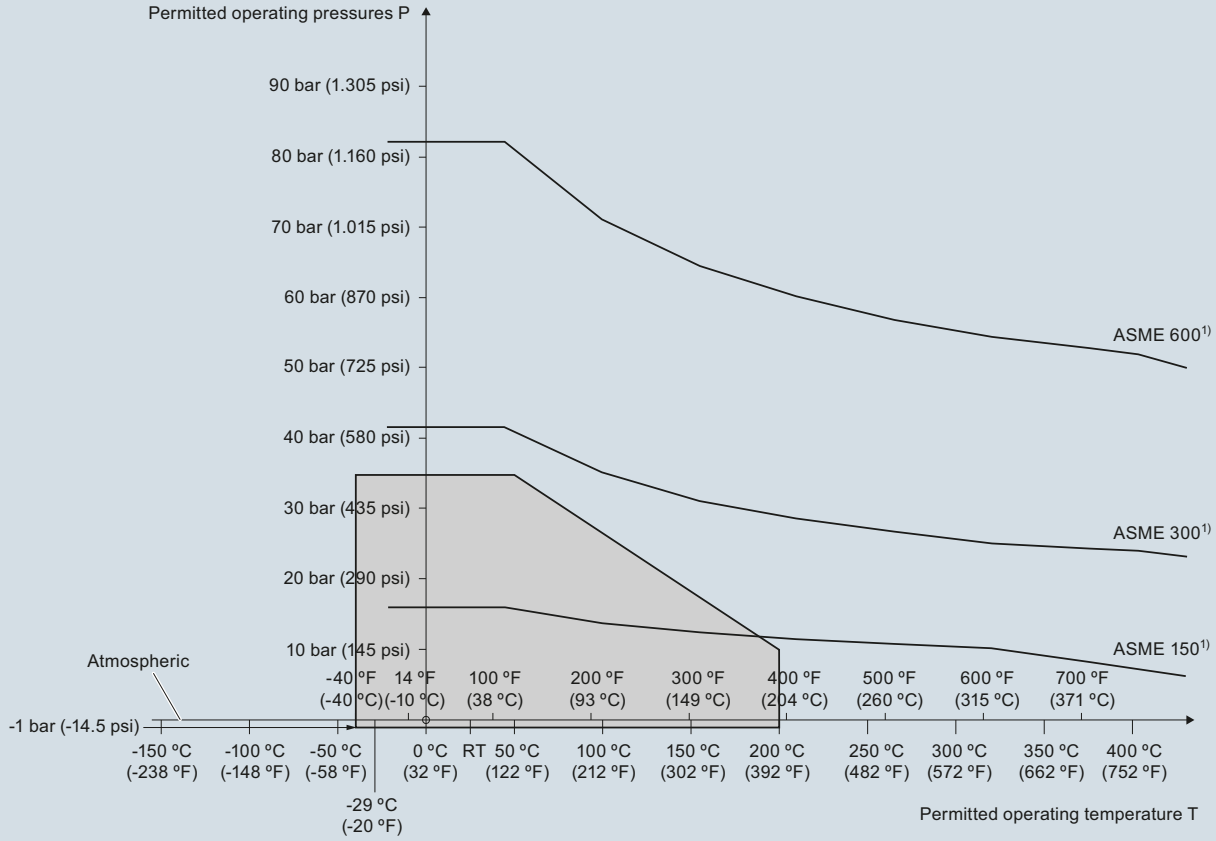
4

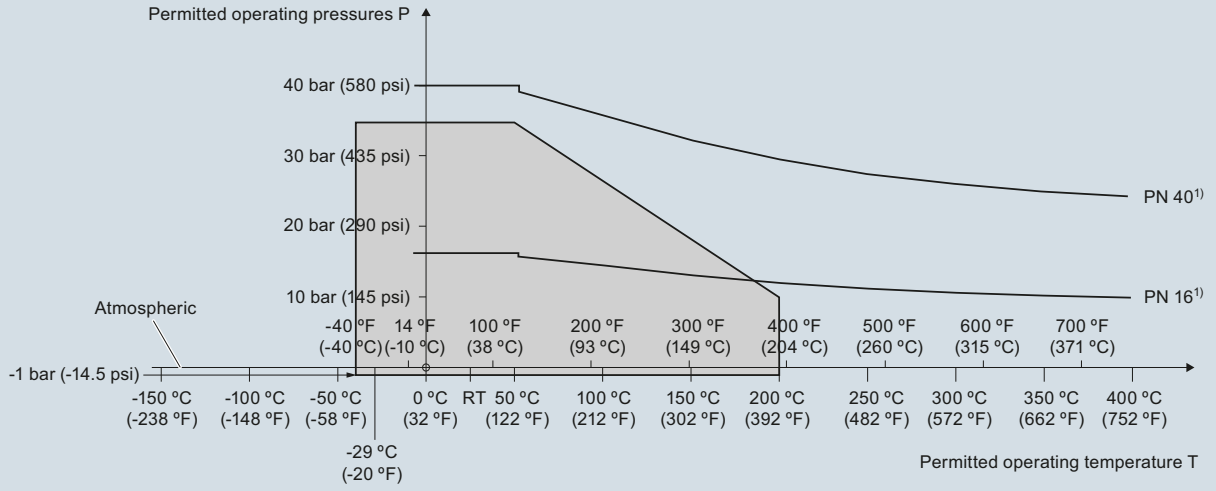
Pressure/temperature curve
LC300 standard, extended rod and cable probes
ASME flanged process connections
(7ML5670, 7ML5671, 7ML5672 and 7ML5673)



[1)] The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5626)

Pressure/temperature curve
LC300 standard, extended rod and cable probes
EN flanged process connections
(7ML5670, 7ML5671, 7ML5672 and 7ML5673)



[1)] The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5626)

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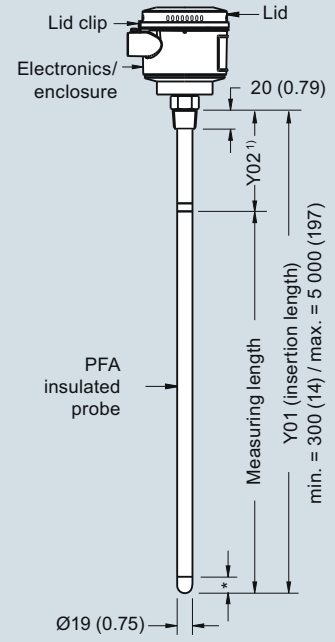
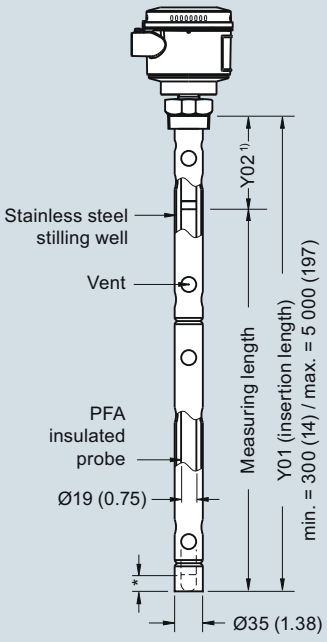
Dimensional drawings

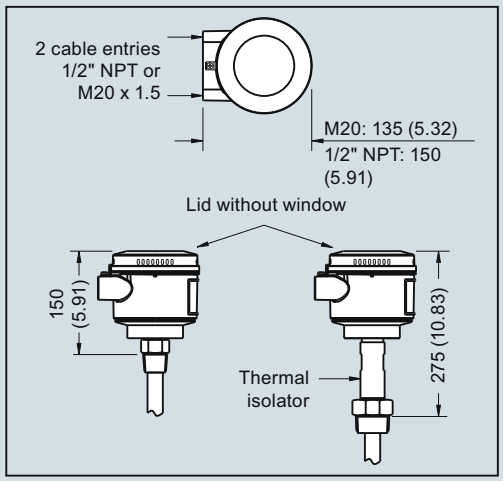
Threaded (7ML5670)



* = 30 (1.18) Inactive tip

Threaded (7ML5671)

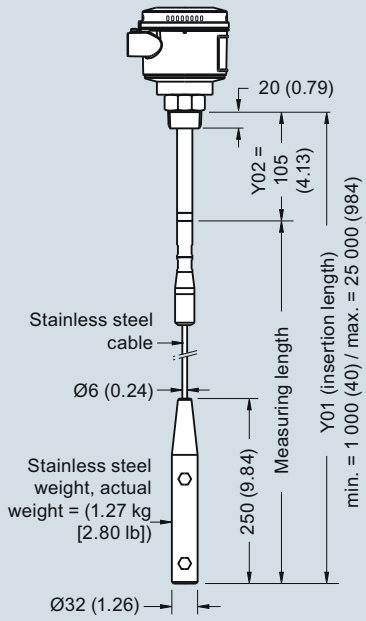




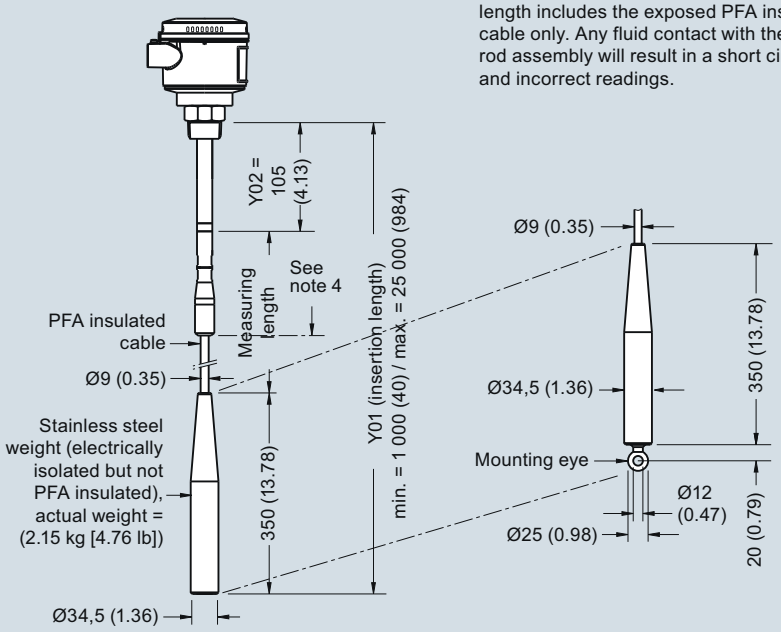
Note:

1) Rod version Y02: Shield length = 100 (3.9) for threaded including process connection thread length, 100 (3.9) for welded flange
2) For non-conductive applications only. Non-insulated cable can be shortened on site. Weight is included in measuring length.
3) For liquids and solids applications. Insulated cable cannot be shortened. Weight is **not** included in measuring length.
4) For conductive materials, the measuring length includes the exposed PFA insulated cable only. Any fluid contact with the upper rod assembly will result in a short circuit and incorrect readings.

Cable version, non-insulated [2]
Threaded (7ML5672)



Cable version, insulated [3]
Threaded (7ML5673)



SITRANS LC300 - Threaded Process Connections, dimensions in mm (inch)

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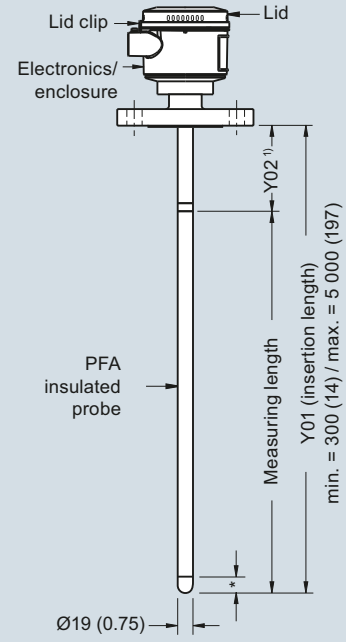
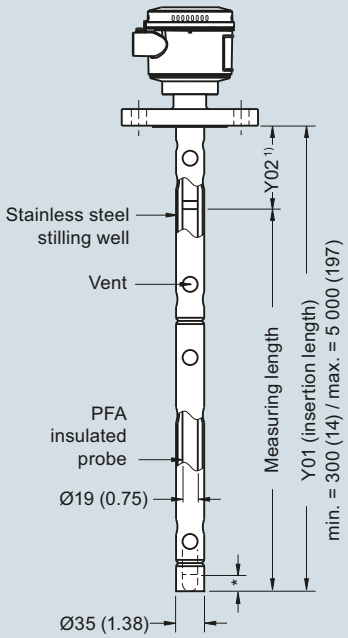
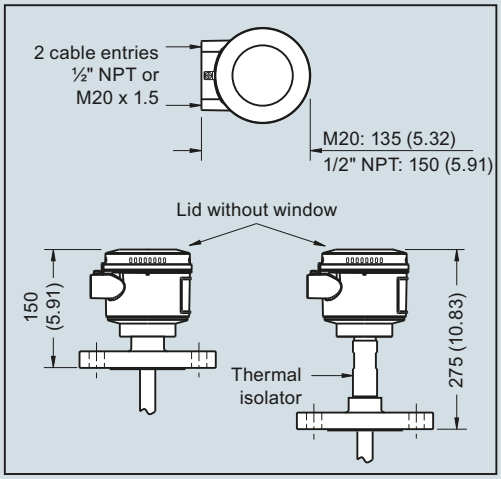
Welded Flange (7ML5670)



* = 30 (1.18) inactive tip

Welded Flange (7ML5671)



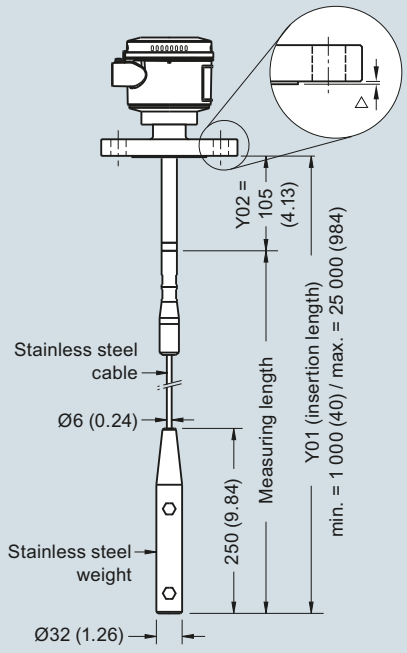


Flange Facing (raised face)	
Flange Class	**Facing thickness**
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

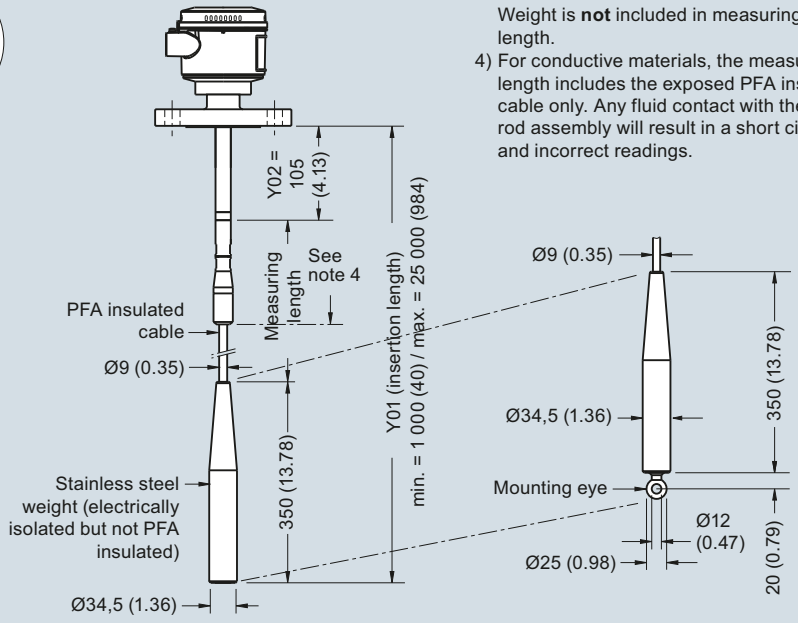
Notes:

1) Rod version Y02: Shield length = 100 (3.9) for threaded including process connection thread length, 100 (3.9) for welded flange.
2) For non-conductive applications only. Non-insulated cable can be shortened on site. Weight is included in measuring length.
3) For liquids and solids applications. Insulated cable cannot be shortened. Weight is **not** included in measuring length.
4) For conductive materials, the measuring length includes the exposed PFA insulated cable only. Any fluid contact with the upper rod assembly will result in a short circuit and incorrect readings.

Cable version, non-insulated [2]
Welded Flange (7ML5672)



Cable version, insulated [3]
Welded Flange (7ML5673)



SITRANS LC300 - Flanged Process Connections, dimensions in mm (inch)

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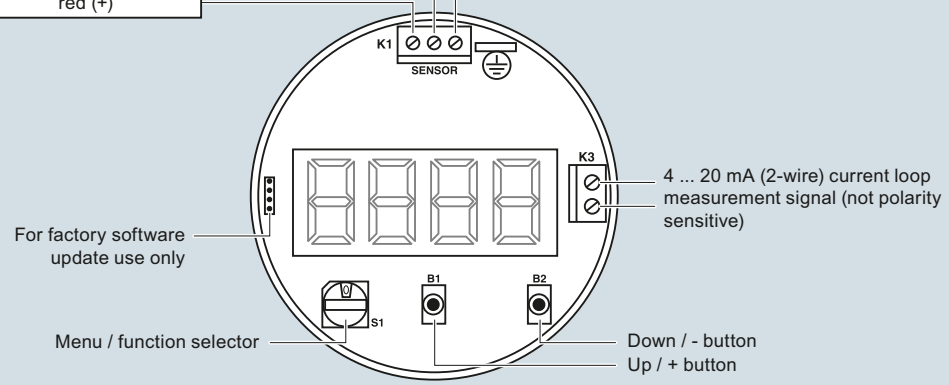
Schematics

With safety barrier	Without safety barrier
white (S)	orange (S)
black (O)	black (O)
red (+)	red (+)



SITRANS LC300 connections

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SITRANS LC500

Overview

SITRANS LC500 is an inverse frequency shift capacitance level or interface transmitter for extreme and critical process conditions, such as oil and liquified natural gas (LNG) as well as toxic and aggressive chemicals and vapors.

Benefits

- Active-Shield technology so measurement is unaffected by material buildup in active shield section
- Simple push-button calibration and integrated local display
- Inverse frequency approach provides high resolution
- 2-wire loop powered 4 to 20/20 to 4 mA measurement signal
- Pre-detection alarm and full function diagnostics
- High temperature and pressure resistant (optional)
- Full-function diagnostics comply with NAMUR NE 43
- Easy calibration locally or via HART (using SIMATIC PDM software)

Application

SITRANS LC500's advanced electronics provide one-step, push-button calibration and local display for easy on-site installation and setup.

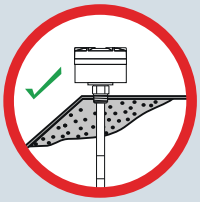
The unique mechanical probe design coupled with a high performance transmitter gives superior performance in toxic and aggressive chemicals, acids, caustics, adhesives and in viscous conductive and non-conductive materials.

The SMART 2-wire transmitter has HART communications for remote commissioning and inspection.

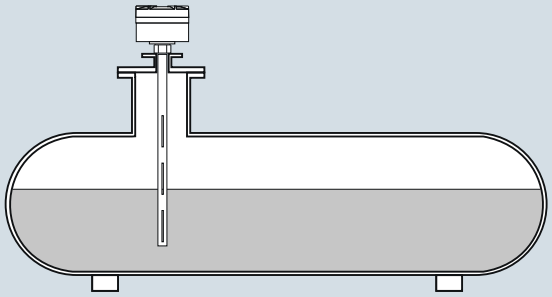
- Key Applications: Oil/water or foam/liquid interface measurement in separators or coalescers, cryogenic applications including CO_2 and liquified natural gas (LNG), distillation/ regeneration tanks with high temperatures

Configuration

Installation



Build up of material or condensation in active shield area does not affect switch operation.



Mounting on non-linear vessels in non-conductive fluids using stilling well.

SITRANS LC500 installation, dimensions in mm (inch)

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Technical specifications

Input	
Measuring range	1 ... 3 300 pF
Span	Min. 3.3 pF
Output	
Solid-state switch	
• Output	Galvanically isolated
• Protection	Bipolar
• Max. switching voltage	• 30 V (DC) • 30 V peak (AC)
• Max. load current	82 mA
• Voltage drop	< 1 V, typical at 50 mA
• Time delay (pre or post switching)	1 ... 60 s
Loop current	3.6 ... 22 mA/22 ... 3.6 mA (2-wire current loop)
Accuracy (transmitter)	
Temperature stability	0.15 pF (0 pF) or < 0.25 % (typically < 0.1 %) of actual measured value, whichever is greater over the full temperature range
Non-linearity and repeatability	< 0.1 % of range and actual measured value respectively
Accuracy	Deviation < 0.1 % of measured value
Rated operating conditions[1]	
Installation conditions	
• Location	Indoor/outdoor
Ambient conditions	
• Ambient temperature (transmitter)	-40 ... +85 °C (-40 ... +185 °F)[2]
• Installation category	II
• Pollution degree	4
Medium conditions	
• Relative dielectric constant ε_r	Min. 1.5
• Process temperature	Temperature rating of process seal is pressure dependent. See Pressure/Temperature curves.
- Standard (PFA) [3]	-50 ... +200 °C (-58 ... +392 °F)
- Cryogenic version	-200 ... +200 °C (-328 ... +392 °F) Contact ceg.smpi@siemens.com for details.
• Process pressure	Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves.
• Standard (PFA)	-1 ... 150 bar g (2175 psi g)
Design	
Material	
• Wetted parts material	
- Standard rod	316L stainless steel
• Probe insulation (rod)	PFA
• Cable	316 stainless steel/ 316 stainless steel PFA
Probe diameter	
• Rod version	16 mm (0.63 inch) or 24 mm (0.95 inch)
• Cable version	9 mm (0.35 inch) with PFA jacket, 6 mm (0.24 inch) without PFA jacket
Active shield length	
• Minimum (rod version)	50 mm (1.97 inch), customer selectable (order number Y02)
Probe length	
• Rod version	Max. 3.5 m (138 inch) with 16 mm rod, PFA Max. 5.5 m (216 inch) with 24 mm rod, PFA
• Cable version	Max. 35 m (1 378 inch)
Process connection of probe	
• Threaded mounting	NPT [(Taper), ANSI/ASME B1.20.1] R [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
• Flange mounting	ASME, EN 1092-1
Enclosure	
• Material	Aluminum, epoxy-coated
• Cable inlet	2 x ½ inch NPT (2 x M20x1.5, IP68 adapter, optional)
• Degree of protection	Type 4X/NEMA4X/IP65, IP68
Power supply	12 ... 33 V DC
User Interface	
Display	Local LCD, 4 digit, each 0 ... 9 and limited alpha characters
Rotary function switch	For selecting programmable menu items
Push buttons	Red +, blue -, used in conjunction with rotary switch for programming
Features	
Measurement current signaling	According to NAMUR NE 43, signal 3.8 ... 20.5 mA, fault ≤ 3.6 or ≥ 21 mA (22 mA)
Safety	• Inputs/outputs fully galvanically isolated • Polarity-insensitive current loop • Fully potted • Integrated safety barrier
Diagnostics with fault alarm when:	Primary variable (PV) out of limits, system failure in measurement circuit, deviation between A/D and D/A converter, check sum, watch dog and self-checking facility
Function rotary switch	Positions 0 ... 9, A ... F
SMART communication	Conforming to HART Communication Foundation (HCF)
Certificates and approvals	
General Purpose	CE, CSA, FM, RCM
Non-incendive/Non-sparking	• CSA/FM Class 1, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx nA [ib] IIC • T6 ... T4 T100 °C
Dust Ignition Proof (Intrinsically Safe Probe Circuit)	• CSA/FM Class II and III, Div. 1, Groups E, F, G • ATEX II 1/2 GD EEx d [ia] T6 to T1 T100 °C
Explosion Proof (Intrinsically Safe Probe Circuit)	• FM Class 1, Div. 1, Groups A, B, C, D T4 • ATEX II 1/2 GD EEx d [ia] IIC T6 to T1
Marine	Lloyds Register of Shipping, Categories ENV1, ENV2, ENV3 and ENV5, Bureau Veritas

[1] When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 4/348.

[2] Thermal isolator is used if process connection temperature exceeds 85 °C (185 °F).

[3] Not recommended for steam environments

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SITRANS LC500

SITRANS LC500 probe version	Standard		Extended Cable version with Rod Sensor
Process connection types	Threaded or welded flange	Single piece flanged	Threaded or welded flange
Threaded	Available as standard	–	Available as standard
Flange	Available as standard	Available as standard	Available as standard
Process connection materials			
Stainless steel 316L	Available as standard	Available as standard	Available as standard
Probe insulation			
PFA	Available as standard	Available as standard	Available as standard
Length and Process parameters[1]			
Rod length for PFA 16 mm version	Min. 200 mm (7.87 inch) Max. 3 500 mm (137.80 inch)	Min. 200 mm (7.87 inch) Max. 3 500 mm (137.80 inch)	Min. 200 mm (7.87 inch) Max. 3 500 mm (137.80 inch)
Rod length for PFA 24 mm version	Min. 200 mm (7.87 inch) Max. 5 500 mm (216.54 inch)	Min. 200 mm (7.87 inch) Max. 5 500 mm (216.54 inch)	Min. 200 mm (7.87 inch) Max. 5 500 mm (216.54 inch)
Cable length	Min. 1 000 mm (39.37 inch) Max. 35 000 mm (1 377.95 inch)	Min. 1 000 mm (39.37 inch) Max. 35 000 mm (1 377.95 inch)	Min. 5 000 mm (196.85 inch)[2] Max. 35 000 mm (1 377.95 inch)[2]
Maximum process pressure	See Pressure/Temperature curves for specific probe type		5 bar g (73 psi g)
Maximum process temperature			100 °C (212 °F)

1) See Pressure/Temperature curves for specific probe type

2) Refers to total insertion length. See dimension drawing on page 4/356 for further explanation

- Not available as standard

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Selection and Ordering data	Article No.
SITRANS LC500, Threaded or Welded Flange with Cable Sensor ↗	**7ML5513-** ■■■■-■■■
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Version[1]	
Cable, 9 mm (0.35 inch) diameter, 316 stainless steel with PFA insulation, weighted	
Add Order code Y01 and plain text: "Insertion length ... mm"	
1 000 ... 2 000 mm (39.37 ... 78.74 inch)	0 E
2 001 ... 4 000 mm (78.78 ... 157.48 inch)	1 E
4 001 ... 6 000 mm (157.52 ... 236.22 inch)	2 E
6 001 ... 8 000 mm (236.26 ... 314.96 inch)	3 E
8 001 ... 10 000 mm (315 ... 393.70 inch)	4 E
Longer lengths possible to a max. of 35 000 mm (114.83 ft). Contact ceg.smpi@siemens.com for details.	
Cable, 6 mm (0.24 inch) diameter, 316L stainless steel, non-insulated, weighted (non-conductive media only)	
Add Order code Y01 and plain text: "Insertion length ... mm"	
1 000 ... 2 000 mm (39.37 ... 78.74 inch)[2]	0 F
2 001 ... 4 000 mm (78.78 ... 157.48 inch)[2][3]	1 F
4 001 ... 6 000 mm (157.52 ... 236.22 inch)[2][3]	2 F
6 001 ... 8 000 mm (236.26 ... 314.96 inch)[2][3]	3 F
8 001 ... 10 000 mm (315 ... 393.70 inch)[2][3]	4 F
Cable lengths up to 25 000 mm (984.25 inch) are possible for non-conductive media. Cable lengths up to 15 000 mm (590.55 inch) are possible for conductive media. Contact ceg.smpi@siemens.com for details.	
Process connection (316L stainless steel)	
Threaded connection	
1½" NPT [(Taper), ANSI/ASME B1.20.1]	C 0
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	F 0
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	K 0
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	L 0
Welded flange, raised face	
1½", ASME, 150 lb	B 1
1½", ASME, 300 lb	B 2
1½", ASME, 600 lb	B 3
2", ASME, 150 lb	C 1
2", ASME, 300 lb	C 2
2", ASME, 600 lb	C 3
3", ASME, 150 lb[3]	D 1
3", ASME, 300 lb[3]	D 2
3", ASME, 600 lb[3]	D 3
4", ASME, 150 lb[3]	E 1
4", ASME, 300 lb[3]	E 2
4", ASME, 600 lb[3]	E 3
6", ASME, 150 lb[3]	F 1
6", ASME, 300 lb[3]	F 2
6", ASME, 600 lb[3]	F 3
Welded flange, Type A flat faced	
DN 40, PN 16	K 4
DN 40, PN 40	K 5
DN 50, PN 16	L 4
DN 50, PN 40	L 5
DN 80, PN 16	M 4
DN 80, PN 40[3]	M 5
DN 100, PN 16[3]	N 4
DN 100, PN 40[3]	N 5
DN 125, PN 16[3]	P 4
DN 125, PN 40[3]	P 5
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	

Selection and Ordering data	Article No.
SITRANS LC500, Threaded or Welded Flange with Cable Sensor	**7ML5513-** ■■■■-■■■
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	
Approvals	
General Purpose: CE, CSA, FM, RCM	1
CSA / FM Class I, Div. 2, Groups A, B, C, D CSA / FM Class II, III, Div. 1, Groups E, F, G T4 ATEX II 3G 2D EEx nA [ib] IIC T6 ... T4 T 100 °C	2
ATEX II 1/2 GD EEx d [ia] IIC T6 ... T1 T 100 °C	4
FM Class I, Div.1, Groups A, B, C, D, T4	6
Enclosure/Cable inlet	
Aluminum epoxy coated	
2 x ½" NPT, IP68	1
2 x M20x1.5 (IP68, adapter)	2
Options	
No additional options	A
With mounting eye[4]	B
Thermal isolator	
Without thermal isolator	A
Isolator, only for use when temperature range is outside of -40 ... +85 °C (-40 ... +185 °F), explosion proof approval -40 ... +70 °C (-40 ... +158 °F)	B
Electronic output	
2-wire loop current 4 ... 20 mA (transmitter MSP 2002-2 _3300 pF)	1

[1] A minimum span of 3 pF must be maintained

[2] Available with non-conductive media only

[3] Custom shipping methods required. Contact factory for more details.

[4] Available in PFA insulated version only

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	**Y01**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	**See page 4/347**
Accessories	**See page 4/347**

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SITRANS LC500

Selection and Ordering data	Article No.
SITRANS LC500, Threaded or Welded Flange, with Rod Sensor ↗	**7ML5515-**
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	■■■■■ - ■■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Version	
Rod, 16 mm (0.63 inch), PFA insulated Add Order code Y01 and Y02 and plain text: "Insertion length ... mm and active shield length ... mm"	
200 ... 1 000 mm (7.87 ... 39.37 inch)[1]	**0 A**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**1 A**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[2]	**2 A**
3 001 ... 3 500 mm (118.15 ... 137.80 inch)[2]	**3 A**
Rod, 16 mm (0.63 inch), PFA insulated with 35 mm (1.38 inch) stilling well in 316L stainless steel Add Order code Y01 and Y02 and plain text: "Insertion length ... mm and active shield length ... mm"	
200 ... 1 000 mm (7.87 ... 39.37 inch)[1)3]	**0 B**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[3]	**1 B**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[2)3]	**2 B**
3 001 ... 3 500 mm (118.15 ... 137.80 inch)[2)3]	**3 B**
Rod, 24 mm (0.94 inch), PFA insulated Add Order code Y01 and Y02 and plain text: "Insertion length ... mm and active shield length ... mm"	
200 ... 1 000 mm (7.87 ... 39.37 inch)[4]	**0 C**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[4]	**1 C**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[2)4]	**2 C**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[2)4]	**3 C**
4 001 ... 5 000 mm (173.26 ... 196.88 inch)[2)4]	**4 C**
5 001 ... 5 500 mm (196.89 ... 216.54 inch)[2)4]	**5 C**
Rod, 24 mm (0.94 inch), PFA insulated with 48 mm (1.89 inch) stilling well in 316L stainless steel Add Order code Y01 and Y02 and plain text: "Insertion length ... mm and active shield length ... mm"	
200 ... 1 000 mm (7.87 ... 39.37 inch)[5]	**0 D**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[5]	**1 D**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[2)5]	**2 D**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[2)5]	**3 D**
4 001 ... 5 000 mm (173.26 ... 196.88 inch)[2)5]	**4 D**
5 001 ... 5 500 mm (196.89 ... 216.54 inch)[2)5]	**5 D**
Process connection (316L stainless steel)	
Threaded connection	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	**A 0**
1" NPT [(Taper), ANSI/ASME B1.20.1]	**B 0**
1½" NPT [(Taper), ANSI/ASME B1.20.1]	**C 0**
2" NPT [(Taper), ANSI/ASME B1.20.1]	**D 0**
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	**E 0**
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	**F 0**
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	**J 0**
R 2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	**K 0**
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	**N 0**
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**P 0**
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**R 0**
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**S 0**
G 2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	**T 0**

Selection and Ordering data	Article No.
SITRANS LC500, Threaded or Welded Flange, with Rod Sensor	**7ML5515-**
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	■■■■■ - ■■■■
Welded flange, raised face	
1½", ASME, 150 lb	**B 1**
1½", ASME, 300 lb	**B 2**
1½", ASME, 600 lb	**B 3**
2", ASME, 150 lb	**C 1**
2", ASME, 300 lb	**C 2**
2", ASME, 600 lb	**C 3**
3", ASME, 150 lb[2]	**D 1**
3", ASME, 300 lb[2]	**D 2**
3", ASME, 600 lb[2]	**D 3**
4", ASME, 150 lb[2]	**E 1**
4", ASME, 300 lb[2]	**E 2**
4", ASME, 600 lb[2]	**E 3**
6", ASME, 150 lb[2]	**F 1**
6", ASME, 300 lb[2]	**F 2**
6", ASME, 600 lb[2]	**F 3**
Welded flange, Type A flat faced	
DN 40, PN 16	**K 4**
DN 40, PN 40	**K 5**
DN 50, PN 16	**L 4**
DN 50, PN 40	**L 5**
DN 80, PN 16	**M 4**
DN 80, PN 40[2]	**M 5**
DN 100, PN 16[2]	**N 4**
DN 100, PN 40[2]	**N 5**
DN 125, PN 16[2]	**P 4**
DN 125, PN 40[2]	**P 5**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	
Approvals	
General Purpose: CE, CSA, FM, RCM	**1**
CSA / FM Class I, Div. 2, Groups A, B, C, D CSA / FM Class II, III, Div. 1, Groups E, F, G T4 ATEX II 3G 2D EEx nA [ib] IIC T6 ... T4 T 100 °C	**2**
ATEX II 1/2 GD EEx d [ia] IIC T6 ... T1 T 100 °C	**4**
FM Class I, Div.1, Groups A, B, C, D, T4	**6**
Enclosure/Cable inlet	
Aluminum epoxy coated 2 x ½" NPT, IP68	**1**
2 x M20 x1.5 (IP68, adapter)	**2**
Options	
No additional options	**A**
Thermal isolator/remote version	
Without thermal isolator or remote electronics	**A**
Thermal isolator, only for use when temperature range is outside of -40 ... +85 °C (-40 ... +185 °F), explosion proof approval -40 ... +70 °C (-40 ... +158 °F)	**B**
Remote electronics with mounting bracket and cable[6]	
• Length: 2 m (79 inch)	**C**
• Length: 3 m (118 inch)	**D**
• Length: 4 m (158 inch)	**E**
• Length: 5 m (197 inch)	**F**
Electronic output	
2-wire loop current 4 ... 20 mA (transmitter MSP 2002-2 _3300 pF)	**1**

[1] A minimum span of 3 pF must be maintained

[2] Custom shipping methods required. Contact factory for more details.

[3] Available with process connection 1½" or larger

[4] Available with process connection 1" or larger

[5] Available with process connection 2 " or larger

[6] Available with approval option 1 only

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	**Y01**
Active shield length, specify in plain text [min. length is 50 mm (2 inch)]: Y02: ... mm	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Manufacturing Test Report (Electrode Test)	**C18**
Operating Instructions	**See page 4/347**
Accessories	**See page 4/347**

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SITRANS LC500

Selection and Ordering data	Article No.
SITRANS LC500, Single Piece Flanged with Rod Sensor ↗	**7ML5517-** ■■■■■ - ■■■■
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Version	
Rod, 16 mm (0.63 inch), PFA insulated Add Order code Y01 and Y02 and plain text: "Insertion length ... mm and active shield length ... mm"	
250 ... 1 000 mm (9.84 ... 39.37 inch)[1]	**0 A**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**1 A**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[2]	**2 A**
3 001 ... 3 500 mm (118.15 ... 137.80 inch)[2]	**3 A**
Rod, 16 mm (0.63 inch), PFA insulated with 35 mm (1.34 inch) stilling well in 316L stainless steel Add Order code Y01 and Y02 and plain text: "Insertion length ... mm and active shield length ... mm"	
250 ... 1 000 mm (9.84 ... 39.37 inch)	**0 B**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**1 B**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[2]	**2 B**
3 001 ... 3 500 mm (118.15 ... 137.80 inch)[2]	**3 B**
Rod, 24 mm (0.94 inch), PFA insulated Add Order code Y01 and Y02 and plain text: "Insertion length ... mm and active shield length ... mm"	
250 ... 1 000 mm (9.84 ... 39.37 inch)	**0 C**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)	**1 C**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[2]	**2 C**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[2]	**3 C**
4 001 ... 5 000 mm (173.26 ... 196.88 inch)[2]	**4 C**
5 001 ... 5 500 mm (196.89 ... 216.54 inch)[2]	**5 C**
Rod, 24 mm (0.94 inch), PFA insulated with 48 mm (1.89 inch) stilling well in 316L stainless steel Add Order code Y01 and Y02 and plain text: "Insertion length ... mm and active shield length ... mm"	
250 ... 1 000 mm (9.84 ... 39.37 inch)	**0 D**
1 001 ... 2 000 mm (39.41 ... 78.74 inch)[2][3]	**1 D**
2 001 ... 3 000 mm (78.78 ... 118.11 inch)[2][3]	**2 D**
3 001 ... 4 000 mm (118.15 ... 157.48 inch)[2][3]	**3 D**
4 001 ... 5 000 mm (173.26 ... 196.88 inch)[2][3]	**4 D**
5 001 ... 5 500 mm (196.89 ... 216.54 inch)[2][3]	**5 D**
Process connection (316L stainless steel)	
Single piece flange, raised face	
1½", ASME, 150 lb	**B 1**
1½", ASME, 300 lb	**B 2**
1½", ASME, 600 lb	**B 3**
2", ASME, 150 lb	**C 1**
2", ASME, 300 lb	**C 2**
2", ASME, 600 lb	**C 3**
3", ASME, 150 lb[2]	**D 1**
3", ASME, 300 lb[2]	**D 2**
3", ASME, 600 lb[2]	**D 3**
4", ASME, 150 lb[2]	**E 1**
4", ASME, 300 lb[2]	**E 2**
4", ASME, 600 lb[2]	**E 3**
6", ASME, 150 lb[2]	**F 1**
6", ASME, 300 lb[2]	**F 2**
6", ASME, 600 lb[2]	**F 3**

Selection and Ordering data	Article No.
SITRANS LC500, Single Piece Flanged with Rod Sensor	**7ML5517-** ■■■■■ - ■■■■
Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	
Single piece flange, Type B1 raised face	
DN 40, PN 16	**K 4**
DN 40, PN 40	**K 5**
DN 50, PN 16	**L 4**
DN 50, PN 40	**L 5**
DN 80, PN 16	**M 4**
DN 80, PN 40[2]	**M 5**
DN 100, PN 16[2]	**N 4**
DN 100, PN 40[2]	**N 5**
DN 125, PN 16[2]	**P 4**
DN 125, PN 40[2]	**P 5**
Single piece flange with PTFE flange facing (applicable with versions 0A ... 3A and 0C ... 5C)[4]	
1½" ASME, 150 lb	**B 4**
1½", ASME, 300 lb	**B 5**
1½", ASME, 600 lb	**B 6**
2", ASME, 150 lb	**C 4**
2", ASME, 300 lb	**C 5**
2", ASME, 600 lb	**C 6**
3", ASME, 150 lb[2]	**D 4**
3", ASME, 300 lb[2]	**D 5**
3", ASME, 600 lb[2]	**D 6**
4", ASME, 150 lb[2]	**E 4**
4", ASME, 300 lb[2]	**E 5**
4", ASME, 600 lb[2]	**E 6**
6", ASME, 150 lb[2]	**F 4**
6", ASME, 300 lb[2]	**F 5**
6", ASME, 600 lb[2]	**F 6**
Single piece flange with PTFE flange facing (applicable with versions 0A ... 3A, 0C ... 5C)[4]	
DN 40, PN 16	**K 6**
DN 40, PN 40	**K 7**
DN 50, PN 16	**L 6**
DN 50, PN 40	**L 7**
DN 80, PN 16	**M 6**
DN 80, PN 40[2]	**M 7**
DN 100, PN 16[2]	**N 6**
DN 100, PN 40[2]	**N 7**
DN 125, PN 16[2]	**P 6**
DN 125, PN 40[2]	**P 7**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	

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Selection and Ordering data	Article No.
SITRANS LC500, Single Piece Flanged with Rod Sensor Inverse frequency shift capacitance level and interface transmitter for extreme and critical process conditions, such as oil and liquid gas, toxic and aggressive chemicals and vapours.	**7ML5517-** ■■■■ - ■■■■
Approvals	
General Purpose: CE, CSA, FM, RCM	**1**
CSA / FM Class I, Div. 2, Groups A, B, C, D CSA / FM Class II, III, Div. 1, Groups E, F, G T4 ATEX II 3G 2D EEx nA [ib] IIC T6 ... T4 T 100 °C	**2**
ATEX II 1/2 GD EEx d [ia] IIC T6 ... T1 T 100 °C	**4**
FM Class I, Div.1, Groups A, B, C, D, T4	**6**
Enclosure/Cable inlet Aluminum epoxy coated	
2 x ½" NPT, IP68	**1**
2 x M20 x1.5 (IP68, adapter)	**2**
Options	
None	**A**
Thermal isolator/remote version	
Without thermal isolator	**A**
Isolator, only for use when temperature range is outside of -40 ... +85 °C (-40 ... +185 °F), explosion proof approval -40 ... +70 °C (-40 ... +158 °F)	**B**
Remote electronics with mounting bracket and cable[5]	
• Length: 2 m (79 inch)	**C**
• Length: 3 m (118 inch)	**D**
• Length: 4 m (158 inch)	**E**
• Length: 5 m (197 inch)	**F**
Electronic output	
2-wire loop current 4 ... 20 mA (transmitter MSP 2002-2 _3300 pF)	**1**

[1] A minimum span of 3 pF must be maintained

[2] Custom shipping methods required. Contact factory for more details.

[3] Available with process connection 2" or larger, and only available with process connection options C1 ... F3, L4 ... P5

[4] Not available with versions 0E and 0F

[5] Available with approval option 1 only

Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: ... mm	**Y01**
Active shield length, specify in plain text [min. length is 50 mm (2 inch)]: Y02: ... mm	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate: M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Manufacturing Test Report (Electrode Test)	**C18**
Operating Instructions	**See page 4/347**
Accessories	**See page 4/347**

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SITRANS LC500

Selection and Ordering data	Article No.
SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange[1)] ↗	**7ML5523-**
Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Version[2)]	
Rod, 16 mm (0.63 inch), PFA insulated and 316L stainless steel flexible extension tube	
Total insertion length:	
Add Order code Y01 and plain text: "Total insertion length ... mm and Y02 and plain text: Active shield length ... mm"[3)4)]	
• 5 000 ... 10 000 mm (196.85 ... 393.70 inch)[1)]	**0 A**
• 10 001 ... 15 000 mm (393.74 ... 590.55 inch)[1)]	**1 A**
• 15 001 ... 20 000 mm (590.59 ... 787.40 inch)[1)]	**2 A**
• 20 001 ... 25 000 mm (787.44 ... 984.25 inch)[1)]	**3 A**
• 25 001 ... 30 000 mm (984.29 ... 1181.10 inch)[1)]	**4 A**
• 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)[1)]	**5 A**
Rod, 24 mm (0.94 inch), PFA insulated and 316L stainless steel flexible extension tube	
Total insertion length:	
Add Order code Y01 and plain text: "Total insertion length ... mm and Y02 and plain text: Active shield length ... mm"[3)4)]	
• 5 000 ... 10 000 mm (196.85 ... 393.70 inch)[1)]	**0 B**
• 10 001 ... 15 000 mm (393.74 ... 590.55 inch)[1)]	**1 B**
• 15 001 ... 20 000 mm (590.59 ... 787.40 inch)[1)]	**2 B**
• 20 001 ... 25 000 mm (787.44 ... 984.25 inch)[1)]	**3 B**
• 25 001 ... 30 000 mm (984.29 ... 1 181.10 inch)[1)]	**4 B**
• 30 001 ... 35 000 mm (1 181.14 ... 1 377.95 inch)[1)]	**5 B**
Process connection (316L stainless steel)	
Threaded connection	
2" NPT [(Taper), ANSI/ASME B1.20.1]	**A 0**
R 2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	**B 0**
G 2" [(BSPP), EN ISO 228-1/PF (JIS-P) JIS B 0202]	**D 0**
Welded flange, raised face	
2", ASME, 150 lb	**C 1**
2", ASME, 300 lb	**C 2**
3", ASME, 150 lb[1)]	**D 1**
3", ASME, 300 lb[1)]	**D 2**
4", ASME, 150 lb[1)]	**E 1**
4", ASME, 300 lb[1)]	**E 2**
6", ASME, 150 lb[1)]	**F 1**
6", ASME, 300 lb[1)]	**F 2**
Welded flange, Type A flat faced	
DN 50, PN 16	**L 4**
DN 50, PN 40	**L 5**
DN 80, PN 16	**M 4**
DN 80, PN 40[1)]	**M 5**
DN 100, PN 16[1)]	**N 4**
DN 100, PN 40[1)]	**N 5**
DN 125, PN 16[1)]	**P 4**
DN 125, PN 40[1)]	**P 5**
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	
Approvals	
General Purpose: CE, CSA, FM, RCM	**1**
CSA / FM Class I, Div. 2, Groups A, B, C, D	**2**
CSA / FM Class II, III, Div. 1, Groups E, F, G T4	
ATEX II 3G 2D EEx nA [ib] IIC T6 ... T4 T 100 °C	
ATEX II 1/2 GD EEx d [ia] IIC T6 ... T1 T 100 °C	**4**
FM Class I, Div. 1, Groups A, B, C, D T4	**6**

Selection and Ordering data	Article No.
SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange[1)]	**7ML5523-**
Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.	
Enclosure/Cable inlet	
Aluminum epoxy coated	
2 x ½" NPT, IP68	**1**
2 x M20x1.5 (IP68, adapter)	**2**
Options	
No additional options	**A**
With mounting eye	**B**
Thermal isolator	
Without thermal isolator	**A**
Isolator, only for use when temperature range is outside of -40 ... +85 °C (-40 ... +185 °F), explosion proof approval -40 ... +70 °C (-40 ... +158 °F)	**B**
Electronic output	
2-wire loop current 4 ... 20 mA (transmitter MSP 2002-2 _3300 pF)	**1**

1) Custom shipping methods required. Contact factory for more details.

2) A minimum span of 3 pF must be maintained.

3) See dimension drawings on page 4/356 for further explanation of Y01.

4) Inactive length is equal to the flexible extension plus transition. See dimension drawings on page 4/356 for further explanation of Y02.

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Selection and Ordering data	Order code
Further designs	
Please add "**-Z**" to Article No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: to mm (Includes measuring range plus cable extension) - see dimensional information on page 4/356	**Y01**
Active shield/cable extension length, specify in plain text [min. length is 50 mm (2 inch)]: Y02: to mm (see dimensional information on page 4/356)	**Y02**
Stainless steel tag [69 x 50 mm (2.71 x 1.97 inch)]: Measuring-point number/identification (max. 27 characters) specify in plain text	**Y15**
Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000	**C11**
Inspection Certificate Type 3.1 per EN 10204	**C12**
Operating Instructions	Article No.
English	**7ML1998-5GE04**
French	**7ML1998-5GE12**
Spanish	**7ML1998-5GE21**
German	**7ML1998-5GE33**
Note: The Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual DVD containing the ATEX Quick Start and Operating Instructions library.	

Selection and Ordering data	Article No.
Accessories	
General Purpose	
1/2" NPT General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 6 ... 12 mm (0.236 ... 0.472 inch)	**7ML1830-1JA**
M20x1.5 General Purpose Cable Entry IP68/IP69K NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472 inch)	**7ML1830-1JC**
Hazardous Locations	
1/2" NPT EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22, and in Gas Groups IIA,IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	**7ML1830-1JB**
M20 EMC rated Cable Gland: Dust Ignition Proof, Flameproof Exd, and Increased Safety ATEX II 2 GD ExtD A21 (Zone 1, Zone 2, Zone 21, Zone 22 and in Gas Groups IIA,IIB and IIC) -60 ... +80 °C IP66, IP67, IP68, NEMA4X, cable sizes 5.5 ... 12 mm (0.216 ... 0.472 inch)	**7ML1830-1JD**
Transmitter, MSP 2002-1, 330 PF[1)]	**7ML1830-1JP**
Transmitter, MSP 2002-2, 3 300 PF[1)]	**7ML1830-1JQ**
Transmitter, MSP 2002-3, 6 600 PF (used with conductive fluids and probe lengths >10 000 mm)[1)]	**7ML1830-1JR**
SITRANS RD100, loop powered display - see Chapter 7	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see Chapter 7	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see Chapter 7	**7ML5744-...**
SITRANS RD500 web, universal remote monitoring solution for instrumentation - see Chapter 7	**7ML5750-...**
For applicable back up point level switch - see point level measurement section	

[1)] Transmitters not suitable for Intrinsically Safe application (ATEX II 1G EEx ia IIC T4 or CSA/FM Class 1 Div. 1 Groups A, B, C and D

Please contact ceg.smpi@siemens.com for special requests.

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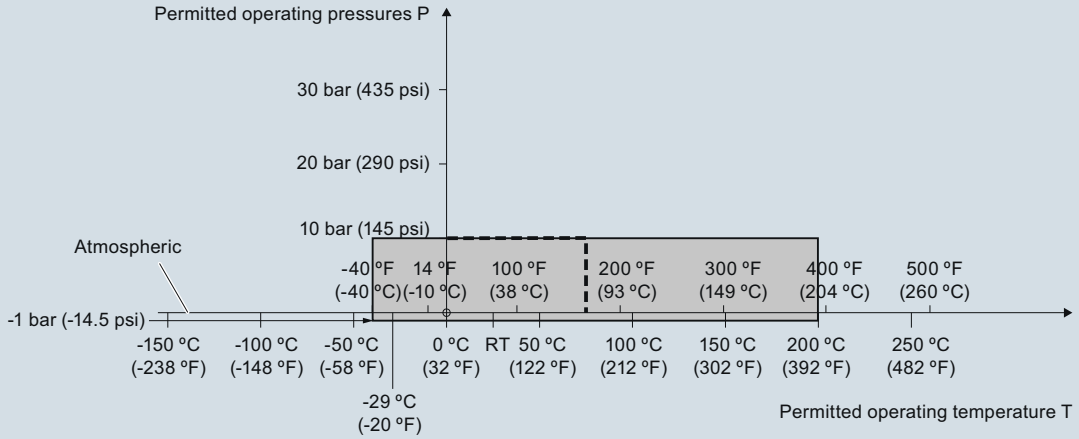
Characteristic curves

**Pressure/temperature curve
LC500 cable probes
threaded process connections
(7ML5513)**



---- Example:
permitted operating pressure = 10 bar (145 psi) at 75 °C

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

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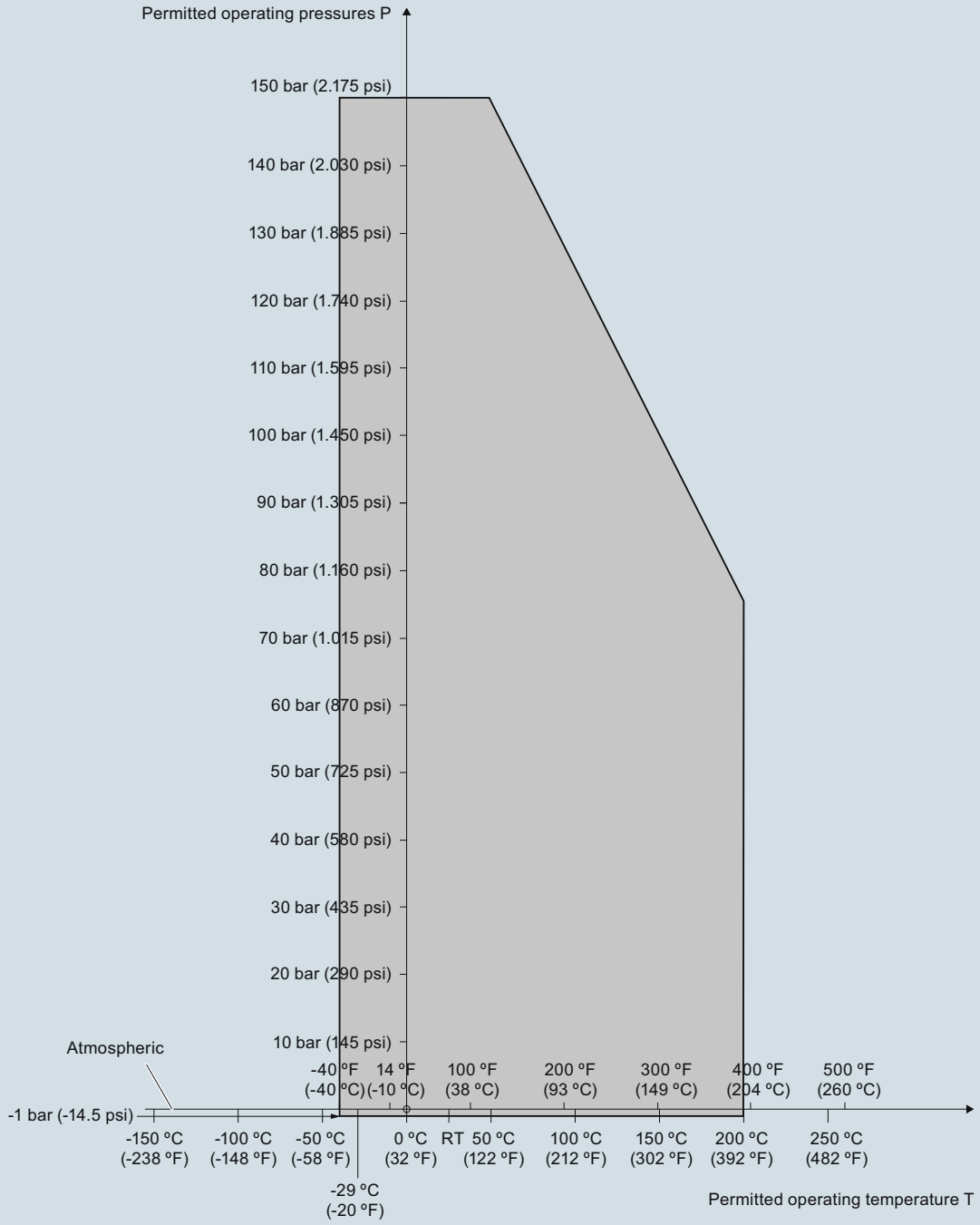
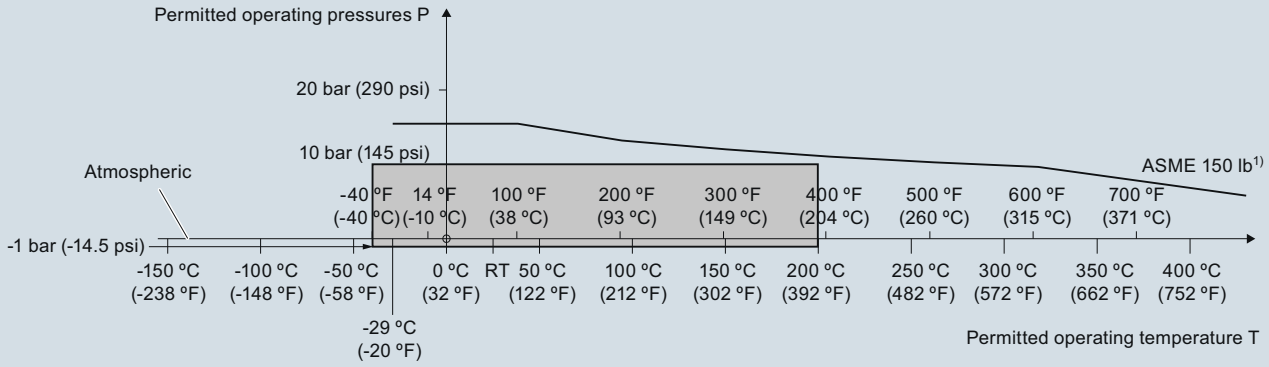
Pressure/temperature curve
LC500 PFA rod probes
Threaded process connections
(7ML5515)



SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515)

© Siemens AG 2015

Pressure/temperature curve
LC500 cable probes
ASME flanged process connections
(7ML5513)

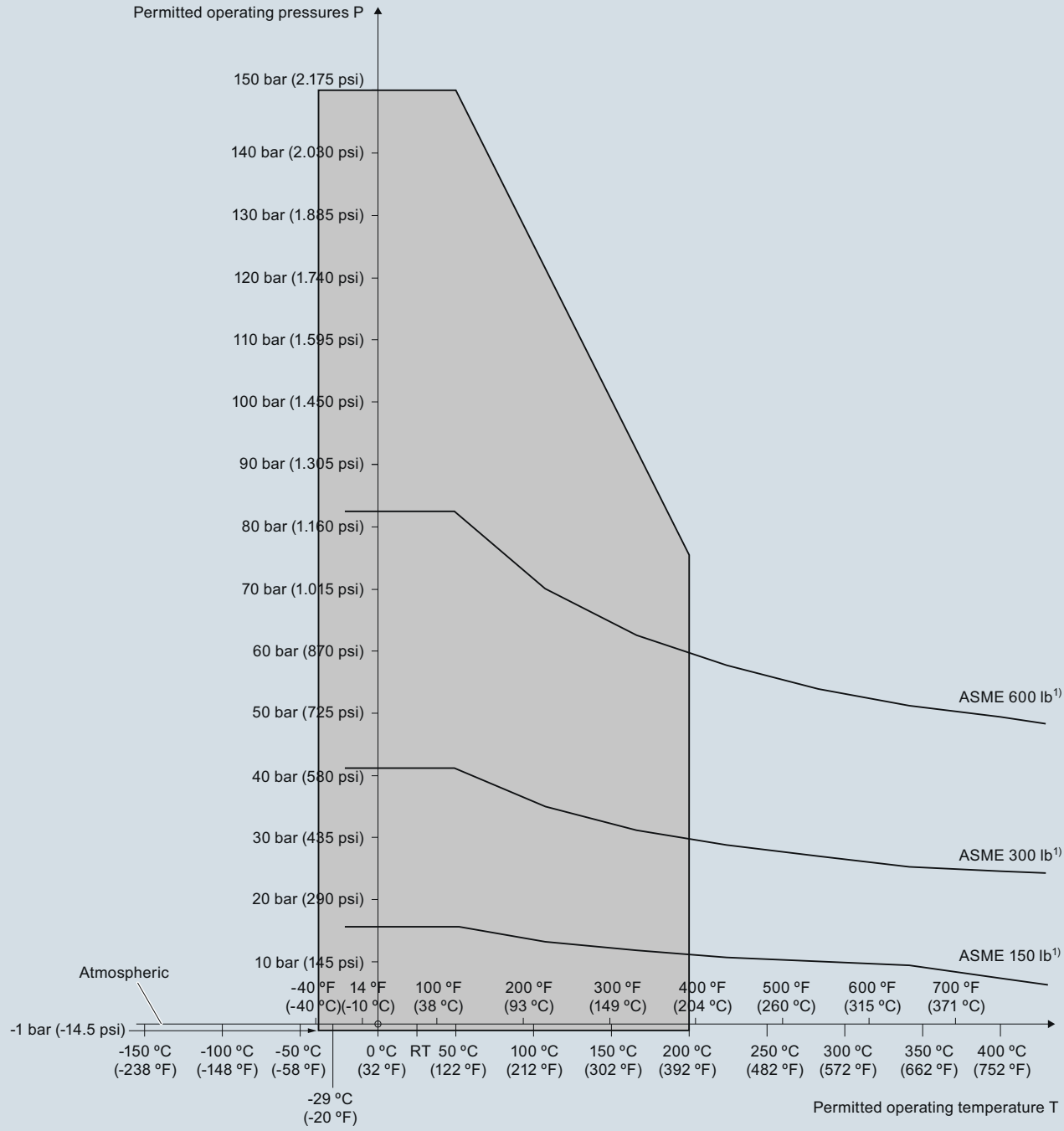


1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

© Siemens AG 2015

Pressure/temperature curve
LC500 PFA rod probes
ASME flanged process connections
(7ML5515 and 7ML5517)

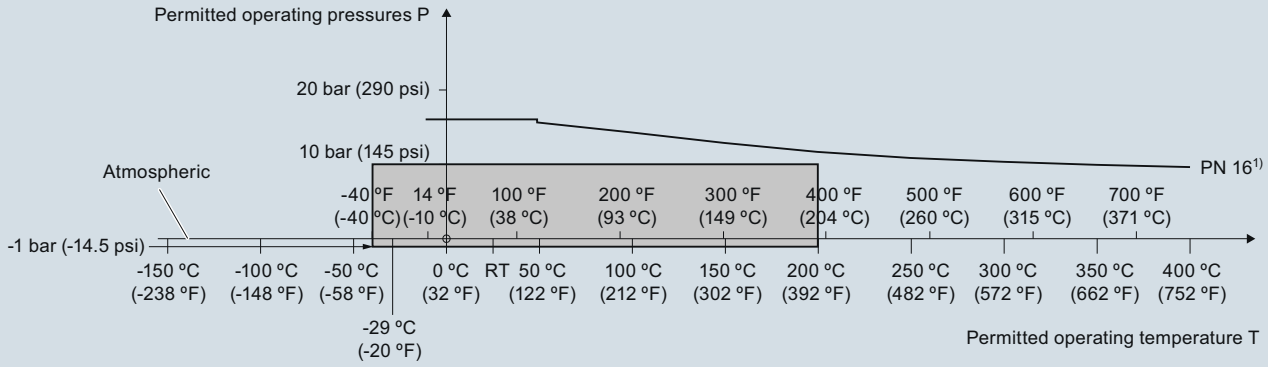


1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

© Siemens AG 2015

Pressure/temperature curve
LC500 cable probes
EN flanged process connections
(7ML5513)

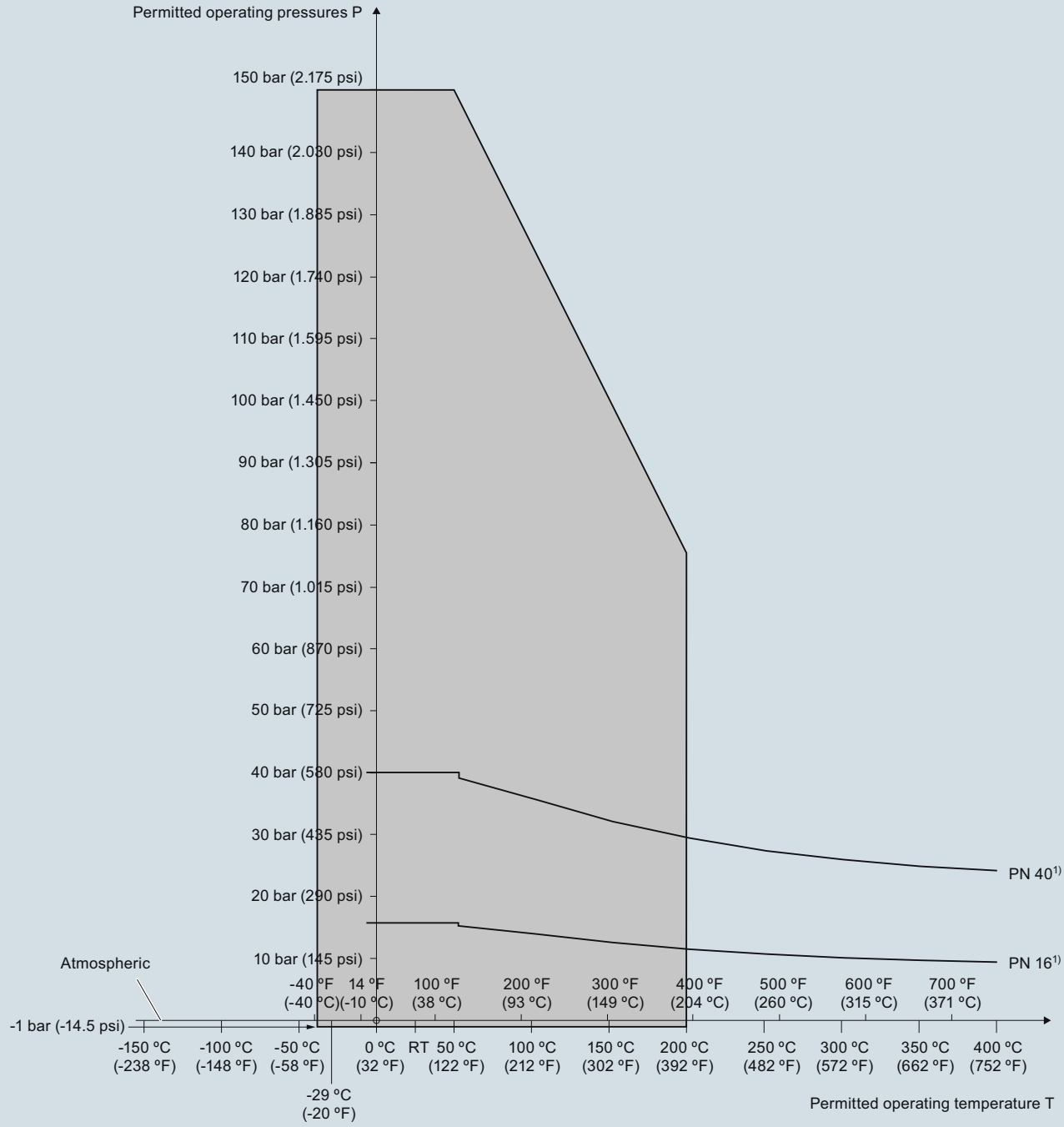


[1)] The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

© Siemens AG 2015

Pressure/temperature curve
LC500 PFA rod probes
EN flanged process connections
(7ML5515 and 7ML5517)

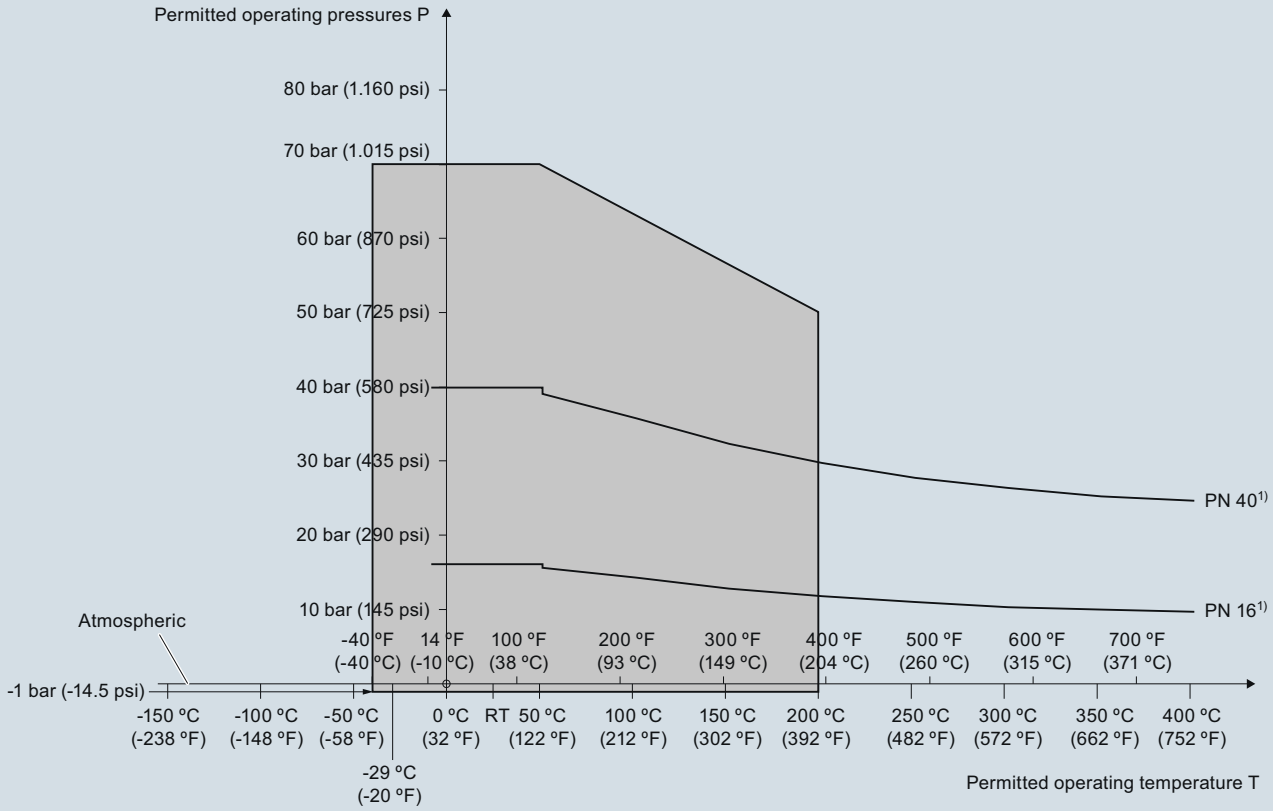


[1)] The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

© Siemens AG 2015

Pressure/temperature curve
LC500 single piece flanged rod probes with PTFE facing
EN flanged process connections
(7ML5517)

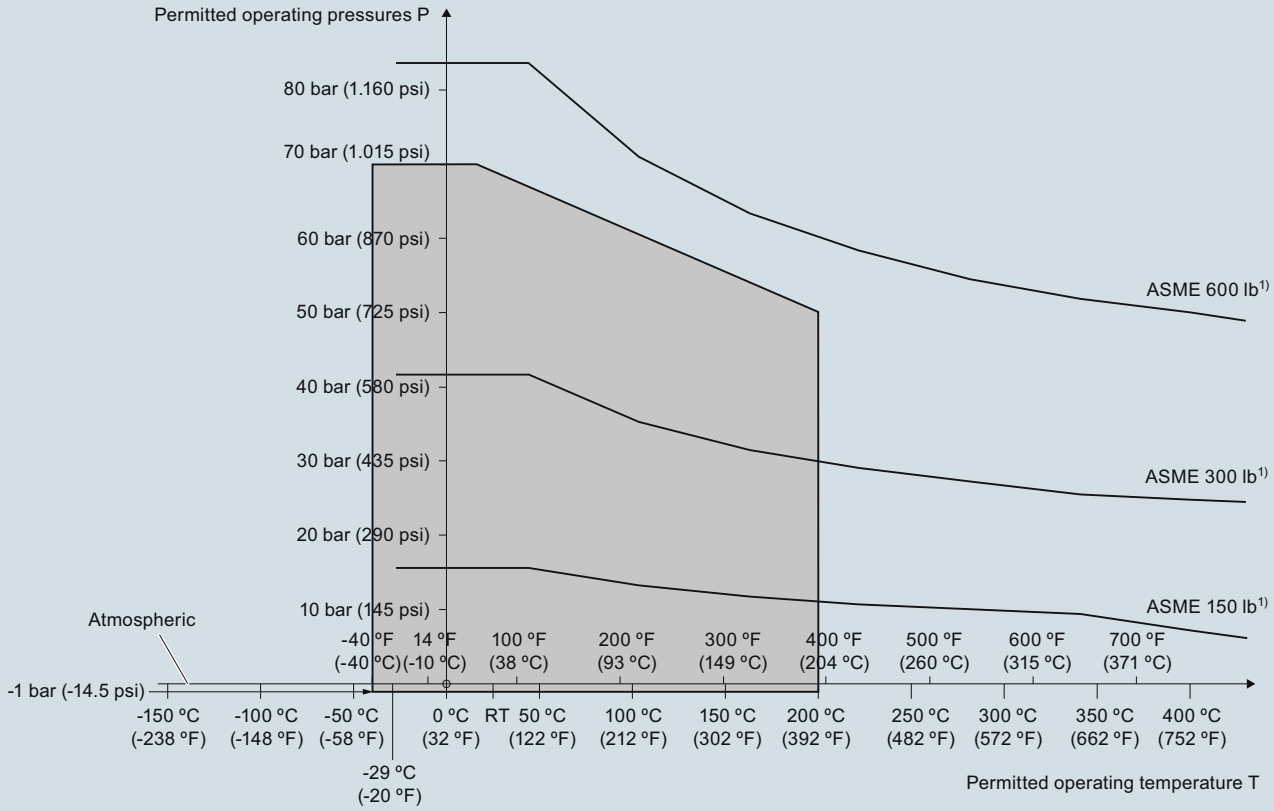


1) The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)

© Siemens AG 2015

Pressure/temperature curve
LC500 single piece flanged rod probes with PTFE facing
ASME flanged process connections
(7ML5517)



1) The curve denotes the minimum allowable flange class for the shaded area below.

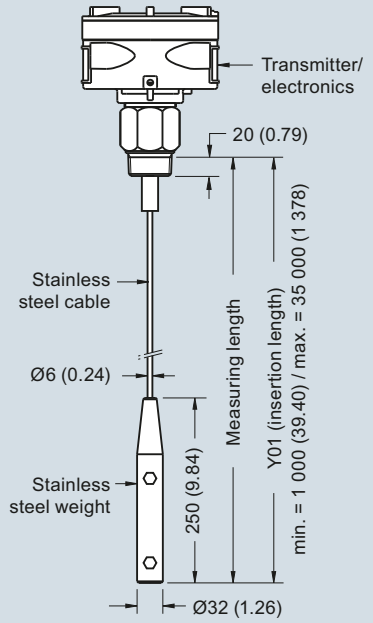
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)

© Siemens AG 2015

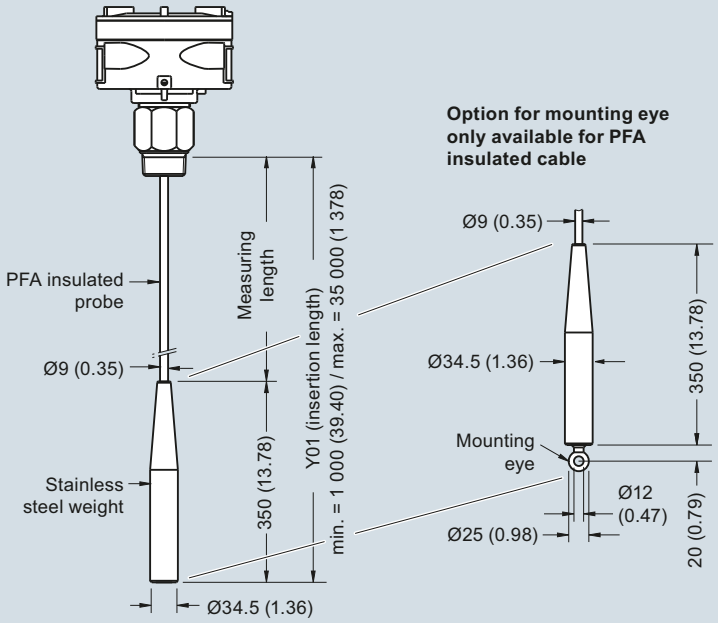
4

Dimensional drawings

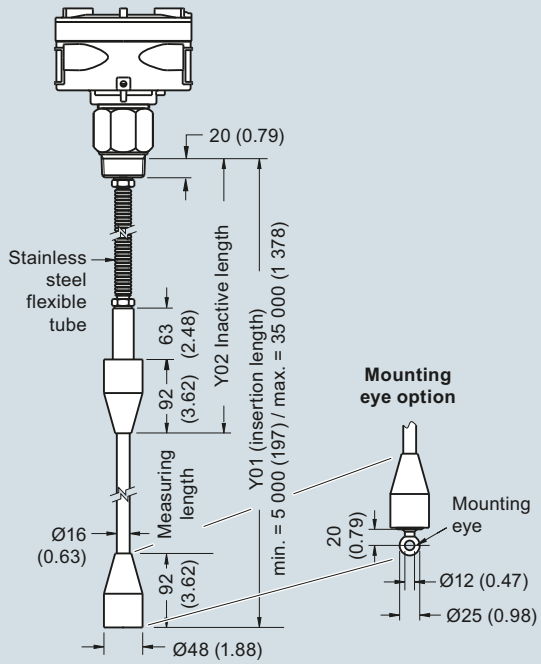
Cable version, non-insulated welded flange (7ML5513)



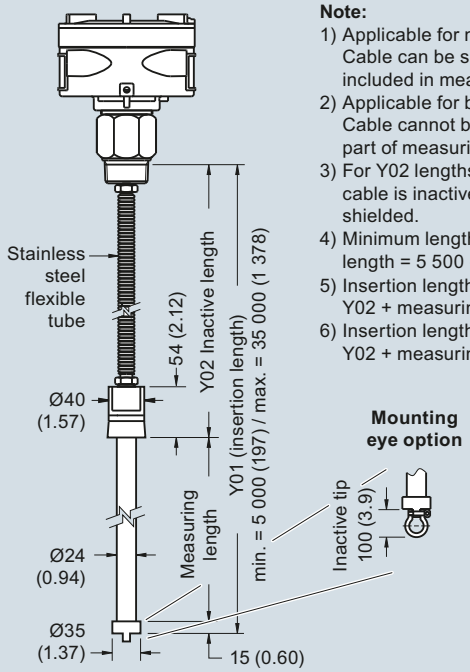
Cable version, insulated welded flange (7ML5513)



Extended cable version with rod sensor welded flange (7ML5523)



Extended cable version with rod sensor welded flange (7ML5523)



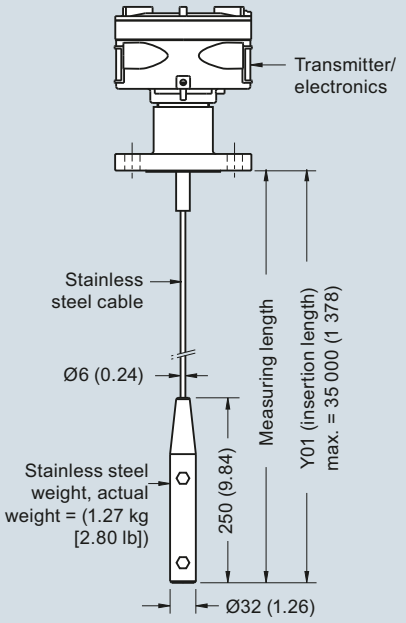
Note:

1) Applicable for non-conductive media only. Cable can be shortened on site. Weight is included in measuring length.
2) Applicable for both liquids and solids. Cable cannot be shortened. Weight is **not** part of measuring length.
3) For Y02 lengths greater than 5 000 (197), cable is inactive and is **not** actively shielded.
4) Minimum length = 200 (7.87), maximum length = 5 500 (216.54)
5) Insertion length Y01 = Y02 + measuring length + 92 (3.62)
6) Insertion length Y01 = Y02 + measuring length + 15 (0.59)

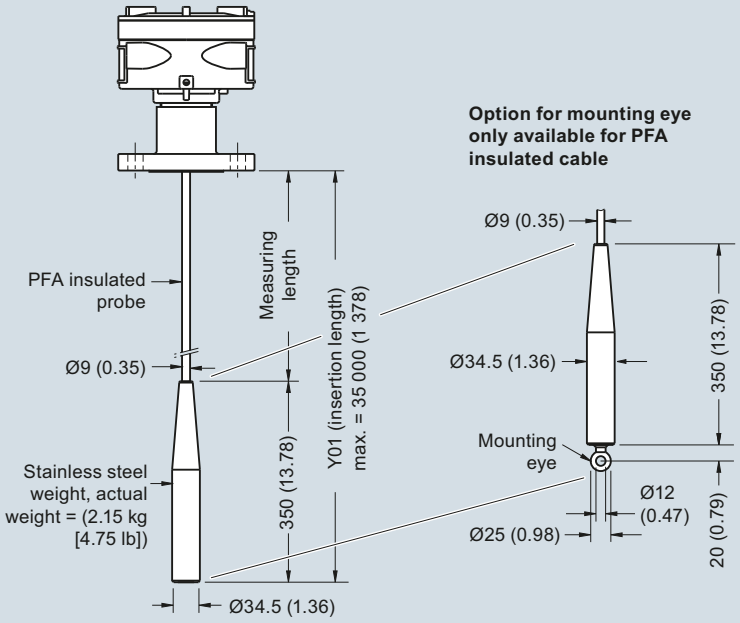
SITRANS LC500 - Cable Versions, dimensions in mm (inch)

© Siemens AG 2015

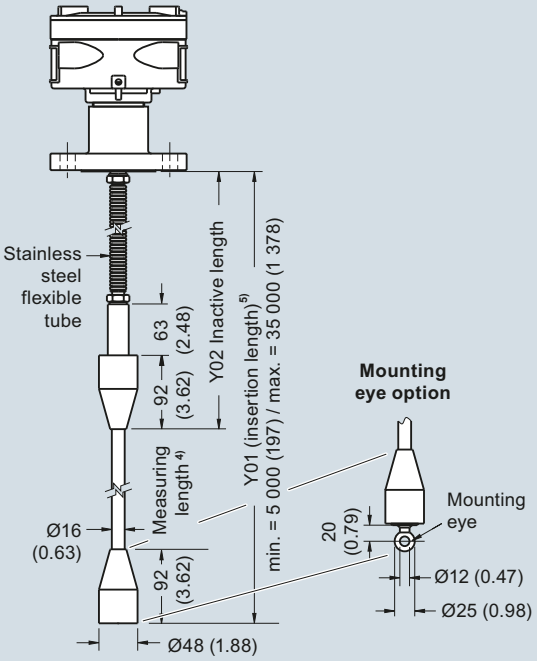
Cable version, non-insulated [1]
Welded flange (7ML5513)



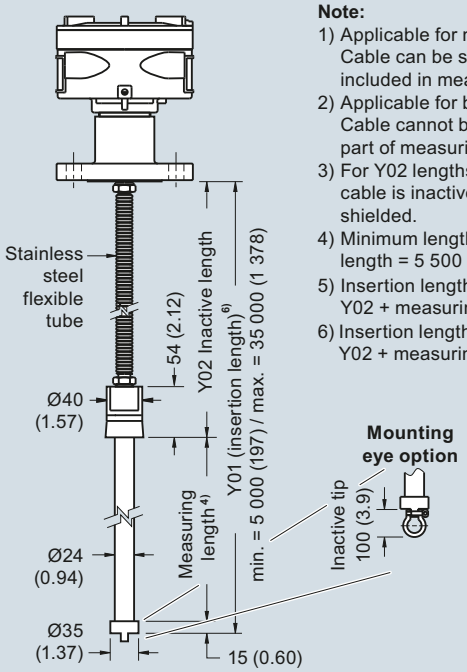
Cable version, insulated [2]
Welded flange (7ML5513)



Extended cable version with rod sensor [3]
Welded flange (7ML5523)



Extended cable version with rod sensor [3]
Welded flange (7ML5523)



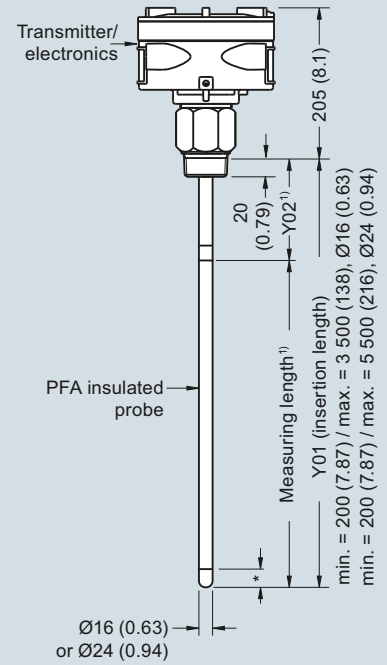
Note:

1) Applicable for non-conductive media only. Cable can be shortened on site. Weight is included in measuring length.
2) Applicable for both liquids and solids. Cable cannot be shortened. Weight is **not** part of measuring length.
3) For Y02 lengths greater than 5 000 (197), cable is inactive and is **not** actively shielded.
4) Minimum length = 200 (7.87), maximum length = 5 500 (216.54)
5) Insertion length Y01 = Y02 + measuring length + 92 (3.62)
6) Insertion length Y01 = Y02 + measuring length + 15 (0.59)

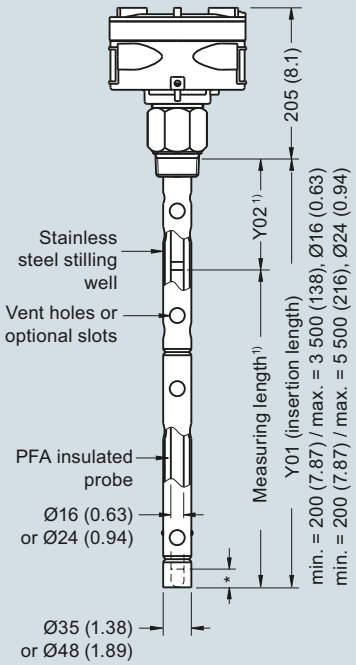
SITRANS LC500 - Cable Versions, dimensions in mm (inch)

© Siemens AG 2015

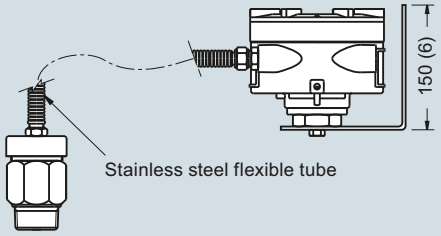
Rod version threaded (7ML5515)



Rod version with stilling well threaded (7ML5515)

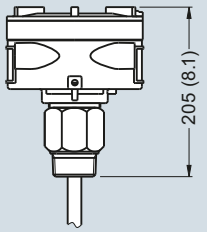


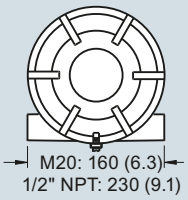
Remote electronics with mounting bracket option threaded (7ML5515)



General purpose approval only.

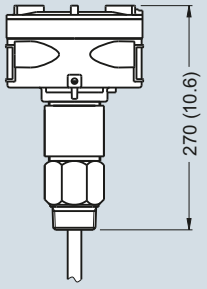
Standard configuration (all versions)

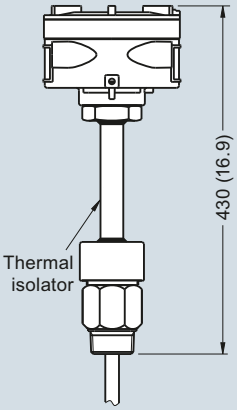




With thermal isolator option (all versions)

With explosion-proof seal option (all versions)





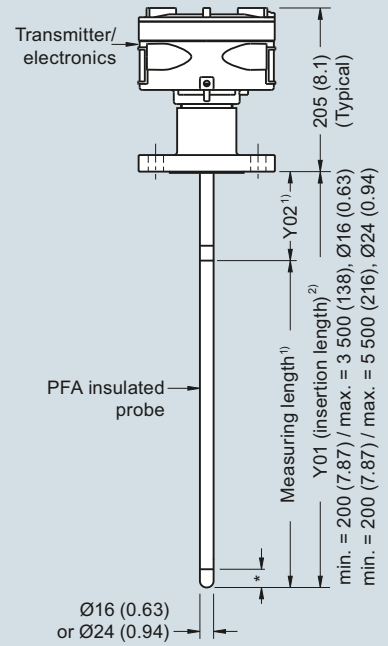
* = 30 (1.18) inactive tip

Note:
1) Minimum Y02 (active shield length) = 50 (1.96), minimum measuring length = 200 (7.87)

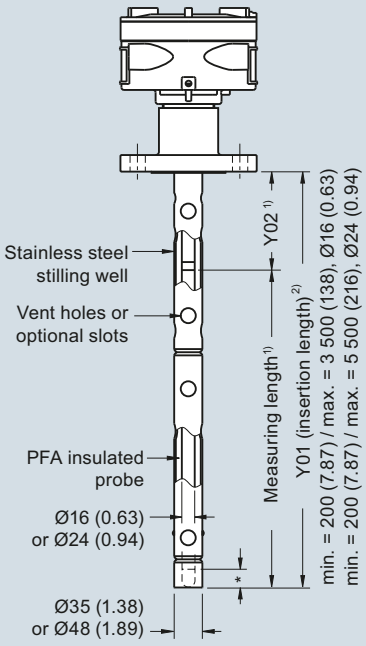
SITRANS LC500 - Rod Versions, dimensions in mm (inch)

© Siemens AG 2015

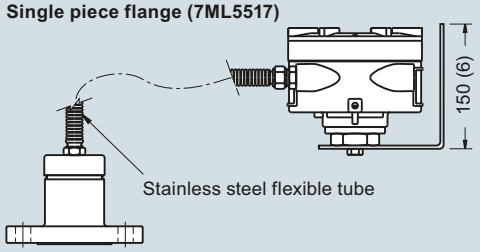
Rod version
Welded flange (7ML5515)
Single piece flange (7ML5517)



Rod version with stilling well
Welded flange (7ML5515)
Single piece flange (7ML5517)

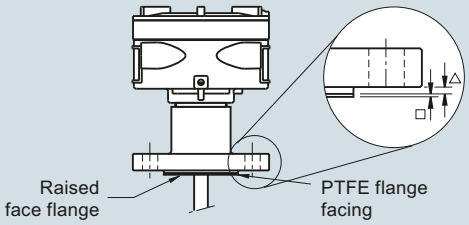


Remote electronics with mounting bracket option
Welded flange (7ML5515)
Single piece flange (7ML5517)



General purpose approval only.

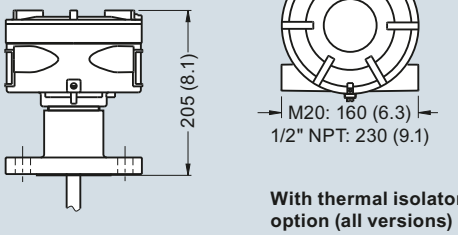
PTFE flange facing option
single piece flange only (7ML5517)



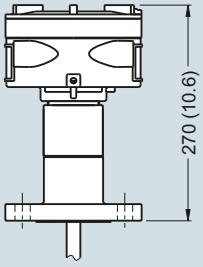
No stilling well or enamel probe available with this option.

* = 30 (1.18) inactive tip

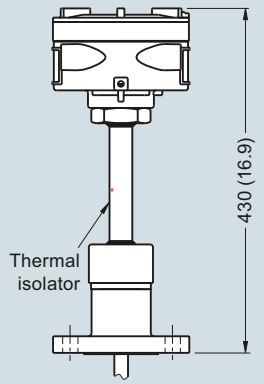
Standard configuration (all versions)



With explosion-proof seal option (all versions)



With thermal isolator option (all versions)



Flange facing (raised face)	
Flange class	**Facing thickness**
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/25/40/64	2 (0.08)
□ PTFE facing (additional)	2 (0.08)

Notes:
1) Minimum Y02 (active shield length) = 50 (1.96), minimum measuring length = 200 (7.87)
2) Insertion length does not include any raised face/gasket face dimension (see Flange Facing table above).

SITRANS LC500 - Rod Versions, dimensions in mm (inch)

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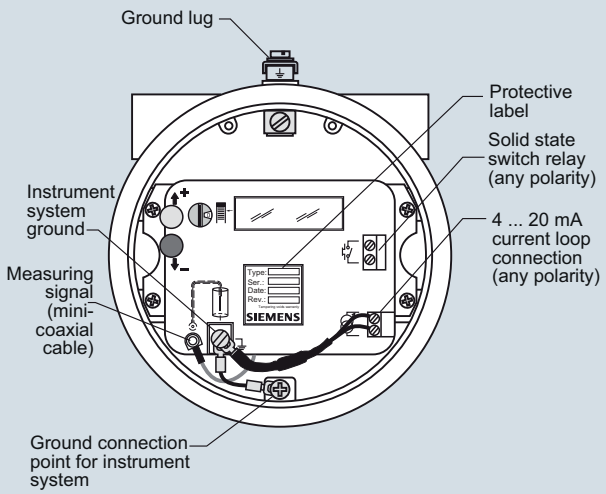
Schematics



SITRANS LC500 connections

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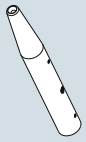
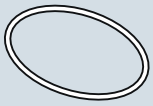
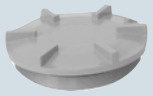
Selection and ordering data

LC300 and LC500 Specials[1]	Article No.
LC300 Cable Extensions, 316L stainless steel	
Kit, stainless steel cable extension, 1 m, adjustable by customer	**A5E01163688**
Kit, stainless steel cable extension, 3 m, adjustable by customer	**A5E01163689**
Kit, stainless steel cable extension, 5 m, adjustable by customer	**A5E01163690**
Kit, stainless steel cable extension, 10 m, adjustable by customer	**A5E01163691**
Kit, stainless steel cable extension, 15 m, adjustable by customer	**A5E01163693**
Kit, stainless steel cable extension, 20 m, adjustable by customer	**A5E01163695**
LC300 Cable Extensions, 316 stainless steel with PFA coating	
Kit, PFA cable extension, 1 m	**A5E01163709**
Kit, PFA cable extension, 3 m	**A5E01163710**
Kit, PFA cable extension, 5 m	**A5E01163711**
Kit, PFA cable extension, 10 m	**A5E01163712**
Kit, PFA cable extension, 15 m	**A5E01163713**
Kit, PFA cable extension, 20 m	**A5E01163714**

LC300 and LC500 Specials[1]	Article No.
LC300 Mounting Eye	
Spare mounting eye (LC300 PFA versions only)	**A5E01163717**
LC300 Weight Kit, 316L stainless steel	
Kit, Spare stainless steel weight. To be used in any cable version of CLS300, or stainless steel cable version of LC300	**A5E01163727**
LC500 Gasket (IP65), Silicone	
Spare gasket, LC500 enclosure version, IP65	**A5E01163728**
LC500 Blind Lid	
Spare LC500 aluminum blind lid	**A5E01163729**
LC500 Mounting Eye	
Spare mounting eye (PFA cable version only)	**A5E01163717**
LC500 Mounting Bracket	
Spare mounting bracket	**A5E01163730**
LC500 Sanitary Versions[2]	

[1] Special flange sizes and facings are available. Please contact ceg.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 4/11.

[2] Please contact ceg.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 4/11.

Please contact ceg.smpi@siemens.com for special requests.

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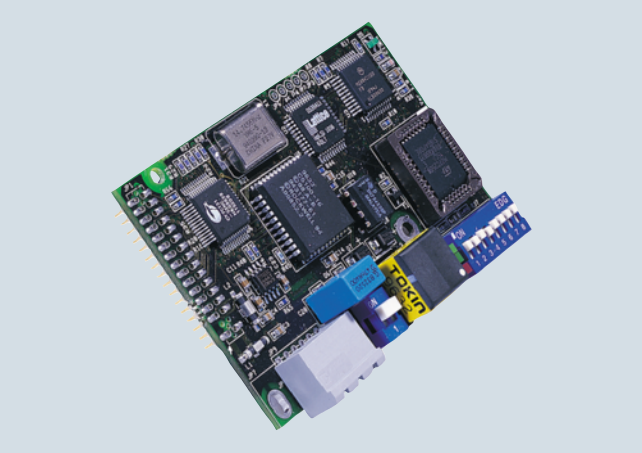
SmartLinx module

Overview



SmartLinx modules provide direct digital connection to popular industrial communications buses with true plug-and-play compatibility with products manufactured by Siemens.

Benefits

- Fast, easy installation
- Direct connection: no additional installation required
- Scaleable application layer allows for optimized network bandwidth and memory requirements
- Modules available for PROFIBUS DP, DeviceNet

Application

Many Siemens products include HART, PROFIBUS PA and Modbus communications. For additional communication modules, SmartLinx cards are the answer.

They're fast and easy to install, and can be added at any time. The module simply plugs into the socket on any SmartLinx-enabled product. They require no secondary private buses or gateways and no separate wiring. There are no extra boxes to connect to your network so there's a minimum load on engineering and maintenance staff.

SmartLinx provides all data from the instrument, including measurement and status, and allows changes to operation parameters to be done over the bus or telemetry link. The user can select which data in the application layer to transfer over the bus. This selection saves bandwidth and memory and optimizes data throughput and speeds up the network, enabling you to connect more instruments to your network.

Technical specifications

Module type	PROFIBUS DP
• Interface	RS 485 (PROFIBUS standard)
• Transmission rate	All valid PROFIBUS DP rates from 9 600 Kbps ... 12 Mbps
• Rack address	0 ... 99
• Connection	Slave
• SmartLinx module compatibility	• MultiRanger 100/200 • HydroRanger 200

Module type	DeviceNet
• Interface	DeviceNet physical layer
• Transmission rate in kbps	125, 250, 500
• Rack address	0 ... 63
• Connection	Slave (group 2)
• SmartLinx module compatibility	• MultiRanger 100/200 • HydroRanger 200

Selection and Ordering data	Article No.
SmartLinx module for MultiRanger 100/200 and HydroRanger 200	
PROFIBUS DP module	**7ML1830-1HR**
DeviceNet module	**7ML1830-1HT**
Operating Instructions	
PROFIBUS communications module	
• English	**7ML1998-1AQ03**
• French	**7ML1998-1AQ13**
• German	**7ML1998-1AQ33**
DeviceNet This device is shipped with the Siemens Milltronics manual DVD containing Quick Starts and Operating Instructions.	
• English	**7ML1998-1BH02**
• French	**7ML1998-1BH12**
Spare SmartLinx software	
PROFIBUS DP data diskette	**7ML1830-1CL**
DeviceNet data diskette	**7ML1830-1CM**

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Overview

Dolphin Plus is instrument configuration software that allows you to quickly and easily configure, monitor, tune and diagnose several Siemens level devices remotely (see list below). Remote access is available using your desktop PC or connected directly in the field using a laptop.

Benefits

- Real-time monitoring and adjustment of parameters
- On-screen visualization of process values
- Saving and visualization of echo profiles for a wide range of Siemens level meters
- Copying of data for programming several devices
- Quick setup and commissioning of device
- Generation of configuration reports within seconds

Note:

The Dolphin Plus software is only available in English.

Application

Dolphin Plus is easy to install and use. Just load the software from the CD. In minutes, you're ready to set up or modify complete parameter configurations for one or more devices.

Following configuration, you can alter parameters, upload and download parameter sets to and from disk, and use parameter sets saved from other instruments. Reading of echo profiles permits fine tuning without the need for special instruments. Built-in quick start wizards and help functions guide you through the entire process.

Compatibility

Dolphin Plus is compatible with Microsoft Windows 95/98/NT4/Me/2000/XP and works with a wide range of Siemens products, including:

- SITRANS LU10
- SITRANS LU02
- SITRANS LU01

Connection to a Siemens instrument may be a direct RS 232 serial connection or via an RS 485 converter or Siemens infrared ComVerter, depending on the instrument being configured.

Meets VDE 2187 user interface requirements.

(Most other Siemens level devices use Simatic PDM configuration software.)

Selection and Ordering data	Article No.
Dolphin Plus ↗	**7ML1841-**
Instrument configuration software to quickly and easily configure, monitor, tune and diagnose most Siemens devices remotely, from your desktop PC or connected directly in the field using a laptop. Dolphin Plus Software includes a software DVD, and a nine pin adapter with a 2.1 m (82.7 inch) cable for connection to a PC serial port.	**A A 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
RS 485 to RS 232 converter	
No	**0**
Yes	**1**
ComVerter	
No	**0**
Yes	**1**

Selection and Ordering data	Article No.
Operating Instructions	
Connection manual, English: Included on Dolphin Plus DVD and available at www.siemens.com/processautomation	
Spare parts	
Converter, RS 485 to RS 232 (D-Sub)	**7ML1830-1HA**
Kit containing one 9-pin D-Sub to RJ11 Adapter and one 2.1 meter telephone cable with two male jacks	**7ML1830-1MC**
ComVerter, Infrared link	**7ML1830-1MM**

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Notes

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	SIPART PS2
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	Technical specifications
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	Software
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You can download all instructions, catalogs and certificates for positioners free of charge at the following Internet address: www.siemens.com/positioners

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Overview

	Application	Description	Catalog page	Software for parameterization
Positioners				
	Position control of pneumatic linear or part-turn actuators, also for intrinsically safe operation	**SIPART PS2** Universal device for positioning pneumatic actuators • Connection: 4 to 20 mA • HART, PROFIBUS PA or FOUNDATION Fieldbus • Local manual operation • Binary inputs and outputs • Diagnostic function • Blocking function • Automatic startup	5/3	SIMATIC PDM
	As above, but in flameproof enclosure for explosion-proof application	**SIPART PS2** As above, but in flameproof aluminum enclosure	5/3	SIMATIC PDM

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Overview

Electropneumatic positioner SIPART PS2 in the Makrolon enclosure

SIPART PS2 electropneumatic positioner in flameproof aluminum enclosure

SIPART PS2 in stainless steel enclosure

The SIPART PS2 electropneumatic positioner is used to control the final control element of pneumatic linear or part-turn actuators. The electropneumatic positioner moves the actuator to a valve position corresponding to the setpoint. Additional function inputs can be used to block the valve or to set a safety position. A binary input is present as standard in the basic device for this purpose.

Benefits

SIPART PS2 positioners offer decisive advantages:

- Simple installation and automatic commissioning (self-adjustment of zero and span)
- Simple operation with
  - Local operation (manual operation) and configuration of the device using three buttons and a user-friendly two-line display
  - Parameterization via SIMATIC PDM
- Very high-quality control thanks to an online adaptation procedure
- Negligible air consumption in stationary operation
- "Tight closing" function (ensures maximum positioning pressure on the valve seat)
- "Fail in place" function: Current position is retained on electrical power failure (does not apply in conjunction with SIL)
- Numerous functions can be activated by simple configuring (e. g. characteristic curves and limits)
- Extensive diagnostic functions for valve and actuator
- Only one device version for linear and part-turn actuators
- Few moving parts, hence insensitive to vibrations
- External non contacting sensor as option for extreme ambient conditions
- "Intelligent solenoid valve": Partial Stroke Test and solenoid valve function in one device
- Partial Stroke Test e. g. for safety valves
- Full Stroke Test, Multi Step Response Test, Valve Performance Test for performance and maintenance evaluation of the valve
- Can also be operated with purified natural gas, carbon dioxide, nitrogen or noble gases
- SIL (Safety Integrity Level) 2

Application

The SIPART PS2 positioner is used, for example, in the following industries:

- Chemical/petrochemical
- Power stations
- Paper and glass
- Water, waste water
- Food and pharmaceuticals
- Offshore plants

The SIPART PS2 positioner is available:

- For single-acting actuators: In Makrolon, stainless steel or aluminum enclosure, as well as flameproof aluminum enclosure
- For double-acting actuators: In Makrolon enclosure, stainless steel enclosure and flameproof aluminum enclosure
- For non-hazardous applications
- For hazardous applications in the versions
  - Intrinsic safety type of protection
  - Flameproof enclosure type of protection
  - Non-sparking type of protection
  - Dust protection by enclosure type of protection

and in the versions:

- With 0/4 ... 20 mA control with/without communication through HART signal
- With PROFIBUS PA communication interface
- With FOUNDATION Fieldbus (FF) communications interface

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Explosion-proof versions

- Device with protection type "intrinsic safety" for use in Zone 1, 2, 21, 22 or Class I, II, III/Division 1/Groups A-G
- Device with protection type "dust protection with enclosure" for use in Zone 21, 22 or Class II, III/Division 1/Groups E-G
- Device with protection type "non-sparking" for use in Zone 2 or Class I, Division 2, Groups A-D
- Device with protection type "flameproof enclosure" for use in Zone 1 or Class I, Division 1, Groups A-D

Stainless steel enclosure for extreme ambient conditions

The SIPART PS2 is available in a stainless steel enclosure (with no window in the cover) for use in particularly aggressive environments (e.g. offshore operation, chlorine plants etc.). The device functions are the same as for the basic version.

Design

The SIPART PS2 positioner is a digital field device with a highly-integrated microcontroller.

The positioner consists of the following components:

- Enclosure and cover
- PCB with corresponding electronics with or without communication through HART 7
  or with electronics for communication in accordance with
  - PROFIBUS PA specification, IEC 61158-2; bus-supplied device, or
  - FOUNDATION Fieldbus (FF) specification, IEC 61158-2, bus-supplied device
- Position detection system
- Terminal housing with screw terminals
- Pneumatic valve manifold with piezoelectric valve precontrol.

The valve manifold is located in the housing, the pneumatic connections for the inlet air and the positioning pressure on the right-hand side. A pressure gauge block and/or a safety solenoid valve can be connected there as options. The SIPART PS2 positioner is fitted to the linear or part-turn actuator using an appropriate mounting kit. The circuit board container in the casing provides slots for separately ordered boards with the following functions:

Position feedback module

- Position feedback as a two-wire signal 4 to 20 mA

Alarm module (3 outputs, 1 input)

- Signaling of two limits of the travel or angle by binary signals. The two limits can be set independently as maximum or minimum values.
- Output of an alarm if the setpoint position of the final control element is not reached in automatic mode or if a device fault occurs.
- Second binary input for alarm signals of for triggering safety reactions, e. g. blocking function or safety position.

Limit signaling through slot-type initiators (SIA module)

Two limits can be signaled redundantly as NAMUR signals (EN 60947-5-6) by slot-type initiators. An alarm output is also integrated in the module (see "Alarm Module").

Limit value signal via mechanical contacts (mechanical limit switch module)

Two limits can be signaled redundantly by switching contacts. An alarm output is also integrated in the module (see "Alarm Module").

Valid for all modules described above:

All signals are electrically isolated from one another and from the basic unit. The outputs indicate self-signaling faults. The modules are easy to retrofit.

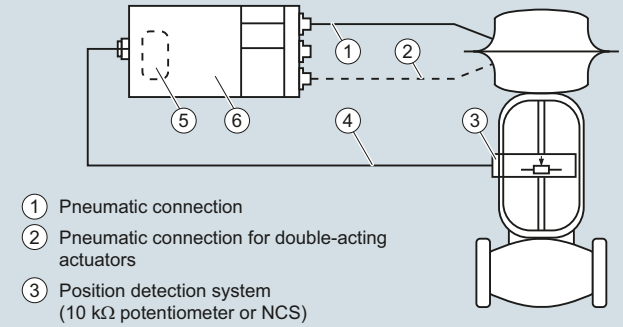
Separate mounting of position detection system and controller unit

The position detection system and controller unit can be connected separately for all casing versions of the SIPART PS2 (except flameproof design). Measurement of the travel or angle is carried out directly on the actuator. The controller unit can then be fitted a certain distance away, e. g. on a mounting pipe or similar, and is connected to the position detection system by an electric cable and to the actuator by one or two pneumatic lines. Such a split design is frequently advantageous if the ambient conditions at the fitting exceed the specified values for the positioner (e. g. strong vibrations).

The following can be used for measuring the travel or angle:

- NCS sensor
- External position detection system C73451-A430-D78
- A commercially available potentiometer (10 kΩ resistance), e. g. for higher application temperatures or customer-specific applications

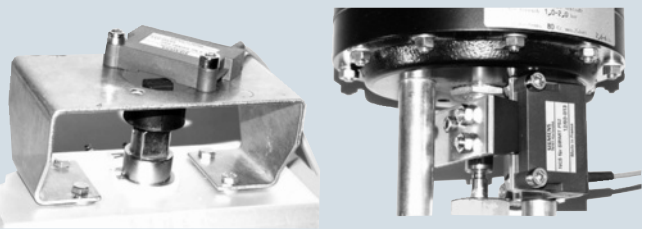
The use of potentiometers is recommended for very small linear actuators with a short valve travel since, on the one hand, the space required by the potentiometer is very small and, on the other, the transmission characteristic is optimum for a small travel.



1 Pneumatic connection
2 Pneumatic connection for double-acting actuators
3 Position detection system (10 kΩ potentiometer or NCS)
4 Electric cable
5 Retrofitted EMC filter module (in device)
6 SIPART PS2

Separate mounting of position detection system and controller unit

Non contacting sensor (NCS)



NCS for part-turn actuator (6DR4004-.N.10) mounted with mounting console (left) and NCS for linear actuator ≤ 14 mm (0.55 inch) (6DR4004-.N.20) mounted with actuator-specific mounting solution (right)

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NCS (6DR4004-.N.30) for travels > 14 mm (0.55 inch) mounted using mounting kit for NAMUR linear actuator

The NCS sensor consists of a non-contacting position sensor. All coupling elements are omitted such as coupling wheel and driver pin with part-turn actuators or lever and pick-up bracket with linear actuators for up to 14 mm travel.

This results in:

- Even greater resistance to vibration and shock
- No wear of sensor
- Problem-free mounting on very small actuators
- Negligible hysteresis with very small travels.

The sensor does not require an additional power supply, i. e. SIPART PS2 (not for Ex d version) can be operated in a 2-wire system. The NCS (Non Contacting Sensor) consists of a potted sensor housing which must be mounted permanently and a magnet which is mounted on the spindle of linear actuators or on the shaft butt of part-turn actuators. For the version for travels >14 mm (0.55 inch), the magnet and the NCS are premounted on a stainless steel frame and offer the same interface mechanically as the positioner itself, i. e. they can be mounted using the standard mounting kits 6DR4004-8V, -8VK and -8VL.

The installation of a EMC filter module in the positioner (controller unit) is necessary in order to ensure a connection level with EMC according to EC Declaration of Conformity when using external sensors (see "Selection and Ordering Data", "EMC Filter Module").

Function

The SIPART PS2 positioner works in a completely different way to normal positioners.

Mode of operation

Comparison of the setpoint and the actual value takes place electronically in a microcontroller. If the microcontroller detects a deviation, it uses a 5-way switch procedure to control the piezoelectric valves, which regulates the flow of air into and from the chambers of the pneumatic actuator or blows it in the opposite direction.

The microcontroller then outputs an electric control command to the piezoelectric valve in accordance with the size and direction of the deviation (deviation between setpoint and actual values). The piezoelectric valve converts the command into a pneumatic positional increment.

The positioner outputs a continuous signal in the area where there is a large system deviation (fast step zone); in areas of moderate system deviation (slow step zone) it outputs a sequence of pulses. No positioning signals are output in the case of a small system deviation (adaptive or variable deadband).

The linear or rotary motion of the actuator is detected by the mounting kit and transferred to a high-quality potentiometer over a shaft and a non-floating gear transmission.

The angular error of the pick-up in cases where the assembly is mounted on a linear actuator is corrected automatically.

When connected in a 2-wire system, the SIPART PS2 draws its power exclusively from the 4 to 20 mA setpoint signal.
The electric power is also connected through the 2-wire bus signal with PROFIBUS operation (SIPART PS2 PA).
The same applies for the FOUNDATION Fieldbus version.

Pneumatic valve manifold with piezoelectric valve precontrol

The piezoelectric valve can release very short control pulses. This helps achieve a high positioning accuracy. The pilot element is a piezoelectric bending converter which switches the pneumatic main controller unit. The valve manifold is characterized by an extremely long service life.

Local operation

Local operation is performed using the built-in display and the three buttons. Switching between the operating levels Automatic, Manual, Configuring and Diagnosis is possible at the press of a button.

In manual mode the drive can be adjusted over the entire range without interrupting the circuit.

Operation and monitoring with the SIMATIC PDM configuration software

The configuration software SIMATIC PDM permits simple operation, monitoring, configuration and parameterization of the device. The diagnostic information available can be read via SIMATIC PDM from the device. Communication is carried out via the HART protocol or PROFIBUS PA. For the HART protocol, the device can be accessed both via a HART modem and via a HART-compatible input/output module (remote IO). The corresponding device description files, such as GSD and (Enhanced) EDD are available for both types of communication.

In addition, the SITRANS DTM provides software based on tried and tested EDD technology that can be used to parameterize field devices via a DTM (Device Type Manager) using an FDT frame application (e. g. PACTware). SITRANS DTM and the necessary device-specific enhanced EDD are available for download free of charge. The software provides the relevant communication interfaces for HART and PROFIBUS.

Automatic commissioning

With a simple configuration menu the SIPART PS2 can be quickly adapted to the fitting and adjusted by means of an automatic startup function.

During initialization, the microcontroller determines the zero point, full-scale value, the direction of action and the positioning speed of the fitting. From this data it establishes the minimum pulse time and the deadband, thus optimizing the control.

Low air consumption

A hallmark of the SIPART PS2 is its own extremely low consumption of air. Normal air losses on conventional positioners are very costly. Thanks to the use of modern piezoelectric technology, the SIPART PS2 consumes air only when it is needed, which means that it pays for itself within a very short time.

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Comprehensive monitoring functions

The SIPART PS2 has various monitoring functions with which changes on the actuator and valve can be detected and signaled if applicable when a selectable limit has been exceeded. This information may be important for diagnosis of the actuator or valve. The measuring data to be determined and monitored, some of whose limits can be adjusted, include:

- Travel integral
- Number of changes in direction
- Alarm counter
- Self-adjusting deadband
- Valve end limit position (e. g. for detection of valve seat wear or deposits)
- Operating hours (also according to temperature and travel ranges) as well as min./max. temperature
- Operating cycles of piezoelectric valves
- Valve positioning time
- Actuator leakages

At a glance with the Diagnostics Cockpit

With the Diagnostics Cockpit, the HART variants of the SIPART PS2 provide a straightforward way of getting started with the world of diagnostic capabilities. All relevant information (setpoint, actual value, control deviation, status of the diagnostic system, etc.) of the valve is available at a glance. Additional facts and details are just a few mouse clicks away from the Diagnostics Cockpit.

Status monitoring with 3-stage alarm concept

The intelligent electropneumatic SIPART PS2 positioner is equipped with additional monitoring functions. The status indications derived from these monitoring functions signal active faults of the unit. The severity of these faults are graded using "traffic light signaling", symbolized by a wrench in the colors green, yellow and red (in SIMATIC PDM and Maintenance Station):

- Need for maintenance (green wrench)
- Urgent need for maintenance (yellow wrench)
- Imminent danger of unit failure or general failure (red wrench)

This allows users to put early measures into action before a serious valve or actuator fault occurs which could result in a system shutdown. The fact that a fault indication is signaled, such as the onset of a diaphragm break in the actuator or the progressive sluggishness of a unit, enables the user to ensure system reliability at any time by means of suitable maintenance strategies.

This three-stage alarm hierarchy also allows early detection and signaling of other faults, such as the static friction of a packing box, the wearing of a valve plug/seating, or precipitations or incrustations on the fittings.

These fault indications can be output either line-conducted over the alarm outputs (see above) of the positioner (max. 3), or via communication over the HART or field bus interfaces. In this case, the HART, PROFIBUS and FF versions of SIPART PS2 permit a differentiation of the various fault indications, as well as a trend representation and histogram function of all key process variables with regard to the fittings.

The device display also displays the graded maintenance requirements, complete with identification of the source of the fault.

Maintenance required for valve

The Full Stroke Test, Step Response Test, Multi Step Response Test and Valve Performance Test provide detailed information about the maintenance required of the valve. With the help of HART communication, you receive comprehensive test results and can identify the extent of the maintenance measures. In order to quantify the performance capability of valves, characteristic values such as step response times (T63, T86, user-selectable Txx), dead times, overshoot, hysteresis, errors of measurement, non-linearity, etc., are determined.

Functional safety acc. to SIL2

The positioner is suitable for use on valves that satisfy the special requirements in terms of functional safety up to SIL 2 in accordance with IEC 61508 or IEC 61511. The variants 6DR5.1.-0....-....-Z C20 are available for this.

These are single-acting positioners for mounting on pneumatic actuators with spring return.

The positioner vents the valve actuator on demand/in the event of a fault and puts the valve in the preset safety position.

This positioner meets the following requirement:

- Functional safety up to SIL 2 in accordance with IEC 61508 or IEC 61511 for safe venting.

SIPART PS 2 as "intelligent solenoid valve“

Open/Close valves, safety fittings in particular, are generally pneumatically controlled over a solenoid valve. If you use SIPART PS2 instead of this type of solenoid valve, the positioner performs two tasks in a single device (without extra wiring)

- Firstly, it switches the fitting off on demand by venting the actuator (functional safety acc. to SIL 2 (see above)
- Secondly, it can perform a Partial Stroke Test at regular intervals (1 - 365 days), which prevents the blocking of the fitting, e. g. due to corrosion or furring.

As in this case SIPART PS2 is constantly working in normal operation (e. g. 99 % position), it also acts as a permanent test function for the pneumatic output circuit, which is not usually possible when using a solenoid valve.

Solenoid valves on control valves can also not normally be tested during operation. They are therefore not necessary when using SIPART PS 2 with a 4-wire connection system as the venting is carried out on demand by SIPART PS2. This means that on control valves, both the control function and the shut-off function can be carried out by a single device.

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Configuring

In configuring mode, the SIPART PS2 positioner can be configured to requirements and include the following settings:

- Input current range 0 to 20 mA or 4 to 20 mA
- Rising or falling characteristic curve at the setpoint input
- Positioning speed limit (setpoint ramp)
- Splitrange operation; adjustable start-of-scale and full-scale values
- Response threshold (deadband); self-adjusting or fixed
- Direction of action; rising or falling output pressure with rising setpoint
- Limits (start-of-scale and full-scale values) of positioning range
- Limits (alarms) of the final control element position; minimum and maximum values
- Automatic "tight closing" (with adjustable response threshold)
- The travel can be corrected in accordance with the valve characteristic curve.
- Function of binary inputs
- Function of alarm output etc.

Configuration of the various SIPART PS2 versions is largely identical.

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Technical specifications

SIPART PS2 (all versions)

Rated conditions	
Ambient conditions	For indoor and outdoor use
Ambient temperature	In hazardous areas, observe the maximum permitted ambient temperature according to the temperature class. See "Technical Specifications" on page 5/9.
• Permitted ambient temperature for operation[1)]	-30 ... +80 °C (-22 ... +176 °F)
• Altitude	2 000 m above sea level. At altitudes greater than 2 000 m above sea level, use a suitable power supply.
• Relative humidity	0 ... 100 %
Degree of protection[2)]	IP66 according to IEC/EN 60529/NEMA 4X
Mounting position	Any; pneumatic connections and exhaust opening not facing up in wet environment
Vibration resistance	
• Harmonic oscillations (sine-wave) according to EN 60068-2-6/10.2008	3.5 mm (0.14"), 2 ... 27 Hz, 3 cycles/axis 98.1 m/s² (321.84 ft/s²), 27 ... 300 Hz, 3 cycles/axis
• Bumping (half-sine) according to EN 60068-2-27/02.2010	150 m/s² (492 ft/s²), 6 ms, 1000 shocks/axis
• Noise (digitally controlled) according to EN 60068-2-64/04.2009	10 ... 200 Hz; 1 $(m/s^2)^2$/Hz ($3.28\ (ft/s^2)^2$/Hz) 200 ... 500 Hz; 0.3 $(m/s^2)^2$/Hz ($0.98\ (ft/s^2)^2$/Hz) 4 hours/axis
• Recommended continuous duty range of the complete fitting	≤ 30 m/s² (98.4 ft/s²) without resonance sharpness
Climatic class	According to EN 60721-3-4
• Storage	1K5, but -40 ... +80 °C (1K5, but -40 ... +176 °F)
• Transport	2K4, but -40 ... +80 °C (2K4, but -40 ... +176 °F)
• Operation[1)3)4)]	4K3, but -30 ... +80 °C (4K3, but -22 ... +176 °F)[3)]
Pneumatic data	
Auxiliary power (air supply)	Compressed air, carbon dioxide (CO_2), nitrogen (N), noble gases or cleaned natural gas
• Pressure[5)]	1.4 ... 7 bar (20.3 ... 101.5 psi)
Air quality to ISO 8573-1	
• Solid particulate size and density	Class 2
• Pressure dew point	Class 2 (min. 20 K (36 °F) below ambient temperature)
• Oil content	Class 2
Unrestricted flow (DIN 1945)	
• Inlet air valve (ventilate actuator)[6)]	
- 2 bar (29 psi)	4.1 Nm³/h (18.1 USgpm)
- 4 bar (58 psi)	7.1 Nm³/h (31.3 USgpm)
- 6 bar (87 psi)	9.8 Nm³/h (43.1 USgpm)
• Outlet air valve (deaerate actuator for all versions except fail in place)[6)]	
- 2 bar (29 psi)	8.2 Nm³/h (36.1 USgpm)
- 4 bar (58 psi)	13.7 Nm³/h (60.3 USgpm)
- 6 bar (87 psi)	19.2 Nm³/h (84.5 USgpm)
• Outlet air valve (deaerate actuator for fail in place version)	
- 2 bar (29 psi)	4.3 Nm³/h (19.0 USgpm)
- 4 bar (58 psi)	7.3 Nm³/h (32.2 USgpm)
- 6 bar (87 psi)	9.8 Nm³/h (43.3 USgpm)
Valve leakage	$< 6 \cdot 10^{-4}$ Nm³/h (0.0026 USgpm)
Restrictor ratio	Adjustable up to ∞ : 1
Auxiliary power consumption in the controlled state	$< 3{,}6 \cdot 10^{-2}$ Nm³/h (0.158 USgpm)
Sound pressure	$L_{Aeq} < 75$ dB $L_{Amax} < 80$ dB
Design	
Mode of operation	
• Range of stroke (linear actuators)	3 ... 130 mm (0.12 ... 5.12 inch) (angle of positioner shaft 16 ... 90°) Larger range of stroke on request.
• Angle of rotation range (part-turn actuators)	30 ... 100°
Mounting type	
• On linear actuators	Using mounting kit 6DR4004-8V and where necessary with an additional lever arm 6DR4004-8L on actuators according to IEC 60534-6-1 (NAMUR) with ribs, bars or flat face.
• On part-turn actuators	Using mounting kit 6DR4004-8D on actuators with mounting plane according to VDI/VDE 3845 and IEC 60534-6-2.
Weight, positioner without option modules or accessories	
• 6DR5..0 Glass-fiber reinforced enclosure made from polycarbonate	Approx. 0.9 kg (1.98 lb)
• 6DR5..1 Aluminum enclosure, narrow	Approx. 1.3 kg (2.86 lb)
• 6DR5..2 Stainless steel enclosure	Approx. 3.9 kg (8.6 lb)
• 6DR5..3 Aluminum enclosure	Approx. 1.6 kg (3.53 lb)
• 6DR5..5 Flameproof aluminum enclosure	Approx. 5.2 kg (11.46 lb)
Material	
• Enclosure	
- 6DR5..0 Makrolon	Glass-fiber reinforced polycarbonate (PC)
- 6DR5..1 Aluminum, narrow	GD AlSi12
- 6DR5..2 Stainless steel	Austenitic stainless steel 316Cb, mat. No. 1.4581
- 6DR5..3 Aluminum	GD AlSi12
- 6DR5..5 Aluminum, flameproof	GK AlSi12
• Pressure gauge block	Aluminum AlMgSi, anodized
Dimensions	See "Dimensional Drawings" on page 5/22
Device versions	
• In Makrolon enclosure 6DR5..0	Single-acting and double-acting
• In aluminum enclosure 6DR5..1	Single-acting
• Im aluminum enclosure 6DR5..3 and 6DR5..5	Single-acting and double-acting
• In stainless steel enclosure 6DR5..2	Single-acting and double-acting

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Gauge	
• Degree of protection	
- Gauge made of plastic	IP31
- Gauge made of steel	IP44
- Gauge made of stainless steel 316	IP54
• Vibration resistance	According to EN 837-1
Connections, electrical	
• Screw terminals	2.5 mm^2 AWG30-14
• Cable gland	
- Without explosion protection as well as with Ex i	M20x1.5 or ½-14 NPT
- With explosion protection Ex d	Ex d certified M20x1.5; ½-14 NPT or M25x1.5
Connections, pneumatic	Female thread G¼ or ¼-18 NPT
Controller	
Controller unit	
• Five-point switch	Self-adjusting
• Deadband	
- dEbA = Auto	Self-adjusting
- dEbA = 0.1 … 10 %	Can be set as fixed value
Analog-to-digital converter	
• Scan time	10 ms
• Resolution	≤ 0,05 %
• Transmission error	≤ 0,2 %
• Temperature influence effect	≤ 0.1 %/10 K (≤ 0.1 %/18 °F)
Certificates and approvals	
Classification according to pressure equipment directive (PED 97/23/EC)	For gases of fluid group 1, complies with requirements of article 3, paragraph 3 (sound engineering practice SEP)
CE conformity	You can find the appropriate directives and standards, including the relevant versions, in the EC Declaration of Conformity on the Internet.
Explosion protection	
Explosion protection according to ATEX/IECEx	
• Flameproof enclosure "d"	II 2 G Ex d IIC T6/T4 Gb
• Intrinsic safety "i"	II 2 G Ex ia IIC T6/T4 Gb II 3 G Ex ic IIC T6/T4 Gc II 2 D Ex ia IIIC T110°C Db
• Non-sparking "nA"	II 3 G Ex nA IIC T6/T4 Gc
• Dust, protection with "t" enclosure[7)]	II 2 D Ex tb IIIC T100°C Db
Explosion protection according to FM/CSA, suitable for installations according to NEC 500/NEC 505	
• Flameproof enclosure "XP"	XP, Class I, Division 1, Gr. ABCD XP, Class I, Zone 1, AEx d, IIC, T6/T4
• Intrinsic safety "IS"	IS / I, II, III / 1 / A-G IS / 1 / AEx / Ex ib / IIC, Gb IS / 21 / AEx / Ex ib / IIIC, Db, T110°C
• Non-sparking "NI"	NI / I / 2 / A-D NI / 2 / AEx / Ex nA, Ex ic / IIC, Gc
• Dust, protection with "DIP" enclosure[7)]	DIP / II, III / 1 / E-G DIP / 21 / AEx / Ex tb / IIIC, Db, T100°C

Permissible ambient temperature	
For operation with and without HART[1)3)]	
• 6DR501./6DR502./6DR521./ 6DR522.	T4: -30 ... +80 °C (-22 ... +176 °F) T6: -30 ... +50 °C (-22 ... +122 °F)
• 6DR5.15/6DR5.25	T4: -30 ... +80 °C (-22 ... +176 °F) T6: -30 ... +50 °C (-22 ... +122 °F)
For operation with PROFIBUS PA or with FOUNDATION Fieldbus[1)3)]	
• 6DR551./6DR552./6DR561./ 6DR562.	T4: -20 ... +75 °C (-4 ... +167 °F) T6: -20 ... +50 °C (-4 ... +122 °F)
• 6DR5515/6DR5525/6DR5615/ 6DR5625	T4: -30 ... +80 °C (-22 ... +176 °F) T6: -30 ... +50 °C (-22 ... +122 °F)
Natural gas as driving medium	For technical specifications using natural gas as driving medium, see operating instructions.

1) The following applies to fail in place:
Without explosion protection: -20 ... +60 °C (-4 ... +140 °F)
With explosion protection:
T4: -20 ... +60 °C (-4 ... +140 °F)
T6: -20 ... +50 °C (-4 ... +122 °F)

2) Max. impact energy 1 Joule for enclosure with inspection window 6DR5..0 and 6DR5..1 or max. 2 Joule for 6DR5..3.

3) At ≤ -10 °C (≤ 14 °F) the display refresh rate of the indicator is limited. When using position feedback module, only T4 is permitted.

4) -20 ... +80 °C (-4 ... + 176 °F) for 6DR55..-0G..., 6DR56..-0G..., 6DR55..-0D... and 6DR56..-0D...

5) The following applies to fail in place: 3 ... 7 bar (43.5 ... 101.5 psi).

6) With Ex d version (6DR5..5-…) values are reduced by approx. 20 %.

7) For aluminum enclosure, narrow, single-acting, without inspection window 6DR5..1-.D...-..A.-Z...
For stainless steel enclosure, 6DR5..2-.D...-..A.-Z...
For aluminum enclosure, with inspection window 6DR5..3-.K...-..A.-Z...

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Technical specifications

SIPART PS2 with and without HART

	Basic device without Ex protection	Basic device with Ex d explosion protection	Basic device with "ia"explosion protection	Basic device with explosion protection "ic", "nA", "t"
Electrical specifications				
Current input I_W				
• Rated signal range		0/4 ... 20 mA		
• Test voltage		840 V DC, 1 s		
• Binary input BE1 (terminals 9/10; electrically connected to the basic device)		Suitable only for floating contact; max. contact load < 5 µA at 3 V		
2-wire connection (terminals 6/8) 6DR50.. and 6DR53.. without HART 6DR51.. and 6DR52.. with HART				
Current to maintain the auxiliary power supply		≥ 3.6 mA		
Required load voltage U_B (corresponds to Ω at 20mA)				
• Without HART (6DR50..)				
- Typical	6.36 V (= 318 Ω)	6.36 V (= 318 Ω)	7.8 V (= 390 Ω)	7.8 V (= 390 Ω)
- max.	6.48 V (= 324 Ω)	6.48 V (= 324 Ω)	8.3 V (= 415 Ω)	8.3 V (= 415 Ω)
• Without HART (6DR53..)				
- Typical	7.9 V (= 395 Ω)	-	-	-
- max.	8.4 V (= 420 Ω)	-	-	-
• With HART (6DR51..)				
- Typical	6.6 V (= 330 Ω)	6.6 V (= 330 Ω)	-	-
- max.	6.72 V (= 336 Ω)	6.72 V (= 336 Ω)	-	-
• With HART (6DR52..)				
- Typical	-	8.4 V (= 420 Ω)	8.4 V (= 420 Ω)	8.4 V (= 420 Ω)
- max.	-	8.8 V (= 440 Ω)	8.8 V (= 440 Ω)	8.8 V (= 440 Ω)
• Static destruction limit	±40 mA	±40 mA	-	-
Effective internal capacitance C_i				
• Without HART	-	-	11 nF	"ic": 11 nF
• With HART	-	-	11 nF	"ic": 11 nF
Effective internal inductance L_i				
• Without HART	-	-	207 µH	"ic": 207 µH
• With HART	-	-	310 µH	"ic": 310 µH
For connecting to circuits with the following peak values	-	-	U_i = 30 V I_i = 100 mA P_i = 1 W	"ic": U_i = 30 V I_i = 100 mA "nA"/"t": $U_n \leq$ 30 V $I_n \leq$ 100 mA
3-/4-wire connection (terminals 2/4 and 6/8) 6DR52.. with HART, explosion-protected 6DR53.. without HART, not explosion-protected)				
Load voltage at 20 mA	≤ 0.2 V (= 10 Ω)	≤ 0.2 V (= 10 Ω)	≤ 1 V (= 50 Ω)	≤ 1 V (= 50 Ω)
Power supply U_H	18 ... 35 V DC	18 ... 35 V DC	18 ... 30 V DC	18 ... 30 V DC
Current consumption I_H		(U_H -7.5 V)/2.4 kΩ [mA]		
Effective internal capacitance C_i	-	-	22 nF	"ic": 22 nF
Effective internal inductance L_i	-	-	0.12 mH	"ic": 0,12 mH
For connecting to circuits with the following peak values	-	-	U_i = 30 V DC I_i = 100 mA P_i = 1 W	"ic": U_i = 30 V I_i = 100 mA "nA/"t": $U_n \leq$ 30 V $I_n \leq$ 100 mA
Electrical isolation	between U_H and I_W	between U_H and I_W	between U_H and I_W (2 intrinsically safe circuits)	between U_H and I_W
HART communication				
HART version		7		
PC parameterization software		SIMATIC PDM; supports all device objects. The software is not included in the scope of delivery.		

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SIPART PS2 with PROFIBUS PA/with FOUNDATION Fieldbus

	Basic device without Ex protection	**Basic device with Ex d explosion protection**	**Basic device with "ia"explosion protection**	**Basic device with explosion protection "ic", "nA", "t"**
Electrical specifications				
Power supply, bus circuit (terminals 6/7)		Bus-supplied		
Bus voltage	9 ... 32 V	9 ... 32 V	9 ... 24 V	9 ... 32 V
For connecting to circuits with the following peak values				
• Bus connection with FISCO supply unit			U_i = 17.5 V I_i = 380 mA P_i = 5.32 W	"ic": U_i = 17.5 V I_i = 570 mA "nA"/"t": $U_n \leq$ 32 V
• Bus connection with barrier			U_i = 24 V I_i = 250 mA P_i = 1.2 W	"ic": U_i = 32 V "nA"/"t": $U_n \leq$ 32 V
Effective internal capacitance	-	-	C_i = negligible	C_i = negligible
Effective internal inductance	-	-	L_i = 8 µH	"ic": L_i = 8 µH
Current consumption		11.5 mA ± 10 %		
Additional error signal		0 mA		
Safety shutdown can be activated with coding bridge (terminals 81/82)		electrically isolated from bus circuit and binary input		
• Input resistance		> 20 kΩ		
• Signal state "0" (shutdown active)		0 ... 4.5 V or unconnected		
• Signal state "1" (shutdown not active)		13 ... 30 V		
For connecting to power supply with the following peak values			U_i = 30 V I_i = 100 mA P_i = 1 W	"nA": $U_n \leq$ 30 V $I_n \leq$ 100 mA "ic": U_i = 30 V I_i = 100 mA
• Effective Internal capacitance	-	-	C_i = negligibly small	C_i = negligibly small
Binary input BE1 for PROFIBUS (terminals 9/10); electrically connected to the bus circuit)		Bridged or connection to switching contact. Suitable only for floating contact; max. contact load < 5 µA at 3 V		
Electrical isolation				
• For basic device without Ex protection and for basic device with Ex d		Electrical isolation between basic device and the input for safety shutdown, as well as the outputs of the option modules		
• For basic device Ex "ia"		The basic device and the input to the safety shutdown, as well as the outputs of the option modules, are separate, intrinsically safe circuits.		
• For basic device Ex "ic", "nA", "t"		Electrical isolation between basic device and the input for safety shutdown, as well as the outputs of the option modules		
Test voltage		840 V DC, 1 s		
PROFIBUS PA communication				
Communication		Layers 1 and +2 according to PROFIBUS PA, transmission technology according to IEC 61158-2; slave function; layer 7 (protocol layer) according to PROFIBUS DP, EN 50170 standard with the extended PROFIBUS functions (all data acyclic, manipulated variable, feedbacks and status also cyclic)		
C2 connections		Four connections to master class 2 are supported; automatic connection setup 60 s after break in communication		
Device profile		PROFIBUS PA profile B, version 3.0, more than 150 objects		
Response time to master message		Typically 10 ms		
Device address		126 (when delivered)		
PC parameterization software		SIMATIC PDM; supports all device objects. The software is not included in the scope of delivery.		

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Technical specifications

	Basic device without Ex protection	Basic device with Ex d explosion protection	Basic device with "ia"explosion protection	Basic device with explosion protection "ic", "nA", "t"
FOUNDATION Fieldbus communication				
Communications group and class	According to technical specification of the Fieldbus Foundation for H1 communication			
Function blocks	Group 3, Class 31PS (Publisher Subscriber) 1 Resource Block (RB2) 1 Analog Output Function Block (AO) 1 PID Function Block (PID) 1 Transducer Block (Standard Advanced Positioner Valve)			
Execution times of the blocks	AO: 60 ms PID: 80 ms			
Physical layer profile	123, 511			
FF registration	Tested with ITK 5.0			
Device address	22 (when delivered)			

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Option modules

	Without Ex protection/ with Ex protection Ex d	With explosion protection "ia"	With explosion protection "ic", "nA", "t"
Alarm module	**6DR4004-8A**	**6DR4004-6A**	**6DR4004-6A**
3 binary output circuits		• Alarm output A1: Terminals 41 and 42 • Alarm output A2: Terminals 51 and 52 • Alarm output: Terminals 31 and 32	
• Power supply U_H	≤ 35 V	-	-
• Signal state			
- High (not activated)	Conductive, R = 1 kΩ, +3/-1 % *)	≥ 2.1 mA	≥ 2.1 mA
- Low *) (activated)	Blocked, I_R < 60 µA	≤ 1.2 mA	≤ 1.2 mA
*) Low is also the status when the basic device is faulty or is without additional electrical power supply.	*) When used in the flameproof enclosure the current consumption must be limited to 10 mA per output.	Switching threshold with supply to EN 60947-5-6: U_H = 8.2 V, R_i = 1 kΩ	Switching threshold with supply to EN 60947-5-6: U_H = 8.2 V, R_i = 1 kΩ
• For connecting to circuits with the following peak values	-	U_i = 15 V I_i = 25 mA P_i = 64 mW	"ic": U_i = 15 V I_i = 25 mA "nA"/"t": U_n ≤ 15 V
Effective internal capacitance	-	C_i = 5.2 nF	C_i = 5.2 nF
Effective internal inductance	-	L_i = negligibly small	L_i = negligibly small
1 binary output circuit	Binary input BE2: Terminals 11 and 12, terminals 21 and 22 (bridge)		
• Electrically connected to the basic device			
- Signal state 0		Floating contact, open	
- Signal state 1		Floating contact, closed	
- Contact load		3 V, 5 µA	
• Electrically isolated from the basic device			
- Signal state 0		≤ 4.5 V or open	
- Signal state 1		≥ 13 V	
- Natural resistance		≥ 25 kΩ	
• Static destruction limit	± 35 V	-	-
• For connecting to circuits with the following peak values	-	U_i = 25.2 V	"ic": U_i = 25.2 V "nA"/"t": U_n ≤ 25.5 V
Effective internal capacitance	-	C_i = negligibly small	C_i = negligibly small
Effective internal inductance	-	L_i = negligibly small	L_i = negligibly small
Electrical isolation	The 3 outputs, the input BE2 and the basic device are electrically isolated from each other		
Test voltage	840 V DC, 1 s		
Position feedback module	**6DR4004-8J**	**6DR4004-6J**	**6DR4004-6J**
DC output for position feedback			
1 current output: Terminals 61 and 62		2-wire connection	
Rated signal range		4 ... 20 mA, short-circuit proof	
Total operating range		3.6 … 20.5 mA	
Power supply U_H	+12 … +35 V	+12 … +30 V	+12 … +30 V
External loads R_B [kΩ]		≤ (U_H [V] – 12 V)/I [mA]	
Transmission error		≤ 0,3 %	
Temperature influence effect		≤ 0.1 %/10 K (≤ 0.1 %/18 °F)	
Resolution		≤ 0,1 %	
Residual ripple		≤ 1 %	
• For connecting to circuits with the following peak values	-	U_i = 30 V I_i = 100 mA P_i = 1 W	"ic": U_i = 30 V, I_i = 100 mA "nA"/"t": U_n ≤ 30 V, I_n ≤ 100 mA P_n ≤ 1 W
Effective internal capacitance	-	C_i = 11 nF	C_i = 11 nF
Effective internal inductance	-	L_i = negligibly small	L_i = negligibly small
Electrical isolation	Electrically isolated from the alarm option and safely isolated from the basic device		
Test voltage	840 V DC, 1 s		

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Technical specifications

	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "nA", "t"
SIA module	**6DR4004-8G**	**6DR4004-6G**	**6DR4004-6G**
Limit transmitter with slot-type initiators and alarm output			
2 slot-type initiators	• Binary output (limit transmitter) A1: Terminals 41 and 42 • Binary output (limit transmitter) A2: Terminals 51 and 52		
• Connection	2-wire system to EN 60947-5-6 (NAMUR), for switching amplifier to be connected on load side		
• Signal state High (not activated)	> 2.1 mA		
• Signal state Low (activated)	< 1.2 mA		
• 2 slot-type initiators	Type SJ2-SN		
• Function	NC (normally closed)		
• Connecting to circuits with the following peak values	Rated voltage 8 V current consumption: ≥ 3 mA (limit value not responded), ≤ 1 mA (limit value responded)	U_i = 15 V I_i = 25 mA P_i = 64 mW	"ic": U_i = 15 V I_i = 25 mA "nA": $U_n \leq$ 15 V $P_n \leq$ 64 mW
Effective internal capacitance	-	C_i = 41 nF	C_i = 41 nF
Effective internal inductance	-	L_i = 100 µH	L_i = 100 µH
1 alarm output	Binary output: Terminals 31 and 32		
• Connection	On switching amplifier according to EN 60947-5-6: (NAMUR), U_H = 8.2 V, R_i = 1 kΩ).		
• Signal state High (not activated)	R = 1.1 kΩ	> 2.1 mA	> 2.1 mA
• Signal state Low (activated)	R = 10 kΩ	< 1.2 mA	< 1.2 mA
• Power supply U_H	$U_H \leq$ 35 V DC I ≤ 20 mA	-	-
• Connecting to circuits with the following peak values	-	U_i = 15 V I_i = 25 mA P_i = 64 mW	"ic": U_i = 15 V I_i = 25 mA "nA": $U_n \leq$ 15 V $P_n \leq$ 64 mW
Effective internal capacitance	-	C_i = 5.2 nF	C_i = 5.2 nF
Effective internal inductance	-	L_i = negligibly small	L_i = negligibly small
Electrical isolation	The 3 outputs are electrically isolated from the basic device.		
Test voltage	840 V DC, 1 s		

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	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "nA", "t"
Mechanical limit switch module	6DR4004-8K	6DR4004-6K	6DR4004-6K
Limit transmitter with mechanical switching contacts			
2 limit value contacts		• Binary output A1: Terminals 41 and 42 • Binary output A2: Terminals 51 and 52	
• Max. switching current AC/DC	4 A	-	-
• Connecting to circuits with the following peak values	-	U_i = 30 V I_i = 100 mA P_i = 750 mW	"ic": U_i = 30 V I_i = 100 mA "nA": $U_n \leq$ 15 V
Effective internal capacitance	-	C_i = negligibly small	C_i = negligibly small
Effective internal inductance	-	L_i = negligibly small	L_i = negligibly small
• Max. switching voltage AC/DC	250 V/24 V	30 V DC	30 V DC
1 alarm output		Binary output: Terminals 31 and 32	
• Connection		On switching amplifier according to EN 60947-5-6: (NAMUR), U_H = 8.2 V, R_i = 1 kΩ).	-
• Signal state High (not activated)	R = 1.1 kΩ	> 2.1 mA	> 2.1 mA
• Signal state Low (activated)	R = 10 kΩ	< 1.2 mA	< 1.2 mA
• Auxiliary power	$U_H \leq$ 35 V DC I ≤ 20 mA	-	-
• Connecting to circuits with the following peak values	-	U_i = 15 V I_i = 25 mA P_i = 64 mW	"ic": U_i = 15 V I_i = 25 mA
Effective internal capacitance	-	C_i = 5.2 nF	C_i = 5.2 nF
Effective internal inductance	-	L_i = negligibly small	L_i = negligibly small
Electrical isolation		The 3 outputs are electrically isolated from the basic device	
Test voltage		3 150 V DC, 2 s	
Rated conditions altitude	Max. 2 000 m NN At altitudes over 2 000 m NN, use a suitable power supply	-	-
EMC filter module		EMC filter module type C73451-A430-D23 is required for NCS sensor or an external potentiometer. External position sensor (potentiometer or NCS; as option) with the following peak values	
Resistance of external potentiometer		10 kΩ	
Peak values when suppled via the PROFIBUS basic device	-	U_o = 5 V I_o = 75 mA statisch I_o = 160 mA kurzfristig P_o = 120 mW	U_o = 5 V I_o = 75 mA - P_o = 120 mW
Peak values when suppled via other basic devices	-	U_o = 5 V I_o = 100 mA P_o = 33 mW C_o = 1 µF L_o = 1 mH	U_o = 5 V I_o = 75 mA P_o = 120 mW C_o = 1 µF L_o = 1 mH
Electrical isolation		Electrically connected to the basic device	

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Technical specifications

	Without Ex protection	With explosion protection "ia"	With explosion protection "ic", "nA", "t"
NCS sensor			
Position range			
• Linear actuator 6DR4004-.N.20		3 ... 14 mm (0.12 ... 0.55")	
• Linear actuator 6DR4004-.N.30		10 ... 130 mm (0.39 ... 5.12"); up to 200 mm (7.87") on request	
• Part-turn actuator		30° ... 100°	
Linearity (after correction by positioner)			
• Linear actuator		± 1 %	
• Part-turn actuator		± 1 %	
Hysteresis		± 0,2 %	
Continuous working temperature	-40 °C ... +90 °C (-40 °F ... +194 °F)	-	-
Climatic class		Nach DIN EN 60721-3-4	
• Storage		1K5, but -40 ... +90 °C (1K5, but -40 ... +194 °F)	
• Transport		2K4, but -40 ... +90 °C (2K4, but -40 ... +194 °F)	
Vibration resistance			
• Harmonic oscillations (sine) according to IEC 60068-2-6		3.5 mm (0.14"), 2 ... 27 Hz; 3 cycles/axis 98.1 m/s² (321.84 ft/s²), 27 ... 300 Hz, 3 cycles/axis	
• Bumping according to IEC 60068-2-29		300 m/s² (984 ft/s²), 6 ms, 4 000 shocks/axis	
Degree of protection of enclosure		IP68 according ot IEC EN 60529; NEMA 4X / Encl. Type 4X	
• Connecting to circuits with the following peak values	-	U_i = 5 V I_i = 160 mA P_i = 120 mW	"ic"/"nA": U_i = 5 V
Effective internal capacitance	-	C_i = 180 nF	C_i = 180 nF
Effective internal inductance	-	L_i = 922 µH	L_i = 922 µH
Explosion protection according to ATEX/IECEx	-	Intrinsic safety "ia": II 2 G Ex ia IIC T6/T4 Gb	Intrinsic safety "ic": II 3 G Ex ic IIC T6/T4 Gc Non-sparking "nA": II 3 G Ex nA IIC T6/T4 Gc
Explosion protection according to FM	-	Intrinsic safety "ia": IS, Class I, Divison 1, ABCD IS, Class I, Zone 1, AEx ib, IIC	Non-sparking, "nA": NI, Class I, Divison 2, ABCD NI, Class I, Zone 2, AEx nA, IIC
Permissible ambient temperature			
• ATEX/IECEx	-	T4: -40 ... +90 °C (-40 ... +194 °F) T6: -40 ... +70 °C (-40 ... +158 °F)	
• FM	-	T4: -40 ... +85 °C (-40 ... +185 °F) T6: -40 ... +70 °C (-40 ... +158 °F)	

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Selection and ordering data		Article No.	Order code
SIPART PS2 electropneumatic positioner in enclosure made of Makrolon, aluminum and stainless steel	↗	6 D R 5 - 0 ▢▢▢ - 0 ▢ A ▢	▢▢▢
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Version			
2-wire (4 to 20 mA)			
• Without HART	▶⬟	0	
• With HART, not explosion-protected	▶⬟	1	
2-, 3-, 4-wire (0/4 to 20 mA)			
• With HART, explosion-protected	▶⬟	2	
• Without HART, not explosion -protected		3	
PROFIBUS PA connection		5	
FOUNDATION Fieldbus connection		6	
For actuator			
Single-acting	▶⬟	1	
Double-acting	▶⬟	2	
Enclosure			
Makrolon	▶⬟	0	
Aluminum, narrow; only single-acting		1 1	
Stainless steel, without inspection window		2	
Aluminum		3	
Explosion protection			
Without	▶⬟	N	
With protection type	▶⬟	E	
• Intrinsic safety			
With protection type[1]		D	
• Non-sparking			
• Dust protection via enclosure			
With protection type[2]		F	
• Intrinsic safety			
• Non-sparking			
With protection type[2]		G	
• Non-sparking			
With protection type[1]		K	
• Intrinsic safety			
• Non-sparking			
• Dust protection via enclosure			
Connection thread electrical/pneumatic			
M20x1.5/G¼	▶⬟	G	
½-14 NPT / ¼-18 NPT	▶⬟	N	
M20x1.5/¼-18 NPT		M	
½-14 NPT / G¼		P	
Plug M12 / G¼[3]		R	
Plug M12 / ¼-18 NPT[3]		S	

▶ Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

1) Enclosure: aluminum narrow 6DR5..1 or stainless steel 6DR5..2, each without inspection window in the cover. Aluminum 6DR5..3 with inspection window in the cover and max. impact energy 2 Joule.

2) Enclosure: aluminum or Makrolon, each with inspection window in the cover. Max. impact energy 1 Joule for enclosure with inspection window 6DR5..0 and 6DR5..1 or max. 2 Joule for 6DR5..3.

3) Connector M12 mounted and electrically connected in versions 6DR55.. and 6DR56..
Connector M12 mounted in versions 6DR50.., 6DR51.., 6DR52.. and 6DR53..
Not for protection type "dust protection by enclosure" 6DR5...-0D... and 6DR5...-0K...

Selection and ordering data		Article No.	Order code
SIPART PS2 electropneumatic positioner in enclosure made of Makrolon, aluminum and stainless steel		6 D R 5 - 0 ▢▢▢ - 0 ▢ A ▢	▢▢▢
Limit monitor			
Installed, incl. 2nd cable gland			
Without	▶⬟	0	
Alarm module; electronic (6DR4004-.A)		1	
SIA module; slot-type initiators (6DR4004-.G)		2	
Mechanical limit switch module (mechanical switching contacts (6DR4004-.K))		3	
Option modules			
Installed, incl. 2nd cable gland			
Without	▶⬟	0	
Position feedback module for position feedback signal (4 ... 20 mA) (6DR4004-.J)		1	
EMC filter module for external position sensor in the SIPART PS2 enclosure (C73451-A430-D23), NCS sensor 6DR4004-.N..0 and external position sensing with non-Siemens potentiometer		2	
Position feedback module and EMC filter module for external position sensor		3	
Customer-specific design			
Without	▶⬟	0	
Brief instructions			
German/English	▶⬟	A	
French/Spanish/Italian		B	
Mounted pressure gauge block			
Without	▶⬟	0	
Gauge made of plastic			
Block made of aluminum, single-acting G¼, scaled in MPa and bar		1	
Block made of aluminum, double-acting G¼, scaled in MPa and bar		2	
Block made of aluminum, single-acting ¼-18 NPT, scaled in MPa and psi		3	
Block made of aluminum, double-acting ¼-18 NPT, scaled in MPa and psi		4	
Gauge made of steel			
block made of aluminum, single-acting G¼, scaled in MPa, bar, psi		9	R 1 A
Block made of aluminum, double-acting G¼, scaled in MPa, bar, psi		9	R 2 A
Block made of aluminum, single-acting ¼-18 NPT, scaled in MPa, bar, psi		9	R 1 B
Block made of aluminum, double-acting ¼-18 NPT, scaled in MPa, bar, psi		9	R 2 B
Gauge made of stainless steel 316			
Block made of stainless steel 316, single-acting G¼, scaled in MPa, bar, psi		9	R 1 C
Block made of stainless steel 316, double-acting G¼, scaled in MPa, bar, psi		9	R 2 C
Block made of stainless steel 316, single-acting ¼-18 NPT, scaled in MPa, bar, psi		9	R 1 D
Block made of stainless steel 316, double-acting ¼-18 NPT, scaled in MPa, bar, psi		9	R 2 D

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Selection and Ordering data SIPART PS2

Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner in enclosure made of Makrolon, aluminum and stainless steel	**6 D R 5** ■■■ - 0 ■■■■ - 0 ■ **A** ■ ■■■	
Further designs Add "-Z" to Article No. and specify Order Code.	Order code	
TAG plate made of stainless steel, 3-line Text line 1: Plain text from Y17 Text line 2: Plain text from Y15 Text line 3: Plain text from Y16	**A20**	
Version with stainless steel sound absorbers Standard with stainless steel enclosure	**A40**	
Functional safety (SIL 2) only for 6DR5.1. (single-acting positioners) Device suitable for use according to IEC 61508 and IEC 61511	**C20**	
Fail in Place Holding function in case of auxiliary electrical power failure	**F01**	
Pneumatic terminal block made of stainless steel 316 For device versions in Makrolon enclosure	**K18**	
OPOS adapter with interface VDI/VDE 3847 blanketing, not for flameproof aluminum enclosure	**K20**	
Marine approval		
Germanischer Lloyd certificate	**S10**	
LR Lloyds Register certificate	**S11**	
BV Bureau Veritas certificate	**S12**	
ABS American Bureau of Shipping certificate	**S13**	
DNV-GL Det Norske Veritas	**S14**	
Measuring point description Max. 16 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: **Y15: .....**	**Y15**	
Measuring point text Max. 24 characters for HART, max. 32 characters for PROFIBUS PA, FOUNDATION Fieldbus and 4 ... 20 mA, specify in plain text: **Y16: .....**	**Y16**	
Measuring point number (TAG No.) Max. 32 characters, specify in plain text: **Y17: .....**	**Y17**	
Preset bus address Specify in plain text: **Y25: .....** (only for 6DR55.. and 6DR56..)	**Y25**	
Customer-specific parameter setting Specify in plain text: Y30:	**Y30**	

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Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner, in flameproof aluminum enclosure, without cable gland	**6 D R 5 5 - 0 E - 0 A**	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Version		
2-wire (4 to 20 mA)		
• Without HART	0	
• With HART	1	
2-, 3-, 4-wire (0/4 to 20 mA)		
• With HART ►⬟	2	
• Without HART	3	
PROFIBUS PA connection	5	
FOUNDATION Fieldbus connection	6	
For actuator		
Single-acting ►⬟	1	
Double-acting ►⬟	2	
Connection thread electrical/pneumatic		
M20 x 1.5 / G¼ ►⬟	G	
½-14 NPT / ¼-18 NPT ►⬟	N	
M20 x 1.5 / ¼-18 NPT	M	
½-14 NPT / G¼	P	
M25x1.5 / G¼	Q	
Limit monitor Built-in		
Without ►⬟	0	
Alarm module; electronic (6DR4004-8A)	1	
Option modules Built-in		
Without ►⬟	0	
Position feedback module for position feedback signal (4 ... 20 mA) (6DR4004-8J)	1	
EMC filter module for external position sensor	2	
Position feedback module and EMC filter module for external position sensor	3	
Brief instructions		
German/English ►⬟	A	
French/Spanish/Italian	B	

► Available ex stock

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and ordering data	Article No.	Order code
SIPART PS2 electropneumatic positioner, in flameproof aluminum enclosure, without cable gland	**6 D R 5 5 - 0 E - 0 A**	
Mounted pressure gauge block		
Without ►⬟	0	
Gauge made of plastic, block made of aluminum, single-acting G¼, scaled in MPa and bar	1	
Gauge made of plastic, block made of aluminum, double-acting G¼, scaled in MPa and bar	2	
Gauge made of plastic, block made of aluminum, single-acting ¼-18 NPT, scaled in MPa and psi	3	
Gauge made of plastic, block made of aluminum, double-acting ¼-18 NPT, scaled in MPa and psi	4	
Gauge made of steel		
Block made of aluminum, single-acting G¼, scaled in MPa, bar, psi	9 R 1 A	
Block made of aluminum, double-acting G¼, scaled in MPa, bar, psi	9 R 2 A	
Block made of aluminum, single-acting ¼-18 NPT, scaled in MPa, bar, psi	9 R 1 B	
Block made of aluminum, double-acting ¼-18 NPT, scaled in MPa, bar, psi	9 R 2 B	
Gauge made of stainless steel 316		
Block made of stainless steel 316, single-acting G¼, scaled in MPa, bar, psi	9 R 1 C	
Block made of stainless steel 316, double-acting G¼, scaled in MPa, bar, psi	9 R 2 C	
Block made of stainless steel 316, single-acting ¼-18 NPT, scaled in MPa, bar, psi	9 R 1 D	
Block made of stainless steel 316, double-acting ¼-18 NPT, scaled in MPa, bar, psi	9 R 2 D	
Further designs Add "-Z" to Article No. and specify Order Code.		Order code
TAG plate made of stainless steel, 3-line Text line 1: Plain text from Y17 Text line 2: Plain text from Y15 Text line 3: Plain text from Y16		**A20**
Functional safety (SIL 2) only for 6DR5.1. (single-action positioners) Device suitable for use according to IEC 61508 and IEC 61511		**C20**
Fail in Place Holding function in case of auxiliary electrical power failure		**F01**
Measuring point description Max. 16 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: **Y15: .....**		**Y15**
Measuring point text Max. 24 characters for HART, max. 32 characters for PROFIBUS PA and FOUNDATION Fieldbus, specify in plain text: **Y16: .....**		**Y16**
Measuring point number (TAG No.) Max. 32 characters, specify in plain text: **Y17: .....**		**Y17**
Preset bus address Specify in plain text: **Y25: .....** only for 6DR55.. and 6DR56..)		**Y25**

► Available ex stock

5

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5

Selection and ordering data		Article No.
Accessories		
Position feedback module for position feedback signal (4 ... 20 mA)		
• Without explosion protection	►	**6DR4004-8J**
• With explosion protection ATEX/IECEx	►	**6DR4004-6J**
• With explosion protection FM/CSA		**6DR4004-7J**
Alarm module for 3 alarm outputs and 1 binary input (functionality: 2 limit monitors, 1 fault alarm, 1 binary input)		
• Without explosion protection	►	**6DR4004-8A**
• With explosion protection ATEX/IECEx	►	**6DR4004-6A**
• With explosion protection FM/CSA		**6DR4004-7A**
SIA module (slot-type initiator alarm module, not for Ex d version)		
• Without explosion protection	►	**6DR4004-8G**
• With ATEX/IECEx and FM/CSA explosion protection	►	**6DR4004-6G**
Mechanical limit switch module (with mechanical ground contacts, not for Ex d version)		
• Without explosion protection	►	**6DR4004-8K**
• With explosion protection	►	**6DR4004-6K**
EMC filter module with and without explosion protection for connection of external position sensor (10 kΩ) or NCS sensor	►	**C73451-A430-D23**

► Available ex stock

Selection and ordering data	Article No.
Accessories	
NCS sensor for non-contacting detection of position (not for Ex d version)	↗ **6DR4004-** ■ **N** ■ ■ **0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Explosion protection	
Not explosion-proof	**8**
With protection type (ATEX/IECEx/FM) • Intrinsic safety • Non-sparking	**6**
Cable length	
6 m (19.68 ft)	**N**
20 m (65.67 ft)	**P**
40 m (131.23 ft)	**R**
Actuator type	
For part-turn actuators, glass fiber-reinforced polyester magnet holders[1]	**1**
For linear actuators up to 14 mm (0.55 inch)[2]	**2**
For linear actuators > 14 ... 130 mm (0.55 ... 5.12 inch)[3]	**3**
For part-turn actuators, anodized aluminum magnet holders	**4**

1) Fitted with mounting console, available for order separately as accessory.
2) Mounted with individual mounting solution. Only a NAMUR mounting bracket can be used as mounting base (order separately as accessory).
3) Mounted with NAMUR interface. Article No. either 6DR4004-8V or 6DR4004-8V + 6DR4004-8L depending on stroke range.
Or mounted without NAMUR interface, individual mounting solution. Article No. 6DR4004-8VK or 6DR4004-8VL can be used as individual mounting solution depending on the stroke range.

Selection and ordering data		Article No.
External position detection system (with explosion protection to ATEX/IECEx) for separate mounting of position sensor and controller unit (not for Ex d version), comprising SIPART PS2 Makrolon enclosure with integral potentiometer and sliding clutch (without electronics and valve block) The EMC filter module is additionally required for the controller unit. (separate ordering item, see above).	►	**C73451-A430-D78**
Gauge block with		
2 gauges made of plastic, block made of aluminum, single-acting G¼, scaled in MPa and bar	►	**6DR4004-1M**
3 gauges made of plastic, block made of aluminum, double-acting G¼, scaled in MPa and bar	►	**6DR4004-2M**
2 gauges made of plastic, block made of aluminum, single-acting ¼-18 NPT, scaled in MPa and psi	►	**6DR4004-1MN**
3 gauges made of plastic, block made of aluminum, double-acting ¼-18 NPT, scaled in MPa and psi	►	**6DR4004-2MN**
2 gauges made of steel Block made of aluminum, single-acting G¼, scaled in MPa, bar, psi	►	**6DR4004-1P**
3 gauges made of steel Block made of aluminum, double-acting G¼, scaled in Mpa, bar, psi	►	**6DR4004-2P**
2 gauges made of steel Block made of aluminum, single-acting ¼-18 NPT, scaled in MPa, bar, psi	►	**6DR4004-1PN**
3 gauges made of steel Block made of aluminum, double-acting ¼-18 NPT, scaled in MPa, bar, psi	►	**6DR4004-2PN**
2 gauges made of stainless steel 316 Block made of stainless steel 316, single-acting G¼, scaled in MPa, bar, psi	►	**6DR4004-1Q**
3 gauges made of stainless steel 316 Block made of stainless steel 316, double-acting G¼, scaled in MPa, bar, psi	►	**6DR4004-2Q**
2 gauges made of stainless steel 316 Block made of stainless steel 316, single-acting ¼-18 NPT, scaled in MPa, bar, psi	►	**6DR4004-1QN**
3 gauges made of stainless steel 316 Block made of stainless steel 316, double-acting ¼-18 NPT, scaled in MP, bar, psi	►	**6DR4004-2QN**
Pneumatic terminal block made of stainless steel 316 to replace the pneumatic terminal block made of aluminum for SIPART PS2 with Makrolon enclosure		
Single-acting with G¼	►	**6DR4004-1R**
Double-acting with G¼	►	**6DR4004-2R**
Single-acting with ¼-18 NPT	►	**6DR4004-1RN**
Double-acting with ¼-18 NPT	►	**6DR4004-2RN**
Mounting kit for NAMUR part-turn actuators		
(VDI/VDE 3845, with plastic coupling wheel, without mounting console)	►	**6DR4004-8D**
(VDI/VDE 3845, with stainless steel coupling, without mounting console)	►	**TGX:16300-1556**
The following mounting consoles can be used with the NAMUR part-turn actuator mounting kit 6DR4004-8D. Size W x L x H (H = height of shaft butt)		
• 30 x 80 x 20 mm	►	**TGX:16152-105**
• 30 x 80 x 30 mm	►	**TGX:16300-147**
• 30 x 130 x 30 mm	►	**TGX:16300-149**
• 30 x 130 x 50 mm	►	**TGX:16300-151**

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Mounting kit for other part-turn actuators		
The following mounting consoles can be used together with the NAMUR part-turn actuator mounting kit 6DR4004-8D.		
• SPX (DEZURIK) Power Rac, sizes R1, R1A, R2 and R2A	▶	**TGX:16152-328**
• Masoneilan Camflex II	▶	**TGX:16152-350**
• Fisher 1051/1052/1061, sizes 30, 40, 60 to 70	▶	**TGX:16152-364**
• Fisher 1051/1052, size 33	▶	**TGX:16152-348**
Mounting kit for NAMUR linear actuators		
• NAMUR linear actuator mounting kit with short lever (2 ... 35 mm (0.08 ... 1.38 inch)	▶	**6DR4004-8V**
• Long lever for travels from 35 ... 130 mm (1.38 ... 5.12 inch) without NAMUR mounting bracket	▶	**6DR4004-8L**
• Reduced mounting kit (like 6DR4004-8V but without fixing angle and U-bracket), with short lever with up to 35 mm travel (1.38 inch)	▶	**6DR4004-8VK**
• Reduced mounting kit (like 6DR4004-8V but without fixing angle and U-bracket), with long lever with > 35 mm travel (1.38 inch)	▶	**6DR4004-8VL**
• Roll and disk made of stainless steel 316 for replacement of the Teflon roll and aluminum disk in the 6DR4004-8, -8VK and -8VL mounting kits for NAMUR linear actuators	▶	**6DR4004-3N**
• Two terminal blocks made of stainless steel 316 for replacement of the aluminum terminal blocks in the 6DR4004-8V, -8VK and -8VL mounting kits for NAMUR linear actuators	▶	**6DR4004-3M**
Mounting kit for other linear actuators		
• Retrofitting kit for Moore series 72 and 750 valve positioners	▶	**TGX:16152-117**
• Masoneilan type 87/88	▶	**TGX:16152-620**
• Fisher type 657/667, size 30 to 80	▶	**TGX:16152-110**
• Samson actuator type 3277 (yoke dimension (H5) = 101 mm^2 (integrated connection without tube), not for Ex d	▶	**6DR4004-8S**
OPOS Interface according to VDI/VDE 3847		
• OPOS adapter with interface VDI/VDE 3847, blanketing, not for flameproof aluminum enclosure	▶	**6DR4004-5PA**
• OPOS/NAMUR mounting kit with short lever (complete), base plate, rail, mounting parts	▶	**6DR4004-5PL**
Connection block, for safety solenoid valve with extended mounting flange to NAMUR		
• For mounting to IEC 534-6	▶	**6DR4004-1B**
• For SAMSON actuator (integrated mounting) see above	▶	**6DR4004-1C**[1)]

Documentation (see notes below)		
Operating Instructions		
• SIPART PS2 HART German		**A5E00074630**
• SIPART PS2 HART English		**A5E00074631**
• SIPART PS2 PROFIBUS PA German		**A5E00127924**
• SIPART PS2 PROFIBUS PA English		**A5E00127926**
• SIPART PS2 FOUNDATION Fieldbus German		**A5E00214568**
• SIPART PS2 FOUNDATION Fieldbus English		**A5E00214569**
SIPART PS2 Compact Instruction Manual		
• English, French, German, Spanish, Italian, Dutch		**A5E03436620**
• Estonian, Latvian, Lithuanian, Polish, Romanian		**A5E03436655**
• Bulgarian, Czech, Finnish, Slovakian, Slovenian		**A5E03436664**
• Danish, Greek, Portuguese, Swedish, Hungarian		**A5E03436683**
Operating Instructions for NCS Sensor		
• English, German, French, Italian, Spanish, Portuguese (Brazil)		**A5E00097485**
SIPART PS2 device documentation		
• DVD with complete documentation for all device versions		**A5E00214567**
SITRANS I100 output isolator HART (see "SITRANS I supply units and isolation amplifiers") with		
• 24 V DC auxiliary power	▶	**7NG4124-0AA00**
SITRANS I200 output isolator HART (see "SITRANS I supply units and isolation amplifiers") with		
• 24 V DC auxiliary power	▶	**7NG4131-0AA00**
HART modem for connecting to PC or laptop		
• with USB interface	▶	**7MF4997-1DB**

▶ Available ex stock

[1)] Only together with 6DR4004-8S and 6DR4004-1M.

Note:

All the above-mentioned manuals are included on DVD and can be downloaded from www.siemens.de/sipartps2.

Scope of delivery for positioner

- 1 SIPART PS2 positioner as ordered
- 1 DVD with the complete documentation for all versions and accessories
- Short manual "SIPART PS2 - Configuration At a Glance"

Selection and ordering data	Article No.
NCS-Sensor spare parts	
Magnet holder made of fiberglass-reinforced polyester including magnet for non-contacting position detection for part-turn actuators	**A5E00078030**
Magnet holder made of anodized aluminum including magnet for non-contacting position detection for part-turn actuators	**A5E00524070**

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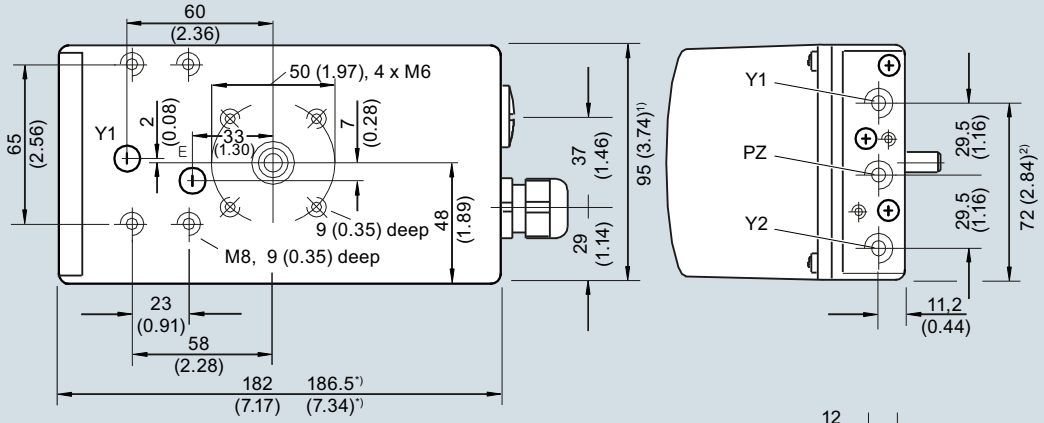
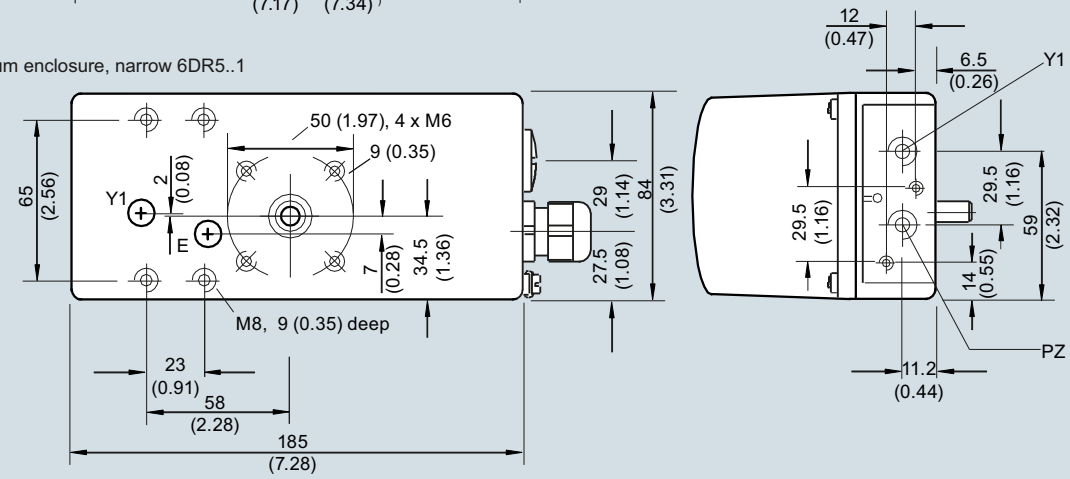
Dimensional drawings

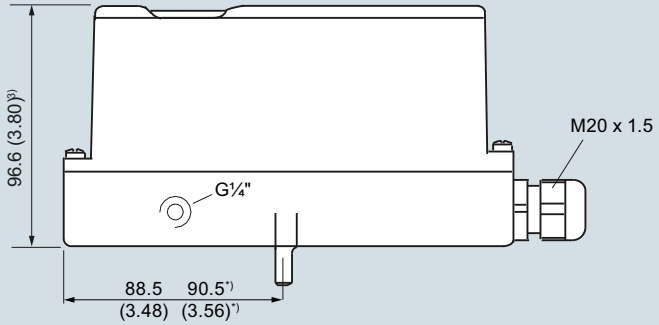
Makrolon enclosure 6DR5..0
Stainless steel enclosure 6DR5..2



Aluminum enclosure, narrow 6DR5..1



Makrolon enclosure 6DR5..0
Aluminum enclosure, narrow 6DR5..1
Stainless steel enclosure 6DR5..2



*) Dimensions with pneumatic terminal block NPT
Stainless steel version, values:
1) 99 (3.89)
2) 74 (2.91)
3) 98 (3.86)

Dimensional drawings for enclosure, dimensions in mm (inch)

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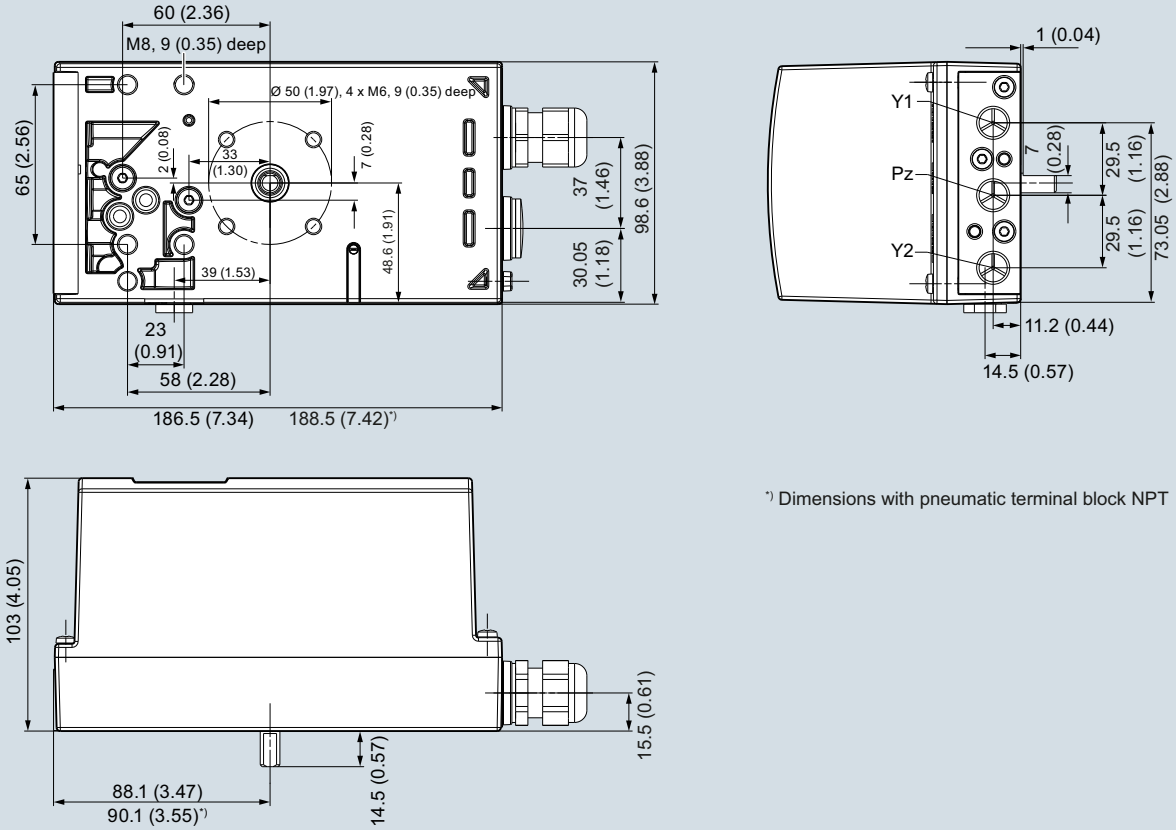

*) Dimensions with pneumatic terminal block NPT

Aluminum enclosure 6DR5..3, dimensions in mm (inch)

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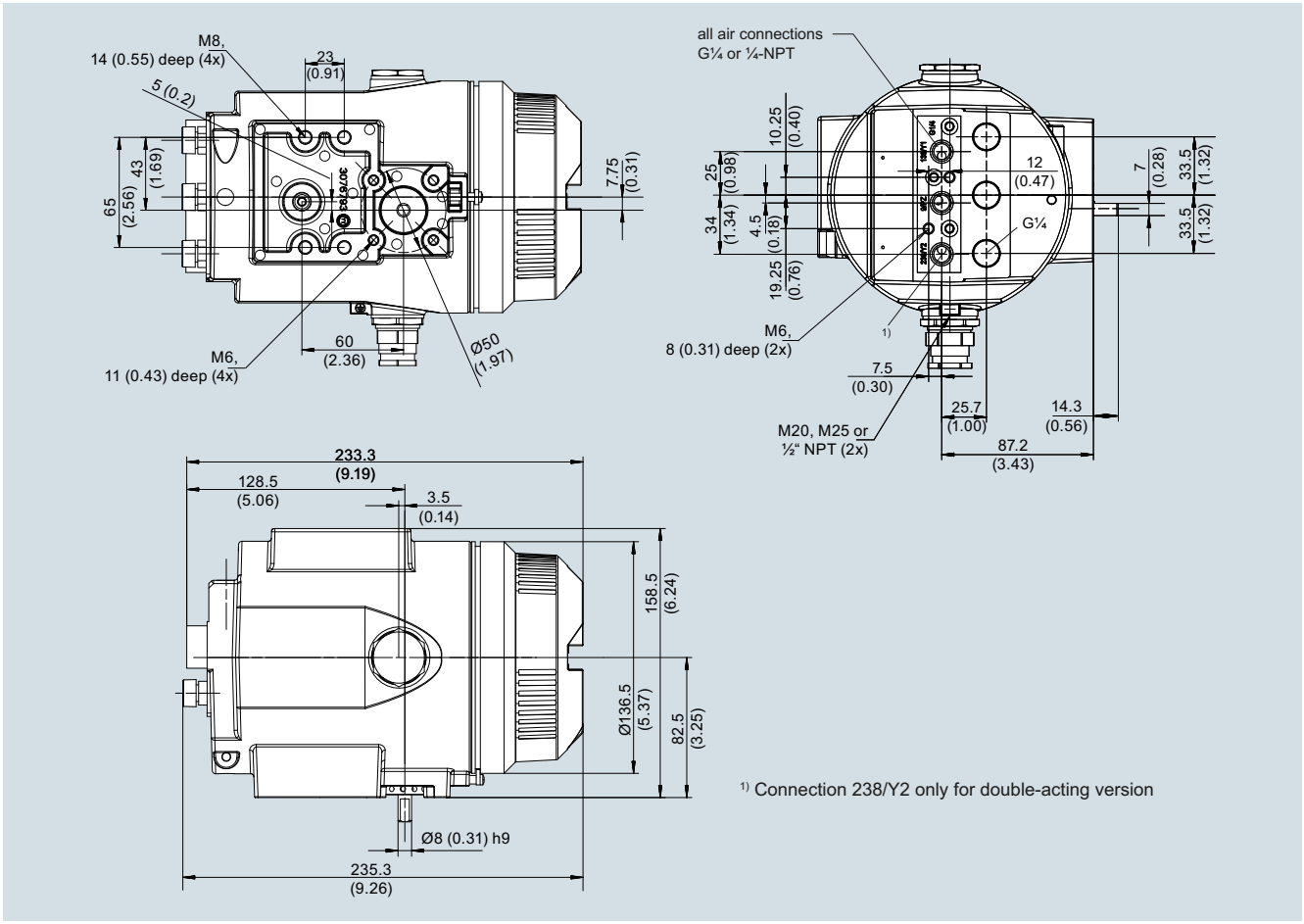
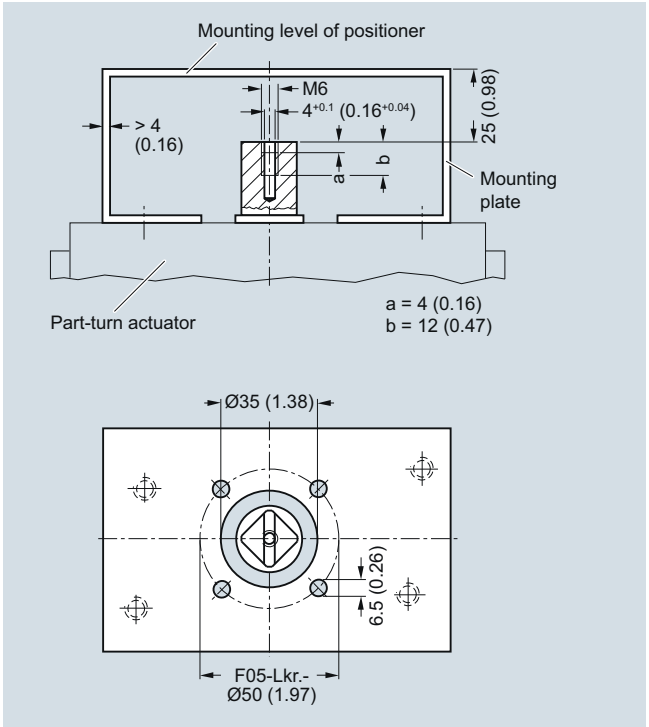
Dimensional drawings



Flameproof aluminum enclosure 6DR5..5, dimensions in mm (inch)



Mounting onto part-turn actuators; mounting consoles (scope of delivery of actuator manufacturer), extract from VDI/VDE 3845, dimensions in mm (inch)

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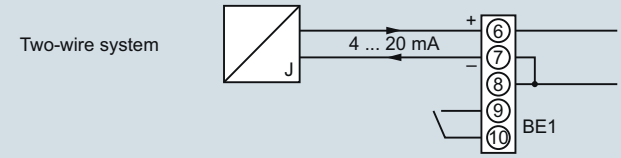
Schematics

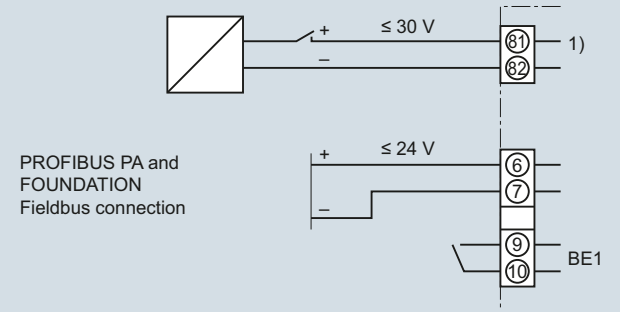
Electric connection of 2-wire devices (6DR50.. and 6DR51..)

Devices of types 6DR50.. and 6DR51.. are operated in a 2-wire system.



SIPART PS2 electropneumatic positioner, input circuit for 6DR50.. and 6DR51..

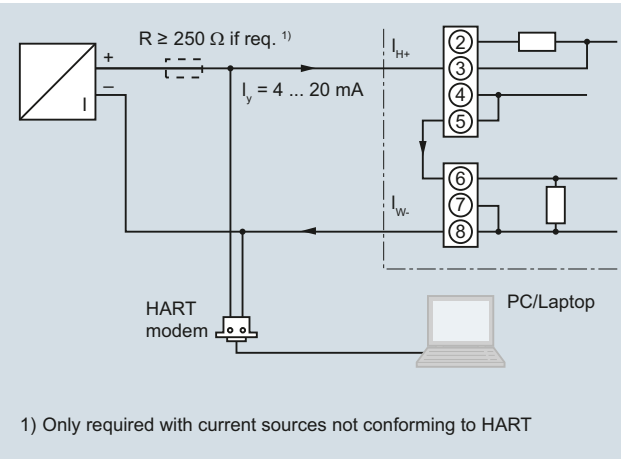
Electric connection of PROFIBUS PA device (6DR55..) and FOUNDATION Fieldbus device (6DR56..)



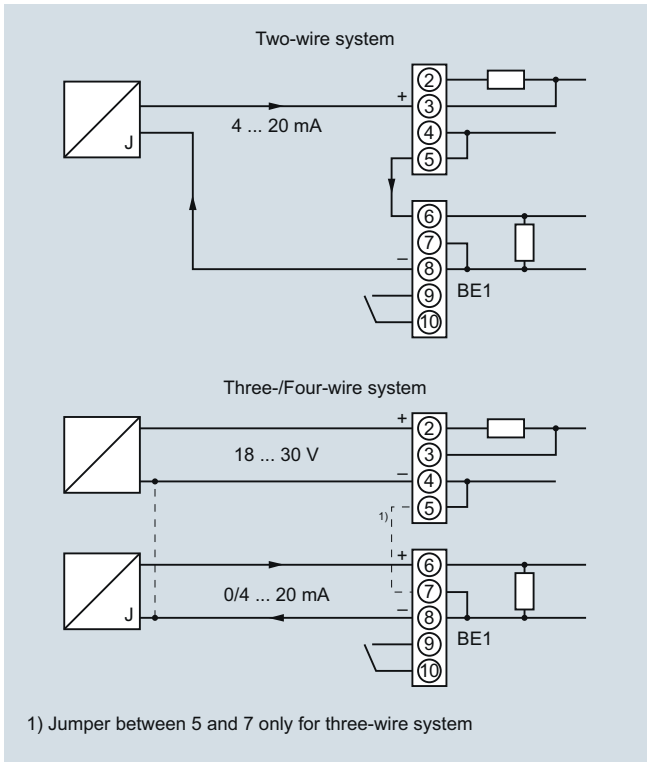
SIPART PS2 PA and SIPART PS2 FF electropneumatic positioner, input circuit for 6DR55.. and 6DR56..

Electric connection of 2-, 3- and 4-wire device (6DR52.. and 6DR53..)

Devices of types 6DR52.. and 6DR53.. can be operated in a 2-, 3- and 4-wire system.



SIPART PS2 electropneumatic positioner, example of connection for communication through HART for 6DR52..



SIPART PS2 electropneumatic positioner, input circuits for 6DR52.. and 6DR53..

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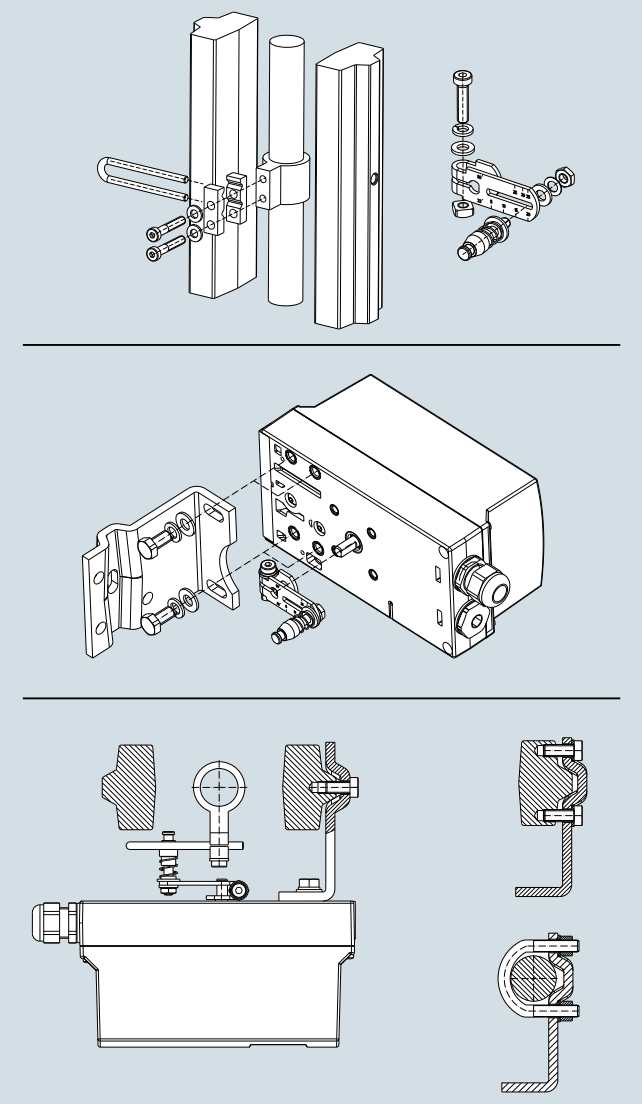
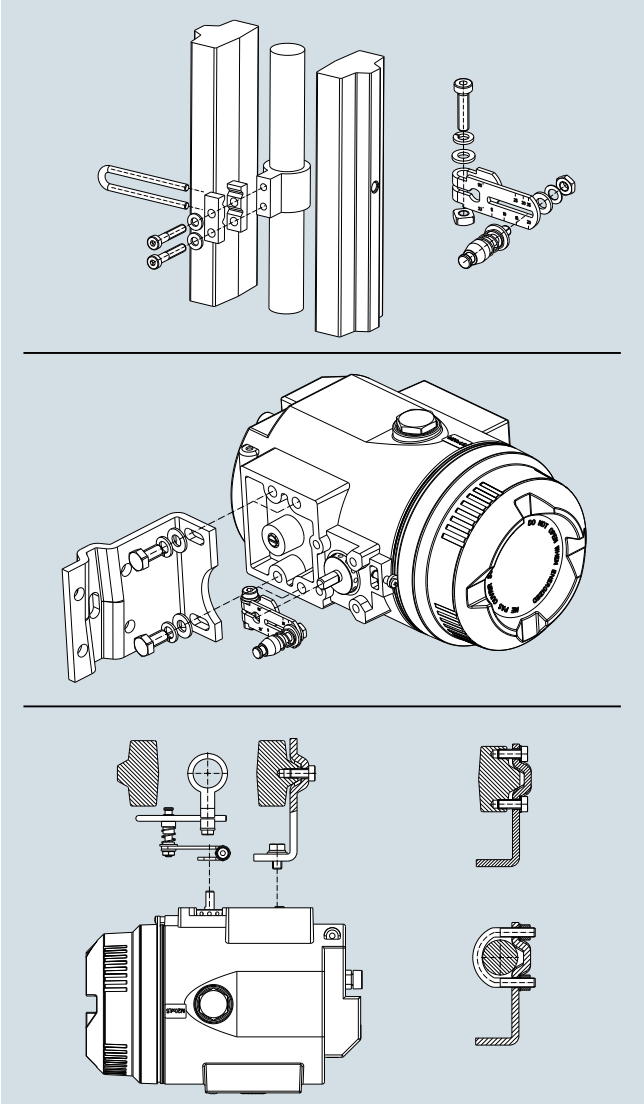
Mounting kit

Mounting kit for NAMUR linear actuators

- 1 mounting bracket
- 2 mounting prisms
- 1 U-bracket
- 1 lever arm with adjustable pick-up roll
- 2 U-bolts
- Various screws and lock washers



Mounting of SIPART PS2 on linear actuators



Mounting of SIPART PS2 in flameproof aluminum enclosure on linear actuators

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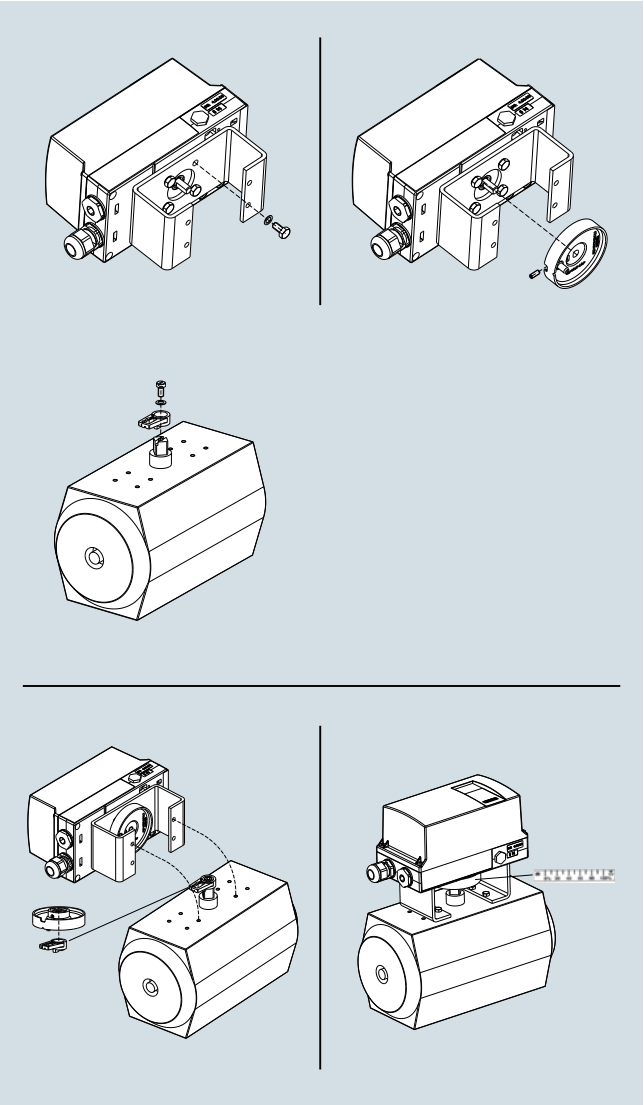
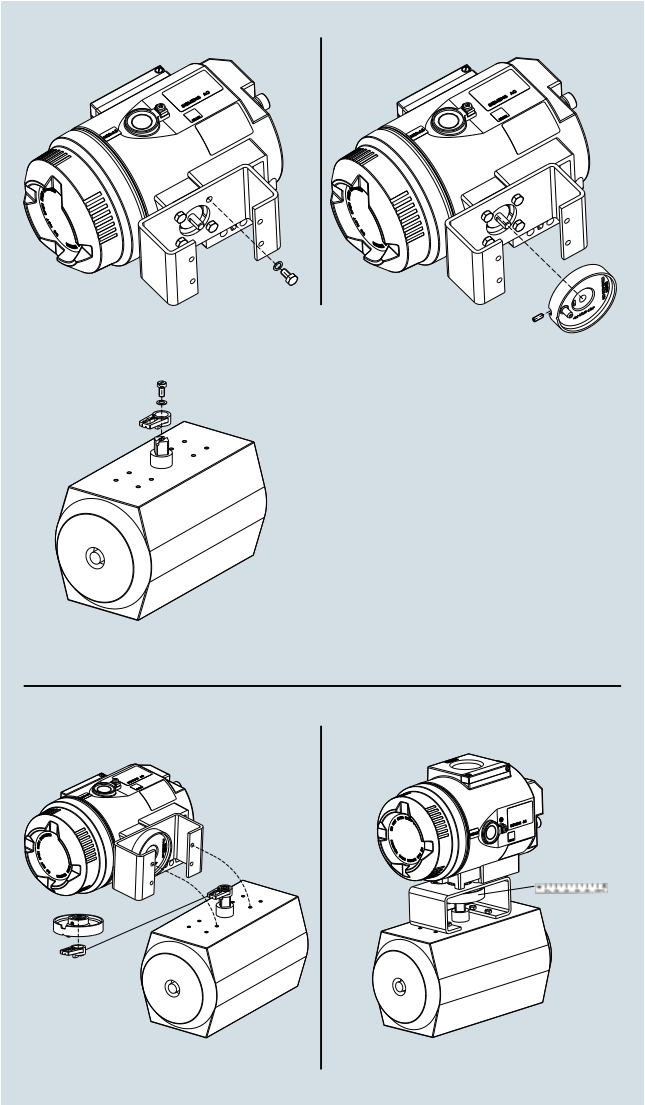
Mounting kit for NAMUR part-turn actuators

- 1 coupling wheel
- 1 driver pin
- 8 scales
- 1 pointer
- Various screws and lock washers

Caution: The mounting consoles and the screws for mounting onto the part-turn actuator are not included in the scope of delivery and must be provided by the customer (see "Technical specifications")



Mounting of SIPART PS2 on part-turn actuators



Mounting of SIPART PS2 in flameproof aluminum enclosure on part-turn actuators

More information

Special versions

On request

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Notes

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6/2	**Overview**
6/3	**Acoustic and motion sensing**
	Acoustic sensors for pump monitoring
6/5	SITRANS DA400 acoustic diagnostic unit
	Acoustic sensors for material flow monitoring
6/10	SITRANS AS100 acoustic sensor
6/14	SITRANS CU02 control unit
	Motion sensors
6/17	Milltronics MFA 4p motion failure alarm controller
6/23	Milltronics MSP-7 motion sensor
6/25	SITRANS WM100 motion sensor

You can download all instructions, catalogs and certificates for Process Protection free of charge at: www.siemens.com/processprotection

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Overview

	Application	Device description	Page
Acoustic sensor for pump monitoring			
	Acoustic diagnostics unit for flow valve leakage monitoring in oscillating displacement pumps or for material flow monitoring of bulk solids in pipes, conveyors or raceways.	**SITRANS DA400** • 4 inputs for structure-born noise sensors • 4 universal inputs • 6 digital outputs • With PROFIBUS DP or PROFIBUS PA • Sensor degree of protection IP66/IP68	6/5
Acoustic sensors for material flow monitoring			
	Acoustic sensor for solids flow detection.	**SITRANS AS100** • Non-invasive • Screw in, bolt on, weld, or bond in place • Analog output • High and low sensitivity range of operation	6/10
	Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow. It processes signals from the sensor, providing relay and analog outputs for interface into a process.	**SITRANS CU02** • 3 digit LCD display • 4 ... 20 mA output • Two programmable relays • Adjustable independent time delay for each relay • DIN rail mounting provides easy installation	6/14
Motion sensors			
	Highly sensitive single set point motion sensor alarm unit, used with MSP probes.	**Milltronics MFA 4p** • Probe/target separation up to 100 mm (4 inch) • Minimum velocity of moving ferrous target: 1 cm/sec. (2 fpm)	6/17
	Heavy duty 3-wire motion sensor that provides an NPN open collector output to PLCs.	**Milltronics MSP-7** • Up to 100 mm (4 inch) gap between target and probe • Corrosion resistant construction	6/23
	Heavy-duty zero speed alarm switch.	**SITRANS WM100** • Detects the absence or presence of motion of rotating or reciprocating or conveying equipment	6/25

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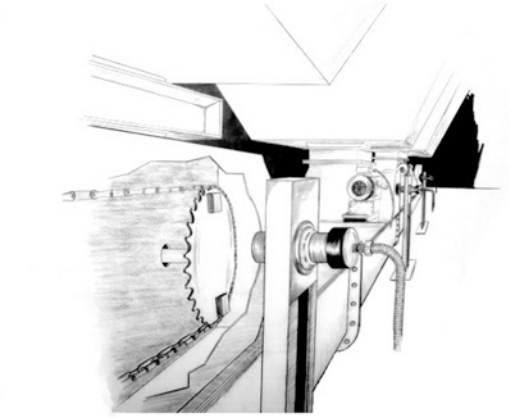
Overview

Process protection devices act as early warning systems to avoid costly process interruptions and breakdowns of equipment. Non-contacting motion sensors detect changes in motion and speed of conveying, reciprocating and rotating machinery.

Non-invasive acoustic sensors detect inaudible, high frequency acoustic emissions generated by friction and impact, caused by materials in motion. They can detect conditions of flow/no flow or high/low flow, to warn of blockages, product absence or equipment failure. They are located outside of the process, accurately detecting conditions without wear on the sensor.

Motion sensors can warn in case of equipment malfunction and shut down machinery in case of a slowdown or failure. They are rugged and perform even in harsh industrial conditions. Most of the MFA 4p motion sensing probes, as well as the SITRANS WM100, can be mounted up to 100 mm (4 inch) from the ferrous target, reducing the chance of damage to the probe and the equipment. The probes are not affected by moisture or dust build-up.



Motion sensing on drive shaft of rotary feeder

Mode of operation

Acoustic Sensing

Acoustic sensors monitor high frequency emissions generated by friction and the impact of flowing material or mechanical parts. The sensors can also sense the turbulence of gases or liquids leaking through valves and flanges. When matter vibrates between 0 Hz and 200 kHz, it creates acoustic energy. Sound energy between 20 Hz and 20 kHz can be detected by humans. Acoustic sensors detect high-frequency acoustic energy between 75 kHz and 175 kHz. Acoustic energy travels quickly through dense materials (metal) and poorly through less dense materials (air). Because the acoustic sensors are mounted directly to the external wall of the chute work, other plant noises are well below 75 kHz and effectively ignored by the sensors.

The acoustic sensors contain a specialized piezocrystal and filter circuit that responds effectively to the high-frequency band between 75 kHz and 175 kHz. As the crystal is excited by the acoustic energy, it produces a continuous electrical signal in direct proportion to the level of acoustic energy received. The SITRANS AS100 sensor output of 0 to 10 V DC can be applied to a PLC or to an optional control unit for a programmable alarm relay or 4 to 20 mA signal output.

Motion sensing

Siemens Milltronics probes work on the principle of Faraday's Laws of Electromagnetic Induction. When a ferromagnetic object enters the probe's permanent magnetic field, it distorts the flux, causing its coil windings to generate a voltage. This voltage is proportional to the strength of the magnet and the number of wire turns in the coil (constant in the probes) and the speed at which the ferrous target passes through the flux. The generated voltage is also inversely proportional to the square of the distance between the target and the probe.

The robust motion sensors provide the contacts to shut down machinery whenever under-speed, over-speed or plant equipment failure occurs. On belt, drag and screw conveyors, or on bucket elevators, fans and pumps, the speed alarm option can warn instantly of equipment malfunction. Some probes may be linked to a programmable logic controller to monitor equipment.

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Technical specifications

Process Protection Selection Guide

Criteria	SITRANS DA400	SITRANS AS100	Milltronics MFA 4p	Milltronics MSP-7	SITRANS WM100
Typical industries	Mining, water/wastewater, chemicals/petrochemicals and oil & gas industry	Aggregates, grain, cement, food processing, power generation, steel processing	Aggregates, cement, mining, wastewater, grain	General industrial applications	Aggregates, cement, mining
Typical Applications	Oscillating displacement pumps such as diaphragm piston pumps, piston pumps and hose-type diaphragm piston pumps. Monitoring of flowing materials in pipes, conveyors or channels.	Pipes, pneumatic conveyors, aerated gravity flow systems, burst filter bag detection	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators	Tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps	Tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators
Operation	Acoustic detection of cavitation, optionally acoustic detection of impact noises of high frequency	Acoustic sensing	Motion sensing	Motion sensing	Motion sensing
Enclosure	Electronics housing, Makrolon IP65, sensor, stainless steel material number W.-No. 1.4571 (316Ti SST)	Compact 304 or 303 stainless steel, IP68	Type 4X/NEMA 4X/IP65 polycarbonate	Type 4X/NEMA 4X/IP67 aluminum	Type 4X/NEMA 4X/IP67 aluminum
Sensor mounting	Screw to outside of pump housing. For material flow monitoring on the outside of pipes, channels, chutes or raceways	Sensor non-invasive: glue or weld-on disc, bolt or weld-on tab, drill and tap	Non-contacting probes secured with supplied flange	Non-contacting probe secured with supplied flange	Non-contacting, secured with supplied flange
Operating temperature	Electronics: -20 °C ... +60 °C (-4 °F ... +140 °F) Sensor: -20 °C ... +110 °C (-4 °F ... +230 °F)	-20 ... +80 °C (-4 ... +176 °F)[1]	-20 ... +50 °C (-4 ... +122 °F)[2]	-40 ... +60 °C (-40 ... +140 °F)	-40 ... +60 °C (-40 ... +140 °F)
Power requirements	19 V ... 36 V DC, < 100 mA	20 ... 30 V DC, 18 mA	100/115/200/230 V AC ± 10 % 50/60Hz, 15 VA	21 ... 28 V DC, 40 mA max.	115 or 230 V AC ± 10 % 50/60 Hz, 7 VA
Approvals	CE, PROFIBUS DP and PROFIBUS PA conform, Ex protection to ATEX 1G or 1D	CE, RCM, CSA/FM Class II, Div. 1, Group E, F, G optional, ATEX II, 2GD, 3D optional, GOST-R	$CSA_{US/C}$, CE, RCM	CE, RCM	$CSA_{US/C}$, CE, RCM

[1] Extended temperature model -40 ... +125 °C (-40 ... +257 °F) available (CE version)

[2] Probes available for -40 ... +260 °C (-40 ... +500 °F)

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Overview

The SITRANS DA400 acoustic diagnostic unit acoustically measures the structure-borne noise

- In the version for pump monitoring; on oscillating displacement pumps
- In the version for material flow monitoring; on pipes, conveying equipment or channels.

It comprises an electric diagnostic unit and up to four acoustic sensors.

Benefits

Benefits when pump monitoring

- Increased availability of the system through:
  - Advanced maintenance planning thanks to early recognition of defective components
  - Reduced downtimes (no fault locating necessary)
  - Increased maintenance intervals
  - Greater pump reliability
- Prevention of expensive consequential damage
- Increased safety of critical applications
- Early recognition of a reduction in power
- Increased productivity

Benefits when material flow monitoring

- Detection of insufficient or excessive inflow of material in a liquid or gas flow
- Detection of blockages or clogging
- Reduction of down times
- Increased product quality
- Increased availability
- Guaranteed operational safety
- Increased productivity

Application

In the version for pump monitoring, the SITRANS DA400 allows continuous, simultaneous and independent monitoring of up to four flow control valves in a pump for leaks. In addition, another four inputs are available for monitoring standard signals (e.g. diaphragm and temperature monitoring). This means that the condition of an oscillating displacement pump is monitored in every phase of its operation.

The SITRANS DA400 is used in all industries where an oscillating displacement pump is used.

The version for material flow monitoring monitors the material flow in liquids or gases that is usually as a result of impact or friction, e.g. against the pipe or channel wall.

If the acoustic diagnostic unit is used in potentially explosive areas, the sensors as well as the acoustic diagnostic unit can be installed in the Ex-zone.

If using the unit in potentially explosive areas, you have two options:

- Operation of the sensors over the safety barriers or
- Operation of the sensors over the SITRANS DA400 with explosion protection

Function

Product features

Continuous and independent status monitoring:

- Of the flow control valves, for leaks
- Of the membranes, for material fatigue
- Of the temperature loading of the hydraulic oil
- Of flowing bulk solids in pipes, conveying equipment or channels

Communication of the status to superordinate control systems:

- Via digital outputs
- Digitally, via PROFIBUS DP or PROFIBUS PA

Simple to operate and parameterize:

- Locally, via digital display and keys
- PROFIBUS DP and PROFIBUS PA

Mode of operation

Principle of measurement

Leaks in the flow control valves of oscillating displacement pumps are flows in which cavitation occurs. This results in sound waves that are transmitted to the valve housing, where they are recorded by the structure-borne sound sensor in the SITRANS DA400 on the outside.

The SITRANS DA400 utilizes the fact that with both an open valve and a closed intact valve, no cavitation occurs and the measured sound level thus corresponds to the operating noise of the pump. By contrast, with a closed defective valve cavitation does occur, which can be identified by a period increase in the sound level (see figures). The measured value from the SITRANS DA400 corresponds exactly to this increase in the sound level.

In the version for material flow monitoring, SITRANS DA400 continuously detects high-frequency acoustic oscillations by means of structure-born noise sensors.

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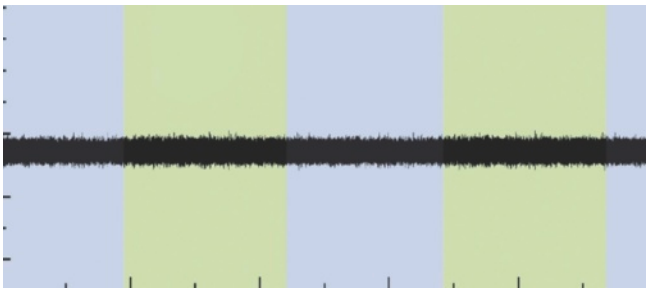
SITRANS DA400 acoustic diagnostic unit

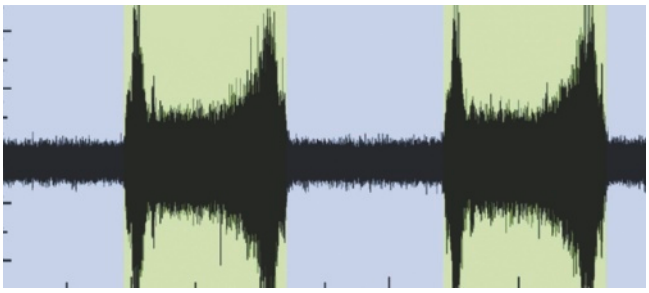
These oscillations are created by:

- Friction and impact of bulk solids in:
  - pipes, raceways or channels
  - chutes
  - conveyors
- Friction and impact of mechanical parts
- Bursting of bubbles
- Cavitation
- Turbulence in gas and liquid flows

The following shows an example of signal levels at an oscillating displacement pump



Signal from structure-borne sound sensor with intact valve



Signal from structure-borne sound sensor with defective valve

Sensor operation

The structure-borne sound sensor works on the piezoelectric principle. The structure-borne sound is injected into the sensor via the sensor base (mounting surface) and inside it is converted into an electrical voltage by a piezo-ceramic element. This is amplified in the sensor and transmitted via the cable.

The sensor frequency range lies in the ultrasonic range (> 20 kHz). The sensor is non-directional, i.e. the angle at which the sound wave impacts on the sensor base is not important.

Mode of operation of the safety barrier

The safety barrier comprises intrinsically-safe circuits. These circuits serve to operate intrinsically-safe components such as sensors and to isolate safety from the non-hazardous area with the SITRANS DA400 diagnostic unit.

Technical specifications

SITRANS DA400	Without Ex protection	With Ex protection
Input		
Acoustic channels	4	
• Cycle time	10 ms	
Only for connection to intrinsically safe sensors with:		
• Max. voltage U_o	-	≤ 5.5 V
• Max. current I_o	-	≤ 70 mA
• Max. power P_o	-	≤ 100 mW
• Internal capacitance C_i	-	≤ 1.2 µF
• Internal inductance L_i	-	Negligible
Universal inputs	4	
• Cycle time	80 ms	
• Low pass filter time	1 s	
Universal analog current input		
• Load	< 105 Ω	< 12 Ω
• Resolution	0.1 %	
• Accuracy	0.5 %	
• Fault signal	> 21 mA or < 3.6 mA (at 4 ... 20 mA)	
• Alarm monitoring hysteresis	0.5 %	
• Static destruction limit	40 mA, 4 V	-
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	≤ 30 V
• Max. short-circuit current I_i	-	≤ 100 mA
• Max. power P_{oi}	-	≤ 1 W
• Internal capacitance C_i	-	≤ 11 nF
• Internal inductance L_i	-	≤ 70 µH
Universal input 24 V digital signal		
• Input resistance	> 19 kΩ	
• Signal level Low	< 4.5 V or open	
• Signal level High	> 7 V	
• Hysteresis	> 1 V	
• Static destruction limit	± 40 V	-
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	≤ 30 V
• Max. short-circuit current I_i	-	≤ 100 mA
• Max. power P_{oi}	-	≤ 1 W
• Internal capacitance C_i	-	≤ 11 nF
• Internal inductance L_i	-	≤ 70 µH

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SITRANS DA400	Without Ex protection	With Ex protection
Universal input closing contact		
For connection to closing contact with the maximum values:		
• Max. voltage U_o	-	≤ 10 V
• Max. current I_o	-	≤ 1 mA
• Max. power P_o	-	≤ 5 mW
• Internal capacitance C_i	-	≤ 11 nF
• Internal inductance L_i	-	≤ 70 µH
8.2 V source for NAMUR signal (DIN EN 60947-5-6)		
• Open circuit voltage	8.2 V ± 0.3 V, short-circuit proof	-
• Input resistance	< 950 Ω	-
• Static destruction limit for incorrect wiring	+20 V/-10 V	-
Output		
Digital outputs	6	6 (applicable for NAMUR switch hardener)
• Semiconductor relay	Individually isolated, short circuit-proof	-
• Switching voltage	24 V AC/36 V DC, any polarity	-
• Destruction limit	35 V AC, 50 V DC	-
• Max. switching current	100 mA	-
• Signal status Low (no response)	-	≤ 1.2 mA (source to DIN 19234)
• Signal status High (response)	-	≥ 2.1 mA (source to DIN 19234)
For connection with an intrinsically safe switching amplifier to DIN 19234 with:		
• Max. supply voltage U_i	-	≤ 15.5 V
• Max. short-circuit current I_i	-	≤ 25 mA
• Max. power P_{oi}	-	≤ 64 mW
• Internal capacitance C_i	-	≤ 5.2 nF
• Internal inductance L_i	-	Negligible
Conditions of use		
Installation conditions	Vertical wall mounting, cables fed in from below	
Climatic class	Class 4K4 according to EN 60721-3-4	
Mounting location	-	Zone 1 or zone 2
Permissible ambient temperature	-20 ... +60 °C (-4 ... +140 °F)	-
• Temperature class T5 – T1		-20 ... +60 °C (-4 ... +140 °F)
• Temperature class T6		-20 ... +50 °C (-4 ... +122 °F)
Mechanical load	Class 4M3 according to EN 60721-3-4	
Degree of protection to EN 60529	IP65	
Electromagnetic Compatibility		
• Emitted interference and interference immunity	To EN 61326 and NAMUR NE 21	
Usage limits for water		
• Delivery side	≥ 10 bar a	
• Number of strokes	Min. 4 min^{-1}, max. 10 ... 500 min^{-1}	

SITRANS DA400	Without Ex protection	With Ex protection
Design		
Weight (without options)	Approx. 2.5 kg	
Dimensions (W x H x D) in mm (inch)	172 x 320 x 80 (6.8 x 12.6 x 3.2)	
Enclosure material	Makrolon (Polycarbonate + 20 % glass fiber)	Makrolon (Polycarbonate + 20 % glass fibers), surface attenuated with CrNi layer and painted
Electrical connection via screw terminals	• Rigid 2.5 mm (0.984 inch) • Flexible 1.5 mm (0.59 inch) • Flexible with connector sleeves 1.5 mm (0.59 inch)	
Cable inlet via plastic cable joints	• 2 x Pg 13.5 • 5 x Pg 11	
Power supply		
Rated voltage	24 V DC	16 V DC
Operating range	19 ... 36 V DC	15 ... 17 V DC
Current consumption	< 100 mA	< 40 mA
For connection with approved intrinsically safe circuits with:		
• Max. supply voltage U_i	-	≤ 17.4 V
• Max. short-circuit current I_i	-	≤ 191 mA
• Max. power P_{oi}	-	≤ 1.35 W
• Internal capacitance C_i	-	≤ 33 nF
• Internal inductance L_i	-	≤ 28 µH
Certificates and approvals		
Explosion protection to EN 50014, EN 50020 and EN 50021		
Intrinsic safety "i"	-	TÜV (German Technical Inspectorate) 06 ATEX 2952
Marking	-	II 2(1) G EEx is [ia] IIC T6
Communication		
PROFIBUS DP	RS 485, switchable terminating resistor	
Protocol	Cyclic with Master C1 and acyclic with Master C2	
Power supply	-	Bus-supplied
Bus voltage	-	9 ... 24 V
Current consumption	-	10.5 mA ± 10 %
Bus connection with FISCO supply unit, ia/ib group IIC or IIB	-	Yes
Layer 1 and 2 from PROFIBUS PA, transfer technology from IEC 1158-2	-	
• C2 connections	-	4 connections are supported in master class 2
• Device profile	-	PROFIBUS PA Profil V3.0 Rev. 1, Class B
• Device address	-	1 ... 126 (126 factory-set)
PC parameterization software	SIMATIC PDM (not included in the scope of delivery)	

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SITRANS DA400 acoustic diagnostic unit

Sensor for SITRANS DA400	
Setup	• Piezoceramic sensor with pre-amplifier • Encapsulated electronics • 4-wire cable with anti-kink sleeve
Conditions of use	
Permissible Ambient Temperature	-40 ... +110 °C (-40 ... +230 °F)
Degree of protection to EN 60529	IP66/IP68
Mechanical load	Class 4M7 according to EN 60721-3-4
Climatic class	Class 4K4 according to EN 60721-3-4
Design	
Housing material	Stainless steel 1.4571 (316Ti SST)
Cable	Ends with wire protectors and cable shoe for connection to the SITRANS DA400
Weight	125 g (0.276 lb)
Mounting location	Zone 0/1 or zone 20/21/22
Dimensions (W x H x D) in mm (inch)	26 x 29 x 40 (1.02 x 1.14 x 1.57)
Power supply	Power fed from device
Certificates and approvals	
Explosion protection	
Intrinsic safety "i"	TÜV 2005 ATEX 2876 X
Marking	II 1 G EEx ia IIC T6/T5/T4 or II 1 D EEx ia D 20/21/22 T160
Permissible ambient temperature	
• Category 1G	
- Temperature class T4, T5	-20 ... +60 °C (-4 ... +140 °F)
- Temperature class T6	-20 ... +50 °C (-4 ... +122 °F)
• Category 2G	
- Temperature class T4	-40 ... +110 °C (-40 ... +230 °F)
- Temperature class T5	-40 ... +80 °C (-40 ... +176 °F)
- Temperature class T6	-20 ... +65 °C (-4 ... +149 °F)
• Category 1D or 2D	
- Temperature class T160	-40 ... +110 °C (-40 ... +230 °F)

Ex barriers for sensors	
Application area	For the intrinsically safe supply of the acoustic sensors in zone 1; the safety barriers must be installed between the SITRANS DA400 acoustic diagnostic unit and the sensor if only the sensors are being operated in the Ex zone.
Input	A maximum of two sensors can be connected.
Conditions of use	
Degree of protection to EN 60529	IP20
Permissible Ambient Temperature	-20 ... +60 °C (-4 ... +140 °F)
Design	
Weight	115 g (0.254 lb)
Housing material	Plastic, polyamide
Type of installation	Installation on mounting rail NS 32 or NS 35/7.5. The acoustic diagnostic unit SITRANS DA400 and the safety barrier must be operated outside the Ex zone.
Dimensions (W x H x D) in mm (inch)	68 x 77 x 42 (2.68 x 3.03 x 1.65)
Certificates and Approvals	
Explosion protection	
Intrinsic safety "i"	TÜV 05 ATEX 2917 X
Marking	II (2) G [EEx ib] IIC

Selection and Ordering data

	Article No.
Acoustic diagnostics unit SITRANS DA400 with local programming and display ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7MJ2400-** ■■ **A 0** ■
Communication	
• PROFIBUS DP	**1 A**
• PROFIBUS PA	**2 B**
Explosion protection	
• Without	**A**
• With EEx ia/ib to ATEX[1]	**B**
Application software	
For continuous condition monitoring of positive displacement pumps	**1**
for material flow monitoring in pipes, raceways and conveyors	**2**
Acoustic sensors for diagnostics unit SITRANS DA400 ↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	**7MJ2000-1** ■ **0 0**
Explosion protection	
• Without	**A**
• With EEx ia to ATEX	**B**
Cable (incl. pin and allen screw M6)	
20 m	**B**
40 m	**C**
100 m	**F**
Safety barriers for sensors For rail mounting NS 32 and NS35/7.5 in non-hazardous areas Explosion-protected output circuit EEx ib	**7MJ2010-1AA**

[1] Not in combination with trigger sensor.

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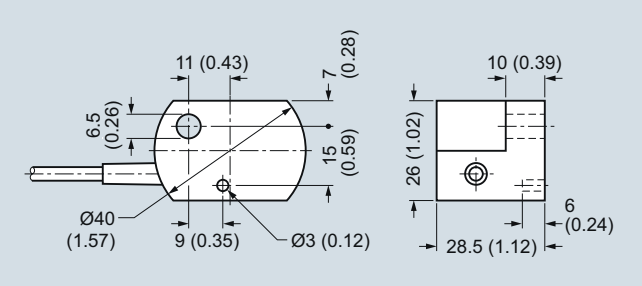
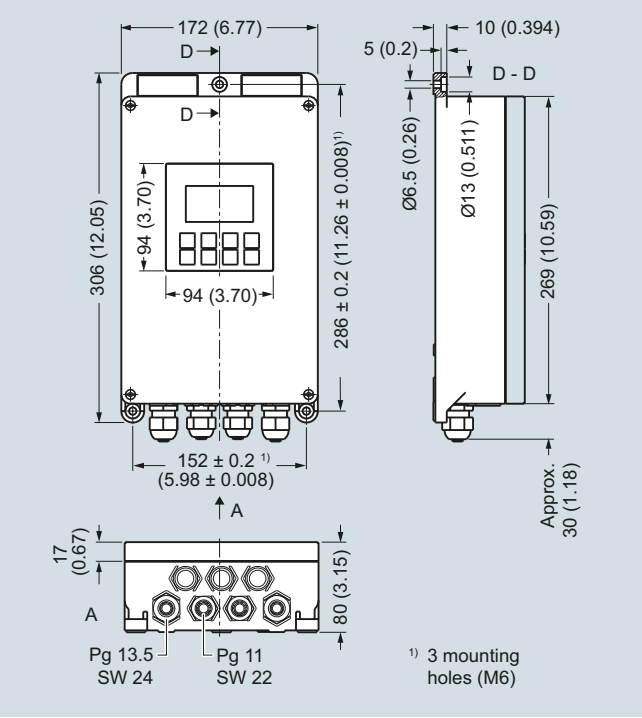
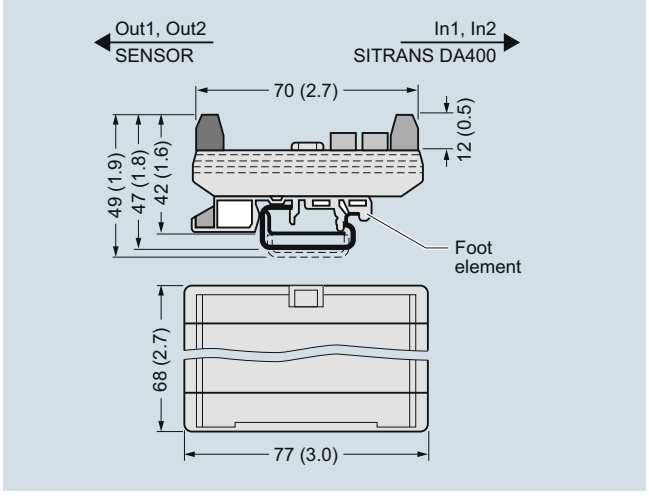
Dimensional drawings



Sensor for SITRANS DA400, dimensions in mm (inch)

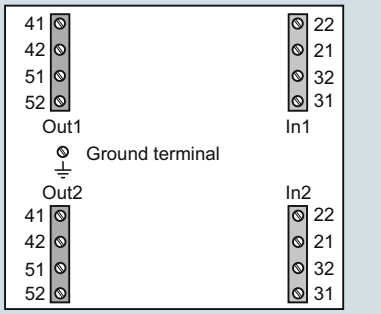


SITRANS DA400, dimensions in mm (inch)

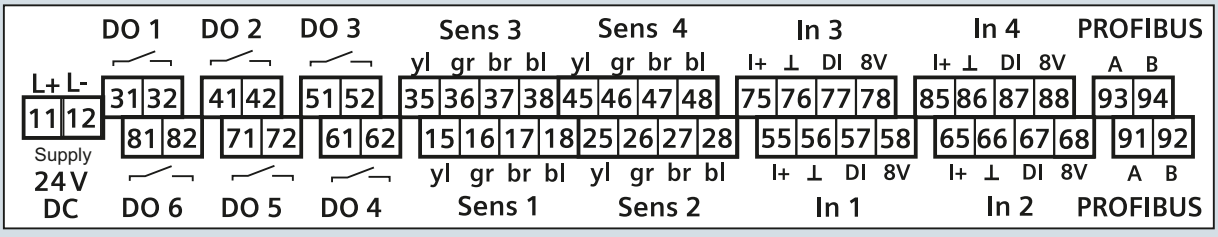


Safety barrier for SITRANS DA400, dimensions in mm (inch)

Schematics



Safety barrier for SITRANS DA400, terminal assignment



L+/L-	Power supply (Any polarity with PROFIBUS PA)	In	Input	⊥	Ground
DO	Digital output	yl	yellow	DI	Digital input
Sens	Sensor	gr	green	A	Signal A (green) with PROFIBUS DP, any with PROFIBUS PA
		br	brown	B	Signal B (red) with PROFIBUS DP, any with PROFIBUS PA
		bl	black		
		I+	Analog current input +		

SITRANS DA400, terminal assignment

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SITRANS AS100 acoustic sensor

Overview

SITRANS AS100 is an acoustic sensor used for solids flow detection.

Benefits

- Non-invasive
- Screw in, bolt on, weld, or bond in place
- Analog output
- High and low sensitivity range of operation

Application

SITRANS AS100 detects changes in high frequency sound waves from equipment and materials in motion. It detects and reacts instantly to changes in solids flow to warn of blockages, product absence, or equipment failure such as burst filter bags. This allows an operator to take early preventative action and avoid costly damage.

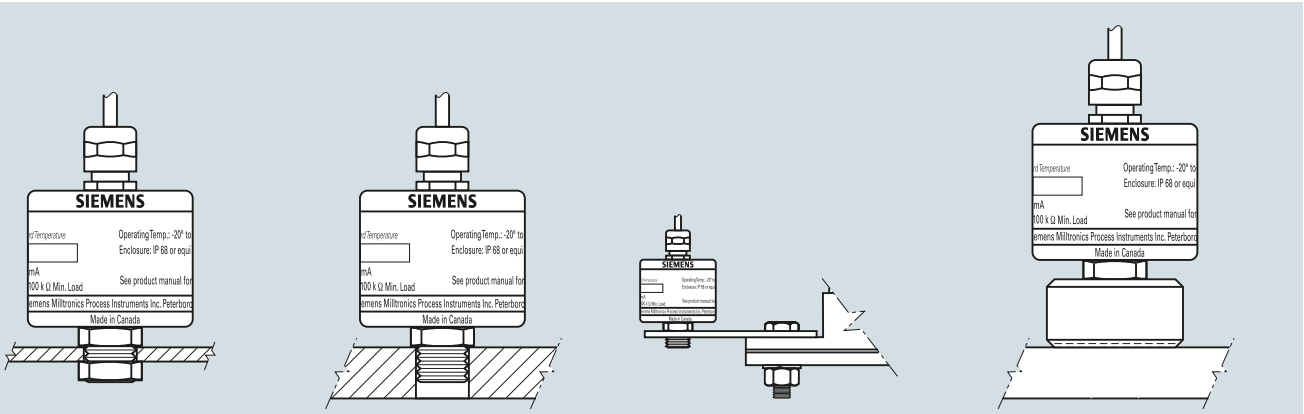
Common applications include pellets, powders and most bulk solids in pipes, chutes, vibratory feeders, pneumatic conveyors or aerated gravity flow systems.

Operating with a SITRANS CU02 control unit, the system detects conditions of high flow, low flow or no flow. It can be added to a control loop via a 4 to 20 mA output. Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device.

With no moving parts and a type 304 or 303 stainless steel enclosure sealed against dust and moisture, this non-invasive unit requires little or no maintenance. With a dual operating range, the sensor offers an exceptionally wide range of application capabilities.

- Key applications: pipes, chutes, vibratory feeders, aerated gravity flow systems, burst filter bag detection

Design



Clearance hole
Insert mounting post through hole in device being monitored and fasten with customer-supplied washers and nut.

Drill and tap
Screw mounting post into threaded hole in device being monitored.

Extension tab
Screw sensor into threaded hole of tab, and fasten onto device being monitored.

Mounting disc
Screw sensor into disc, after welding or bonding disc onto device being monitored.

SITRANS AS100 mounting

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Technical specifications

Mode of Operation	
Operating principle	Acoustic sensing of high frequency emissions caused by impact or friction
Typical application	• Detects burst filter bags in dust collection systems • Detects material being conveyed in pneumatic conveyor lines • Route confirmation in chute work
Model	
Standard	Standard operating temperature range
Extended	Extended operating temperature range
Operation	
Relative sensitivity	0.5 %/°C of reading, average over the operating range
Outputs	Analog, 0.08 ... 10 V DC nominal, 100 kΩ minimum load impedance
Rated operating conditions	
Amb. temperature for enclosure	
• Standard	-20 ... +80 °C (-4 ... +176 °F)
• Extended	• -40 ... +125 °C (-40 ... +257 °F) (CE only) • -30 ... +120 °C (-22 ... +248 °F) option
Design	
Weight	0.4 kg (1 lb)
Enclosure	Enclosure: 304 (1.4301) stainless steel [303 stainless steel (1.4305) on Class II version], aluminum 231 on 2GD version]
Degree of protection	IP68 (waterproof)
Cable	
• Standard	4 m (13 ft) cable, PVC jacketed, 3 twisted pairs, 24 AWG (0.25 mm^2), shielded
• Extended	4 m (13 ft) cable, thermoplastic elastomer jacketed, 6 conductor, 24 AWG (0.25 mm^2) conductor, shielded
Power supply	20 ... 30 V DC, 18 mA (typical)
Certificates and approvals	CE, RCM CSA/FM Class II, Div. 1, Group E, F and G (optional), ATEX II 2GD (optional), ATEX II 3D (optional), GOST-R

Selection and Ordering data

		Article No.
SITRANS AS100 Acoustic Sensor ↗		**7MH7560-**
An acoustic sensor used for solids flow detection.		■■■ **0** ■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Sensor		
Standard temperature range [-20 ... +80 °C (-4 ... +176 °F)][1]	⬟	**1**
Extended temperature range [-40 ... +125 °C (-40 ... +257 °F)][2]	⬟	**3**
Extended temperature range [-30 ... +120 °C (-22 ... +248 °F)][3]	⬟	**4**
Cable Length		
4 m (13.12 ft)	⬟	**A**
Sensor Mounting		
None	⬟	**A**
Mounting disk	⬟	**B**
Mounting tab	⬟	**C**
Approvals		
CE, RCM	⬟	**1**
CSA/FM Class II Div. 1, Group E, F, and G (includes ½" NPT female fitting)	⬟	**3**
CSA Class II, Div. 1, Group E, F, and G (includes ½" NPT female fitting)	⬟	**4**
CE, RCM, FM/CSA Class II, Div. 1, Group E, F and G, ATEX II 3D (includes M20 female fitting)	⬟	**5**
ATEX II 2GD, c/w cable gland[4]		**6**

[1] Available with approval options 1, 3, 5, and 6 only

[2] Available with approval option 1 only

[3] Available with approval option 4 only

[4] Available with sensor option 1 only and sensor mounting option A only

Selection and Ordering data

		Order code
Further designs		
Please add **"-Z"** to Article No. and specify Order code(s).		
Manufacturer's test certificate: According to EN 10204-2.2	⬟	**C11**
Acrylic coated, stainless steel tag [12 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 16 characters), specify in plain text	⬟	**Y17**
Operating Instructions		Article No.
English		**A5E31952194**
German		**A5E31990912**
French		**A5E31993317**
Spanish Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing ATEX Quick Starts and operating instructions.		**7ML1998-5DM21**
Spare Parts		
Mounting tab		**7MH7723-1AA**
Mounting disk		**7MH7723-1AB**
½" NPT adapter kit for standard temperature range sensor, not Class II approved		**7MH7723-1BW**
M20 adapter kit for standard temperature range sensor, not Class II or ATEX approved		**7MH7723-1BV**
½" NPT adapter kit for extended temperature range sensor, not Class II approved Note: Adapter kits are not CSA Class II approved		**7MH7723-1BX**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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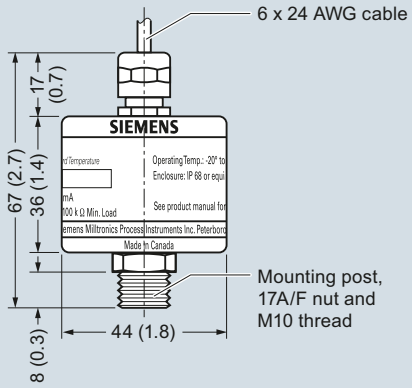
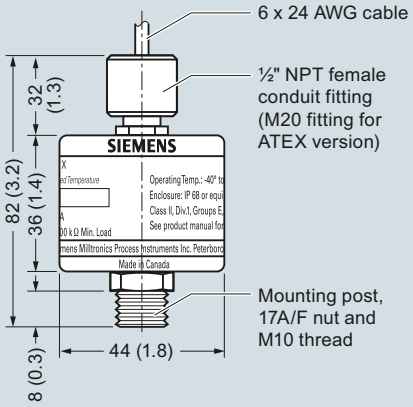
Dimensional drawings

SITRANS AS100
(ST and ET versions)



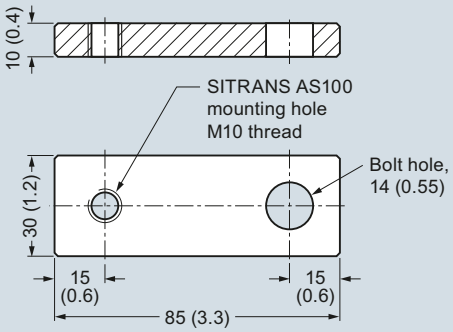
SITRANS AS100
(class II rated ST and ET versions)



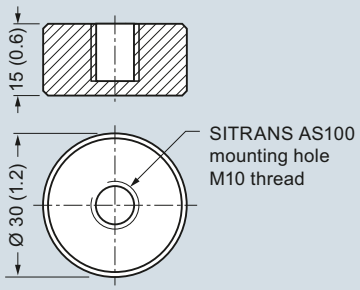
SITRANS AS100, dimensions in mm (inch)

Accessories

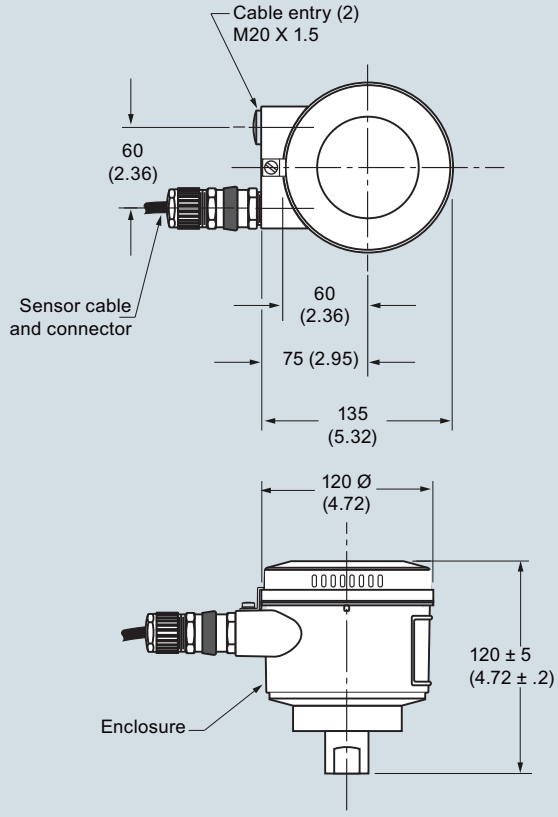
Extension tab - bolt on
(304 stainless steel)



Mounting disc - bonded or welded
(304 stainless steel)



SITRANS AS100 accessories, dimensions in mm (inch)



SITRANS AS100 (2D, 2G, XP version), dimensions in mm (inch)

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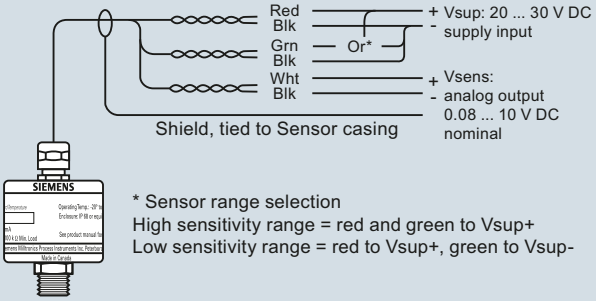
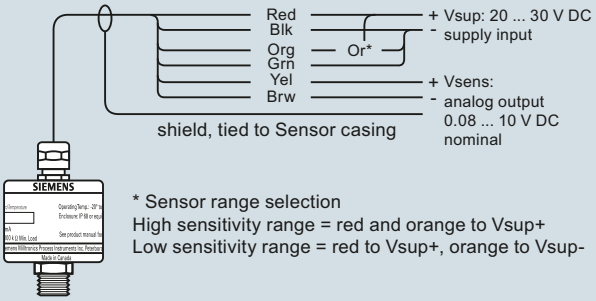
Schematics

Standard temperature range



* Sensor range selection
High sensitivity range = red and green to Vsup+
Low sensitivity range = red to Vsup+, green to Vsup-

Extended temperature range



* Sensor range selection
High sensitivity range = red and orange to Vsup+
Low sensitivity range = red to Vsup+, orange to Vsup-

Interconnection
The longer the cable, the more susceptible it is to noise and earth loops. It is therefore recommended to use cable with heavy gauge conductors and good RF/electrical shielding (copper braid rather than drain and foil). A proper junction box close to the sensor is an ideal location not only to extend the cable but also to configure the wiring for high or low sensitivity range operation.
The following table provides a guideline for suitable wire gauges where distances are considerable.

Max. distance between sensor and supply
(24 V or Control Unit).

AWG	Wire size		Distance	
	mm	mm²	meters	feet
24	7 x 0.20	0.25	500	1 600
22	7 x 0.25	0.35	800	2 600
20	10 x 0.25	0.5	1 200	3 900

SITRANS AS100 connections

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SITRANS CU02 control unit

Overview

SITRANS CU02 is an alarm control unit, for use with SITRANS AS100 acoustic sensor, that provides reliable continuous protection for bulk solids flow.

Benefits

- 4 to 20 mA output
- Two programmable relays
- Adjustable independent time delay for each relay
- Adjustable start-up time delay
- DIN rail mounting provides easy installation
- Built-in password protection to parameters

Application

SITRANS CU02 receives a 0 to 10 V DC input signal from the SITRANS AS100 sensor, providing relay and analog outputs for interface into a process.

- Key applications: with SITRANS AS100 for bulk solids flow

Function

The system can be readily configured for set points indicating such conditions as high flow, low flow or no flow. Alternatively, it can be added to a control loop via a 4 to 20 mA isolated output for trend monitoring proportional to the signal from the sensor.

Two relays are fully programmable and independent of each other and can be used to operate an alarm or control device. Alarming may be provided above or below a setpoint or within a band. Readings are also displayed locally by the SITRANS CU02 on its LCD.

The SITRANS CU02 may be mounted up to 500 m (1 500 ft) from the sensor.

Technical specifications

Mode of operation	
Measuring principle	Controller for acoustic sensing (SITRANS AS100)
Typical application	Connects to SITRANS AS100 to detect burst filter bag
Input	0 … 10 V DC, from sensor
Output	
Output signal	4 … 20 mA isolated output, 2 Form C relays - latching or non-latching - 5 amp at 250 V AC non-inductive
Sensor excitation	26 V DC
Max. load	750 Ω
Rated operating conditions	
Installation conditions	
• Location	Indoor
Ambient conditions	
• Ambient temperature for enclosure	-20 … +50 °C (-4 … +122 °F)
• Relative humidity	80 % for temperatures up to 50 °C (122 °F)
• Degree of protection	IP20
• Installation category	II
• Pollution degree	2
Design	
Weight	550 g (18 oz)
Dimensions (W x H x D)	55 x 75 x 110 mm (2.2 x 3 x 4.4 inch)
Material enclosure	Polycarbonate
Mounting	DIN Rail (DIN 46277 or DIN EN 50022), or wall mount, up to 500 m (1 500 ft) from sensor
Cable	2 twisted pair, 24 AWG (22 mm^2), shielded. Mount up to 500 m (1 500 ft) from sensor
Display	Liquid crystal, three digits, 9 mm (0.35 inch), high and multi-segment graphic symbols for operation status
Power supply	
Supply voltage	100, 115, 200, 230 V AC ± 15 %, 50/60 Hz, factory set
Power consumption	Max. 10 VA
Approvals	$CSA_{US/C}$, CE, RCM, GOST-R

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Selection and Ordering data

		Article No.
SITRANS CU02 Control Unit	↗	**7MH7562-**
Alarm control unit for use with SITRANS AS100 acoustic sensor to provide reliable continuous protection for bulk solid flow		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Power Supply		
100 V AC	⬟	**1**
115 V AC	⬟	**2**
200 V AC	⬟	**3**
230 V AC	⬟	**4**
Enclosure		
Standard DIN Rail	⬟	**A**
Approvals		
$CSA_{US/C}$, CE, RCM	⬟	**A**

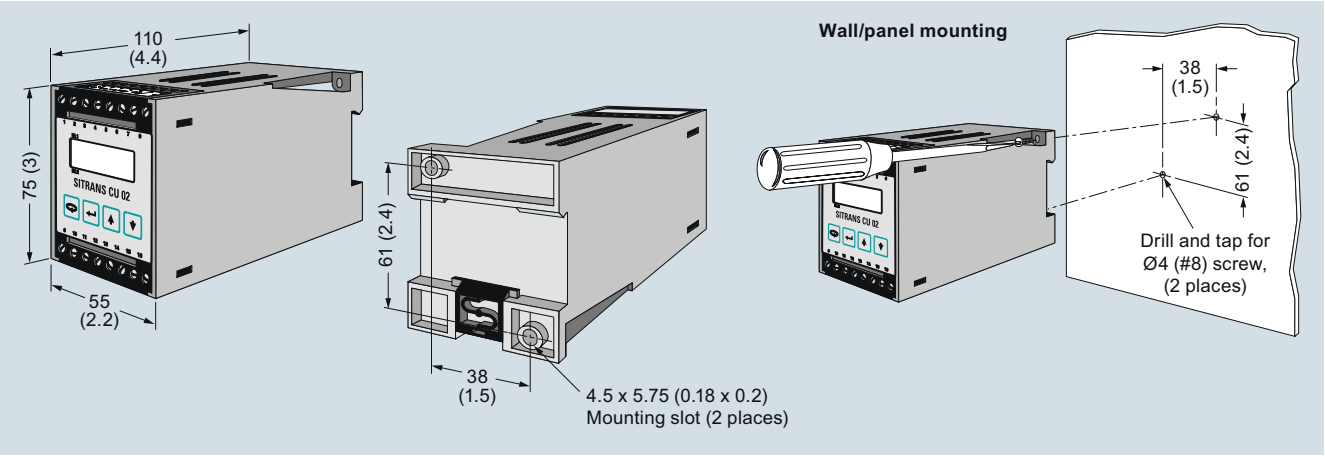
⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data

		Order code
Further designs		
Please add **"-Z"** to Article No. and specify Order code(s).		
Manufacturer's test certificate: According to EN 10204-2.2	⬟	**C11**
Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	⬟	**Y18**
Operating Instructions		Article No.
English		**7ML1998-5DN01**
French		**7ML1998-5DN11**
German Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.		**7ML1998-5DN31**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Dimensional drawings



SITRANS CU02, dimensions in mm (inch)

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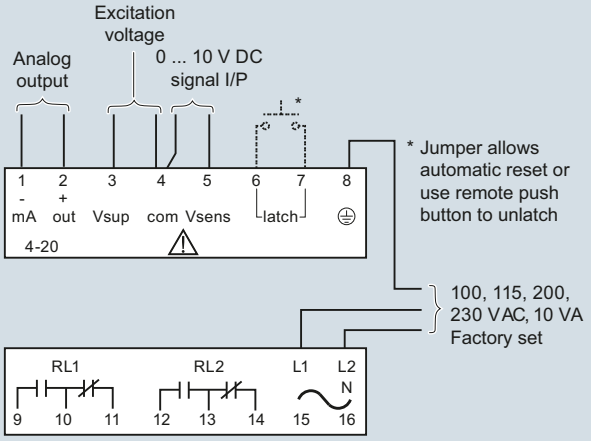
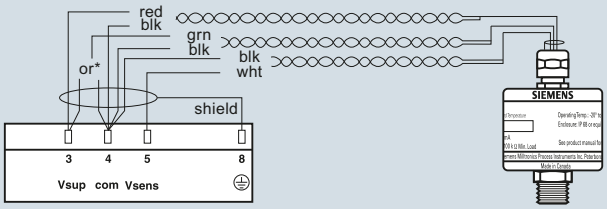
Schematics

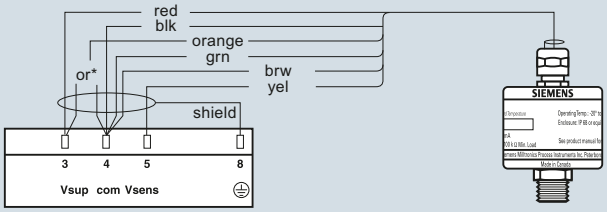


Standard temperature version



* Sensor range selection
High sensitivity range = green to 'Vsup'
Low sensitivity range = green to 'com'

Extended temperature version



* Sensor range selection
High sensitivity range = orange to 'Vsup'
Low sensitivity range = orange to 'com'

Mounting
Installation shall only be performed by qualified personnel and in accordance with local governing regulations.
This product is susceptible to electrostatic shock. Follow proper grounding procedures.

Interconnection
All field wiring must have insulation suitable for at least 250 V.
Relay contact terminals are for use with equipment having no accessible live parts and wiring having insulation suitable for at least 250 V.
The maximum allowable working voltage between adjacent relay contacts shall be 250 V. If sensor case is grounded, do not connect shield of cable to SITRANS CU02 ground terminal.

SITRANS CU02 connections

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Overview

MFA 4p motion failure alarm controller is a highly sensitive single setpoint motion sensor system, used with Milltronics MSP probes.

Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Switch selectable overspeed or underspeed detection
- Setpoint adjustment 0.15 to 3 000 PPM (pulses/minute)
- Adjustable start-up time delay
- Visual indication of probe operation and relay status
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

Application

The MFA 4p detects changes in the motion and speed of rotating, reciprocating or conveying equipment. It warns of equipment malfunction and signals through contacts to shut down machinery in case of a slowdown or failure. Its reliability makes it a cost-effective way to protect valuable process equipment.

The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

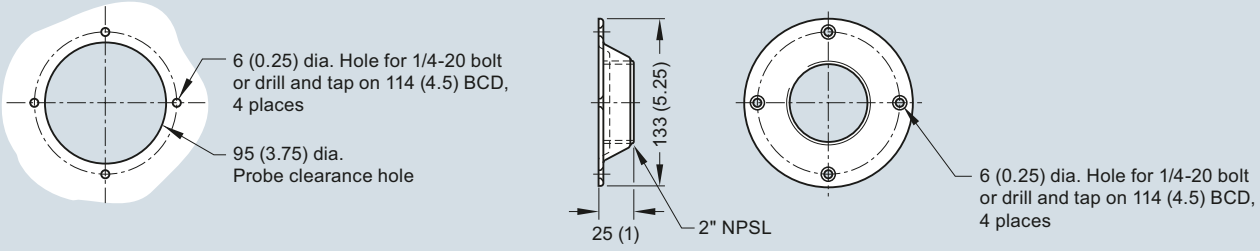
A special feature is the adjustable 0 to 60 second time delay, allowing the monitored device to accelerate to normal running speed before monitoring begins. A wide range of probes are available to suit specific needs, including high temperatures and corrosive installations. The CE approval allows the MFA 4p to consistently meet the needs of the mining aggregate, cement and other primary and secondary industries.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

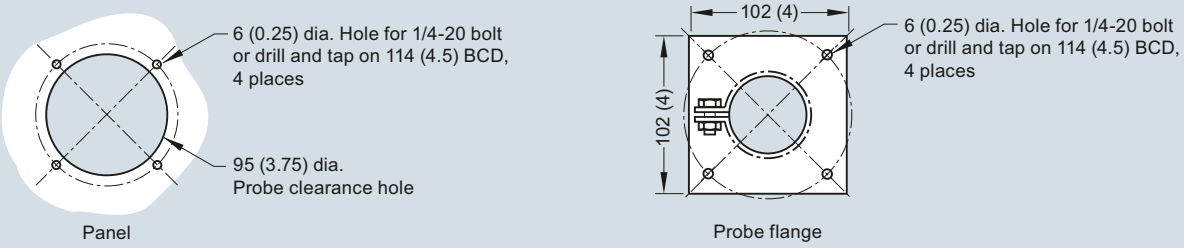
Mounting

Mounting for Milltronics MSP-12, MSP-3, XPP-5



Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-9



MSP-12, MSP-3, MSP-9, XPP-5 mounting, dimensions in mm (inch)

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Milltronics MFA 4p motion failure alarm controller

Probes

Standard Milltronics MSP-12
- Heavy-duty general purpose motion probe
- Long lasting aluminum body with internal amplifier
- Convenient mounting flange and locknut for fast installation and setup
- Temperature rating: -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Milltronics XPP-5
- CSA hazardous approval (Class I, Div. 1, Groups A, B, C, D; Class II Div. 1, Groups E, F, G; Class III)
- Aluminum body that is fully potted
- Convenient mounting flange and locknut
- 3/4" NPT male hub connection
- Operating temperature from -40 ... 60 °C (-40 ... 140 °F)
- Enclosure rating: Type/NEMA 4X,6, IP67

High temperature Milltronics MSP-3
- Heavy-duty, high temperature aluminum probe designed to withstand operating temperatures from -50 ... 260 °C (500 °F)
- Cast aluminum probe with convenient mounting flange and locknut
- 1.5 m (5 ft) of high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Stainless high temperature Milltronics MSP-9
- Heavy-duty, high temperature 304 stainless steel probe
- Special construction allows operation of probe in environment from -50 ... 260 °C (500 °F)
- 1.5 m (5 ft) special high temperature PTFE cable provided. Up to 30 m (100 ft) may be used.
- Amplifier remote mounted in enclosure 140 x 140 x 100 mm (5.5 x 5.5 x 4 inch), available in cast aluminum (½" NPT conduit entry), painted steel (Type/NEMA 4, IP65 rating), or stainless steel (Type/NEMA 4X, IP65 rating)
- Enclosure rating: Type/NEMA 4X, 6, IP67
- Amplifier temperature rating -40 ... +60 °C (-40 ... +140 °F)

Milltronics RMA (Remote Mounted Amplifier)
- Available for internal mounting within Probe, or in enclosure for remote mounting
- Enclosures available in cast aluminum (½" NPT entry), painted steel (Type/NEMA 4 rating) or stainless steel (Type/NEMA 4X, IP65 rating)
- Operating temp. from -40 ... +60 °C (-40 ... +140 °F)
- Enclosure rating: Type/NEMA 4X, 6, IP67

Motion probes

Technical specifications

Mode of operation	
Measuring principle	Motion monitor and alarm
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	• Switch selectable overspeed or underspeed detection • Setpoint adjustment: 0.15 ... 3 000 PPM • Adjustable start-up time delay: 0 ... 60 seconds • Visual indication of probe operation and relay status
Output	2 relays working in unison, each providing 1 SPDT Form C relay contact, rated 8 A at 250 V AC resistive
Performance	
Repeatability	± 1 %
Dead band	± 0.25 %

Dynamic Range	0 ... 7 200 PPM
Ambient Temperature Range	-20 ... +50 °C (-5 ... +122 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP65 (standard and optional stainless steel) Type 4/NEMA 4/IP65 (optional mild steel)
Enclosure dimensions	160 x 240 x 82 mm (6.3 x 9.5 x 3.2 inch) Optional: mild steel or 304 (1.4301) stainless steel 203 x 254 x 102 mm (8 x 10 x 4 inch)
Enclosure material	Polycarbonate Optional: mild steel or stainless steel
Power Supply	100/115/200/230 V AC switch selectable, 50/60 Hz, 15 VA ± 10 % of rated voltage
Certificates and approvals	CE, RCM, $CSA_{US/C}$, FM

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Selection and Ordering data — Article No.

MFA 4P Motion Failure Alarm Controller ↗ ⬟ — **7MH7144-** ■■■■

A highly sensitive single setpoint motion sensor system, used with MSP probes.

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Enclosure

NEMA 4X, polycarbonate enclosure	1
NEMA 4, painted mild steel enclosure	2
NEMA 4X, 304 (1.4301) stainless steel enclosure	3

Input Voltage

100/115/200/230 V AC, 50/60 Hz, switch selectable	A

Speed detection version

Standard, underspeed (U/S) or overspeed (O/S), switch selectable	A
Slow speed (S/S), U/S or O/S detection, switch selectable (limit of 15 ppm)	B

Approvals

CE, RCM, $CSA_{US/C}$, FM	2

Selection and Ordering data — Order code

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Manufacturer's test certificate: According to EN 10204-2.2 ⬟	**C11**
Acrylic coated, stainless steel tag [69 x 50 mm (2.7 x 1.97 inch)]: Measuring-point number/ identification (max. 27 characters), specify in plain text ⬟	**Y15**
Painted mild steel, heated enclosure with viewing window for use down to -50 °C (-58 °F) (finished unit is mounted inside enclosure) 483 x 584 x 203 mm (19 x 23 x 8 inch)	**A35**
Stainless steel, sun/weather shield (finished unit is field mounted inside enclosure) [357 x 305 x 203 mm (14 x 12 x 8 inch)] ⬟	**S50**

Operating Instructions — Article No.

English	**A5E33988839**
French	**7ML1998-5FM11**
Spanish	**7ML1998-5FM21**
German Note: The operating instructions should be ordered as a separate item on the order.	**7ML1998-5FM31**

Spare Parts

Relay	**7MH7723-1DW**
Transformer	**7MH7723-1DX**
Circuit Card, standard	**7MH7723-1DU**
Circuit Card, Slow speed	**7MH7723-1DV**
Lid with overlay for MFA 4p	**7MH7723-1GY**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data — Article No.

Milltronics RMA Remote Mounted Amplifier ↗ ⬟ — **7MH7145-** 0■

Remote mounted amplifier for Milltronics MSP-3 and MSP-9 motion sensing probes.

↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Enclosure

Aluminum enclosure, IP65, Type/NEMA 4X, ½" NPT entry	A
Painted steel, Type/NEMA 4, IP65 rating	C
304 (1.4301) stainless steel enclosure, Type/NEMA 4X, IP65 rating	D

Selection and Ordering data — Order code

Further designs

Please add **"-Z"** to Article No. and specify Order code(s).

Manufacturer's test certificate: According to EN 10204-2.20 ⬟	**C11**
Acrylic coated, stainless steel tag [38 x 51 mm (1.5 x 2 inch)]: Measuring-point number/ identification (max. 16 characters), specify in plain text ⬟	**Y18**

Operating Instructions — Article No.

English	**A5E33988839**
French	**7ML1998-5FM11**
Spanish	**7ML1998-5FM21**
German Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.	**7ML1998-5FM31**

Spare Parts

Card, RMA	**7MH7723-1DT**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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Milltronics MFA 4p motion failure alarm controller

Selection and Ordering data		Article No.
Milltronics Motion Sensing Probes	↗ ⬟	**7MH7146-** ■■■
A series of motion sensing probes used with the MFA 4p. Milltronics MSP-3: heavy-duty, high temperature aluminum Milltronics MSP-9: heavy-duty, high temperature stainless steel Milltronics MSP-12: heavy-duty, general purpose Milltronics XPP-5: hazardous rated Note: Milltronics MSP-3 and MSP-9 probes require the use of Milltronics RMA (amplifier)		
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Cable Length		
Standard length (as described in Model options)[1]		**0**
Add Order code Y01 and plain text: "Total cable length ... m"		
Extended cable length 2 ... 30 m (6.6 ... 98.4 ft)[2]		**1**
Extended cable length 31 ... 50 m (101.7 ... 164 ft)[4]		**2**
Extended cable length 51 ... 100 m (167.3 ... 328.1 ft)[4]		**3**
Model [standard cable length/type]		
MSP-3, ½" NPT cable inlet[3] [1.5 m (5 ft) high temperature cable]		**B**
MSP-9 [1.5 m (5 ft) high temperature cable][3]		**D**
MSP-12, ½" NPT cable inlet		**E**
XPP-5 [1.5 m (5 ft) cable, (CSA Class I, Groups A, B, C and D; Class II Groups E,F, and G)]		**G**
XPP-5 [10 m (32.8 ft) cable, (CSA Class I, Groups A, B, C, and D; Class II Groups E, F, and G)]		**H**
XPP-5 [15 m (49.2 ft) cable, (CSA Class I, Groups A, B, C and D; Class II Groups E, F, and G)]		**J**
Approvals		
CE, RCM		**A**

1) No Y01 needed in Order code for standard length
2) Only available with model options B, D, G, H, J
3) MSP-3 and MSP-9 probes required the use of RMA (amplifier)
4) Available with Model options G, H, and J only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Order code
Further designs		
Please add **"-Z"** to Article No. and specify Order code(s).		
Total cable length: enter the total cable length in plain text description	⬟	**Y01**
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text	⬟	**Y17**
Cable gland kit	⬟	**A57**
Manufacturer's test certificate: According to EN 10204-2.2	⬟	**C11**

Operating Instructions	Article No.
English	**A5E33988839**
French	**7ML1998-5FM11**
Spanish	**7ML1998-5FM21**
German Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.	**7ML1998-5FM31**

Spare Parts	
Locknut, for MSP-3, MSP-7, MSP-12, XPP-5	**7MH7723-1CR**
Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5	**7MH7723-1CS**
Mounting bracket for MSP-9	**7MH7723-1CT**
Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12	**7MH7723-1CU**
Lid for MSP-9	**7MH7723-1CV**
Lid gasket, for MSP-3, MSP-9	**7MH7723-1CW**
Lid gasket, for MSP-7, MSP-12	**7MH7723-1CX**
Motion cable gland adaptor kit	**7MH7723-1JU**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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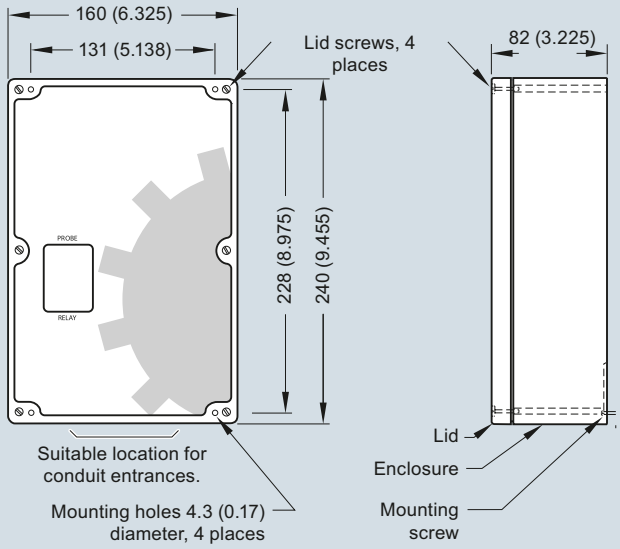
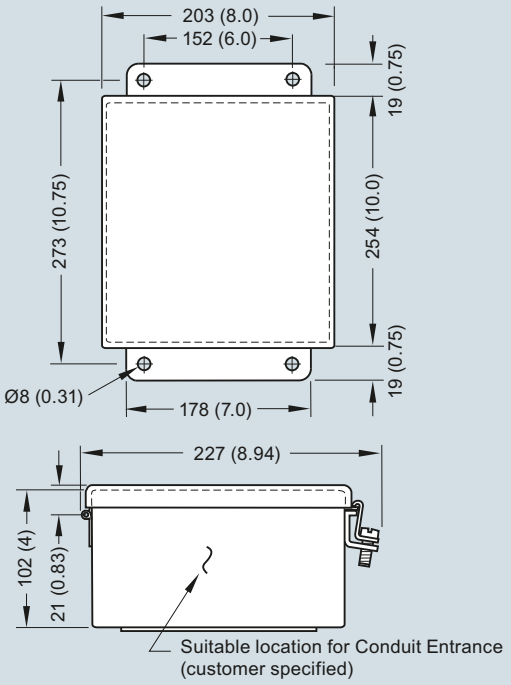
Dimensional drawings

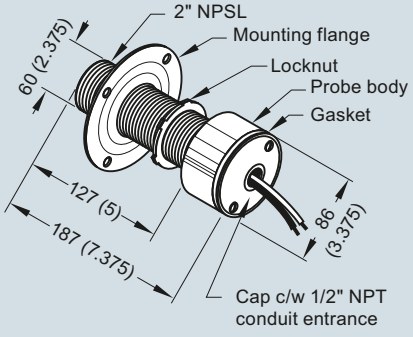
Type 4X/NEMA 4X/IP65 Polycarbonate Enclosure



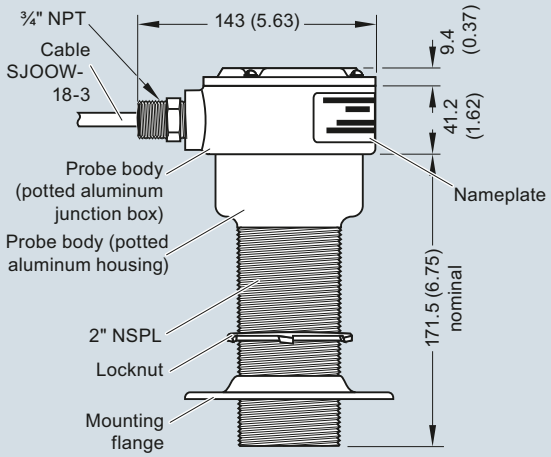
Type 4/NEMA 4/IP65 Painted Steel Enclosure & Type 4X/NEMA 4X/IP65 Stainless Steel Enclosure



Standard Probe MSP-12



Hazardous Locations XPP-5



MFA 4p and probe, dimensions in mm (inch)

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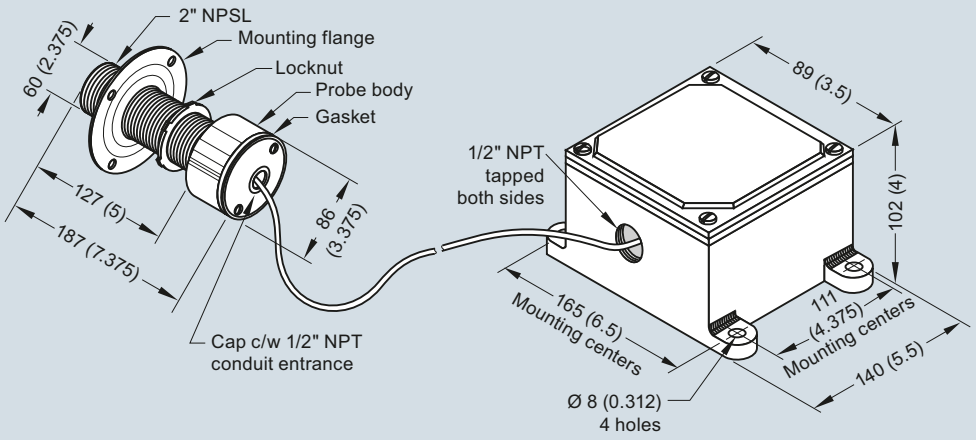
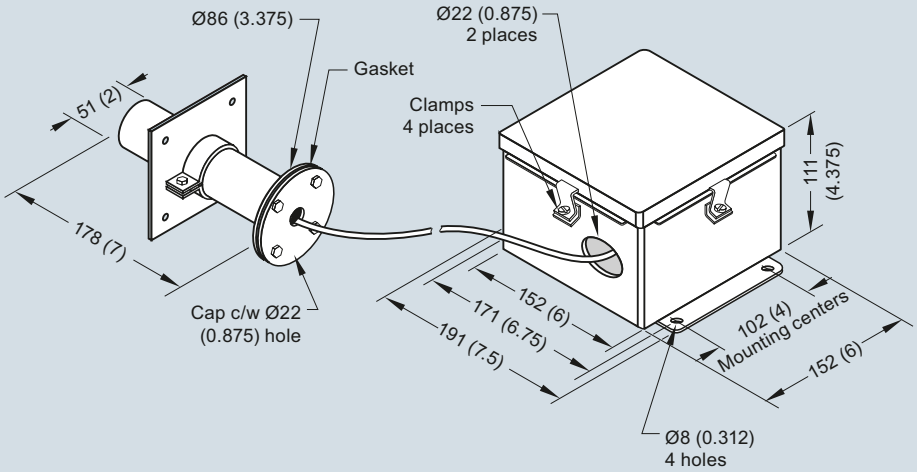
Milltronics MFA 4p motion failure alarm controller

High temperature probe MSP-3



High temperature stainless steel probe MSP-9



Probe, dimensions in mm (inch)

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Overview

Milltronics MSP-7 is a heavy-duty 3-wire motion sensor that provides an NPN open collector output to PLCs.

Benefits

- Up to 100 mm (4 inch) gap between target and probe
- Corrosion resistant construction
- General purpose, suitable for majority of industrial applications; rugged probe designs provide unmatched reliability

Application

The MSP-7 motion sensing probe can detect changes in the rotation and movement of ferrous equipment. When connected to a PLC it can warn of malfunction and signals to stop or slow down equipment, preventing costly failure or downtime. Its reliability makes it a very cost effective sensor.

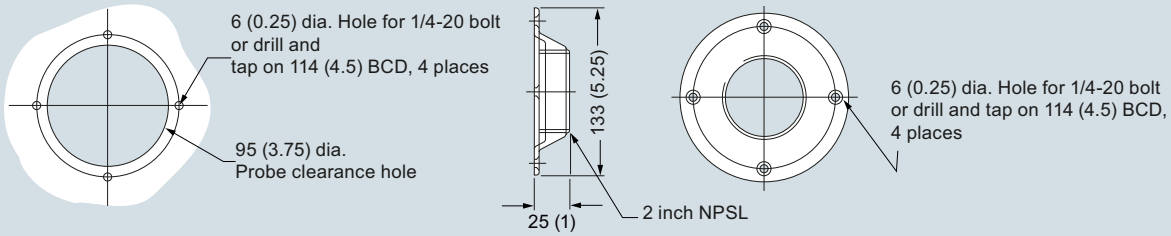
The single setpoint system suits most industrial applications. This versatile unit can be used on tail pulley shafts, driven pulleys, motor shaft sensing, belt or drag conveyors, screw conveyor flights, bucket elevators, fans and pumps.

An NPN open collector 3-wire output allows for versatile connection to most PLC models and a large dynamic range ensures that the MSP-7 can detect changes in target speed for a variety of applications.

- Key Applications: tail pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting for Milltronics MSP-7



Note: Mounting flange supplied with probe.

Mounting for Milltronics MSP-7, dimensions in mm (inch)

Technical specifications

Mode of operation	
Measuring principle	Magnetic
Typical application	Monitoring loss of motion in tail pulley, screw flights, bucket elevators
Features	• Rugged corrosion resistant aluminum body • Low voltage operation • Large dynamic range • Threaded body for finite adjustment
Output	NPN open collector

Performance	
Repeatability	± 1 %
Dead band	± 0.25 %
Dynamic Range	0 ... 7 200 PPM
Ambient Temperature Range	-40 ... +60 °C (-40 ... +140 °F)
Design	
Enclosure rating	Type 4X/NEMA 4X/IP67
Power Supply	21 ... 28 V DC, 40 mA max.
Certificates and approvals	CE, RCM

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Milltronics MSP-7 motion sensor

Selection and Ordering data

	Article No.
Milltronics Motion Sensing Probes ↗ ⬟	**7MH7146-**
Milltronics MSP-7: heavy-duty, 3 wire stand alone	■■■
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Cable Length	
Standard length (as described in Model options)[1]	**0**
Add Order code Y01 and plain text: "Total cable length ... m"	
Extended cable length 2 ... 30 m (6.6 ... 98.4 ft)	**1**
Model [standard cable length/type]	
MSP-7, ½" NPT cable inlet [1.5 m (5 ft) cable]	**K**
Approvals	
CE, RCM	**A**

[1] No Y01 needed in Order code for standard length

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

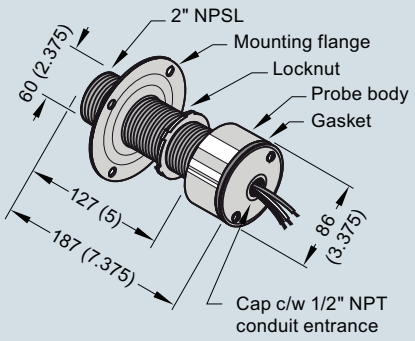
Selection and Ordering data

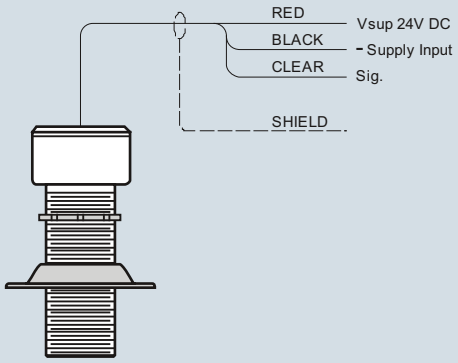
	Order code
Further designs	
Please add **"-Z"** to Article No. and specify Order code(s).	
Total cable length: enter the total cable length in plain text description ⬟	**Y01**
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/identification (max. 16 characters), specify in plain text ⬟	**Y17**
Cable gland kit ⬟	**A57**
Manufacturer's test certificate: According to EN 10204-2.2 ⬟	**C11**
Operating Instructions	Article No.
English	**A5E34105798**
Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.	
Spare Parts	
Locknut, for MSP-3, MSP-7, MSP-12, XPP-5	**7MH7723-1CR**
Mounting flange, for MSP-3, MSP-7, MSP-12, XPP-5	**7MH7723-1CS**
Lid, 1/2" NPT cable inlet for MSP-3, MSP-7, MSP-12	**7MH7723-1CU**
Lid gasket, for MSP-7, MSP-12	**7MH7723-1CX**
Motion cable gland adaptor kit	**7MH7723-1JU**

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Dimensional drawings

Stand alone probe Milltronics MSP-7





Stand alone probe Milltronics MSP-7, dimensions in mm (inch)

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Overview

SITRANS WM100 is a heavy-duty zero-speed alarm switch. This non-contacting unit provides cost-effective equipment protection even in the harshest conditions.

Benefits

- Up to 100 mm (4 inch) gap between SITRANS WM100 and targets
- Rugged, low maintenance suitable for tough environments
- 1 SPDT Form C relay contact
- Provides cost-effective protection
- Visual indication of target triggered pulse

Application

This rugged unit is impervious to dust, dirt, build-up and moisture and is ideal for such primary industries as mining, aggregate, and cement. Operating where other systems are prone to failure, the non-contacting design eliminates the need for lubricating, cleaning and part replacement. Downtime and clean-up expenses associated with conveying equipment failure are reduced by the SITRANS WM100. It alarms to minimize spillage, prevent extensive damage or even fire caused by belt slippage at the head pulley, and warns against conveyor malfunction.

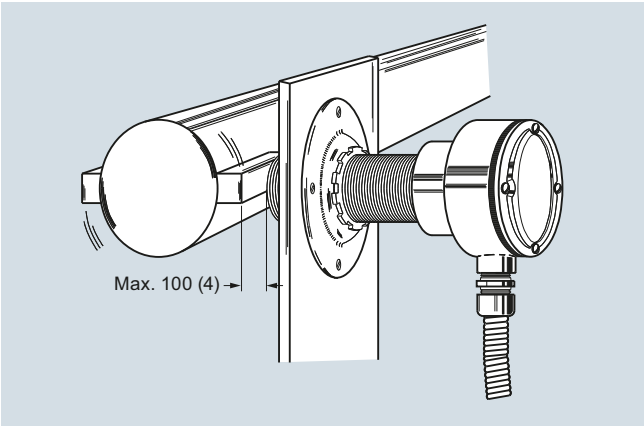
The SITRANS WM100 has built-in selectable start delays and 1 Form C relay contact. With an aluminum body, it operates from -40 to +60 °C (-40 to +140 °F).

- Key Applications: tail pulleys, driven pulleys, motor shaft sensing, screw conveyor flights, bucket elevators

Design

Mounting

The WM100 probe should be mounted, using the supplied mounting flange, onto a vibration-free structure. The gap between the probe and the target should be sufficient such that there is no danger of the target damaging the probe. The maximum allowable gap is 100 mm (4 inch) from the face of the target to the face of the probe for 4.5 x 4.5 mm (3/16 x 3/16 inch) keyway. The WM100 is sensitive to lateral disturbances to its magnetic field. If the WM100 is responding to motion from an interfering target, move the WM100 or install a ferrous plate (steel) as a shield between the WM100 and the interfering target. Where possible, the probe should be mounted such that the cable inlet is pointing downward to avoid accumulation of condensation in the casing. Connection of the probe should be made via flexible conduit for easier removal or adjustment of the probe.



SITRANS WM100 mounting, dimensions in mm (inch)

Technical specifications

Mode of operation	
Measuring principle	Disruption of magnetic field by ferrous target
Typical application	Monitors absence or presence of motion in harsh conditions
Output	
Contact	1 SPDT Form C dry relay contact, rated 5 A at 250 V AC, fail-safe operation
Time delay	Start up: 10 ... 14 seconds (5 ... 7 seconds with 12 ppm jumper installed)
Zero Speed (selected via a common jumper)	• 5 seconds ± 1 (minimum speed 10 ... 15 ppm) or • 10 seconds ± 2 (minimum speed 5 ... 7.5 ppm)
Rated operating conditions	
Operating temperature	-40 ... +60 °C (-40 ... +140 °F)
Design	
Probe body	Aluminum
Process mounting	2" NPSL
Connection box	Aluminum, ¾" NPT conduit entrance, 5 screw terminals plus grounding terminal for electrical connection, max. 12 AWG (3.30 mm^2) wire size
Gasketing	Neoprene
Display	Red LED for verification of pulses
Enclosure rating	Type NEMA 4x, 6, IP67
Dynamic range	Minimum 6 or 12 pulses per minute Maximum 3 000 pulses per minute
Shipping weight	2 kg (4.4 lb)
Power supply	• 115 V AC/50 ... 60 Hz, 7 VA • 230 V AC/50 ... 60 Hz, 7 VA • ± 10 % of rated voltage
Certificates and approvals	$CSA_{US/C}$, CE, RCM

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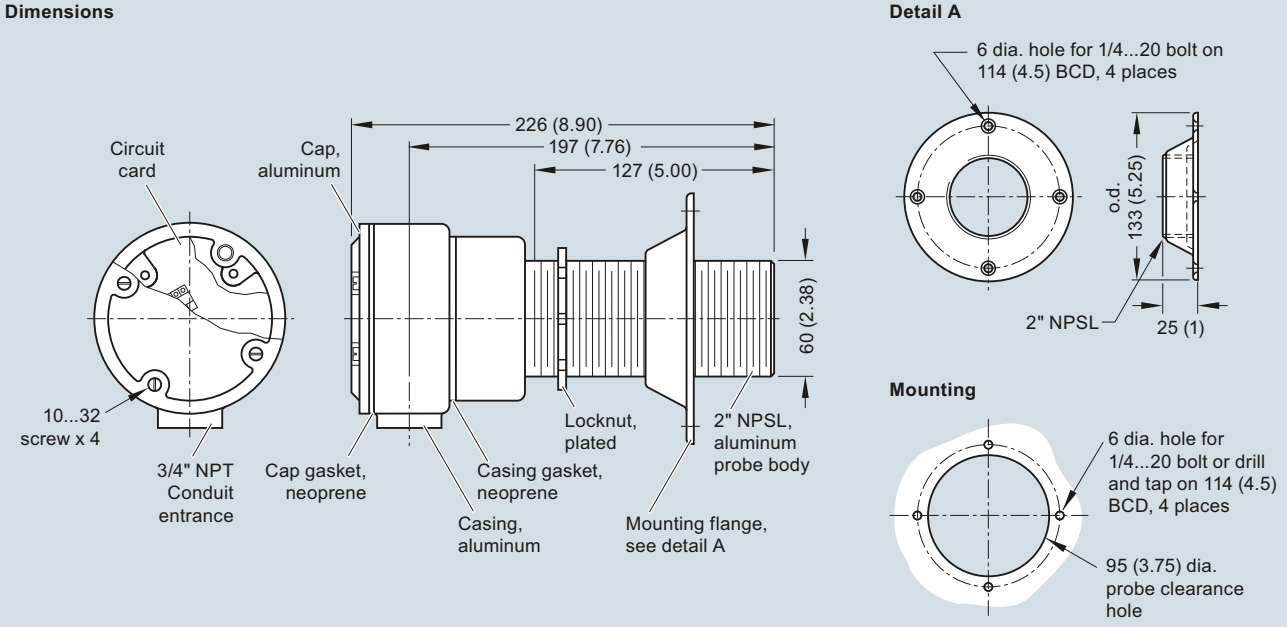
SITRANS WM100 motion sensor

Selection and Ordering data	Article No.
SITRANS WM100 ↗	**7MH7158 -**
A heavy-duty zero-speed alarm switch that does not require a controller.	**0 ■ A 0 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Model	
115 V AC	**A**
230 V AC	**B**

Selection and Ordering data	Order code
Further designs	
Please add **"-Z"** to Article No. and specify Order code(s).	
Manufacturer's Test Certificate: According to EN 10204-2.2	**C11**
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75 inch)]: Measuring-point number/ identification (max. 16 characters), specify in plain text	**Y17**
Operating Instructions	Article No.
SITRANS WM100, English	**7ML1998-5MW01**
SITRANS WM100, German	**7ML1998-5MW31**
SITRANS WM100, French	**A5E35674013**
Note: The operating instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual DVD containing the complete operating instructions library.	
Locknut	**7MH7723-1CR**
Mounting flange	**7MH7723-1CS**
Motion cable gland adaptor kit	**7MH7723-1JN**

6

Dimensional drawings



SITRANS WM100 mounting, dimensions in mm (inch)

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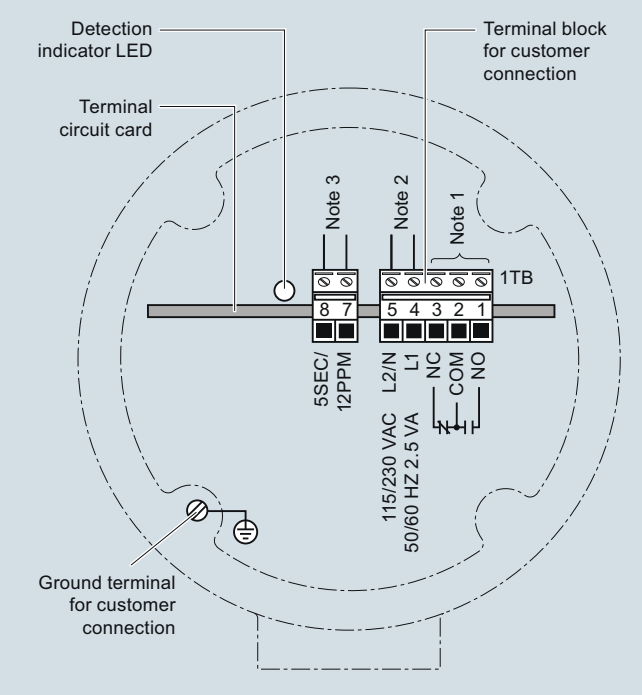
Schematics



SITRANS WM100 wiring

Notes:

1.Dry contacts shown in de-energized (alarm or shelf) state.

2. SITRANS WM100 is manufactured for either 115 or 230 V AC operation. Check WM100 nameplate for applicable voltage. Correct voltage must be supplied. Voltages lower than specified will result in an inoperative condition. Voltages higher than specified will severely damage unit.

3. For 5 second time delay and a minimum 12 ppm range, connect jumper across terminals 7 and 8. Without a jumper, the default is a 10 second time delay and a minimum 6 ppm range.

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Notes

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Supplementary Components

7/2	**Product overview**
	Isolating power supplies and Output isolators
7/4	SITRANS I100
7/7	SITRANS I200
	Displays
7/10	SITRANS RD100
7/12	SITRANS RD200
7/16	SITRANS RD300
	Remote data manager
7/19	SITRANS RD500
	WirelessHART products
7/24	SITRANS AW200 - WirelessHART adapter
7/30	SITRANS AW210 - WirelessHART adapter
7/34	IE/WSN-PA LINK

You can download all instructions, catalogs and certificates for Supplementary Components free of charge at www.siemens.com/processinstrumentation

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Overview

	Application	Description	Catalog page	Programming Software
Isolating power supplies and Output isolators				
	Isolating power supply for supplying 2- and 3-wire transmitters and for connecting mA sources in the hazardous area	**SITRANS I100** Isolating power supply with HART for rail mounting, with intrinsically-safe input.	7/4	-
	Output isolator for controlling valve positioners, i/p converters or indicators in the hazardous area	**SITRANS I200** Output isolator with HART for rail mounting, with intrinsically-safe output	7/7	-
Displays				
	2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation and for hazardous locations	**SITRANS RD100** • Versatile loop-powered meter that displays process variables in level, flow, pressure, temperature and weighing applications • FM and CSA approved device that can be installed in a range of environments, including hazardous areas • Large, easy-to-read display • Easy to install and set up using quick two-step process	7/10	-
	Universal input, panel mount remote digital display for process instrumentation. Supports RTD, TC, current and voltage inputs, and supporting software allows for remote configuration and data logging	**SITRANS RD200** • Universal remote display that accepts various inputs, making it an ideal fit for use with most field instruments • Standard panel mount display with optional enclosures • Two optional relays for alarm indication or process control applications • Meter Copy feature to reduce setup time, cost and errors • RD Software supporting remote configuration, monitoring and logging for up to 100 displays	7/12	-
	A panel mount remote digital display for process instrumentation and acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total and control applications	**SITRANS RD300** • A remote display for level, flow, pressure, weighing, and other process instruments • Acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total, and control applications • Data can be remotely collected, logged and presented on your local computer using the free downloadable RD software. • Accepts a single or dual input of current and voltage	7/16	-
Remote data manager				
	Remote data monitoring providing integrated web access, alarm event handling, and data capture for instrumentation	**SITRANS RD500** • Supports up to 128 devices with the flexible I/O modules and Modbus serial devices, including field instruments • Out- of-the-box operation, no software required, works with standard web browser • Support Ethernet, cellular and PSTN communication • Data and alarming through FTP, Email, SMS, HTML and Modbus TPC • Up to 2 GB of data logging memory	7/19	-

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	Application	Description	Catalog page	Programming Software
WirelessHART products				
	WirelessHART adapter to enable standard 4 ... 20 mA or HART devices to wireless communication	**SITRANS AW200 - WirelessHART adapter** • Makes isolated information in HART field instruments airborne • Permits predictive instead of preventive maintenance strategies • Enables 4 ... 20 mA or HART devices to wireless communication • Up to 4 HART devices can be connected • Power up one connected field instrument	7/24	SIMATIC PDM • Local with HART modem • Wireless via WirelessHART
	Explosion protected WirelessHART adapter to enable standard 4 ... 20 mA or HART devices to wireless communication	**SITRANS AW210 - WirelessHART adapter** • Wireless transfer of the process variable of a 4 to 20 mA device via direct connection • Wireless communication with up to 8 HART field devices in multidrop mode • Suitable for use in explosion-protected areas • Loop-powered or external power supply • Supports burst mode and event notification for adapters and connected devices	7/30	SIMATIC PDM • Local with HART modem • Wireless via WirelessHART
	Gateway for the connection of WirelessHART field devices (HART V7.1) to Industrial Ethernet.	**IE/WSN-PA LINK** • Connection of up to 100 WirelessHART devices • Approved for operation in hazardous areas in Zone 2 • Open TCP/IP communication and Modbus TCP via the Ethernet interface • Can be used with HART-OPC servers of the HART Communication Foundation	7/34	-

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Overview

Analog input 0/4 to 20 mA

The isolating power supplies are used for the intrinsically safe operation of 2- and 3-wire transmitters and for connecting to intrinsically safe mA sources.

The 2- and 3-wire transmitters are supplied with auxiliary power from the transmitter supply unit.

For 2-wire transmitters the isolators transfer the HART communication signal bidirectionally.

Benefits

- Active output 0/4 to 20 mA
- Suitable for 2-, 3-wire transmitters, 2-wire HART transmitters and mA sources
- Intrinsically safe input [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Open-circuit and short-circuit monitoring and messaging for input and output (can be switched off)
- Installation possible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC 61508)

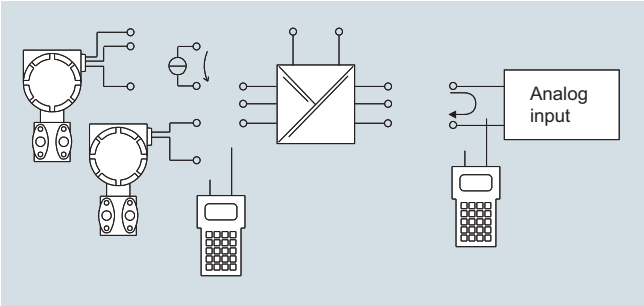
	Zones					
	0	1	2	20	21	22
Ex i interfaces	X	X	X	X	X	X
Installation in			X			X

Design

The HART isolating power supply is comprised of a compact plastic enclosure (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be connected individually using push-in screw terminals or jointly for up to 40 units using pac-Bus.



SITRANS I100 isolating power supply, function block diagram

Technical specifications

SITRANS I100 Isolating Power Supplies with HART	
Ex i input	
Input signal	0/4 ... 20 mA with HART
Functional range	0 ... 24 mA
Max. input current for mA sources	50 mA
Transmitter supply voltage	≥ 16 V at 20 mA (for 2-, 3-wire)
Supply voltage residual ripple	≤ 25 mV_{eff}
No-load voltage	≤ 26 V
Short-circuit current	≤ 35 mA
Input resistance (AC impedance HART)	≈ 500 Ω
Input resistance for mA sources	30 Ω
Communication signal (on 2-wire transmitters)	Bidirectional HART transmission, 0.5 ... 30 kHz
Output	
Output signal	0/4 ... 20 mA with HART
Load resistance R_L	0 ... 600 W (terminal 1+/2-) 0 ... 379 W (terminal 3+/2-) (with internal 221 Ω resistance for HART)
Residual ripple	≤ 40 μA_{eff}
No-load voltage	≤ 15.5 V
Communication signal	Bidirectional HART transmission, 0.5 kHz ... 30 kHz
Response time (10 % ... 90 %)	≤ 25 ms
Transfer behavior Input/Output	1:1 (0 ... 20 mA --> 0 ... 20 mA, 4 ... 20 mA --> 4 ... 20 mA)
Measuring accuracy Accuracy, typical data expressed as % of calibrated span at U_N, 23 °C	
Linearity error	≤ 0.1 %
Offset error	≤ 0.1 %
Temperature influence	≤ 0.1 %/10 K
Power supply effect within voltage range	≤ 0.01 %
Load resistance effect	≤ 0.02 %

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Rated conditions	
Degree of protection of enclosure	IP30
Degree of protection of terminals	IP20
Ambient conditions	
• Ambient temperature	-20 ... +60 °C/+70 °C (-4 ... +140 °F/+158 °F) (see "Operating instructions")
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Relative humidity (no condensation)	≤ 95 %
Electromagnetic compatibility	Tested under the following standards and regulations: EN 61326-1 Use in the industrial environment
Mechanical specifications	
Screw terminals	
• One-wire connextion	
- Rigid	0.2 ... 2.5 mm^2 (0.00031 ... 0.0039 in^2)
- Flexible	0.2 ... 2.5 mm^2 (0.00031 ... 0.0039 in^2)
- Flexible with end ferrules (without/with plastic ferrule)	0.25 ... 2.5 mm^2 (0.00039 ... 0.0039 in^2)
• Two-wire connection	
- Rigid	0.2 ... 1 mm^2 (0.00031 ... 0.00155 in^2)
- Flexible	0.2 ... 1.5 mm^2 (0.00031 ... 0.0023 in^2)
- Flexible with end ferrules	0.25 ... 1 mm^2 (0.00039 ... 0.00155 in^2)
Weight	Approx. 160 g (0.35 lb)
Type of installation	On DIN rail according to EN 50022 (NS35/15; NS35/7.5)
Mounting position	Vertical or horizontal
Enclosure material	PA 6.6
Fire protecting class (UL-94)	V0
Auxiliary power	
Rated voltage U_N	24 V DC
Voltage range	18 ... 31.2 V
Residual ripple within voltage range	≤ 3.6 V_{SS}
Rated current (U_N, 20 mA)	70 mA
Power consumption (U_N, 20 mA)	1.7 W
Power loss (at U_N, R_L = 250 Ω)	1.3 W
Operation indicator	Green "PWR" LED
Reverse polarity protection	Yes
Undervoltage monitoring	Yes (no faulty module/output states)
Galvanic isolation	
• Test voltage according to EN 60079-11	
- Ex i input to output	1.5 kV AC
- Ex i input to auxiliary power	1.5 kV AC
- Ex i input to Error contact	1.5 kV AC
• Test voltage according to EN 50178	
- Output to auxiliary power	350 V AC
- Error contact to auxiliary power and output	350 V AC

Error detection Ex i input	
• Open circuit	< 2 mA
• Short-circuit	> 22 mA
• Output behavior	= Input signal
• Output current at I_{in} = 0	I_{out} = 0 mA
Error detection output	
• Open circuit	< 2 mA
Error messaging Ex i input/output	
• Settings (LF switch)	Activated/deactivated
• Error indication	LED red "LF"
Error messaging and power supply failure	• Contact (30 V/100 mA), closed to ground in case of error • pac-Bus, floating contact (30 V/100 mA)
Certificates and approvals	
Explosion protection ATEX	
• EC type-examination certificate	DMT 03 ATEX E 010 X
• Degree of protection	II 3 (1) G Ex nA nC [ia] IIC T4 II (1) D [Ex iaD]
Installation	In Zone 2, Div. 2 and in the safe area
Other approvals	USA (FM) Kanada (CSA) Shipping (DNV)
Safety specifications (CENELEC)	
• Max. voltage U_o	27 V
• Max. current I_o	88 mA
• Max. power P_o	576 mW
• Max. connectable capacitance C_o for IIC/IIB	90 nF/705 nF
• Max. connectable inductance L_o for IIC/IIB	2.3 mH/14 mH
• Internal capacitance C_i and inductance L_i	Negligible
• Insulation voltage U_m	253 V
• When connecting mA sources:	
- Max. output voltage U_o	4.1 V
- Max. connectable voltage U_i	30 V
- Max. connectable current I_i	100 mA
- Internal capacitance Ci and inductance L_i	Negligible
• For more information and value combinations	See "Certification"

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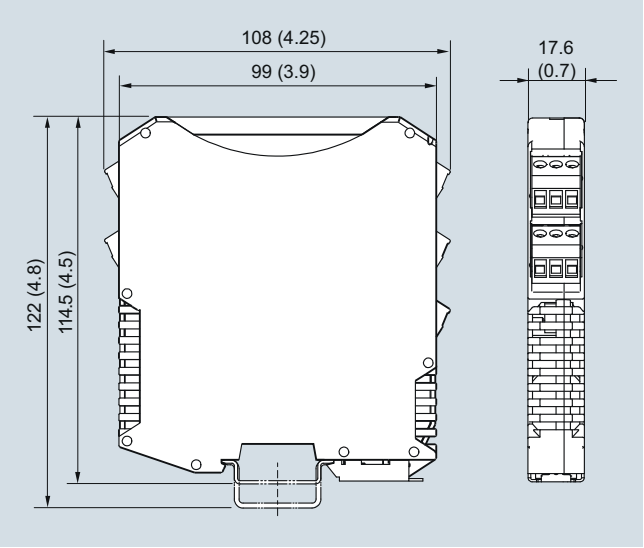
SITRANS I100

Selection and Ordering data

	Article No.
SITRANS I100 Isolating Power Supply with HART ► For rail mounting, for supplying 2-/3-wire transmitters and for mA sources, output 0/4 ... 20 mA, with intrinsically safe input	**7NG4124-0AA00**
Accessories	
pac-Bus basic set ► With 5 single elements and 1 terminal set (beginning and end)	**7NG4998-1AA**
pac-Bus extension set ► With 5 single elements	**7NG4998-1AB**

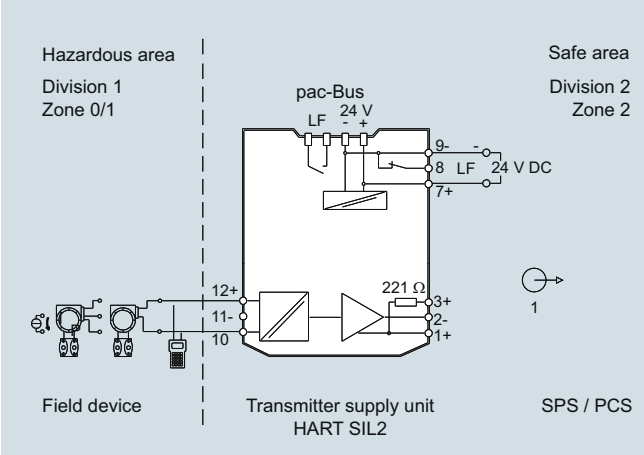
► Available ex stock.

Dimensional drawings

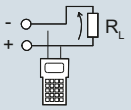


SITRANS I100 isolating power supply with HART, dimensions in mm (inch)

Schematics



SITRANS I100 isolating power supply with HART, connection diagram



SITRANS I100 isolating power supply with HART, output configuration

7

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Overview

Analog output 0/4 to 20 mA for HART

The output isolators are used for the intrinsically safe operation of valve positioners, i/p converters or indicators.

Operation of intrinsically safe HART valve positioners (e.g. SIPART PS2 and SITRANS VP300) is also possible. The units transfer a superimposed HART communication signal bidirectionally.

Benefits

- For HART output signals 0/4 to 20 mA
- Intrinsically safe output [Ex ia] IIC
- Galvanic isolation between input, output and auxiliary power
- Open-circuit and short-circuit monitoring and messaging (can be switched off)
- Installation possible in Zone 2 and Div. 2
- Can be used up to SIL 2 (IEC 61508)

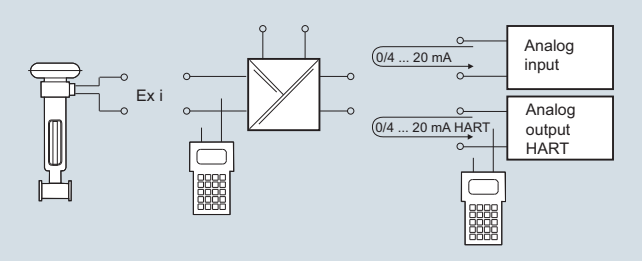
	Zones					
	0	**1**	**2**	**20**	**21**	**22**
Ex i interface	X	X	X	X	X	X
Installation in			X			X

Design

The HART output isolator is comprised of a compact plastic housing (IP30) and is equipped with push-in screw terminals.

On the front are a green LED for indicating the power supply status and a red LED for signaling errors.

The auxiliary power supply can be connected individually using push-in screw terminals or jointly for up to 40 units using pac-Bus.



SITRANS I200 output isolator, function block diagram

Technical specifications

SITRANS I200 output isolator with HART	
Input	
Input signal	0/4 ... 20 mA with HART
Functional range	0 ... 24 mA
Max. input current	50 mA
Input resistance (changeable switch LI)	225 Ω/550 Ω
Communication signal	Bidirectional HART transmission, 0.5 ... 30 kHz
Ex i output	
Output signal	0/4 ... 20 mA with HART
Connectable load resistance	0 ... 800 Ω
Min. load resistance for short-circuit monitoring	150 Ω
Residual ripple	≤ 50 mV
No-load voltage	≤ 25.6 V
Response time (10 % ... 90 %)	≤ 25 ms
Transfer behavior Input/Output	1:1 (0 ... 20 mA --> 0 ... 20 mA, 4 ... 20 mA --> 4 ... 20 mA)
Measuring accuracy Accuracy, typical data expressed as % of calibrated span at U_N, 23 °C	
Linearity error	≤ 0.1 %
Offset error	≤ 0.1 %
Temperature influence	≤ 0.1 %/10 K
Power supply effect within voltage range	≤ 0.01 %
Load resistance effect	≤ 0.02 %
Rated conditions	
Degree of protection of enclosure	IP30
Degree of protection of terminals	IP20
Ambient conditions	
• Ambient temperature	-20 ... +70 °C (-4 ... +158 °F) (see "Operating instructions")
• Storage temperature	-40 ... +80 °C (-40 ... +176 °F)
• Relative humidity (no condensation)	≤ 95 %
Electromagnetic compatibility	Tested under the following standards and regulations: EN 61326-1 Use in the industrial environment

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SITRANS I200

Mechanical specification	
Screw terminals	
• One-wire connection	
- Rigid	0.2 ... 2.5 mm^2 (0.00031 ... 0.0039 in^2)
- Flexible	0.2 ... 2.5 mm^2 (0.00031 ... 0.0039 in^2)
- Flexible with end ferrules (without/with plastic ferrule)	0.25 ... 2.5 mm^2 (0.00039 ... 0.0039 in^2)
• Two-wire connection	
- Rigid	0.2 ... 1 mm^2 (0.00031 ... 0.00155 in^2)
- Flexible	0.2 ... 1.5 mm^2 (0.00031 ... 0.0023 in^2)
- Flexible with end ferrules	0.25 ... 1 mm^2 (0.00039 ... 0.00155 in^2)
Weight	Approx. 160 g (0.35 lb)
Type of installation	On DIN rail according to EN 50022 (NS35/15; NS35/7.5)
Mounting position	Vertical or horizontal
Enclosure material	PA 6.6
Fire protecting class (UL-94)	V0
Auxiliary power	
Rated voltage U_N	24 V DC
Voltage range	18 ... 31.2 V
Residual ripple within voltage range	≤ 3.6 V_{SS}
Rated current (U_N, 20 mA)	80 mA
Power consumption (U_N, 20 mA)	1.3 W
Power loss (at U_N, R_L = 500 Ω)	1.1 W
Operation indicator	Green "PWR" LED
Reverse polarity protection	Yes
Undervoltage monitoring	Yes (no faulty module/output states)
Galvanic isolation	
• Test voltage according to EN 60079-11	
- Ex i output to input	1.5 kV AC
- Ex i output to auxiliary power	1.5 kV AC
- Error contact to Ex i output	1.5 kV AC
• Test voltage according to EN 50178	
- Input to auxiliary power	350 V AC
- Error contact to auxiliary power and input	350 V AC
Error detection Ex i output	
• Open circuit	> 10 kΩ
• Short-circuit	< 15 Ω
• Input behavior	> 6 kΩ
• Open-circuit detection only for input current	≥ 3.6 mA
• Settings (LF switch)	Activated/deactivated
• Error indication	LED red "LF"
• Error messaging and power supply failure	• Contact (30 V/100 mA), closed to ground in case of error • pac-Bus, floating contact (30 V/100 mA)

Certificates and approvals	
Explosion protection ATEX	
• EC type-examination certificate	DMT 03 ATEX E 012 X
• Degree of protection	II 3 (1) G Ex nA nC [ia] IIC T4 II (1) D [Ex iaD]
Installation	In Zone 2, Div. 2 and in the safe area
Other approvals	USA (FM) Canada (CSA) Shipping (DNV)
Safety specifications (CENELEC)	
• Max. voltage U_o	25.6 V
• Max. current I_o	96 mA
• Max. power P_o	605 mW
• Max. connectable capacitance C_o for IIC/IIB	103 nF/800 nF
• Max. connectable inductance L_o for IIC/IIB	1.9 mH/11 mH
• Internal capacitance C_i and inductance L_i	Negligible
• Insulation voltage U_m	253 V
• For more information and value combinations see "Certification".	

Selection and Ordering data

	Article No.
SITRANS I200 output isolator with HART ►	**7NG4131-0AA00**
For rail mounting, input 0/4 ... 20 mA, output 0/4 ... 20 mA, intrinsically safe	
Accessories	
pac-Bus basic set ►	**7NG4998-1AA**
With 5 single elements and 1 terminal set (beginning and end)	
pac-Bus extension set ►	**7NG4998-1AB**
With 5 single elements	

► Available ex stock.

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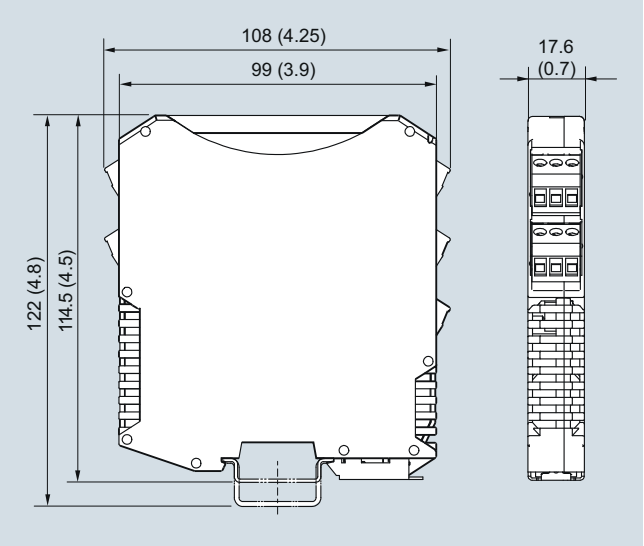
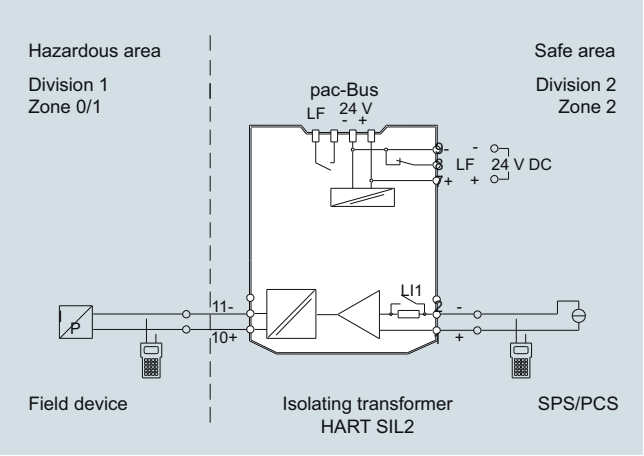
Dimensional drawings



SITRANS I200 output isolator with HART, dimensions in mm (inch)

Schematics



SITRANS I200 output isolator with HART, connection diagram

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SITRANS RD100

Overview

The SITRANS RD100 is a 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.

Benefits

- Easy setup
- Approved for hazardous locations
- NEMA 4X, IP67 impact-resistant enclosure
- Simple two-step calibration
- Two modes of input allow for easy servicing, with no interruption of loop required

Application

The RD100 is very versatile. It can be installed indoors or outdoors, in hot or cold environments, and in safe or hazardous areas.

It has been approved by FM and CSA as Intrinsically Safe and non-incendive, and operates from -40 to +85 °C (-40 to +185 °F), adding only 1 V to the loop.

The RD100 has a large 1 inch (2.54 cm) high display making it easy to read.

Calibration consists of a quick, two-step process involving the adjustment of only two non-interacting potentiometers.

Key Applications

Remotely displays process variables in level, flow, pressure, temperature and weighing applications, in a 4 to 20 mA loop.

Technical specifications

Mode of operation	
Measuring principle	Analog to digital conversion
Measuring range	4 … 20 mA
Measuring points	1 instrument only
Accuracy	± 0.1 % of span ± 1 count
Rated operating conditions	
Ambient conditions	
• Operating temperature range	-40 … +85 °C (-40 … +185 °F)
Design	
Weight	340 g (12 oz)
Material (enclosure)	Impact-resistant glass filled polycarbonate body and clear polycarbonate cover
Degree of protection	NEMA 4X, IP67
Power supply	
External loop power supply	30 V DC max.
Display	• 1 inch (2.54 cm) high LCD • Numeric range from -1 000 … +1 999
Certificates and approvals	
Hazardous	
• Intrinsically Safe	• CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G T4 • CSA/FM Class I, Zone 0, Group IIC
• Non-incendive	• CSA/FM Class I, Div. 2, Groups A, B, C, D • CSA/FM Class II and III, Div. 2, Groups F and G
Options	
Mounting	• 2 inch (5.08 cm) pipe mounting kit (zinc plated or stainless steel) • Panel mounting kit

Selection and Ordering data		Article No.
SITRANS RD100 A 2-wire loop powered, NEMA 4X enclosed remote digital display for process instrumentation.	↗	**7ML5741-**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		**A A 0 0 - 0**
Conduit hole location (½ inch)		
None	▶⬟	**1**
Bottom	▶⬟	**2**
Rear	⬟	**3**
Top	⬟	**4**

▶ Available ex stock. For details see page 9/5 in the appendix.
⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data	Article No.
Operating Instructions	
English	**7ML1998-5JU01**
French	**7ML1998-5JU11**
German Note: The Operating Instructions should be ordered as a separate line item. This device is shipped with the Siemens Milltronics manual DVD containing Quick Starts and Operating Instructions.	**7ML1998-5JU31**
Accessories	
Panel mount kit	**7ML1930-1BN**
2 inch (5.08 cm) pipe mounting kit (zinc plated seal)	**7ML1930-1BP**
2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)	**7ML1930-1BQ**

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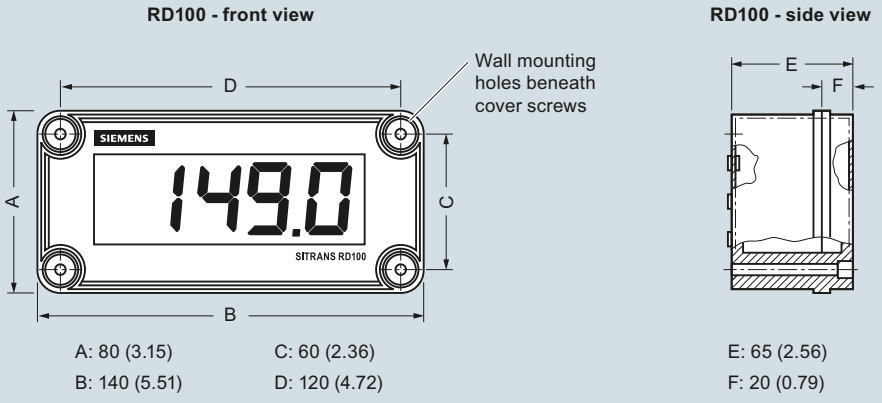
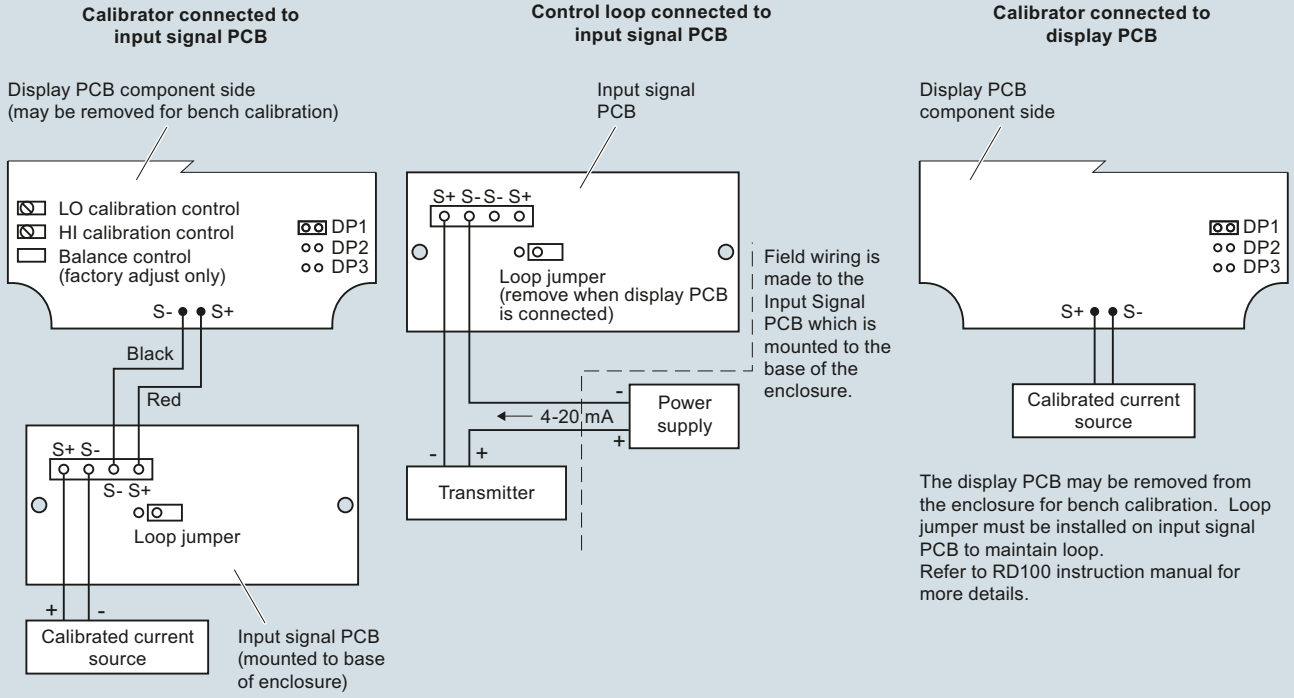
Dimensional drawings



A: 80 (3.15) C: 60 (2.36) E: 65 (2.56)
B: 140 (5.51) D: 120 (4.72) F: 20 (0.79)

SITRANS RD100, dimensions in mm (inch)

Schematics



SITRANS RD100 connections

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SITRANS RD200

Overview

The SITRANS RD200 is a universal input, panel mount remote digital display for process instrumentation.

Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Universal input: accepts current, voltage, thermocouple and RTD signals
- Single or dual 24 V DC transmitter power supply
- Analog to Modbus RTU conversion as standard feature
- Two optional relays for alarm indication or process control applications
- Linear or square root function supported
- Meter Copy feature to reduce setup time, cost or errors
- RD software supporting remote configuration, monitoring and logging for up to 100 displays
- Other features include: 4 to 20 mA analog output option, supports pump alternation control, and optional NEMA 4 and 4X FIELD ENCLOSURES
- Large display option for improved visibility at greater distances

Application

The RD200 is a universal remote display for level, flow, pressure, temperature, weighing, and other process instruments.

Data can be remotely collected, logged and presented from as many as 100 displays on your local computer using the free downloadable RD software.

The display accepts a single input of current, voltage, thermocouple, and RTD. This makes the RD200 an ideal fit for use with most field instruments.

The RD200 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

Key Applications

Tank farms, pump alternation control, local or remote display of level, temperature, flow, pressure and weighing instrument values, PC monitoring and data logging with RD software.

Technical specifications

Mode of operation	
Measuring principle	Analog to digital conversion
Measuring points	• 1 instrument • Remote monitoring of 100 instruments with PC and RD software
Input	
Measuring range	
• Current	• 4 … 20 mA, 0 … 20 mA
• Voltage	• 0 … 10 V DC, 1 … 5 V, 0 … 5 V
• Thermocouple temperature	• Type J: -50 … +750 °C (-58 … +1 382 °F) • Type K: -50 … +1 260 °C (-58 … +2 300 °F) • Type E: -50 … +870 °C (-58 … +1 578 °F) • Type T: -180 … +371 °C (-292 … +700 °F) • Type T, 0.1 resolution: -180.0 … +371 °C (-199.9 … +700 °F)
• RTD temperature	• 100 Ω RTD: -200 … +750 °C (-328 … +1 382 °F)
Output signal	
Output	• PDC output • 4 … 20 mA (optional) • Modbus RTU
Relays	2 SPDT Form C relays, rated 3 A at 30 V DC or 3 A at 250 V AC, non-inductive, auto-initializing (optional)
Communications	• RS 232 with PDC or Modbus RTU • RS 422/485 with PDC or Modbus RTU
Accuracy	
4 … 20 mA optional output	± 0.1 % FS ± 0.004 mA
Process input	± 0.05 % of span ± 1 count, square root: 10 … 100 % FS
Thermocouple temperature input	• Type J: ± 1 °C (± 2 °F) • Type K: ± 1 °C (± 2 °F) • Type E: ± 1 °C (± 2 °F) • Type T: ± 1 °C (± 2 °F) • Type T, 0.1 Resolution: ± 1 °C (± 1.8 °F)
RTD temperature input	• 100 Ω RTD: ± 1 °C (± 1 °F)
Rated operating conditions	
Ambient conditions	
Storage temperature range	-40 … +85 °C (-40 … +185 °F)
Operating temperature range	0 … 65 °C (32 … 149 °F)
Design	
Weight	269 g (9.5 oz) (including options)
Material (enclosure)	• 1/8 DIN, high impact plastic, UL94V-0, color: gray • Optional plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 enclosures
Degree of protection	Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided

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Electrical connection	
• mA output signal	2-core copper conductor, twisted, shielded, 0.82 … 3.30 mm^2 (18 … 12 AWG), Belden 8 760 or equivalent is acceptable
• Electrical connection and relay connection	Copper conductor according to local requirements, rated 3 A at 250 V AC
Power supply	
Input voltage option 1	85 … 265 V AC, 50/60 Hz; 90 … 265 V DC, 20 W max.
Input voltage option 2	12 … 36 V DC; 12 … 24 V AC, 6 W max.
Transmitter power supply	One or two isolated transmitter power supplies (optional)
• Single power supply	One 24 V DC ± 10 % at 200 mA max.
• Dual power supplies	Two 24 V DC ± 10 % at 200 mA and 40 mA max.
External loop power supply	35 V DC max.
Output loop resistance	• 24 V DC, 10 … 700 Ω max. • 35 V DC (external), 100 … 1 200 Ω max.
Displays and controls	
Display	• 14 mm (0.56 inch) high LED • 2X option for 30.5 mm (1.2 inch) high, red LED • Numeric range from -1 999 … +9 999 • 4 digits, automatic lead zero blanking • 8 intensity levels
Memory	• Non-volatile • Stores settings for minimum of 10 years if power is lost
Programming	• Primary: front panel • Secondary: meter copy or PC with SITRANS RD software
Certificates and approvals	CE, UL, $_C$UL
Options	
Enclosures	Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures
Mounting	• 2 inch (5.08 cm) pipe mounting kit (zinc plated seal) • 2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301)

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SITRANS RD200

Selection and Ordering data		Article No.
SITRANS RD200	↗	**7ML5740-**
A universal input, panel mount remote digital display for process instrumentation.		■■■■■ - ■ **A**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Input voltage		
85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.	►⬟	**1**
12 ... 36 V DC; 12 ... 24 V AC, 6 W max.	⬟	**2**
Transmitter supply		
None	⬟	**A**
Single 24 V DC transmitter supply[1]	►⬟	**B**
Dual 24 V DC transmitter supply[1)2)]		**C**
Output		
None	►⬟	**A**
2 relays	⬟	**B**
4 ... 20 mA output	⬟	**C**
Communication		
Modbus enabled	►⬟	**0**
Approvals		
CE, UL, $_{C}$UL	⬟	**1**
Display Size		
Standard	►⬟	**0**
2X option for 30.5 mm (1.2 inch) high, red LED	►⬟	**1**

1) Available with input voltage option 1 only

2) Available with output option C only

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

► Available ex stock when configured with the following options only: Input voltage: 1, Transmitter supply: B, Output : A, Communication: 0. For details see page 9/5 in the appendix.

Selection and Ordering data	Article No.
Operating Instructions	
English	**7ML1998-5JS01**
Spanish	**7ML1998-5JS21**
German Note: The Operating Instructions should be ordered as a separate line item. This device is shipped with the Siemens Milltronics manual DVD containing Quick Starts and Operating Instructions.	**7ML1998-5JS31**
Other Operating Instructions	
SITRANS RD Enclosures, English	**7ML1998-5JX01**
SITRANS RD Enclosures, German	**7ML1998-5JX31**
SITRANS RD Serial communications accessories, English	**A5E31979195**
SITRANS RD Serial communications accessories, German	**A5E31979197**
SITRANS RD Software, English	**7ML1998-5JW01**
SITRANS RD Software, German	**7ML1998-5JW31**

Selection and Ordering data	Article No.
Accessories	
SITRANS RD200 copy cable 2.1 m (7 ft)	**7ML1930-1BR**
SITRANS RD200 RS 232 serial adapter (copy cable included)	**7ML1930-1BS**
SITRANS RD200 RS 422/485 serial adapter (copy cable included)	**7ML1930-1BT**
RS 232 to RS 422/485 isolated converter	**7ML1930-1BU**
RS 232 to RS 422/485 non-isolated converter	**7ML1930-1BV**
SITRANS RD200 RS 232 and RS 485 isolated multi-input adapter board	**7ML1930-1BW**
USB to RS 422/485 isolated converter	**7ML1930-1BX**
USB to RS 422/485 non-isolated converter	**7ML1930-1BY**
USB to RS 232 converter	**7ML1930-6AK**
RD Software CD for 1 ... 100 displays	**7ML1930-1CC**
Low cost polycarbonate plastic enclosure for 1 display	**7ML1930-1CF**
2 inch (5.08 cm) pipe mounting kit (zinc plated seal) only available with 7ML1930-1CF	**7ML1930-1BP**
2 inch (5.08 cm) pipe mounting kit (stainless steel, Type 304, EN 1.4301) only available with 7ML1930-1CF	**7ML1930-1BQ**
Thermoplastic enclosure	
For use with 1 display	**7ML1930-1CG**
For use with 2 displays	**7ML1930-1CH**
For use with 3 displays	**7ML1930-1CJ**
For use with 4 displays	**7ML1930-1CK**
For use with 5 displays	**7ML1930-1CL**
For use with 6 displays	**7ML1930-1CM**
Stainless steel enclosure (Type 304, EN 1.4301)	
For use with 1 display	**7ML1930-1CN**
For use with 2 displays	**7ML1930-1CP**
For use with 3 displays	**7ML1930-1CQ**
For use with 4 displays	**7ML1930-1CR**
For use with 5 displays	**7ML1930-1CS**
For use with 6 displays	**7ML1930-1CT**
Steel enclosure	
For use with 1 display	**7ML1930-1CU**
For use with 2 displays	**7ML1930-1CV**
For use with 3 displays	**7ML1930-1CW**
For use with 4 displays	**7ML1930-1CX**
For use with 5 displays	**7ML1930-1CY**
For use with 6 displays	**7ML1930-1DA**

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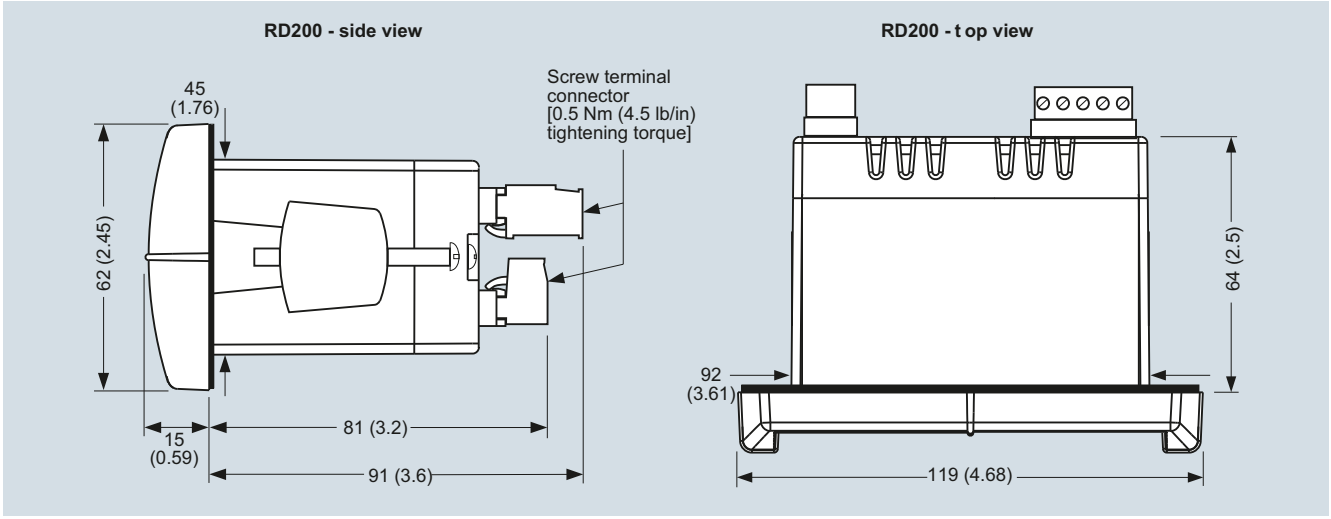
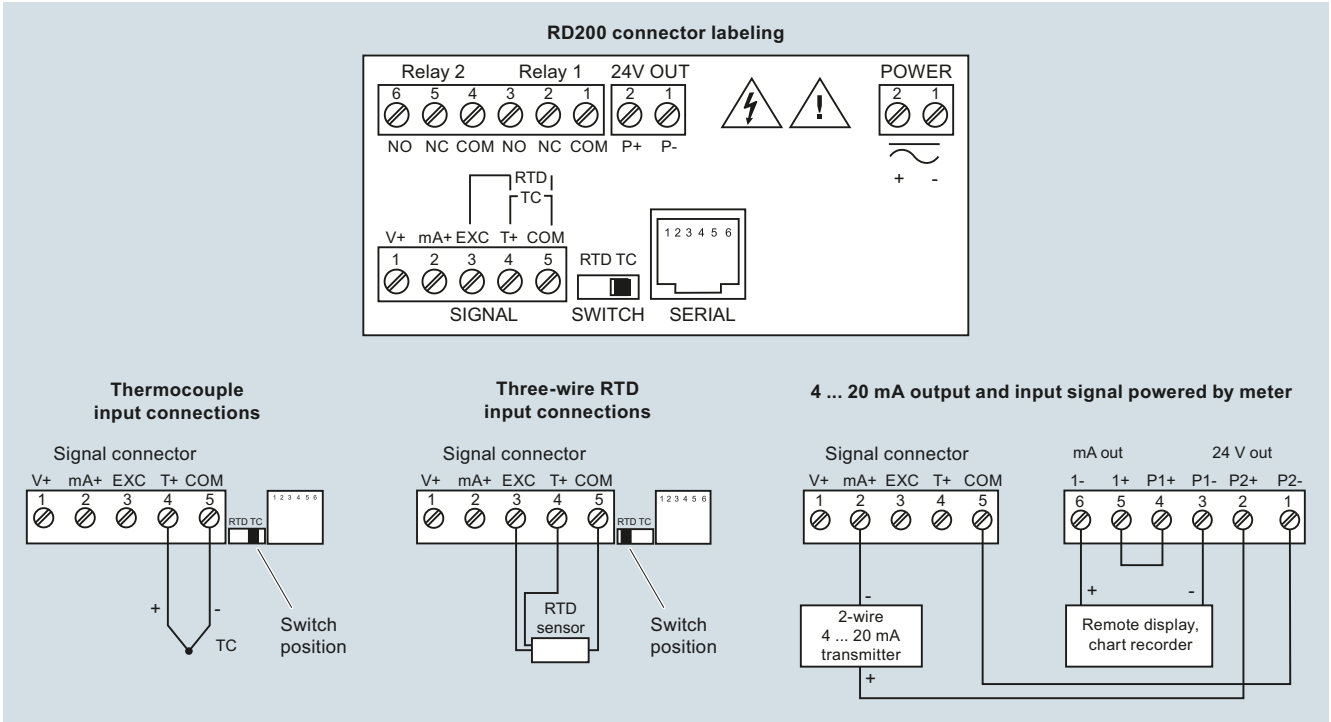
Dimensional drawings



SITRANS RD200, dimensions in mm (inch)

Schematics



SITRANS RD200 connections

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SITRANS RD300

Overview

The SITRANS RD300 is a panel mount remote digital display for process instrumentation and acts as a multi-purpose, easy to use, rate/totalizer ideal for flow rate, total, and control applications.

Benefits

- Easy setup and programming via front panel buttons or remotely using RD software
- Display readable in sunlight
- Input: accepts current and voltage
- Single or dual 24 V DC transmitter power supply
- Serial communication using built in protocol or Modbus RTU
- Supports up to 8 relays and 8 digital I/O for process control and alarming
- 32-point linearization, square root or exponential linearization
- Multi-pump alternation control
- Supports total, grand total or non-resettable grand total
- 9-digit totalizer with total overflow feature
- Large dual-line 6-digit display
- Configure, monitor, and datalog from a PC
- Dual-input option with math functions: addition, difference, average, multiplication, division, minimum, maximum, weighted average, ratio, concentration

Application

The RD300 is a remote display for level, flow, pressure, weighing, and other process instruments. This display also acts as a multi-purpose, easy to use rate/totalizer ideal for flow rate, total, and control applications.

Data can be remotely collected, logged and presented on your local computer using the free downloadable RD software.

The display accepts a single or dual input of current and voltage. This makes the RD300 an ideal fit for use with most field instruments.

The RD300 can be set up as a standard panel mount, or combined with optional enclosures to allow it to house up to 6 displays.

Key Applications

Tank farms, pump alternation control, local or remote display of level, flow, pressure and weighing instrument values, PC monitoring and data logging with RD software.

Technical specifications

Mode of operation	
Measuring principle	Analog to digital conversion
Measuring points	1 or 2 instruments
Input	
Measuring range	
• Current	• 4 … 20 mA, 0 … 20 mA
• Voltage	• 0 … 10 V DC, 1 … 5 V, 0 … 5 V
Output signal	
Output	• 4 … 20 mA (optional) • Modbus RTU
Relays	2 or 4 SPDT (Form C) internal and/or 4 SPST (Form A) external; rated 3 A at 30 V DC and 125/250 V AC resistive load; 1/14 HP (50 W) at 125/250 V AC for inductive loads (optional)
Communications	• RS 232 with Modbus RTU • RS 422/485 with Modbus RTU
Accuracy	
4 … 20 mA optional output	± 0.1 % FS ± 0.004 mA
Process input	± 0.05 % of span ± 1 count, square root: 10 … 100 % FS
Rated operating conditions	
Ambient conditions	
Storage temperature range	-40 … +85 °C (-40 … +185 °F)
Operating temperature range	0 … 65 °C (32 … 149 °F)
Design	
Weight	269 g (9.5 oz) (including options)
Material (enclosure)	• 1/8 DIN, high impact plastic, UL94V-0, color: gray • Optional plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 enclosures
Degree of protection	Type 4X, NEMA 4X, IP65 (front cover); panel gasket provided
Electrical connection	
mA output signal	2-core copper conductor, twisted, shielded, 0.82 … 3.30 mm² (18 … 12 AWG), Belden 8 760 or equivalent is acceptable
Electrical connection and relay connection	Copper conductor according to local requirements, rated 3 A at 250 V AC
Power supply	
Input voltage option	85 … 265 V AC, 50/60 Hz; 90 … 265 V DC, 20 W max. or jumper selectable 12/24 V DC ± 10 %, 15 W max.
Transmitter power supply	Terminals P+ & P-: 24 V DC ± 10 %, 12/24 V DC powered models selectable for 24, 10, or 5 V DC supply (internal jumper J4), 85 ... 265 V AC models rated at 200 mA max, 12/24 V DC powered models rated at 100 mA max, at 50 mA max. for 5 or 10 V DC supply.
External loop power supply	35 V DC max.
Output loop resistance	• 24 V DC, 10 … 700 Ω max. • 35 V DC (external), 100 … 1 200 Ω max.

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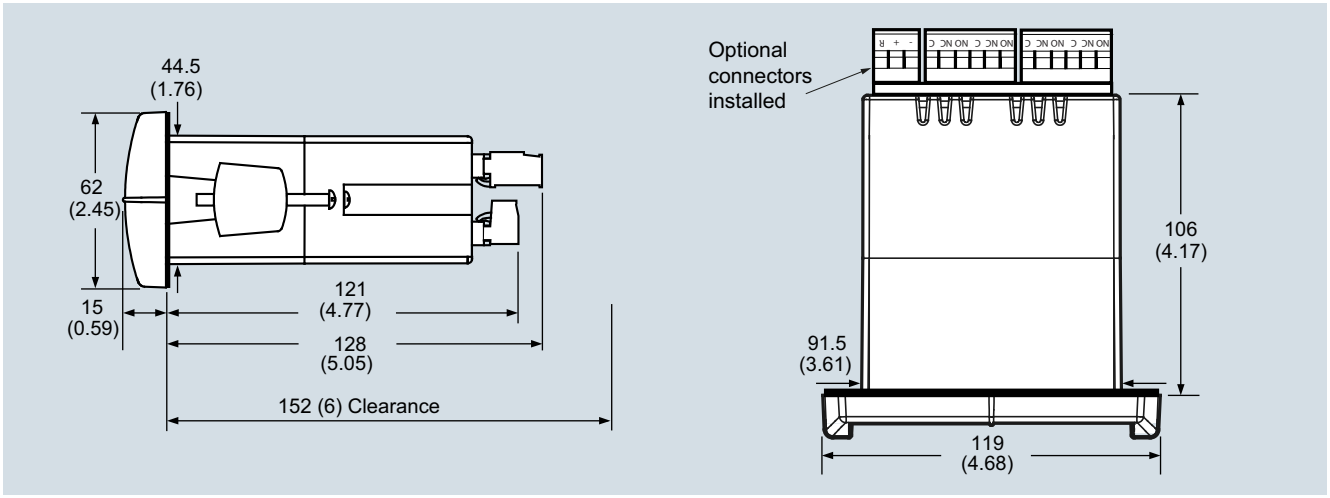
Displays and controls	
Main Display	0.6 inch (15 mm) high, red LEDs
Second display	0.46 inch (12 mm) high, red LEDs, 6-digits: each (-99 999 ... 999 999)
Memory	• Non-volatile • Stores settings for minimum of 10 years if power is lost
Programming	• Primary: front panel • Secondary: meter copy or PC with SITRANS RD software
Certificates and approvals	CE, UL, $_{C}$UL
Options	
Enclosures	Plastic, steel and stainless steel (Type 304, EN 1.4301) NEMA 4 and 4X enclosures

Selection and Ordering data	Article No.
SITRANS RD300 ↗	**7ML5744-** ■■■■■ **- 0 A**
Dual line Remote digital display compatible with PI instruments	
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
Input voltage	
85 ... 265 V AC, 50/60 Hz; 90 ... 265 V DC, 20 W max.	**1**
12 ... 36 V DC; 12 ... 24 V AC, 6 W max.	**2**
Output	
None	**A**
2 Relays	**B**
4 Relays	**C**
4 ... 20 mA output	**D**
2 Relays and 4 ... 20 mA output	**E**
4 Relays and 4 ... 20 mA output	**F**
Type	
Single input process and flow rate/totalizer Mtr	**A**
Dual input process Mtr	**B**
Display	
Standard	**0**
SunBright	**1**
Approvals	
UL & C-UL & CE	**0**

Selection and Ordering data	Article No.
Operating Instructions	
Single input process and flow rate/totalizer Mtr	
English	**A5E31917845**
French	**A5E31948924**
German	**A5E31948919**
Dual input process Mtr	
English	**A5E33481367**
German	**A5E33481387**
Note: The operating instructions should be ordered as a separate line on the order.	
Other Operating Instructions	
SITRANS RD DIN-Rail Mounting Kit, English	**A5E31979181**
SITRANS RD DIN-Rail Mounting Kit, German	**A5E31979184**
SITRANS RD Expansion Modules, English	**A5E31979173**
SITRANS RD Expansion Modules, German	**A5E31979176**
SITRANS RD Serial Communications Accessories, English	**A5E31979195**
SITRANS RD Serial Communications Accessories, German	**A5E31979197**
Accessories	
DIN-Rail Mounting Kit	**7ML1930-6AB**
4 Relays Expansion Module	**7ML1930-6AC**
4 Digital I/O Module	**7ML1930-6AD**
Dual output 4 ... 20 mA expansion module for dual input meter	**7ML1930-6AP**
Meter Copy Cable	**7ML1930-6AE**
RS 232 Serial Adapter	**7ML1930-6AF**
RS 422/485 Serial Adapter	**7ML1930-6AG**
RD300 USB Serial Adapter	**7ML1930-6AJ**
USB to RS 232 Converter	**7ML1930-6AK**
Snubber	**7ML1930-6AL**
Plastic enclosure	
For 1 meter	**7ML1930-6AM**
For 2 meters	**7ML1930-6AN**
For 4 meters	**7ML1930-1CK**
For 5 meters	**7ML1930-1CL**
For 6 meters	**7ML1930-1CM**

Dimensional drawings



SITRANS RD300, dimensions in mm (inch)

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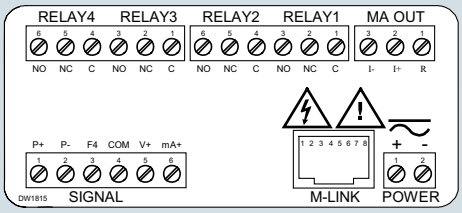
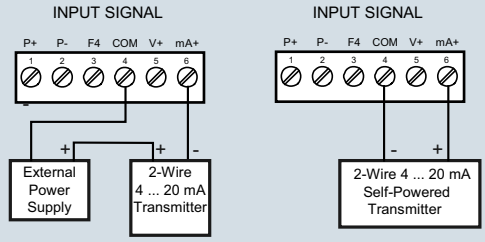
Schematics

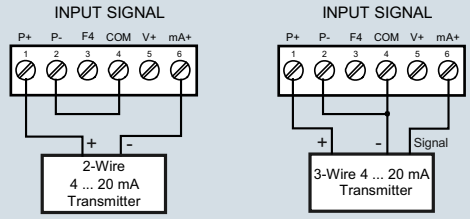
Connector labeling for fully loaded single input meter



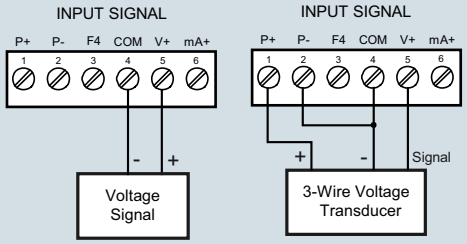
Transmitter powered by external supply or self-powered



Transmitter powered by internal supply



Voltage Input Connections



SITRANS RD300 connections

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Overview

The SITRANS RD500 is a remote data manager providing remote monitoring through integrated web access, alarm event handling, and data capture for instrumentation and other devices.

Benefits

- RD500 supports report and alarm events via email, SMS, and FTP transfer
- Web provides worldwide access to instrument data and RD500 configuration and setup
- Simple configuration using a standard web browser, no programming or additional software required
- Offers scalability with optional I/O modules for current (4 to 20 mA), voltage (0 to 10 V), thermocouple (TC), resistance temperature detector (RTD), and digital input, output and counter
- 10 base-TI 100 Base-TX Ethernet and support for GSM, GPRS, 3G, and PSTN provide flexible remote communications options
- Supports up to 128 devices with the flexible I/O modules and supports addressing for Modbus serial devices via RS 232 and RS 485 serial ports
- Integrated FTP server and client supports FTP data synchronization to central servers
- Compact flash slot supports up to 2 gigabytes of expandable memory for data capture and storage, 1 gigabyte industrial compact flash card included
- Log files formats are CSV (comma separated values) for data files and HTML for report files
- Supports Modbus TCP via Ethernet and GPRS for easy integration into control systems
- Optional 3G modem offers VPN support

Application

The RD500 is an easy-to-use remote data monitoring solution, using a web-based application and hardware modules. The unique modular approach allows a variety of process signals to be monitored, while the serial ports allow data to be collected from Modbus RTU devices.

The RD500 comprises a master communications module, and up to 16 slave modules. Various module types are available, allowing up to a maximum of 128 conventional inputs and outputs. The RD500's serial ports can support addressing for Modbus RTU slave devices including field instruments.

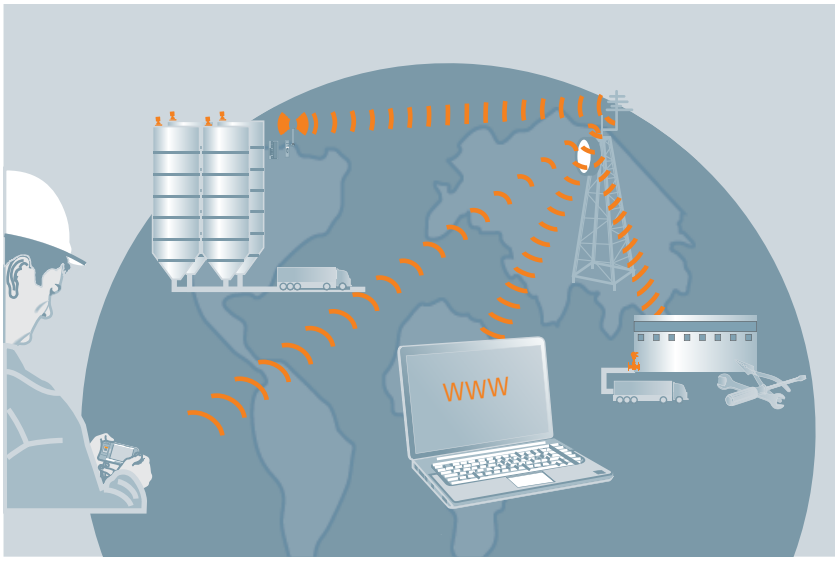
The RD500's built-in web server, FTP, and email client allows the process to be monitored remotely. Alarm notifications are communicated through email and SMS text messages to one or more recipients to ensure that appropriate actions are taken by personnel.

The RD500 supports modems, providing flexibility for applications in which GSM/GPRS/3G cellular or landline connectivity is desired.

The RD500 is configured via a web-based interface - a standard browser is all the software you need to configure your system.

Key Applications

Remote monitoring, inventory management, web enabled instrumentation or other devices remote configuration and maintenance devices



With SITRANS RD500, monitor inventory levels, process, environmental, and remote maintenance applications, and get web access to most types of field instrumentation, including flow, level, pressure, temperature measurement, and weighing.

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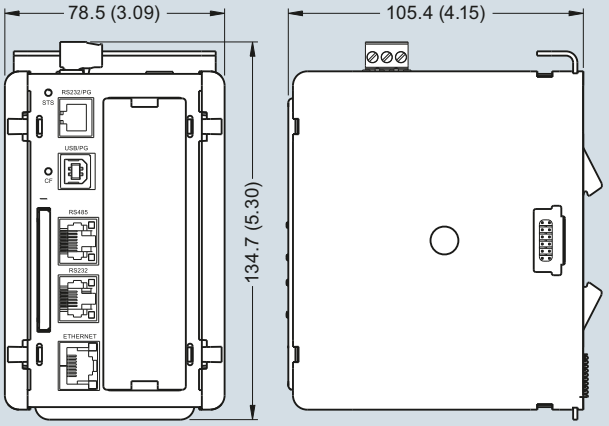
Technical specifications

Mode of operation	
Measuring principle	Remote data monitor
Measuring points	• Up to 128 standard input/ outputs • Addressing for Modbus serial devices
Input	See table on page 7/21
Output	See table on page 7/21
Accuracy	See table on page 7/21
Rated operating conditions	
Storage temperature range	-30 … +70 °C (-22 … +158 °F)
Operating temperature	0 … 50 °C (32 … 122 °F)
Operating and storage humidity	80 % max relative humidity, non-condensing, from 0 … 50 °C (32 … 122 °F)
Design	
Material (enclosure)	High impact plastic and stainless steel
Installation category	I
Pollution degree	2
Weight	456.4 g (15.1 oz)
Mounting	Snaps onto standard DIN style top hat (T) profile mounting rails according to EN 50022 – 35 x 7.5 and – 35 x 15
Power	24 V DC ± 10 % 400 mA min. (1 module) 3.5 Amps max. (16 modules) Must use Class 2 or SELV-rated power supply
Display	
Status LEDs	• STS - status LED indicates condition of master • TX/RX - transmit/receive LEDs show serial activity • Ethernet - link and activity LEDs • CF - CompactFlash LED indicates card status and read/write activity
Memory	
On-board user memory	4 Mbytes of non-volatile Flash memory
On-board SDRAM	2 Mbytes
Memory card	CompactFlash Type II slot for Type I and Type II cards; 1 Gbytes (optional 2 Gbytes)
Certificates and approvals	
Safety	• UL listed to U.S. and Canadian safety standards for use in Class I, II and III, Division 1 and 2 hazardous locations • CE, RCM

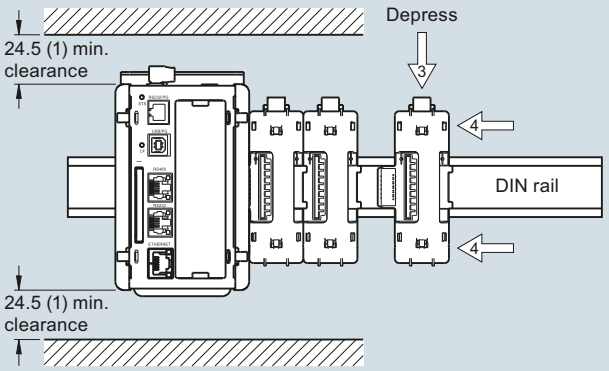
Communication	
USB/PG port	Adheres to USB specifications 1.1. Device only using Type B connection.
Serial ports	Format and baud rates for each port are individually software programmable up to 115 200 baud
RS 232/PG port	RS 232 port via RJ12
Comms ports	RS 422/485 port via RJ45 and RS 232 port via RJ 12
Ethernet port	10 BASE-T/100 BASE-TX; RJ45 jack is wired as a NIC (Network Interface Card)

Dimensional drawings

Dimensions



Mounting



SITRANS RD500, dimensions in mm (inch)

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SITRANS RD500 Module Specifications

	8 inputs, 6 solid state outputs	8 inputs, 6 relay outputs	8 channel, 4 … 20 mA	8 channel ± 10 V	6 channel, RTD	8 channel thermo-couple module
Article number	**7ML1930-1ES**	**7ML1930-1ER**	**7ML1930-1EP**	**7ML1930-1EQ**	**7ML1930-1ET**	**7ML1930-1EU**
Application	8 inputs, 6 outputs used to monitor contact or sensor inputs	8 inputs, 6 outputs used to monitor contact or sensor inputs	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts 0/4 … 20 mA process signals	16 bit analog input module provides high density signal measurement for data monitoring applications and accepts ± 10 V process signals	16 bit analog input module provides high-density signal measurement for data acquisition applications and accepts various RTD inputs	16 bit thermocouple input module provides high density signal measurement for data acquisition applications and accepts wide range of thermocouple types
Accuracy	Not applicable	Not applicable	± 0.1 % of span	± 0.1 % of span	± (0.2 % of span, 1 °C) 0 … 50 °C (32 … 122 °F); ± (0.1 % of span, 1 °C) 18 … 28 °C (64 … 82 °F); includes NIST conformity, A/D conversion errors, temperature coefficient and linearization conformity at 23 °C after 20 minutes warm-up	± (0.3 % of span, 1 °C); includes NIST conformity, cold junction effect, A/D conversion errors, temperature coefficient and linearization conformity at 23 °C after 20 minute warm-up
Mounting	Snaps onto standard DIN style top hat (T) profile mounting rails according to EN 50022 – 35 x 7.5 and - 35 x 15					
Inputs	Dip switch selectable for sink or source	Dip switch selectable for sink or source Max. voltage • 30 V DC, reverse polarity protected Off voltage • < 1.2 V On voltage • > 3.8 V Input frequency • Filter switch on: 50 Hz • Filter switch off: 300 Hz	8 single-ended Ranges • 0 … 20 mA or 4 … 20 mA Resolution • full 16-bit Sample time • 50 … 400 ms depending on number of enabled inputs	8 single-ended Ranges • 0 … 10 V DC or ± 10 V DC Resolution • full 16-bit Sample time • 50 … 400 ms depending on number of enabled inputs	6 single-ended Resolution • full 16-bit Sample time • 67 … 400 ms depending on number of enabled inputs	8 single-ended Resolution • full 16-bit Sample time • 50 … 400 ms depending on number of enabled inputs
Outputs	Solid state output, switched DC, contact rating 1 A DC max.	Form A, NO pairs share common terminals: 1 & 2, 3 & 4, 5 & 6 current rating by pair: 3 Amps at 30 V DC/125 V AC resistive 1/10 HP at 125 V AC	Not applicable	Not applicable	Not applicable	Not applicable

Note:

To ensure the secure operation of a plant or machine it is necessary to take additional, suitable preventive action (e.g. cell protection concept) and to integrate the automation and drive components into a state-of-the-art holistic industrial security concept for the entire plant or machine. Please find further information at: http://www.siemens.com/industrialsecurity

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SITRANS RD500

Selection and Ordering data		Article No.
SITRANS RD500	↗	**7ML5750-**
The SITRANS RD500 is a remote data manager providing integrated web access, alarm event handling and data capture for instrumentation.		**A 0 0 - 0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Communications Connection		
Ethernet[1]	⬟	**1**
Digital Communications to Instruments		
RS 485 Modbus RTU	⬟	**A**

[1] Configuration limited to 16 modules.

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

Selection and Ordering data		Article No.
Input configuration modules		
Note: one RD500 supports 16 input modules maximum		
RD500 8 channel 0 (4) ... 20 mA input module	⬟	**7ML1930-1EP**
RD500 8 channel ± 10 V input module	⬟	**7ML1930-1EQ**
RD500 8 digital inputs/pulse counters, 6 relay outputs module	⬟	**7ML1930-1ER**
RD500 8 digital inputs/pulse counters, 6 solid state outputs module[1]	⬟	**7ML1930-1ES**
RD500 6 channel input, RTD module	⬟	**7ML1930-1ET**
RD500 8 channel thermocouple module	⬟	**7ML1930-1EU**
Optional equipment		
External Cellular modem		**7ML1930-1GJ**
Multitech GPRS modem, internal (including antennae)		**7ML1930-1EY**
Industrial CompactFlash card, 2 GB		**7ML1930-1FB**
Industrial CompactFlash card, 1 GB		**7ML1930-1FC**
RJ11 serial to terminal block RS 232		**7ML1930-1FD**
RJ45 serial to terminal block RS 485		**7ML1930-1FE**
GPRS Spare modem antenna		**7ML1930-1FF**
RD500 Spare Module base		**7ML1930-1FG**
RD500 Spare End terminator		**7ML1930-1FH**
Ethernet Cat 5e Red X/O cable for configuration, 1.52 m (5 ft)		**7ML1930-1FM**
USB cable type A/B		**7ML1930-1FN**
Remote mount external antenna 17 ft (5 m)		**7ML1930-1FY**
Operating Instructions		
Application manual, English		**7ML1998-5MA01**
Application manual, German		**7ML1998-5MA31**
Note: Additional Operating Instructions should be ordered as a separate line item. This device is shipped with the Siemens Milltronics manual DVD containing Quick Starts and Operating Instructions.		

Selection and Ordering data	Article No.
Other Operating Instructions	
RD500 Remote Data Manager manual, English: web access, alarm event handling, and data capture	**7ML1998-5MK01**
RD500 Remote Data Manager manual, German: web access, alarm event handling, and data capture	**7ML1998-5MK31**
RD500 8 channel 0 (4) ... 20 mA input module manual, English	**7ML1998-5MB01**
RD500 8 channel 0 (4) ... 20 mA input module manual, German	**7ML1998-5MB31**
RD500 8 channel ± 10 V input module manual, English	**7ML1998-5MC01**
RD500 8 channel ± 10 V input module manual, German	**7ML1998-5MC31**
RD500 8 inputs, 6 relay outputs module manual, English	**7ML1998-5MD01**
RD500 8 inputs, 6 relay outputs module manual, German	**7ML1998-5MD31**
RD500 8 inputs, 6 solid state outputs module manual, English	**7ML1998-5ME01**
RD500 8 inputs, 6 solid state outputs module manual, German	**7ML1998-5ME31**
RD500 6 channel input, RTD module manual, English	**7ML1998-5MF01**
RD500 6 channel input, RTD module manual, German	**7ML1998-5MF31**
RD500 8 channel thermocouple module manual, English	**7ML1998-5MJ01**
RD500 8 channel thermocouple module manual, German	**7ML1998-5MJ31**
Accessories	
SITRANS RD100, loop powered display - see page 7/10	**7ML5741-...**
SITRANS RD200, universal input display with Modbus conversion - see page 7/12	**7ML5740-...**
SITRANS RD300, dual line display with totalizer and linearization curve and Modbus conversion - see page 7/16	**7ML5744-...**

[1] Configuration limited to 16 modules

⬟ We can offer shorter delivery times for configurations designated with the Quick Ship Symbol ⬟. For details see page 9/5 in the appendix.

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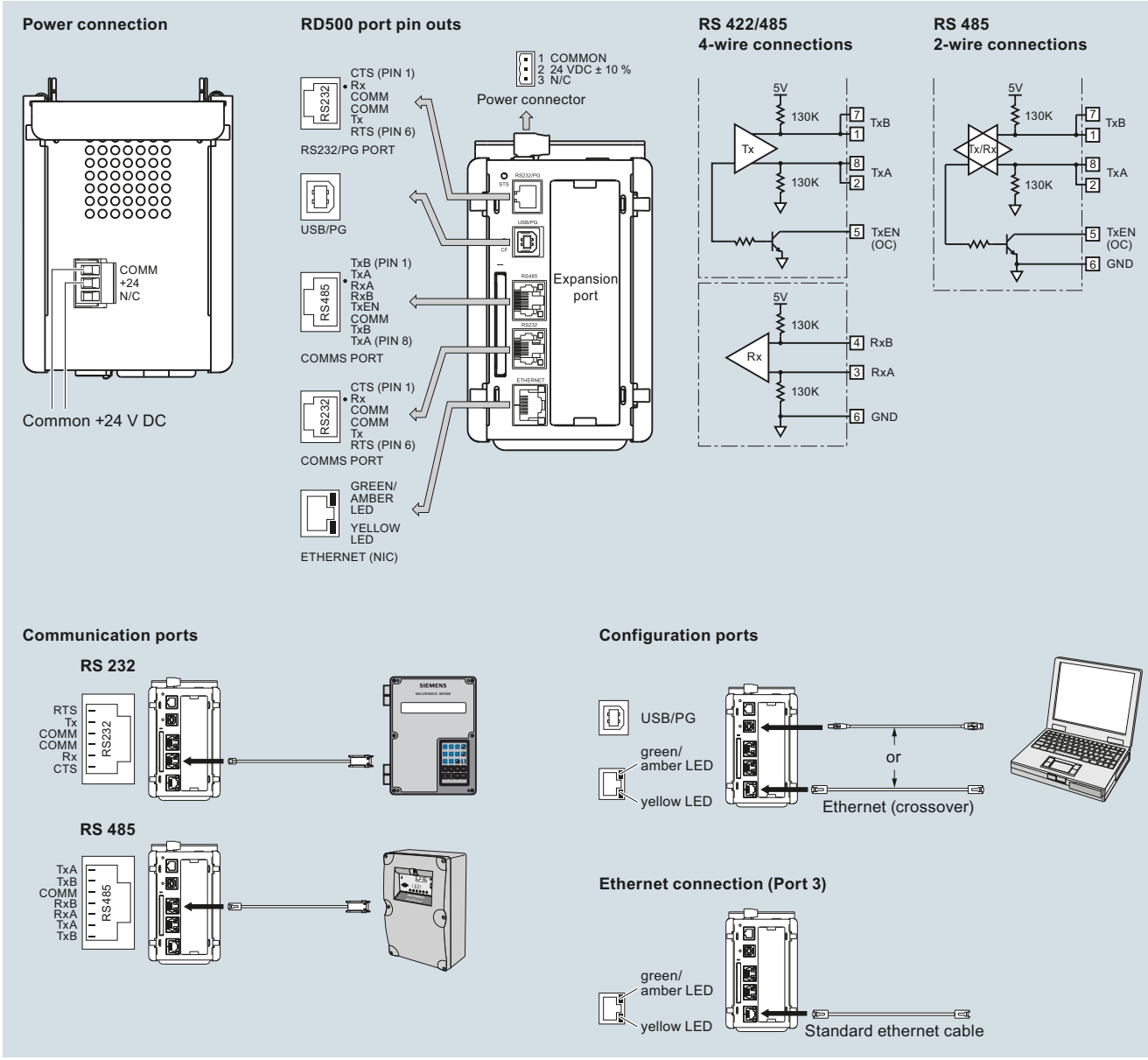
Schematics



SITRANS RD500 connections

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SITRANS AW200 - WirelessHART adapter

Overview

SITRANS AW200 WirelessHART adapter

The SITRANS AW200 WirelessHART adapter is a battery-powered communication component, which integrates HART and 4 to 20 mA field devices into a WirelessHART network. On the wireless communication side, the adapter supports the WirelessHART standard. HART and 4 to 20 mA field devices are connected on the field device side.

The SITRANS AW200 WirelessHART adapter

- Support the WirelessHART standard (HART V 7.1)
- Fatures a very high degree of security for wireless data transmission
- Integrates one 4 to 20 mA field device or up to four HART field devices (in multidrop mode) into a WirelessHART network
- Features intelligent energy management for the power supply of connected field devices
- Can be easily parameterized using SIMATIC PDM

Benefits

- High quality and service life
- Save on wiring costs for difficult installation conditions (e.g. moveable equipment parts) or for temporary installations
- Subsequent integration of an installed field device with HART interface into maintenance and diagnostic systems if the control system does not feature the required communication mechanisms. This application is described in Section 8 of this catalogue under "WirelessHART - Technical Description".
- Proven HART devices can continue to be used for wireless communication, without any limitations .
- Field devices with a 4 to 20 mA interface (without HART) can also be connected.
- Intelligent energy management to achieve the best possible life time for the installed battery unit.
- Optimum addition to wired communication and expansion of solution options for system solutions in process automation.
- Burst mode and event notification parameterization for the adapter and connected field devices.

Application

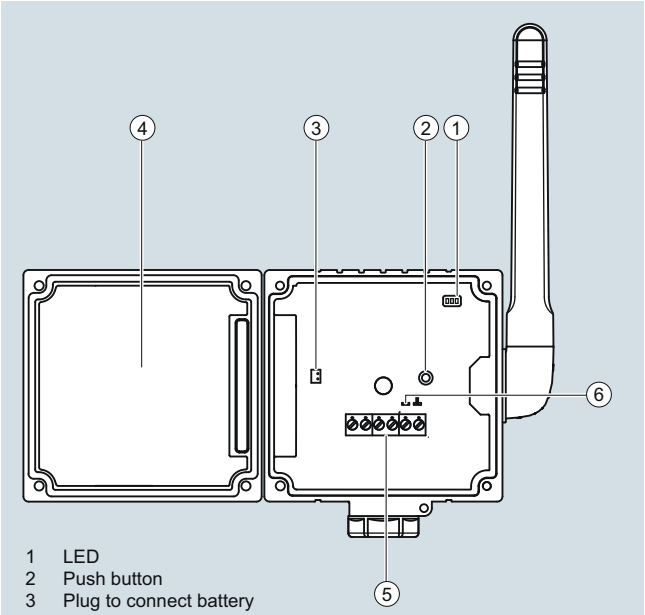
The WirelessHART adapter can be used in a number of different applications, e.g.

- Access to installed basis
  Diagnostic information is obtained from existing wired HART devices through a permanent electrical connection of a WirelessHART adapter, and is sent to an asset management software near the system, e.g. SITRANS MDS.
- Status monitoring of the plant
  Wireless devices are mounted at critical points in the plant, which are not usually connected to the control room due to difficult accessibility or extensive costs for wiring. Better data flow and diagnostics increase the system's reliability, transparency and safety.
- Process optimization
  A temporary installation of a standard 4 to 20mA or HART device together with the WirelessHART adapter SITRANS AW200 allows flexible monitoring and plant optimization at lower costs and reduced effort.
- Process monitoring
  Measured values from e.g. tanks or silos are transmitted to a superordinate system in regular time intervals, together with the device and battery status.

Design

The SITRANS AW200 WirelessHART adapter consists of

- A housing with mounted antenna
- Electronics
- A high-performance lithium battery unit



SITRANS AW200 WirelessHART adapter, assembly

The housing can be opened by loosening 4 screws. This allows to access the electronics and battery unit. The battery unit can be removed without the use of tools, since it is connected to the housing with clips.

The back of the housing features a connection part with a fixing nut onto which different replaceable connecting pieces can be screwed to mount the adapter directly on a field device.

The bottom of the housing contains an optional cable opening which can be used for a cable gland. In the case of an offset mounted adapter, it is possible to feed up to 2 cables.

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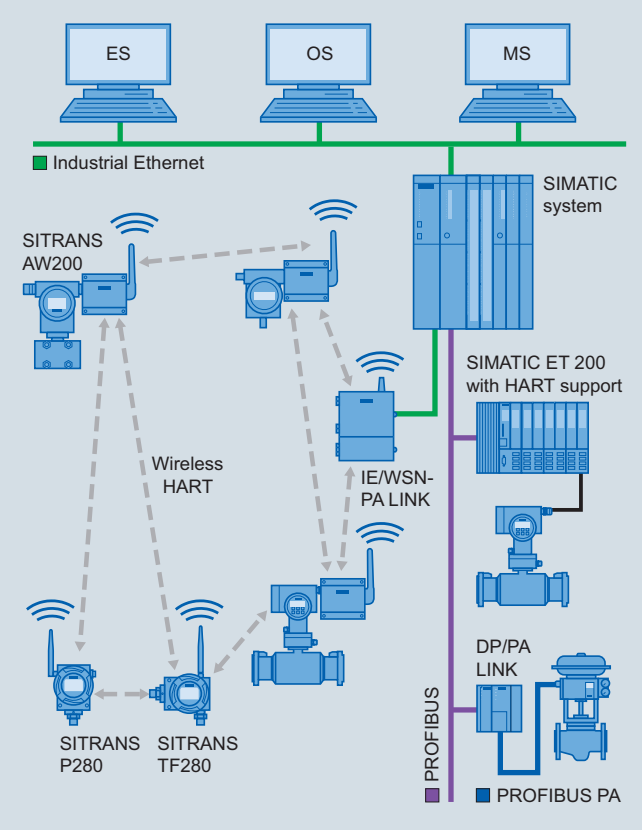
Function



SITRANS AW200 WirelessHART adapter functional diagram

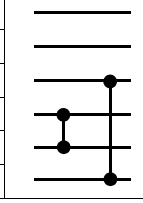
Measured values and diagnostic information of connected field devices with HART communication are transmitted via a wired connection to the WirelessHART adapter. The adapter transmits this information in the form of wireless signals to the IE/WSN-PA LINK, the Siemens WirelessHART gateway. From here, the information is available to the network of the system.

Where a field device with a 4 to 20 mA output signal is connected to the adapter, only the measured value will be transmitted.

Following parameterization and integration into a WirelessHART network, each WirelessHART adapter is able to recognize its neighbors. It notes the strength of the wireless signal, synchronizes itself, receives network information and then establishes connections to the neighbors in the wireless network. A WirelessHART network organizes itself. Manual settings for organizational purposes are not required.

Two- and four-wire field devices can be connected to a WirelessHART adapter. In the case of a connected two-wire field device, power can be supplied by the adapter. Where multiple two-wire field devices are connected (multi drop operation), the adapter must be connected to an external power supply.

The WirelessHART adapter may also be connected in parallel to an already existing installation which consists of a power supply and a HART field device.

Interface	Connection	Function
1		Power supply for the field device
2		HART/4 ... 20 mA
3		External supply/Dimensions
4		High-resistance HART connection
5, 7		High-resistance HART connection
6, 8		Mass, high-resistance connection

Terminal block with 6 screw connection clamps

Parameterization

The SITRANS AW200 configured via HART. This can be done using a handheld communicator or even more conveniently with a HART modem and the SIMATIC PDM parameterization software.

Initial start-up of the adapter is usually carried out via SIMATIC PDM and HART modem or a handheld communicator. During initial start-up, the network ID and join key is set up in the adapter, among others. Using these parameters, the adapter is then integrated into an existing WirelessHART network.

Once it is integrated into the network, the adapter and connected HART devices can be conveniently operated via the WirelessHART network or with the onsite HART modem.

Siemens HART field devices for the adapter

HART and 4 to 20mA field devices can be connected to the SITRANS AW200 WirelessHART adapter. Depending on the electrical data of the field devices, they can receive their power supply from the WirelessHART adapter or will require an external power supply. Please find current information about connectivity to field devices from Siemens as FAQ under http://www.siemens.com/automation/service&support.

Note:

Siemens will only approve the Siemens HART field devices listed there for the adapter, and will only supply technical support for these devices.

Based on HART specifications, it is generally possible to connect devices that are not listed, however with the following limitations:

- All warranties and liabilities will be excluded.
- No technical support

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Technical specifications

Input	
Input	Point-to-Point connection to a HART field device or Point-to-Point connection to a 4 ... 20 mA field device or Up to four HART field devices with external power supply which are integrated using the multidrop method
Communication	HART communication using multi-drop method, 4 ... 20 mA power signal with Point-to-Point connection
Protocol	HART V7 (compatible with previous HART versions)
Transfer rate	1200 bits/s using HART multi-drop method
Output	
Communication	WirelessHART V7
Transfer rate	Nominal 250 kBits/s
Transmission frequency band	2.4 GHz (ISM band)
Range (under reference conditions)	Outside areas up to 250 m, within buildings up to 50 m
RF signal strength	Can be configured: 0 dBm and 10 dBm
Output signals	
• WirelessHART adapter	Measured voltage and up to three other variables may be selected from the following: adapter temperature, battery voltage, energy consumed, expected battery life time
• 4 ... 20 mA field device	Scaled or linearized process values
• HART field device	Up to four process variables, can be configured via PDM or gateway
Measuring accuracy (as per reference conditions IEC 61298-2)	
Max. measuring error (4 ... 20 mA circuit)	0.125 % re: measuring range
Effect of ambient temperature (4 ... 20 mA circuit)	5 µA/10 K
Rated conditions	
Location	Outside/Inside
Ambient conditions	
• Ambient temperature	-40 ... +80 °C (-40 ... +176 °F) The capacity of the battery decreases rapidly if ambient temperature falls below -30 °C.
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F) without batteries < 21 °C with batteries
• Relative humidity	Max 90 % at 25 °C (non-condensating)
• Resistance to vibration	20 ≤ f ≤ 2000 Hz: 0,01 g^2/Hz as per IEC 68-2-64
• Shock resistance	15 g, 11 ms as per IEC 68-2-27
Electromagnetic compatibility	As per EN 61326, EN 301 489-1/17 and NAMUR NE 21

Design	
Weight	0.5 kg without battery, 0.75 kg with battery
Enclosure	
• Material	Polyester (PBT FR)
• Cable entry	2x M20x1.5
Degree of protection	IP65, IP66; NEMA 4
Antenna	Omnidirectional dipolar aerial, vertical rotation
Mounting adapter	M20 x 1.5 on M20 x 1.5, M20 x 1.5 on G½, M20 x 1.5 on ½"- 14 NPT, M20 x 1.5 on ¾" -14 NPT
Power supply	
Battery	Lithium thionylchlorid high-performance battery unit
Supply voltage	5 ... 7.2 V DC
Capacity	19 Ah at 20 °C
Service life	Up to 5 years, depending on update rate, connected field device and ambient conditions
Voltage supply for one field device (independent of multidrop)	
• No-load voltage	8 ... 23 V DC
• Current	4 ... 20 mA DC (as per NAMUR recommendation NE 43)
• Fault current	I ≤ 3.6 mA or I ≥ 21 mA
• Protection	Short-circuit proof, activated at voltages > 25 mA
External voltage supply for one or more field devices (multidrop)	
• Voltage	< 30 V DC
• Current	< 25 mA
Certificates and approvals	
Wireless communication approvals	ETSI (R&TTE) FCC Part 15.247 for wireless applications in the 2.4 GHz transmission frequency band EN 300328

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Selection and ordering data	Article No.
SITRANS AW200 adapter for WirelessHART communication ↗	**7MP3112-** ■■■■ **0 - 0AA0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
WirelessHART adapter AW200 with 4 ... 20 mA- or HART interface Without battery	**1**
Power supply Battery powered	**A**
Certificates and approvals[1] Without	**A**
Enclosure Polyester	**0**
Accessories	
Lithium battery for SITRANS AW200	**7MP3990-0AA00**
Thread adapter for direct mounting of the adapter to a field device	
• M20 thread adapter	**7MP3990-0BA00**
• Thread adapter G½	**7MP3990-0BB00**
• Thread adapter ½" - 14 NPT	**7MP3990-0BC00**
• Thread adapter ¾" - 14 NPT	**7MP3990-0BD00**
Mounting bracket for attaching to wall/pipe, material: stainless steel SS304, including cable gland	**7MP3990-0CA00**

[1] Additional approvals in process.

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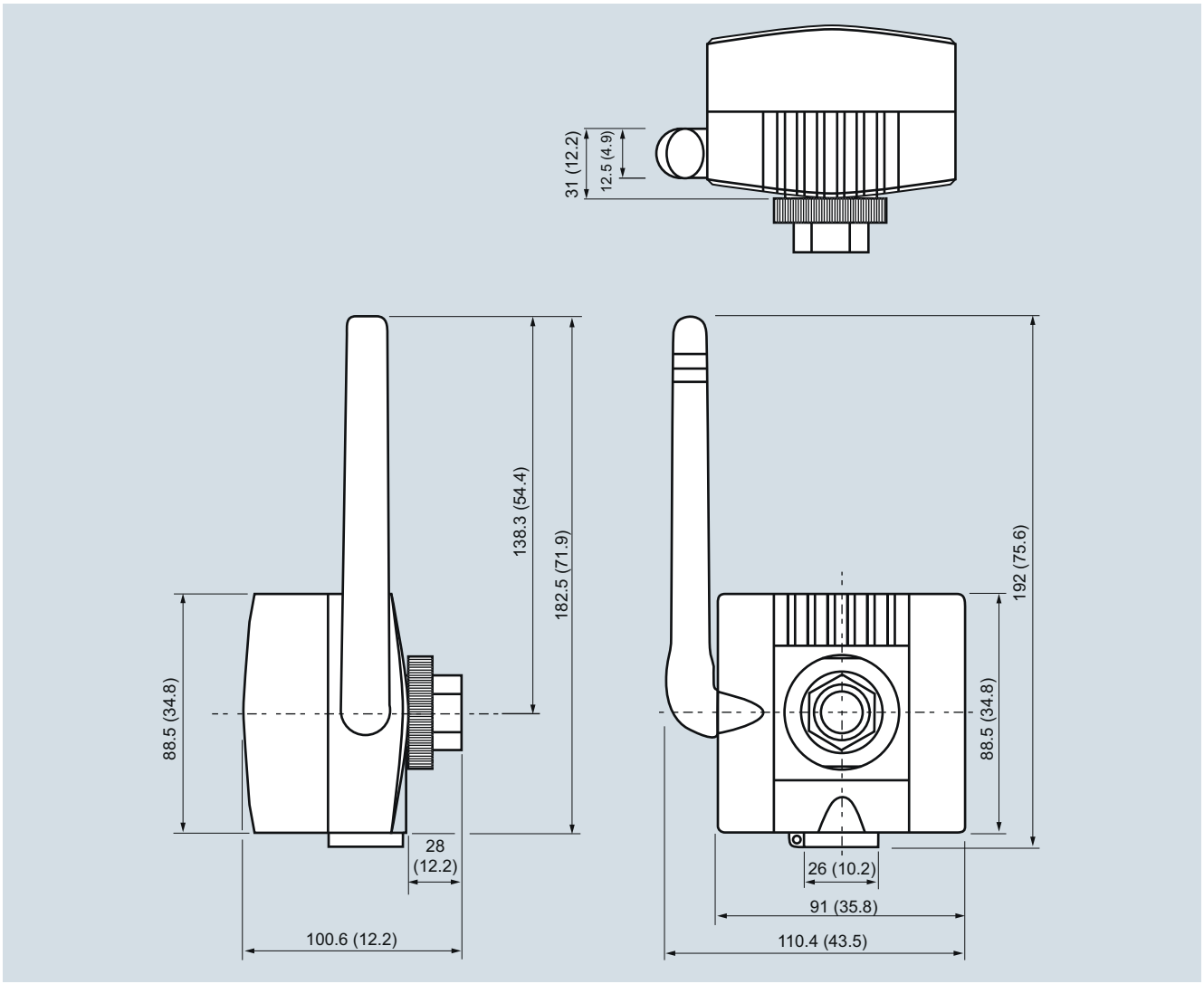
Dimensional drawings



SITRANS AW200 WirelessHART adapter, dimensions in mm (inch)

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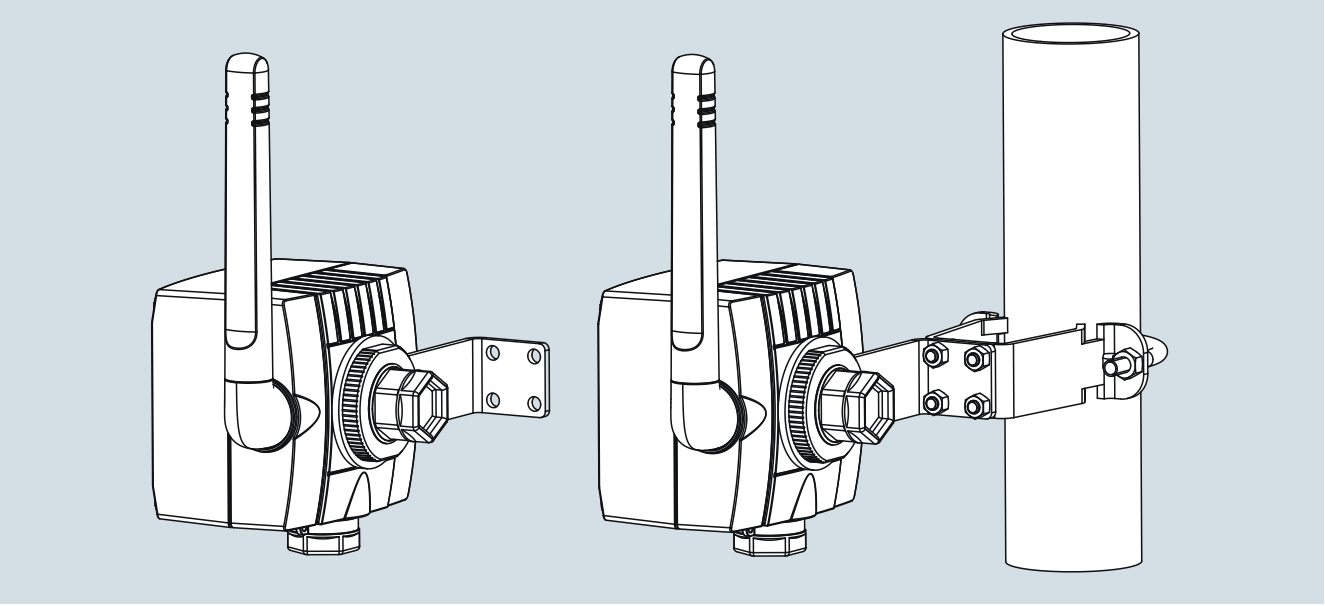
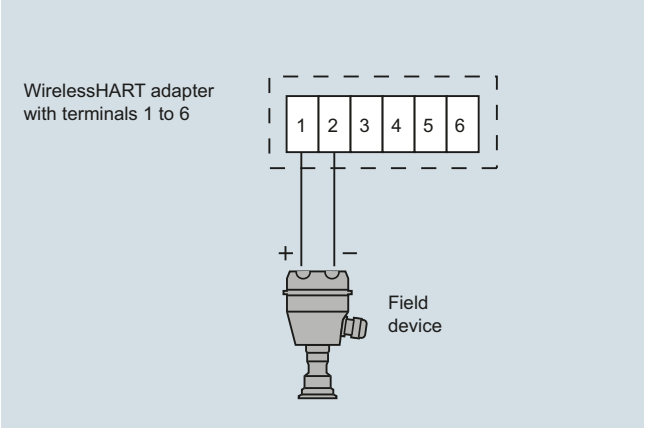
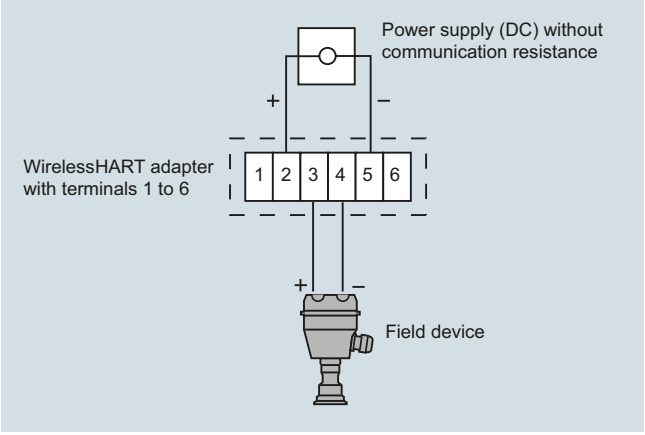


SITRANS AW200 with built-in mounting bracket for wall or pipe mounting

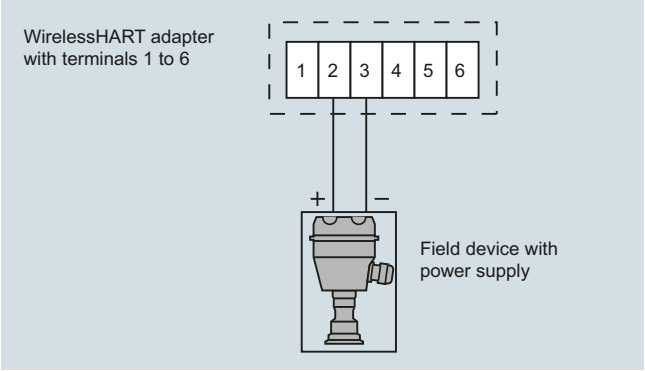
Schematics



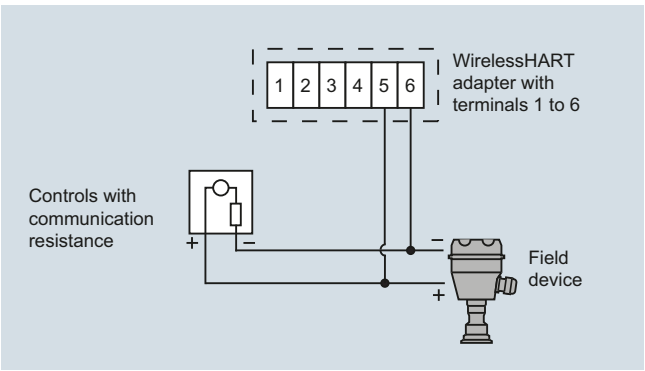
Connection of a two-wire field device, power supply provided by adapter



Connection of a two-wire field device with external power supply



Connection of a four-wire field device



Connection of adapter parallel to wired 4 to 20 mA communication

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SITRANS AW210 - WirelessHART adapter

Overview

SITRANS AW210 WirelessHART adapter

The WirelessHART adapter SITRANS AW210 is a communication component which can integrate a wide range of field devices into a WirelessHART network. On the wireless communication side, the adapter supports the WirelessHART standard. HART and 4 to 20 mA field devices are connected on the field device side.

The WirelessHART adapter SITRANS AW210

- Supports the WirelessHART standard (HART V 7.1)
- Features an extremely high degree of security for wireless data transmission.
- Integrates a 4 to 20 mA field device into a WirelessHART network
- Integrates up to eight HART field devices (in multidrop mode) into a WirelessHART network
- Can be powered with the 4 to 20 mA loop or an external power supply
- Power management can be activated to minimize energy consumption
- Easy to configure with SIMATIC PDM, AMS, Handheld 475.

Benefits

- "Intrinsically safe" or "Explosion proof"
- High quality and service life
- Extremely rugged enclosure
- No additional cabling required with loop power supply
- Subsequent integration of an installed field device with HART interface into maintenance and diagnostic systems if the control system does not feature the required communication mechanisms
- Proven HART devices can continue to be used for wireless communication without any limitations
- Field devices with a 4 to 20 mA interface (without HART) can also be connected
- Ideal addition to wired communication and to the range of system solutions in process automation
- Burst mode and event notification configuration for the adapter and connected field devices

Application

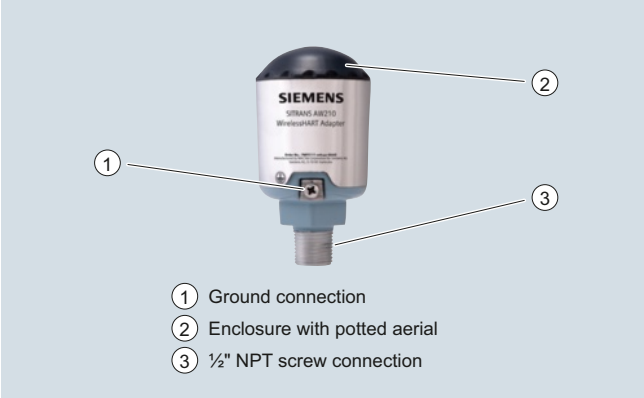
The WirelessHART adapter can be used in a number of different applications:

- Access to installed basis
  Diagnostic information is obtained from existing wired HART devices thanks to the permanent electrical connection of a WirelessHART adapter and power from the 4 to 20 mA loop. This information is sent to central system-based asset management software such as SITRANS MDS.
- Status monitoring of the plant
  Wireless devices are mounted at critical points in the plant which are not usually connected to the control room due to difficult access or high wiring costs. Better data flow and diagnostics increase plant reliability, transparency and safety.
- Process optimization
  Temporary installation of a 4 to 20mA or standard HART device together with a SITRANS AW210 WirelessHART adapter allows easier, flexible monitoring and plant optimization at lower costs. SITRANS AW210 can also be usefully used where there is already an external power supply, or one is needed anyway.
- Process monitoring
  Measured values, for example from tanks or silos, are transmitted to a higher-level system at regular intervals together with the device status. SITRANS AW210 is particularly easy to use with 4-wire devices, as they have an external power supply.

Design

SITRANS AW210 WirelessHART Adapter consists of:

- An enclosure with a fitted aerial
- Electronics



SITRANS AW210 Wireless-HART Adapter, assembly

The enclosure contains the potted electronics and the wireless module. The aerial is fitted at the top in the enclosure.

On the base of the enclosure is the connector with a ½" NPT female thread. Six cables run from this connector to connect the adapter.

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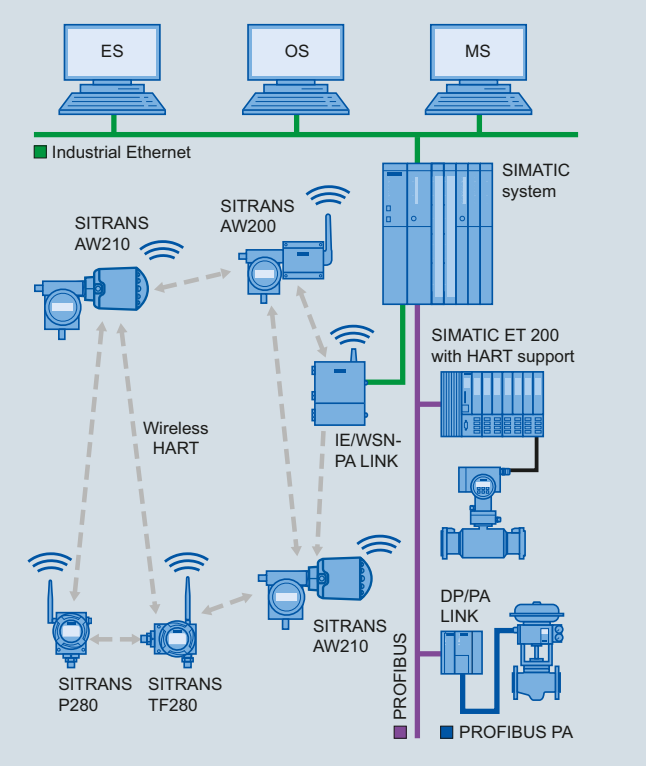
Function



SITRANS AW210 WirelessHART Adapter, functional diagram

The measured values and diagnostic information from the connected field devices with HART communication are transmitted to the WirelessHART adapter over wired connections. The adapter transmits this information as wireless signals to the IE/WSN-PA link, the Siemens WirelessHART gateway. The measured values, all parameters and diagnostic information about the plant network can be accessed from this gateway.

If a field device with a 4 to 20 mA output signal is connected to the adapter, the current will be converted to a digital measured value and transmitted on the basis of a measuring range specified in SITRANS AW210.

Following configuration and integration into a WirelessHART network, each WirelessHART adapter is able to recognize its neighbors. It notes the strength of the wireless signal, synchronizes itself, receives network information and then establishes connections to its neighbors in the wireless network. A WirelessHART network organizes itself. Manual settings for organization are not required.

Two-wire and four-wire field devices can be connected to a WirelessHART adapter. Either up to 2 or up to 8 HART field devices can be connected to the adapter, depending on the selected product version. The adapter either has an external voltage supply or is loop-powered. The WirelessHART adapter can therefore also be connected in parallel to an existing installation consisting of a voltage supply and a HART field device.

Parameter assignment

SITRANS AW210 is configured via HART. Configuration can be carried out using handheld communicator 475 or, more conveniently, with a HART modem and the SIMATIC PDM configuration software.

Initial startup of the adapter is usually carried out via SIMATIC PDM and a HART modem or a handheld communicator. During initial startup, the network ID and join key are set in the adapter. These parameters are used to integrate the adapter into an existing WirelessHART network.

Following integration into the network, the adapter and HART devices connected can be conveniently operated via the WirelessHART network or locally, as detailed above.

Siemens HART field devices for the adapter

In principle, all HART devices certified by the HART Communication Foundation (HCF) can be operated with the SITRANS AW210 WirelessHART adapter. See http://www.siemens.com/automation/service&support for FAQ with the latest information on connectivity for Siemens field devices.

Note:

Siemens has only approved the Siemens HART field devices listed there for the adapter, and will only provide technical support for these devices.

Based on HART specifications, it is generally possible to connect devices that are not listed, however with the following restrictions:

- All warranties and liability will be excluded
- No technical support

Technical specifications

Input	
	Point-to-point connection to a HART field device or Point-to-point connection to a 4 ... 20 mA field device or Up to eight HART field devices with an external voltage supply integrated using multidrop
Communication	• HART communication with multidrop, as primary or secondary HART master (can be specified) • 4 ... 20 mA current signal with a point-to-point connection scaling in user-defined measuring range in SITRANS AW210 - Linear - User-defined scaling with up to 32 points
Protocol	HART V7 (compatible with previous HART versions)

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SITRANS AW210 - WirelessHART adapter

Output	
Communication	WirelessHART V7
Transmission frequency band	2.4 … 2.4835 GHz (ISM band), 16-channel frequency hopping spread spectrum
Range (under reference conditions)	Outside up to 235 m (771 ft)
RF signal strength	10 dBm
Output signals	
• WirelessHART adapter	• HART Cmd 3 Measured current and up to 4 other dynamic variables (measured values, derived values) or device variables • HART Cmd 9 Up to 8 dynamic variables with status • HART Cmd 48 Additional status information
• 4 ... 20 mA field device	Scaled or linearized process values
• HART field device	• HART Cmd 3 Measured current and up to 4 other dynamic variables (measured values, derived values) or device variables • HART Cmd 9 Up to 8 dynamic variables with status • HART Cmd 48 Additional status information
Update time for output signals	You can set the update times separately for the adapter and the connected devices. The possible settings are: • 1, 2, 4, 8, 16, 32 s • 1, 2, 5, 10, 30, 60 min (times also depend on the gateway)
Measuring accuracy	
Max. measuring error (4 ... 20 mA circuit)	1 % of measuring range, 40 … 85 °C (104 … 185 °F)
Rated conditions	
Location	Outside/inside
Ambient conditions	
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) In hazardous areas up to 75 °C (167 °F)
• Storage temperature	-40 ... +85 °C (-40 ... +185 °F)
Electromagnetic compatibility	To EN 301 489-17 and EN 300 328-1
Design	
Weight	0.46 kg (1.01 lb)
Enclosure	
• Material	
- Enclosure	Aluminum alloy, RoHS-compliant polyurethane corrosion-resistant coating
- Cap	Resin
• Cable entry	½" NPT female thread
Degree of protection	IP68
Aerial	Potted in enclosure
Auxiliary power	
Power supply	Loop power 1 … DC 2.5 V, can be set by user in 0.5 V DC increments
Loop-powered, operating current	DC 3.2 … 25 mA operating current; overvoltage, surge and reverse polarity protection

Certificates and approvals	
Wireless communication approvals	• CE (R&TTE, EMC) • FCC Part 15.247 for wireless applications in the 2.4 GHz transmission frequency band • IC
Explosion protection	
Intrinsic safe "i" gases and vapors	II 1G Ex ia IIC T*; IP68 T* = T5 for Ta = -40 ... +85 °C T* = T6 for Ta = -40 ... +75 °C
Intrinsic safe dust	II 1 D Ex iaD 20 IP68 T95C; Ta = -40 ... +85 °C
Non-sparking (zone 2)	II 3 G Ex nA nC IIC T* Gc; IP68 T* = T5 for Ta = -40 ... +85 °C T* = T6 for Ta = -40 ... +75 °C
Explosion protection to FM for US Intrinsic safe, Non-sparking	IS/I,II,III/1/ABCDEFG/ T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C NI/I/2/ABCD/ T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C S/II,III/2/EFG/ T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C I/0/AEx ia/IIC/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; 20/AEx iaD/T95°C; Ta = -40 ... 85°C I/2/AEx nA nC/IIC/ T5 Ta = -40 ... +85 °C, T6 Ta = -40 ... +75 °C; IP68
Explosion protection to FM for CA Intrinsic safe, Non-sparking	IS/I,II,III/1/ABCDEFG/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; NI/I/2/ABCD/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; S/II,III/2/EFG/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; I/0/Ex ia/IIC/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C; I/2/Ex nA nC/IIC/ T5 Ta = -40 ... +85 °C T6 Ta = -40 ... +75 °C II/1/EFG Ta = -40 ... +85°C; IP68
Flameproof gases and vapors	II 2 G Ex d IIC T* Gb; IP68 T* = T5 for Ta = -40 ... +85 °C T* = T6 for Ta = -40 ... +75 °C
Protection by enclosure dust	II 2 D Ex tb IIIC T95°C Ta = -40 ... +85°C; IP68
Explosion protection to FM for US Explosionproof, flameproof, gas, dust	XP/I/1/ABCD I/1 AEx d IIC T5, T6 Gb DIP/II,III/1/EFG 21/AEx tb IIIC T95°C T5 Ta = -40 ... +85°C, T6 Ta = -40 ... +75°C Type 6P, IP68
Explosion protection to FM for CA Explosionproof, flameproof, gas, dust	XP/I/1/ABCD I/1 Ex d IIC T5, T6 Gb DIP/II,III/1/EFG T5 Ta = -40 ... +85°C, T6 Ta = -40 ... +75°C

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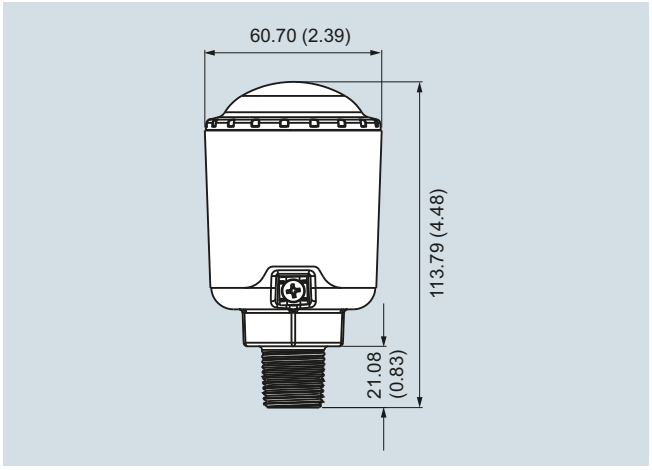
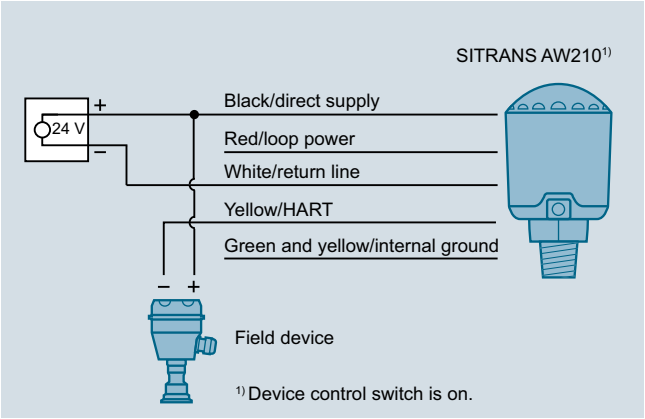
Selection and ordering data	Article No.
SITRANS AW210 Adapter for WirelessHART communication ↗	**7MP3111-** ■■■■ **0 - 0AA0**
↗ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.	
WirelessHART-Adapter AW210 with 4 ... 20 mA- or HART interface	
2 devices	1
8 devices	2
Auxiliary Power	
Loop powered or 24 V DC (external)	A
Certificates and approvals	
Intrinsically safe gas, vapors and dust (ATEX) , Intrinsic Safe (FM)	B
Explosionproof gas, vapour and dust (ATEX), Explosionproof (FM)	C
Enclosure	
Aluminum	0
Accessories	
Thread adapter M20x1.5 (male thread) on ½-14 NPT (female thread) IP65, not explosion proof	**7MP1990-0BA00**

Dimensional drawings

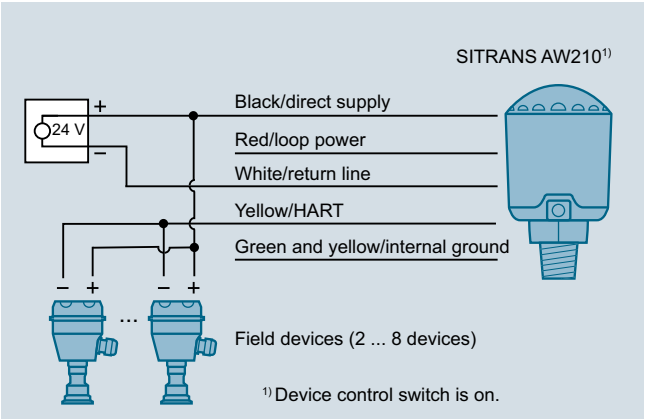


SITRANS AW210 WirelessHART adapter, dimensions in mm (inches)

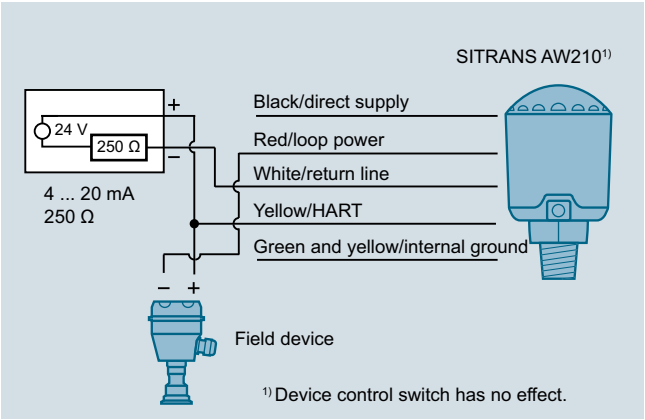
Schematics



External 24 V DC power supply, connection of one device



External 24 V DC power supply, connection of multiple devices



Loop power for connection of one 4 ... 20 mA HART device

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Overview

- The IE/WSN-PA LINK is a network transition for the connection of WirelessHART field devices (HART V7.1) to Industrial Ethernet, as an alternative or supplement to the wired connection.
- Connection of up to 100 WirelessHART devices
- Approved for operation in hazardous areas in Zone 2
- Open TCP/IP communication and Modbus TCP via the Ethernet interface
- Can be used with HART-OPC servers of the HART Communication Foundation

Note:
A general introduction to WirelessHART and information on the WirelessHART adapter and the WirelessHART field devices can be found in Catalog FI 01 or on the Internet at http://www.siemens.com/wirelesshart

Benefits

- Extended possible solutions for connecting process industry field devices by means of alternative or supplementary WirelessHART communication
- Reliable data transmission using intermeshed network technology; the self-organizing network with alternative paths enables radio obstacles to be bypassed
- Reduction of cabling costs under difficult installation conditions, e.g. if the field devices are located on inaccessible plant components or are only required temporarily
- To improve process monitoring and for maintenance tasks, sensors can be retrofitted
- Existing transmitters can be integrated wirelessly into maintenance and diagnostics systems by means of WirelessHART adapters
- Without additional software, restricted monitoring is possible via web services and the integrated web server of the IE/WSN-PA LINK.

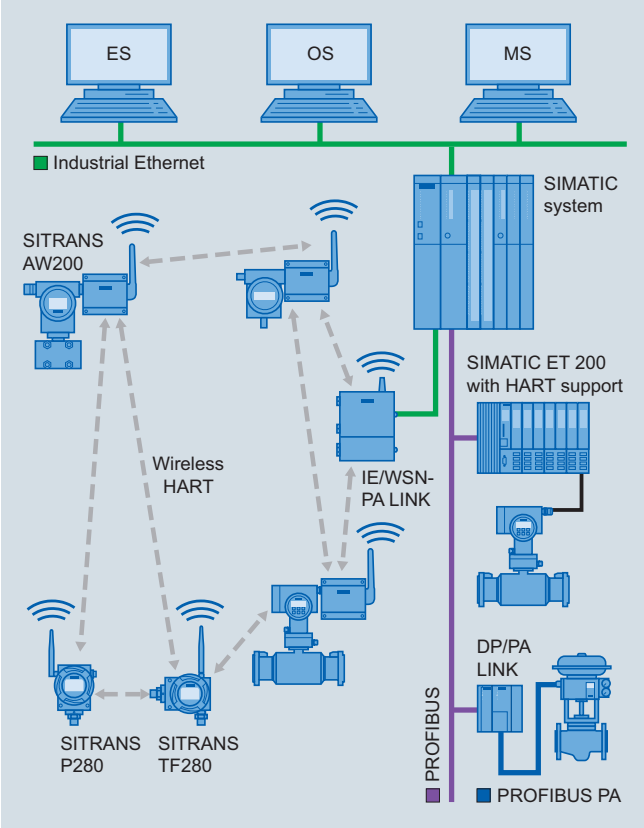
Application

The IE/WSN-PA LINK connects wireless HART field devices by radio to the Ethernet. On the radio side, the IE/WSN-PA LINK supports the WirelessHART standard and on the Ethernet side the TCP/IP and Modbus TCP communication.

The IE/WSN-PA LINK thus enables wireless diagnostics, maintenance and process monitoring.

Monitoring

WirelessHART is particularly suitable for use in plant sections that are to be included in monitoring, but which do not have any existing MSR cabling, e.g. external tank stores or other installations where high cabling costs are anticipated. Data for the visualization can be retrieved from the IE/WSN-PA link via Industrial Ethernet or Modbus TCP.



Monitoring of process states via WirelessHART

Retrofitting for diagnostics and maintenance

For this application, wireless adapters are looped into the 4-20 mA interface or screwed directly onto the HART device. The acyclic HART message frames are transmitted by radio between IE/WSN-PA LINK and a wireless adapter. Without affecting the operation of the plant, the wireless adapter modulates the acyclic HART message frames to the 4-20 mA interface or extracts them from the 4-20 mA interface.

The IE/WSN-PA LINK collects the data of all wireless adapters and transfers it via Industrial Ethernet to the diagnostics and maintenance station.

If greater distances between the IE/WSN-PA LINK and the monitoring station are to be spanned without cabling, this can be implemented by means of Industrial Wireless LAN with the access points and client modules of the SCALANCE W family.

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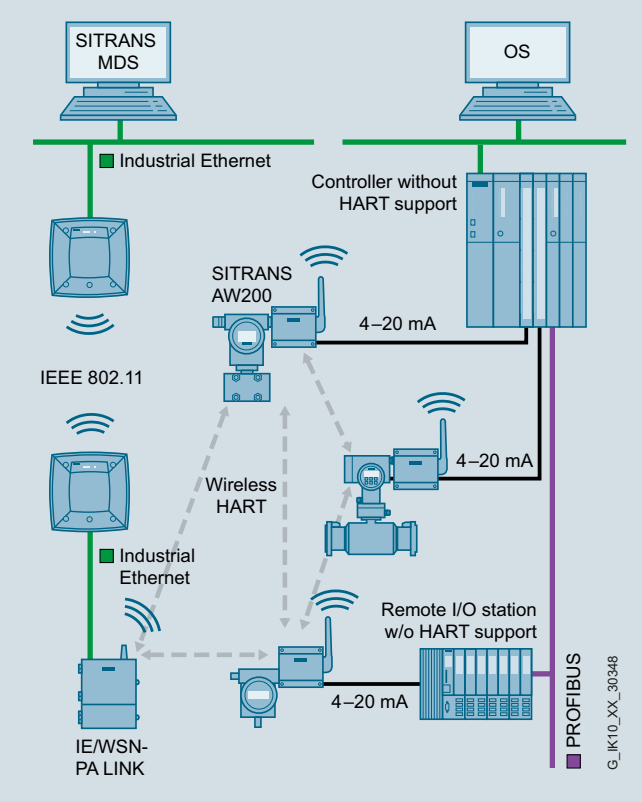


Retrofitting of plants for diagnostics and maintenance

Design

- 2 x 10/100/1 000 Mbit/s RJ45 ports, electrical (no integral switch; interfaces can be used, for example, for continuous connection to the plant network as well as the temporary connection of a PC)
- 1 x screw terminal for connection to Modbus RTU via RS 485
- 1 x screw terminal for the 24 V DC connection
- Rugged metal enclosure with IP65 protection for use outdoors, also in hazardous zone 2
- Mounting: wall or mast mounting (vertical);
  U-bolts for mast mounting are included in the scope of delivery.

Product versions

- With integral, non-detachable antenna
- Redundancy function and with N connector for connection of an external antenna

Function

WirelessHART

The IE/WSN-PA LINK establishes on the radio side an intermeshed wireless sensor network for communication with wireless field devices (e.g. transmitters). The data from the wireless field devices is received by the IE/WSN-PA LINK and transmitted via Industrial Ethernet to the connected systems. The supported wireless network is an open wireless network specified by the HART Communication Foundation (HCF) in accordance with the WirelessHART (HART V7.1) standard.

On the field device side, the IE/WSN-PA LINK requires field devices that support WirelessHART (HART). Existing field devices can be integrated by means of wireless adapters into the WirelessHART communication. To this end, the adapters are looped into the 4-20 mA interface. In addition, as many as four standard HART field devices with external power supply can be connected to the adapter in multidrop mode. Individually connected devices can be operated with the battery of the adapter.

The adapter wirelessly transmits all data and process values of the connected devices. The advantage of this solution is that tried and tested devices can continue to be used.

Industrial Ethernet

Via the Ethernet interface the IE/WSN-PA LINK supports the use of the HART OPC server and the Modbus TCP protocol.

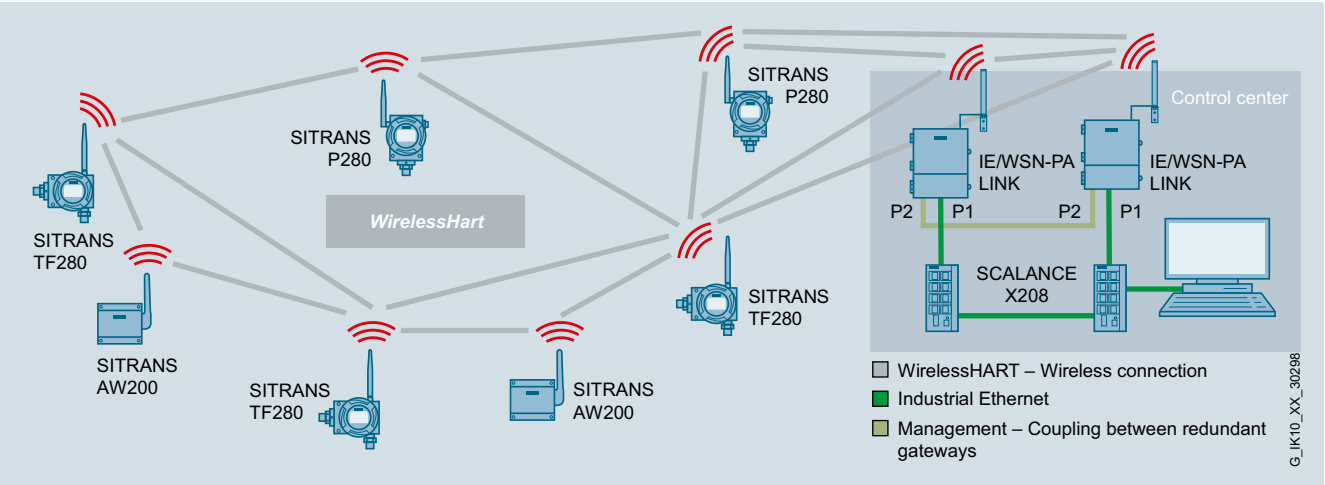
Configuration

The configuration is web-based, without additional software, and performed from the PC. By means of the web user interface it is also possible to display the device states and measured values of the WirelessHART devices.

Increased availability of WirelessHART application due to redundancy mode

For increased availability requirements, the link can be used redundantly. The redundancy function is only available for the device variant with a connection for an external antenna.

Two links are connected to the same Ethernet subnet via a switch to provide the redundancy. The two links are connected to each other via an Ethernet cable (management coupling). One of the two links is configured as the active device. It carries out the communication between the control center and the WirelessHART wireless network under normal conditions. The second link is configured identically. It is used as a standby device. In a redundancy scenario, the standby device becomes the active device.



WirelessHART network operated with a redundant gateway

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Integration

Integration into automation systems

The IE/WSN-PA LINK can be integrated into automation systems via Ethernet or Modbus TCP. Communication modules (CP 343-1 or CP 443-1) are required to connect the IE/WSN-PA LINK to SIMATIC S7-300/400. Function blocks and technical support can be found at:

www.siemens.com/simatic-net/ik-info

Integration in PCS 7

For integration of the IE/WSN-PA LINK into PCS 7 you can obtain function blocks and technical support at:

www.siemens.com/simatic-net/ik-info

Technical specifications

Article No.	**6GK1411-6CA40-0AA0**	**6GK1411-6CA40-0BA0**
Product type designation	IE/WSN-PA LINK	IE/WSN-PA LINK
Transfer rate		
• at the interface 1	10 … 100 Mbit/s	
• at the interface 2	10 … 100 Mbit/s	
• at the interface 3	9.6 to 57.6 kbit/s	
Interfaces		
Number of electrical connections		
• at interface 1 in accordance with Industrial Ethernet	1	
• at interface 2 in accordance with Industrial Ethernet	1	
• at interface 3 in accordance with RS 485	1	
• For power supply	1	
Design of electrical connection		
• at interface 1 in accordance with Industrial Ethernet	RJ 45 port	
• at interface 2 in accordance with Industrial Ethernet	RJ 45 port	
• at interface 3 in accordance with RS 485	2-pin terminal strip	
• For power supply	3-pin terminal strip	
Interfaces wireless		
Number of radio cards permanently installed	1	1
Number of internal antennas	1	0
Number of electrical connections for external antenna(s)	0	1
Design of electrical connection for external antenna(s)	-	N-Connector
Supply voltage, current consumption, power loss		
Type of power supply	DC	
Supply voltage, external	24 V	
• Minimum	20 V	
• Maximum	28 V	
Current consumed from external power supply at 24 V DC, maximum	0.5 A	
Active power loss, maximum	12 W	
Permitted ambient conditions		
Ambient temperature		
• During operating	-40 … +70 °C	
• During storage	-40 … +85 °C	
• During transport	-40 … +85 °C	
Relative humidity at 25 °C without condensation during operating phase, maximum	90 %	
Protection class IP	IP 65	
Design, dimensions and weights		
Width of the housing	229 mm	
Height of the enclosure		
• Without antenna	306 mm	
• With antenna	354 mm	
Depth of the housing	89 mm	
Net weight	4.54 kg	
Mounting type		
• Wall mounting	Yes	
• Mast mounting	Yes	
Mounting type	Material for mast mounting included in scope of delivery	

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Wireless frequencies		
Radio frequency with WirelessHART in the 2.4 GHz frequency band		
• Initial value	2.4 GHz	
• End value	2.5 GHz	
Performance data WirelessHART		
Number of WirelessHART devices which can be operated	100	
Network latency		
• For 100 field devices and WirelessHART network maximum	10 s	
• For 50 field devices and WirelessHART network maximum	5 s	
Transmission link between two devices with WirelessHART network		
• Maximum	100 m	
• Note	Values may vary in the case of radio obstacles	
Protocol is supported HART	Yes	
Product properties, functions, components general		
Protocol is supported		
• Address Resolution Protocol (ARP)	Yes	
• HTTP	Yes	
• HTTPS	Yes	
• Modbus TCP	Yes	
• Modbus TCP secure	Yes	
• Modbus RTU	Yes	
Product functions management, configuration		
Product function		
• Web-based management	Yes	
• DHCP client	Yes	
Product functions Diagnosis		
Product function		
• Web-based diagnostics	Yes	
• WirelessHART diagnostics via Modbus	Yes	
Product functions Redundancy		
Product function device redundancy	No	Yes
Product functions Security		
Product function		
• Password protection - multilevel	Yes	
• WirelessHART join key	Yes	
• ACL - MAC-based	Yes	
• WirelessHART network ID	Yes	
Protocol is supported SSL	Yes	
Principle of encryption	AES 128 bit	
Product functions Time		
Protocol is supported NTP	Yes	

Standards, specifications, approvals		
Standard for WirelessHART	HART V 7.1	
Standard for wireless communication IEEE 802.15.4	Yes	
Certificate of suitability		
• CE mark	Yes	
• Concerning CSA	CSA Division 2 & Dust Ignition-proof for Class I, Division 2, Groups A, B, C, and D. Dust Ignition-proof for Class II, Groups E, F, and G / Suitable for Class III Hazardous Locations. / Install per Siemens drawing A5E02467236A. Temperature Code: T4 (-40°C < Ta < 60°C) CSA Enclosure Type 4X	
• Concerning FM	FM Division 2, Non-Incendive for Class I, Division 2, Groups A, B, C, and D. Dust Ignition-proof for Class II, III, Division 1, Groups E, F, and G / Indoor and outdoor locations / NEMA Type 4X Temperature Code: T4 (-40°C < Ta < 60°C)	
• Concerning ATEX	ATEX type n, see note: Certificate number: Baseefa10ATEX0044X, ATEX marking: Ex II 3 G, Ex nA nL IIC T4 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V, ATEX Dust Ignition-proof: Certificate number: Baseefa10ATEX0045X, ATEX marking: II 3 D, Ex tD A22 IP66 T135 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V. Note on type n: Conditions for safe handling during installation: The device does not pass the 500 V insulation test in accordance with paragraph 6.8.1 of EN 60079-15:2005. This must be taken into account when installing the device.	
• Regarding IECEx	IECEx type n, see note: Certificate number: IECEx BAS 10.0014X, Ex nA nL IIC T4 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V, IECEx Dust Ignition-proof, see note: Certificate number: IECEx BAS 10.0015X, Ex tD A22 IP66 T135 (-40 °C <= Ta <= 60 °C), rated voltage: 28 V. Note on type n: Conditions for safe handling during installation: The device does not pass the 500 V insulation test in accordance with paragraph 6.8.1 of EN 60079-15:2005. This must be taken into account when installing the device.	
Regarding NEMA	-	-
Wireless approval	FCC and IC approval	IC approval

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Selection and Ordering data

	Article No.
IE/WSN-PA LINK Gateway between WirelessHART and Industrial Ethernet; transmission frequency: 2.4 GHz	
• With integral, non-detachable antenna	**6GK1411-6CA40-0AA0**
• N connector for connection of external antennas	**6GK1411-6CA40-0BA0**
Antennas	
Antennas with omni-directional characteristics; country permits, compact instructions (hard copy), German/English	
Wall or mast-mounting	
• **Antenna ANT792-6MN** Antenna gain including N-Connect connector 6 dBi, 2.4 GHz	**6GK5792-6MN00-0AA6**
Roof mounting	
• **ANT795-6MN antenna** Antenna gain incl. N-Connect connector 6/8 dBi, 2.4/5 GHz	**6GK5795-6MN00-0AA6**
• **Antenna mounting tool (ANT795-6MN)** Mounting tool for installation of ANT795-6MN under a roof	**6GK5795-6MN01-0AA6**
LP798-1N Lightning Protector Lightning protector with N/N female/female connector, IP65 (-40 … +100 °C)	**6GK5798-2LP00-2AA6**
Antenna cables	
IWLAN N-Connect male/male flexible connection cable Flexible connecting cable for connecting an external antenna; assembled with two N-Connect male connectors	
• 1 m	**6XV1875-5AH10**
• 2 m	**6XV1875-5AH20**
• 5 m	**6XV1875-5AH50**
• 10 m	**6XV1875-5AN10**
HF coupling N-Connect male/male connector for connecting the LP798-1N lightning protector	**6GK5798-0CP00-1AA0**
Accessories	
IE FC M12 Plug PRO M12 plug-in connector suitable for on-site assembly (D-coded, IP65/IP67), metal housing, FastConnect connection system, for connecting HARTING adapter cables to the Industrial Ethernet	
• 1 unit	**6GK1901-0DB20-6AA0**
IE FC TP Standard Cable GP 2 x 2 (Type A) 4-core, shielded TP installation cable for connection to IE FC Outlet RJ45/IE FC RJ45 Plug; PROFINET-compatible; with UL approval; sold by the meter; max. length 1000 m, minimum order quantity 20 m	**6XV1840-2AH10**
IE FC Stripping Tool Preadjusted stripping tool for fast stripping of the Industrial Ethernet FC cables	**6GK1901-1GA00**
Network components for IWLAN	see "Industrial Wireless Communication"
HARTING adapter cable [1] M12 female NPT 1/2 thread to RJ45 11cm, (minimum order quantity: 10); The adapter is provided for easy connection of the link to the Industrial Ethernet;	**21036836420** Not included in the scope of delivery of the IE/WSN-PA link; You can find ordering information on the Internet at: http://www.harting.com
SITOP compact 24 V/ 0.6 A 1-phase power supply with wide-range input 85 – 264 V AC/110 – 300 V DC, stabilized output voltage 24 V, rated output current value 0.6 A, slim design	**6EP1331-5BA00**

[1] When using the Harting adapter cable for the Ethernet connection, the requirements for intrinsic safety approval are not applicable. When used in an application relevant to intrinsic safety guidelines, it requires acceptance by the appropriate approval agency.

More information

Current approvals can be found on the Internet at:

http://support.automation.siemens.com/WW/view/en/46374734

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Communication

8/2 HART protocol
8/3 WirelessHART
8/6 PROFIBUS
8/7 FOUNDATION Fieldbus

WirelessHART Communication

8/8 Communication blocks
8/9 SITRANS MDS - Maintenance Diagnostic Station

Software

8/11 SIMATIC PDM - Process Device Manager
8/21 SITRANS DTM
8/22 SITRANS Library

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HART protocol

Overview

HART is a widely used communication standard for field devices. Specification of HART devices takes place through the HCF (HART Communication Foundation).

The HART standard expands the analog 4 to 20 mA signal for modulated, industry-proven, digital signal transmission.

Benefits

- Service-proven analog measured value transmission
- Simultaneous digital communication with bidirectional data transmission
- Possibility of transmitting several measured variables from one field device (e.g. diagnosis, maintenance and process data)
- Connection to higher-level systems such as PROFIBUS DP
- Easy installation and startup

Use in conjunction with SIMATIC PDM

- Cross-vendor operation of all HART devices by means of standardized parameter records
- HART field devices that are described by HART DD are integrated in SIMATIC PDM through the HCF catalog. HART DD (Device Description) is standardized in SIMATIC PDM, multivendor and very widely used. Other HART field devices are integrated in SIMATIC PDM through EDD (Electronic Device Description)
- Easy operation and startup of field devices, also in hard-to-reach locations
- Expanded diagnosis, evaluation and logging functions

Application

These devices can be connected in different ways:

- Using the distributed I/O system
  - SIMATIC ET 200M with the HART modules
  - SIMATIC ET 200iSP with the HART modules
  or with analog modules 4 to 20 mA and a HART handheld communicator
- Using a HART modem, with which a point-to-point connection is established between the PC or engineering station and the HART device
- Using HART multiplexers, which are contained in the HART server of the HCF

Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using HART:

Measuring instruments for pressure

SITRANS P DS III
SITRANS P300
SITRANS P500

Measuring instruments for temperature

SITRANS TF
SITRANS TH300
SITRANS TR300
SITRANS TW

Flowmeters

SITRANS F M MAG 5000
SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I / I Ex
SITRANS F M Transmag 2
SITRANS F C MASS 6000 19" / IP67 / Ex d
SITRANS F C FCT030
SITRANS FUS060
SITRANS FX300

Measuring instruments for level

Pointek CLS500
SITRANS Probe LR
SITRANS Probe LU
SITRANS LUT400
SITRANS LR200
SITRANS LR250
SITRANS LR260
SITRANS LR400
SITRANS LR460
SITRANS LR560
SITRANS LC500

Positioners

SIPART PS2

Power supply units and isolation amplifiers

SITRANS I

Selection and Ordering data

	Article No.
HART modem	
With USB connection ►	**7MF4997-1DB**

► Available ex stock

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Overview

WirelessHART is the first international industry standard for wireless communication at field level in the area of process automation. Hence this is the first time users are provided with a standard for wireless communication at field level which ensures the interoperability of instruments and components from different manufacturers.

Benefits

WirelessHART enables access to the following:

- Measuring and control values
- Parameters

of field devices with HART interface. These usually include pressure, temperature, level or flow transmitters or actuators.

WirelessHART allows for the following:

- wireless transmission of measured values and their status
- wireless parameterization and diagnosis of field devices

The WirelessHART adapter can be used to enable field devices with HART interfaces (that are designed for wired communication) for wireless communication. This allows users to continue using their proven devices while benefiting from and participate in addition in advantages offered by wireless communication.

Application

Looking at the large number of possible applications and configurations, we generally differentiate between two application types.

Background for the first type is the fact that according to estimates forwarded by the HART Communication Foundation (HCF), approximately 85 % of the over 30 million HART devices in operation are used in an environment where only the 4 to 20 mA interface rather than the HART interface of the device is used on a system level. Generally, data on the device can only be read on site. This is of particular disadvantage with devices that contain self-diagnostic functions - that's what we call "stranded diagnosis".

In these cases, a WirelessHART adapter can offer assistance. Connected to the 4 to 20 mA loop, it allows central access to the device based on wireless communication. It does not affect process control systems which continue to receive the measured value using the 4 to 20 mA loop.

Central access is enabled through a diagnostic station with SIMATIC PDM and SITRANS MDS software.

Main advantages:

- Increases the availability of the plant
- Increases plant transparency
- Reduces costs due to employing a predictive rather than preventative maintenance concept
- Reduces travel time in larger systems based on central access to field instrumentation

In the second application the 4 to 20 mA loop is omitted, all data including measured process values and diagnostic information are transmitted wirelessly to a process control system, for example.

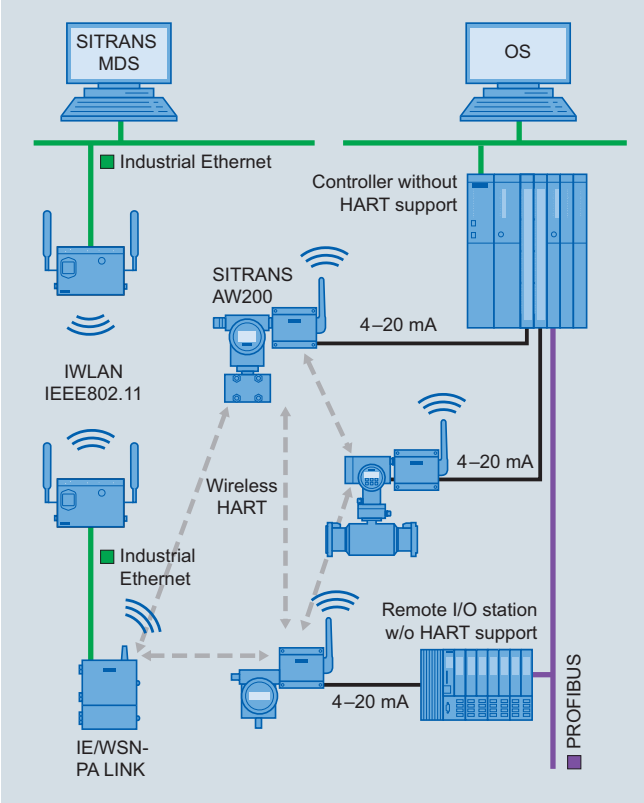
Main advantages are:

- No planning and installation of data cables, resulting in significant cost reductions
- Higher system transparency due to additional and hitherto unfeasible installation of measuring points
- Process optimization due to flexible, temporary and cost-effective measuring points via wireless communication
- Utilization of proven devices by using adapters
- The WirelessHART meshed network also makes it possible to bridge longer distances

Design

This section introduces the application types described in the previous section in greater detail.

The figure below shows a typical situation for the first application type.



The adapter is connected to the 4 to 20 mA loop, which is used to transmit the measured value to the control system, or transmit the setpoint to an actuator. The existing control system is not affected by the WirelessHART adapter.

The data, in particular diagnostic data from the devices is transmitted to the IE/WSN-PA LINK via the connected adapter and the WirelessHART network. The link provides this data to a diagnostic and maintenance station with installed SITRANS MDS software and SIMATIC PDM via an industrial Ethernet. Industrial wireless LAN can be used to save on the installation costs required for Ethernet wiring. An extensive product portfolio of Scalance W components is available for this purpose.

The functionality of related to the SITRANS MDS is described in great detail on page 8/9 of this catalog.

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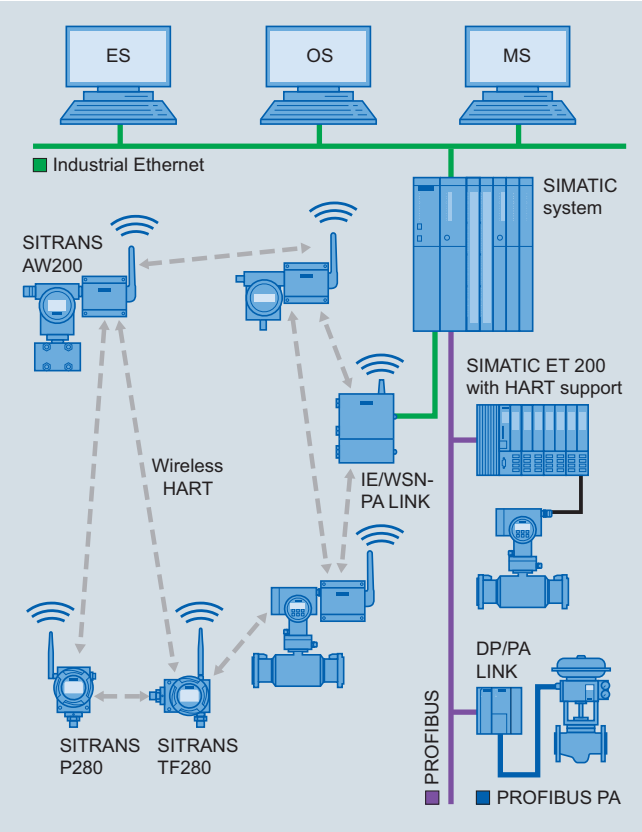
The figure below shows a typical situation for the second application type.



WirelessHART is integrated into SIMATIC systems parallel to the wire-connected devices with HART or PROFIBUS interfaces. In this case, the 4 to 20 mA line to the control system is not required: all data, i.e. process values, parameters, diagnostic information and functions, is supplied to the automation system on a wireless basis. This is mainly useful for replacement and expansion measures related to existing systems, and of course also new systems, but also for temporary and mobile measurements.

The field devices are standard instruments with connected adapters, or those with integrated wireless communication.

In principle, a differentiation needs to be made between wireless communication and the power supply for the devices.

When installing a field device, the planning and installation of the data cable to the control system is usually considered a significant cost driver. This factor is greatly reduced when using wireless communication.

When using 4 to 20 mA/HART field devices with adapters, the question of powering up always arises - in contrast to battery-powered field devices with integrated wireless modules.

It is important to distinguish between two and four-wire devices here. Under certain circumstances, the SITRANS AW200 adapter can take over the supply of a connected two-wire device. The power consumption of the field device plays an important role here. If it is too high, an additional power supply becomes necessary. If more than one device is connected to the SITRANS AW200 adapter, an additional power supply is required.

Four-wire devices always require an additional power supply.

Function

The properties of WirelessHART can be summarized as follows:

- Simplicity in handling and engineering
- Secure communication
- Availability in network

Simplicity in handling and engineering

- Utilize current tools, same workflow
  The description of devices and adapter is carried out using proven EDDL technology. SIMATIC PDM continues to be used as a tool.
- Multiple power supply options
  Devices can be operated externally with 24 V DC, external or integrated battery packs as well as solar cells. The option of using energy from the process or the environment has been researched at universities and industry for some time. It is expected that results and products will be available in the medium term.
- Reduced installation costs
  Depending on use, installation costs for data cables or power supply cables are not required.
- Coexists with other wireless networks
  WirelessHART only uses the ISM band in the 2.4 GHz area, since it is available across the globe. However, it is also used by Industrial Wireless LAN (IWLAN), for example. For this reason, a requirement to allow WirelessHART to co-exist with Wireless LAN networks was an absolute requirement when this technology was defined. This coexistence has been achieved by constantly changing the channels and hence frequencies. This is also called "channel hopping".
  Moreover, individual channels can be completely disabled through so-called "blacklisting", for example if they are locally used by IWLAN.
- Support of star-shaped and meshed network topologies
  Networks can be built in both a star-shaped as well as meshed structure. The advantage of star-shaped networks with a gateway as the centre is that it allows for fast update cycles. However, the range of the network is limited to a maximum of approx. 200 m without obstacles between the gateway and the devices.
  The advantage of meshed networks is their greater range, since each participant in the network is also a repeater and forwards the data of remote participants towards the gateway. The disadvantage: increased transmission times for data between the field device and the gateway.
- Faster commissioning
  Once the device is installed, it can usually be commissioned right away, since the usual waiting time for completing the installation of the cables does not apply in this case.
- Self-organizing and self-healing networks
  WirelessHART networks are automatically organized, built and administered by the Network Manager. Engineering is usually not required.
  The Network Manager is implemented in the IE/WSN-PA LINK, the WirelessHART gateway from Siemens.
  It calculates the optimal connection routes between the network participants and defines an alternative path that can be used in the case of disruptions in advance. In that sense, the network can be considered self-healing.
  In addition, the Network manager also defines the channels or frequencies to be used for all communication.
  Statistics regarding communication are compiled automatically and are available to users.
- Security - always active
  All designated mechanisms with regard to security are available automatically, and do not require any engineering.
- Make changes in the network without the need for configuration. The Network Manager automatically adds and withdraws participants to/from the network.

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Secure communication

- Encryption - All information is automatically encrypted with 128 bit AES prior to transmission
- Specific keys for each data packet
- Data integrity - Each data packet is checked for changes or damage during transport.
- Device authentication
  Each device must know the network identification number as well as the join key. Otherwise the Network Manager does not include it in the network.
- Channel Hopping
  The channel which is used will be changed according to the Network manager's specifications after each telegram. This provides an added level of security against spying activities.
- Failed authentification report
  Each unsuccessful attempt by a participant to join the network will be recorded and made available to the user.

Availability in network

- Communication based on IEEE 802.15.4-2006
  Wireless communication takes place on the basis of a proven industry standard. It allows for very minimal power consumption.
- Utilization of ISM band (2.4 GHz)
  This band can be used worldwide without incurring additional costs.
- Channel hopping overcomes disruptions
  Disruptions are usually limited to a small frequency range. By constantly changing the channel, it is possible to overcome the effects of such disruptions and hence increase the network's reliability.
- Channel Black Listing permanently blocks disrupted channels.
  When operating another network at the same location, the channels occupied by that network can be blocked in the WirelessHART network.
- Self-healing network
  This aspect has already been discussed
- Redundant communication paths
  The Network manager automatically calculates redundant communication paths. This significantly increases the level of availability.

Software Overview

Applications 1 and 2 will require the following software products

	Component	Products	Article No.
Application type 1	Maintenance Diagnostic Station	SITRANS MDS	[1]
		SIMATIC PDM and Options	
		SIMATIC PDM Basic (4 Tags)	**6ES7658-3AX16-0YA5**
		Extend Basic to 128 Tags	**6ES7658-3XA16-2YB5**
		Extend Basic to up to 512 Tags	**6ES7658-3XB16-2YB5**
		Extend Basic to up to 1 024 Tags	**6ES7658-3XC16-2YB5**
		Extend Basic to up to 2 048 Tags	**6ES7658-3XD16-2YB5**
		SIMATIC PDM service (128 Tags)	**6ES7658-3JX16-0YA5**
		SIMATIC PDM Option HART Mux	**6ES7658-3EX16-2YB5**
		HART OPC Server V3.2	**Included in SIMATIC PDM[1]**
	WirelessHART gateway	IE/WSN-PA LINK with integrated non-removable antenna	**6GK1411-6CA40-0AA0**
	WirelessHART adapter	SITRANS AW200[2]	**7MP3112-1AA00-0AA0**
Application type 2	Process control system	SIMATIC PCS 7	
		SIMATIC S7/SIMATIC PCS 7 function blocks for communicating with WirelessHART devices using the IE/WSN-PA LINK	**9AE4110-3AA00**
	WirelessHART gateway	IE/WSN-PA LINK with integrated non-removable aerial[2]	**6GK1411-6CA40-0AA0**
	Field devices	SITRANS AW200[2]	**7MP3112-1AA00-0AA0**
		SITRANS AW210[2]	**7MP3111-...**
		SITRANS P280[2]	**7MP1120-...**
		SITRANS TF280[2]	**7MP1110-...**

1) You can also contact your Siemens contact person.
2) Other versions and accessories can be found in the product descriptions of this catalog.

More information

More detailed information on the required WirelessHART software and hardware components can be found in the FI 01 catalog or at www.siemens.com/wirelesshart.

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Overview

Today, distributed automation solutions based on open field buses are state-of-the-art in large areas of the manufacturing industry and process engineering. It is only with field buses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnosis options and remote parameterization.

PROFIBUS is today's most successful open field bus with a large installed base for a wide range of application. Standardization to IEC 61158 / EN 50170 provides you with future protection for your investment.

Benefits

- A uniform modular system from the sensor into the control level enables new plant concepts
- Problem-free exchangeability of field devices, including from different manufacturers, that comply with the standard profile
- Networking of transmitters, valves, actuators etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire lines for joint energy supply and data transmission
- Reduced cabling costs through savings of material and installation time
- Reduced configuration costs through central, simple engineering of the field devices (PROFIBUS PA and HART with SIMATIC PDM, also cross-vendor)
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnosis options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured values in the field device already, hence no rescaling necessary in SIMATIC PCS 7

Application

PROFIBUS is suitable for fast communication with distributed I/Os (PROFIBUS DP) in production automation as well as for communication tasks in process automation (PROFIBUS PA). It is the first field bus system that meets the demands of both areas with identical communication services.

The transmission technique of the PROFIBUS PA is tailored to the needs of the process industry. Interoperability between field devices from different manufacturers and remote parameterization of the field devices during operation are guaranteed by the standardized communication services.

Using SIMATIC PDM (Process Device Manager), a uniform and cross-vendor tool for configuring, parameterizing, commissioning and diagnosis of intelligent process devices on the PROFIBUS, it is possible to configure a wide variety of process devices from different manufacturers using one uniform graphical user interface.

PROFIBUS PA can just as readily used in standard environments as well as hazardous areas. For use in hazardous areas, PROFIBUS PA and all connected devices have to be designed with type of explosion protection Ex [i].

The uniform protocol of PROFIBUS DP and PROFIBUS PA enables the two networks to be interlinked, thus combining time-based performance with intrinsically safe transmission.

Function

PROFIBUS PA expands PROFIBUS DP with near-process components for the direct connection of actuators and sensors.

For PROFIBUS PA the RS 485 transmission technique was replaced by a different technique optimized for intrinsically safe application. Both techniques are internationally standardized in IEC 61158.

PROFIBUS PA uses the same communication protocol as PROFIBUS DP; the communication services and telegrams are identical.

For PROFIBUS PA the data and energy supply for the field devices can be directed through a 2-wire line.

Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using PROFIBUS:

PROFIBUS PA

Measuring instruments for pressure
SITRANS P DS III PA
SITRANS P300
Measuring instruments for temperature
SITRANS TH400
Flowmeters
SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I / I Ex
SITRANS F M Transmag 2
SITRANS F C MASS 6000 19" / IP67 / Ex d
SITRANS FUS060
Measuring instruments for level
Pointek CLS200
Pointek CLS300
SITRANS Probe LU
SITRANS LR200
SITRANS LR250
SITRANS LR260
SITRANS LR460
SITRANS LR560
Electropneumatic positioners
SIPART PS2
Acoustic sensor for pump monitoring
SITRANS DA400

PROFIBUS DP

Flowmeters
SITRANS F M MAG 6000 19" / IP67
SITRANS F M MAG 6000 I
SITRANS F C MASS 6000 19" / IP67
SIFLOW FC070 (via ET200M)
Measuring instruments for level
HydroRanger 200
MultiRanger 100/200
SITRANS LU01, LU02, LU10
Acoustic sensor for pump monitoring
SITRANS DA400

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Overview

Today, distributed automation solutions based on open field buses are state-of-the-art in large areas of the process engineering industry. It is only with field buses that the functional benefits of digital communication can be put to full use, e.g. better resolution of measured values, diagnosis options and remote parameterization.

Like PROFIBUS PA, the FF bus (FOUNDATION Fieldbus) is an open field bus with a large installed base for a wide range of application. Standardization to IEC 61158 / EN 50170 provides you with future protection for your investment.

Benefits

- A uniform modular system from the sensor to the connection to the control level enables new plant concepts
- Networking of transmitters, valves, actuators etc.
- Implementation of intrinsically safe applications through use of the field bus in hazardous areas
- Easy installation of 2-wire cables for joint energy supply and data transfer
- Reduced cabling costs through savings of material and installation time.
- Reduced configuration costs through central, simple engineering of the field devices, also cross-vendor
- Fast and error-free installation
- Lower service costs thanks to simpler wiring and plant structure plus extensive diagnosis options
- Greatly reduced commissioning costs through simplified loop check
- Scaling/digitizing of the measured values in the field device already, hence no rescaling necessary in SIMATIC PCS 7

Application

The transfer technology of the FOUNDATION Fieldbus is tailored to the needs of the process industry. Interoperability between field devices from different manufacturers and remote parameterization of the field devices during operation are guaranteed by the standardized communication services.

FOUNDATION Fieldbus can just as readily be used in standard environments as in hazardous areas. For use in hazardous areas, FOUNDATION Fieldbus and all connected devices have to be designed with type of explosion protection Ex [i].

Function

FOUNDATION Fieldbus enables the direct connection of actuators and sensors.

FOUNDATION Fieldbus is based on a transfer optimized for intrinsically safe application. The transfer technology is internationally standardized in IEC 61158.

For FOUNDATION Fieldbus the data and energy supply for the field devices can be directed through a 2-wire cable.

FOUNDATION Fieldbus enables device-to-device communication ("control in the field").

Integration

Siemens field devices for process automation which are listed in this catalog and can be controlled using Foundation Fieldbus:

Measuring instruments for pressure
SITRANS P300 FF
SITRANS P DS III FF
Measuring instruments for temperature
SITRANS TH400 FF
Electropneumatic positioners
SIPART PS2 FF
Flowmeters
SITRANS F M MAG 6000
SITRANS F M MAG 6000 I / I Ex
SITRANS F C MASS 6000
Level meters
SITRANS LR250
SITRANS LR560

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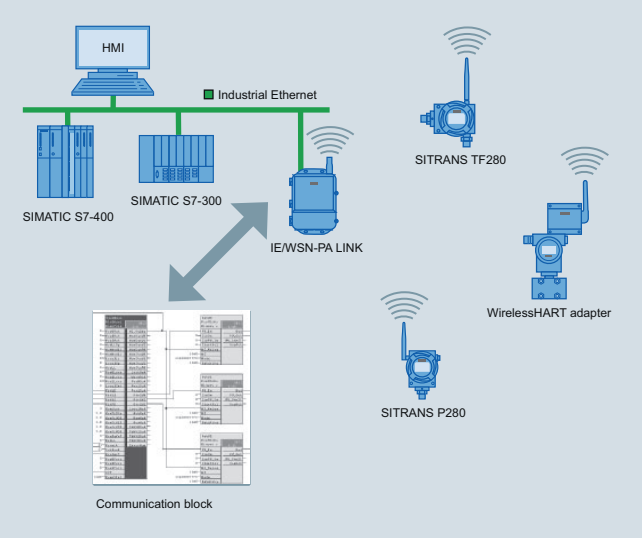
Overview



The WirelessHART communication blocks implement the communication between S7/PCS 7 automation systems and WirelessHART field devices. They communicate via the IE/WSN-PA LINK using the Modbus TCP/IP protocol. Preconfigured communication blocks simplify the engineering process. Symbols and face plates are included in the delivery for use with SIMATIC PCS 7 OS or SIMATIC WinCC.

Benefits

A library, which can be installed, offers pre-fabricated blocks and hence an easy way to integrate WirelessHART devices into the SIMATIC automation world.

Simple configuration thanks to:

- Prefabricated function blocks for IE/WSN-PA LINK and WirelessHART devices
- SIMATIC PCS 7 OS or SIMATIC WinCC symbols and face plates are included
- Configuring help for IE/WSN-PA LINK in line with function blocks
- Output of quality codes for respective process values
- Analysis of IE/WSN-PA LINK diagnostic information

Application

WirelessHART communication blocks are used where SIMATIC automation systems communicate with WirelessHART devices via the IE/WSN-PA LINK gateway.

Function

The function blocks cyclically communicate with the IE/WSN-PA LINK via Modbus TCP/IP. Process values of WirelessHART devices as well as their status are read and made available at the function block outputs. Furthermore, selected status information of the IE/WSN-PA LINK is also made available at another building block. This information includes connection status, condition of the wireless network and other diagnostics. Precondition of the usage of these communication blocks is a TCP/IP connection, engineered in NetPro in the Engineering Station of Simatic PCS 7. Currently this requires a CP343 or a CP443-1.

Configuration

The standard S7 or PCS 7 engineering tools CFC, KOP, FUP can be used for the communication block engineering. Connection planning is done in NetPro. A configuration example for configuring the IE/WSN-PA LINK makes it easy to assign the WirelessHART devices to the communication blocks which need to be engineered.

More information

You can obtain function blocks and technical support for integrating the IE/WSN-PA LINK in PCS 7 at the following address:

Siemens AG
DF CS DS PAS R&D-AP
Roland Heid
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Selection and Ordering data

	Article No.
S7/PCS 7 function blocks for communicating with WirelessHART devices using the IE/WSN-PA LINK S7-300 or S7-400, including face plate	**9AE4110-3AA00**

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Overview

Maintenance Diagnostic Station

SITRANS MDS for flexible and automated diagnostic processing:

- Central display of diagnostic information from HART devices, which was only readable on site until now.
- Adjustable updating period for each device
- Clear visualization of diagnostic status of all devices
- Simply transfer of SIMATIC PDM configuring data
- Windows-based application

Benefits

SITRANS MDS in cooperation with SIMATIC PDM increases significantly the transparency of a plant.

The main advantages of SIMATIC MDS are as follows:

- Increase transparency of the plant by reading diagnostic information from accessible devices and providing a well-organized representation of this information
- Representation of diagnostic status of a device as in SIMATIC PCS 7 or NAMUR NE 107 (switchable)
- Ease of use through use of SIMATIC PDM project data
- The update cycle for the diagnostic status can be uniformly set as the default value for all devices ...
- ... as well as for each device individually

Application

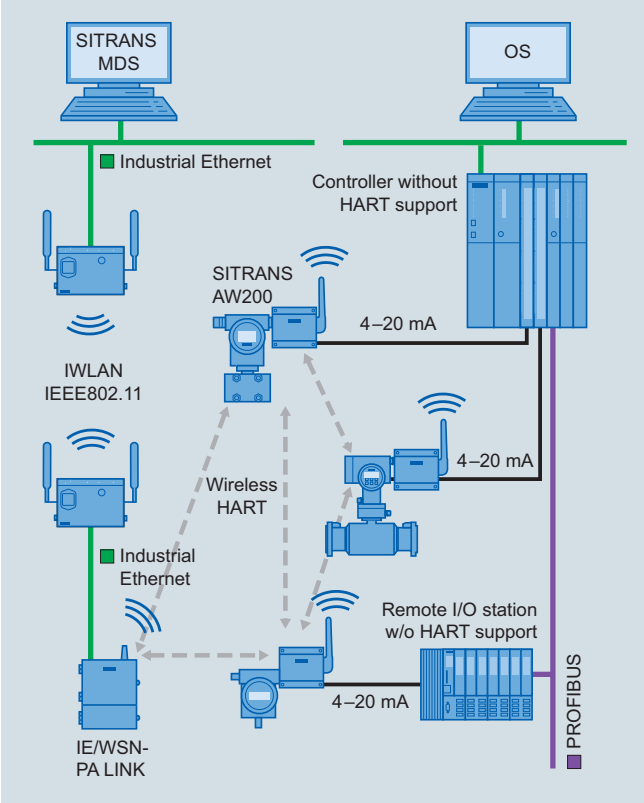
SITRANS MDS increases the transparency of a plant by centrally collecting diagnostic information, directly from the accessible field devices. In principle, all devices that are integrated in SIMATIC PDM can be included in the collecting process.

SITRANS MDS can be used where the installed automation system does not support an integrated acyclic communication of parameters and diagnostic information with the devices. In the case of HART devices, this applies to 85% of all installed devices.

The modern SIMATIC PCS 7 process control system allows for this type of continuous communication from the engineering system up to the devices. It also features a decidedly higher performance asset management system. The use of SIMATIC MDS therefore does not make sense in a SIMATIC PCS 7 environment and is hence not approved for that purpose.

Design

SITRANS MDS uses SIMATIC PDM project data to read and display diagnostic data from accessible devices.



Integration

SITRANS MDS is installed on a PC together with SIMATIC PDM. Only the stand-alone version is used in this case.

Configuration

Configuration required for SITRANS MDS is adopted from SIMATIC PDM. Only the project name must be entered.

Very few other entries are required, such as the definition of update periods.

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Technical specifications

SITRANS MDS Maintenance Diagnostic Station	
Operating system	Microsoft Windows XP professional SP2/SP3
Additionally required software	
SIMATIC PDM as of V 6.05 and options	
• SIMATIC PDM Basic (4 Tags)	6ES7 658-3AX16-0YA5
• SIMATIC PDM service (128 Tags)	6ES7 658-3JX16-0YA5
• SIMATIC PDM Option HART Mux	6ES7 658-3EX16-2YB5
	Additional options to increase number of measuring points
PC hardware	600 MHz 256 MB *) XGA 1024 x 768 16 Bit color depth *) main memory of at least 512 MB is recommended Up-to-date information can be found in the description for SIMATIC PDM

Selection and Ordering data

SITRANS MDS is a software package which is delivered together with the IE/WSN-PA LINK for Version 1.0.

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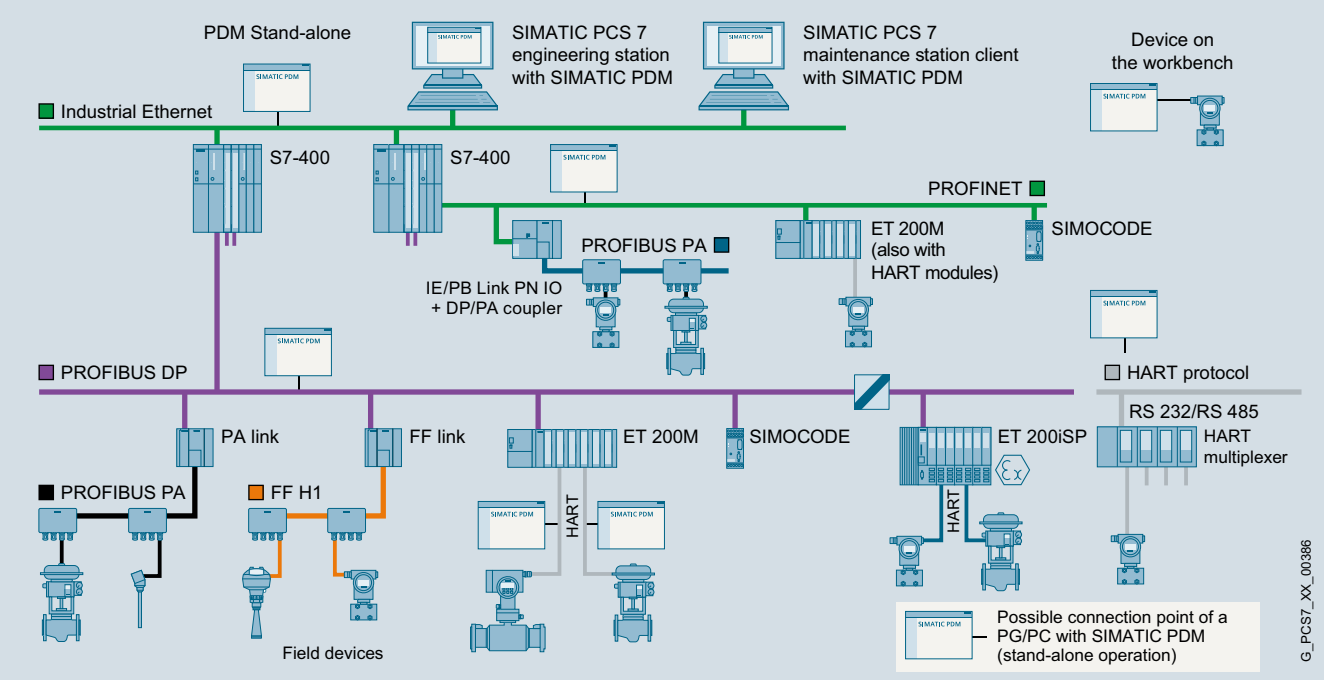
Overview



Configuration options with SIMATIC PDM

SIMATIC PDM (Process Device Manager) is a universal, vendor-independent tool for the configuration, parameter assignment, commissioning, diagnostics and servicing of intelligent field devices (sensors and actuators) and field components (remote I/Os, multiplexers, control-room devices, compact controllers), which in the following sections will be referred to simply as devices.

Using *one* software, SIMATIC PDM enables the processing of more than 2 500 devices from Siemens and over 200 vendors worldwide on *one* homogeneous user interface.

The user interface satisfies the requirements of the VDI/VDE GMA 2187 and IEC 65/349/CD directives. Parameters and functions for all supported devices are displayed in a consistent and uniform fashion independent of their communications interface. Even complex devices with several hundred parameters can be represented clearly and processed quickly. Using SIMATIC PDM it is very easy to navigate in highly complex stations such as remote I/Os and even connected field devices.

From the viewpoint of device integration, SIMATIC PDM is the most powerful open device manager available in the world. Devices which previously were not supported can be integrated in SIMATIC PDM by importing their device descriptions (EDD). This provides security for your investment and saves you investment costs, training expenses and follow-up costs.

SIMATIC PDM supports the operative system management in particular through:

- Uniform presentation and operation of devices
- Uniform representation of diagnostics information
- Indicators for preventive maintenance and servicing
- Detection of changes in the project and device
- Increasing the operational reliability
- Reducing the investment, operating and maintenance costs

When used in SIMATIC PCS 7, SIMATIC PDM is integrated in the maintenance station of the process control system and transmits parameter data and diagnostics information. You can change directly to the SIMATIC PDM views from the diagnostics faceplates in the Maintenance Station.

As an option, SIMATIC PDM can also be started on any SIMATIC PCS 7 maintenance station client (MS Client) in order to parameterize and diagnose the devices integrated per Electronic Device Description (EDD). In this context, SIMATIC PDM user administration based on SIMATIC Logon allows various roles with defined function privileges to be assigned to users. These function privileges refer to SIMATIC PDM system functions, e.g. writing to the device.

For all devices described per Electronic Device Description (EDD), SIMATIC PDM delivers a range of information for display and further processing on the maintenance station, e.g.:

- Device type information (electronic rating plate)
- Detailed diagnostics information (manufacturer information, information on error diagnostics and troubleshooting, further documentation)
- Results of internal condition monitoring functions
- Status information (e.g. local configuration changes)
- Information on changes (audit trail report)
- Parameter information

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Application

Components	Product packages						
	SIMATIC PDM stand-alone			SIMATIC PDM system-integrated			
	Minimum configuration	Basic configuration	Application-specific configurations				
	SIMATIC PDM Single Point	**SIMATIC PDM Basic**	**SIMATIC PDM Service**	**SIMATIC PDM S7**	**SIMATIC PDM PCS 7**		
	V8.2	V8.2	V8.2	V8.2	V8.2	Server V8.2	FF V8.2
SIMATIC PDM TAGs[1] in product package	1	4	4 + 100	4 + 100	4 + 100	4 + 100	4 + 100
SIMATIC PDM expansion options							
Count Relevant Licenses (accumulative) - 10 TAGs - 100 TAGs - 1 000 TAGs	*cannot be expanded*	o	o	o	o	o	o
SIMATIC PDM Basic		●	●	●	●	●	●
SIMATIC PDM Extended		o	o	●	●	●	●
SIMATIC PDM integration in STEP 7/PCS 7		o	o	●	●	●	●
SIMATIC PDM routing		o	o	o	●	●	●
SIMATIC PDM Server		o	o	o	o	●	o
SIMATIC PDM Communication FOUNDATION Fieldbus		o	o	o	o	o	●
SIMATIC PDM HART server		o	o	o	o	o	o
SIMATIC PDM command interface[2]		o	o	–	–	–	–

SIMATIC PDM product structure

● Product component is part of the product package

o Optional product component for the product package; order additive

– Product component is not relevant for the product package or not available

[1] For TAG definition, see "Design" section under "SIMATIC PDM TAGs"

[2] Only for special applications, not envisaged for wide use: Programming knowledge is necessary.

Customer-oriented product structure

SIMATIC PDM is highly versatile in the context of Totally Integrated Automation (TIA): Stand-alone or system-integrated in a SIMATIC PCS 7 / SIMATIC S7 configuration environment.

The customer-oriented products structure of SIMATIC PDM helps you to adapt the scope of functions and performance to your individual requirements. You have the following options:

SIMATIC PDM stand-alone

- Product packages for operation on a mobile computer with local bus connection or with direct connection to the device, optionally as:
  - Minimal configuration SIMATIC PDM Single Point for processing of a single field device via point-to-point coupling
  - Application-specific configuration SIMATIC PDM Service for extended service tasks
- Product package SIMATIC PDM Basic as the basis for an individual SIMATIC PDM configuration with optional product components (see table)

SIMATIC PDM system-integrated

- Product packages for integration of SIMATIC PDM in the engineering system (engineering toolset) and Maintenance Station of the SIMATIC PCS 7 process control system:
  - SIMATIC PDM PCS 7
  - SIMATIC PDM PCS 7 Server (enables SIMATIC PDM to be started on any MS client)
  - SIMATIC PDM PCS 7-FF (also supports the FOUNDATION Fieldbus H1)
- Product package SIMATIC PDM S7 for integration in a SIMATIC S7 configuration environment

In some circumstances, the various product packages can be expanded with optional product components (for details, see the Design section).

Selection criteria

In addition to considering the environment of use and the functional and performance features when selecting the product (see table in "Design" section), also observe the system requirements (see "Technical specifications" section).

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Design

Product range	SIMATIC PDM Single Point	SIMATIC PDM Basic	SIMATIC PDM Service	SIMATIC PDM S7	SIMATIC PDM PCS 7		
	V8.2	V8.2	V8.2	V8.2	V8.2	Server V8.2	FF V8.2
TAGs contained	**1**	**4**	**4 + 100**	**4 + 100**	**4 + 100**	**4 + 100**	**4 + 100**
Project: Create offline	●	●	●	●	●	●	●
Project: Usable TAG extensions	–	●	●	●	●	●	●
Project: Process device network view	●	●	●	●	●	●	●
Project: Process device plant view	●	●	●	●	●	●	●
Project: Export/import devices	–	–	●	–	–	–	–
Project: Export/import parameters	–	o	●	●	●	●	●
Project: HW Config	–	o	o	●	●	●	●
Project: Utilization of SIMATIC PDM options	–	●	●	●	●	●	●
Project: Integration in STEP 7/PCS 7	–	o	o	●	●	●	●
Communication: HART modem	●	●	●	●	●	●	●
Communication: HART interface	●	●	●	●	●	●	●
Communication: PROFIBUS DP/PA	●	●	●	●	●	●	●
Communication: HART over PROFIBUS DP	●	●	●	●	●	●	●
Communication: FF H1	–	o[1)]	o[1)]	o	o	o	●
Communication: Modbus	●	●	●	●	●	●	●
Communication: Ethernet	●	●	●	●	●	●	●
Communication: PROFINET	●	●	●	●	●	●	●
Communication: HART over PROFINET	●	●	●	●	●	●	●
Devices: Export/import parameters	–	o	●	●	●	●	●
Devices: Comparison of parameter values	–	o	●	●	●	●	●
Devices: Saving parameters	●	●	●	●	●	●	●
Devices: Change log (Audit Trail)	–	o	●	●	●	●	●
Devices: Calibration report	–	o	●	●	●	●	●
Devices: Print function	●	o	●	●	●	●	●
Devices: Document manager	–	o	●	●	●	●	●
Lifelist: Basic functionality	●	●	●	●	●	●	●
Lifelist: Expanded functionality (scan range, diagnostics, export, addressing)	–	o	●	●	●	●	●
Communication: S7 routing	–	o	o	o	●	●	●
Communication: HART multiplexer	–	o	o	o	o	o	o
Communication: Wireless HART	–	o	o	o	o	o	o
Function: HART SHC mode (increased communication speed)	●	●	●	●	●	●	●
Function: Device parameterization on PCS 7 maintenance station clients	–	o	o	o	o	●	o

SIMATIC PDM overview of functions and features

● Product component is part of the product package

o Optional product component for the product package; order additive

– Product component is not relevant for the product package or not available

[1)] Not in stand-alone mode

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SIMATIC PDM stand-alone product range

SIMATIC PDM Single Point V8.2

This minimum configuration with handheld functionality is designed for processing exactly *one* field device via point-to-point coupling. Additional functions or SIMATIC PDM TAGs are not possible. Upgrading to a different product variant, e.g. SIMATIC PDM Basic, or a different product version is also not possible. The device functions are supported as defined in the device description.

The following types of communication are possible:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

SIMATIC PDM Basic V8.2

Provided the system requirements are met, SIMATIC PDM Basic can be used for stand-alone operation on any computer (IPC/notebook) with local connection to bus segments or direct connection to the device. The product package features all the basic functions required for operation and parameter assignment of the devices and is enabled for the following communication modes:

- PROFIBUS DP/PA
- HART communication (modem, RS 232 and via PROFIBUS/PROFINET)
- Modbus
- Ethernet
- PROFINET

As a basic block for individual configuration, SIMATIC PDM Basic can be upgraded with all functional SIMATIC PDM options as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs. Without TAG expansion, SIMATIC PDM Basic is suitable for projects with up to 4 TAGs.

SIMATIC PDM Service V8.2

The product package for mobile servicing applications can be executed on any computer (IPC/notebook) with a local connection to a bus segment or direct connection to field devices.

It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- 100 SIMATIC PDM TAGs

Similar to SIMATIC PDM Basic, SIMATIC PDM Service can be upgraded with all functional SIMATIC PDM options as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

SIMATIC PDM system-integrated product range

SIMATIC PDM S7 V8.2

The product package designed for use in a SIMATIC S7 configuration environment requires the installation of STEP 7 V5.5+SP4. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- 100 SIMATIC PDM TAGs

SIMATIC PDM S7 can be expanded with the functional options SIMATIC PDM Routing, SIMATIC PDM Communication FOUNDATION Fieldbus, SIMATIC PDM Server, and SIMATIC PDM HART Server as well as with cumulative sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

SIMATIC PDM PCS 7 V8.2

The product package designed for use in a SIMATIC PCS 7 configuration environment requires the installation of SIMATIC PCS 7 V8.1. SIMATIC PDM can then be integrated in the engineering toolset of the SIMATIC PCS 7 Engineering System V8.1. It comprises:

- SIMATIC PDM Basic (incl. 4 SIMATIC PDM TAGs)
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- 100 SIMATIC PDM TAGs

SIMATIC PDM PCS 7 can be expanded with the functional options SIMATIC PDM Communication FOUNDATION Fieldbus, SIMATIC PDM Server, and SIMATIC PDM HART Server (see "Optional product components") as well as with cumulative sets of SIMATIC PDM TAGs (10, 100 or 1 000).

SIMATIC PDM PCS 7 Server V8.2

The product package designed for use in a SIMATIC PCS 7 configuration environment requires the installation of SIMATIC PCS 7 V8.1. It expands the functionality of SIMATIC PDM PCS 7 by the SIMATIC PDM Server option. It is then possible to parameterize field devices integrated per Electronic Device Description (EDD) on any client of the SIMATIC PCS 7 Maintenance Station V8.1.

SIMATIC PDM PCS 7 Server can be expanded with the functional options SIMATIC PDM Communication FOUNDATION Fieldbus and SIMATIC PDM HART Server (see "Optional product components") as well as with cumulative sets of SIMATIC PDM TAGs (10, 100 or 1 000).

SIMATIC PDM PCS 7-FF V8.2

The product package designed for use in a SIMATIC PCS 7 configuration environment requires the installation of SIMATIC PCS 7 V8.1. It expands the functionality of SIMATIC PDM PCS 7 by the SIMATIC PDM Communication FOUNDATION Fieldbus option. SIMATIC PDM can then also parameterize field devices on the FOUNDATION Fieldbus H1.

SIMATIC PDM PCS 7-FF can be expanded with the functional options SIMATIC PDM Server and SIMATIC PDM HART Server (see "Optional product components") as well as with cumulative sets of SIMATIC PDM TAGs (10, 100 or 1 000).

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Optional product components

SIMATIC PDM Extended V8.2 option

The SIMATIC PDM Extended option enables you to unlock other system functions for SIMATIC PDM Basic and SIMATIC PDM, for example:

- Change log
- Calibration report
- Extended information in the Lifelist
- Export and import functions
- Print functions
- Document manager
- Comparison function

This functionality is already integrated in the product packages of category "SIMATIC PDM system-integrated" (SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF).

SIMATIC PDM integration option in STEP 7/PCS 7 V8.2

This option is used for the integration of SIMATIC PDM in a SIMATIC S7 or SIMATIC PCS 7 configuration environment. SIMATIC PDM can then be started directly from the hardware configurator (HW Config) in STEP 7/SIMATIC PCS 7.

This functionality is already integrated in the product packages of category "SIMATIC PDM system-integrated" (SIMATIC PDM S7, SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF).

SIMATIC PDM Routing V8.2 option

If SIMATIC PDM is used on an engineering station, the SIMATIC PDM Routing option enables handling of every device in the field that can be configured per EDD throughout the plant and across different bus systems and remote I/Os. SIMATIC PDM Routing is offered as an optional product component for SIMATIC PDM Basic, SIMATIC PDM Service, and SIMATIC PDM S7.

Routing is already integrated in SIMATIC PDM PCS 7, SIMATIC PDM PCS 7 Server, and SIMATIC PDM PCS 7-FF.

SIMATIC PDM Server V8.2 option

This option is intended for use of SIMATIC PDM in the SIMATIC PCS 7 Maintenance Station V8.1. Selected field devices can then be handled using the SIMATIC PDM configuration GUI on each client of the SIMATIC PCS 7 Maintenance Station V8.1.

SIMATIC PDM Communication FOUNDATION Fieldbus V8.2 option

In a SIMATIC S7/PCS 7 configuration environment, using this option SIMATIC PDM can communicate with field devices on the FOUNDATION Fieldbus H1 via the FF link.

This functionality is already integrated in the SIMATIC PDM PCS 7-FF product package.

SIMATIC PDM HART Server V8.2 option

This option permits the use of HART multiplexers from various vendors in SIMATIC PDM. Furthermore, wireless HART field devices can also be parameterized with SIMATIC PDM.

SIMATIC PDM Command Interface V8.2 option

SIMATIC PDM configurations for stand-alone operation, based on the SIMATIC PDM Basic or SIMATIC PDM Service product package, can be remote-controlled by this option with regard to configuration and field device operation.

Note: The SIMATIC PDM Command Interface option can only be used specific to a project. It is not envisaged for wide use. Programming knowledge is necessary.

SIMATIC PDM TAGs (version-independent)

Depending on the project size, the SIMATIC PDM TAGs supplied with a product package (except SIMATIC PDM Single Point) can be cumulatively expanded with sets of 10, 100 or 1 000 SIMATIC PDM TAGs.

A SIMATIC PDM TAG corresponds to a SIMATIC PDM object, which represents individual field devices or components within a project, e.g. measuring instruments, positioners, switching devices or remote I/Os. SIMATIC PDM TAGs are also relevant for diagnostics with the lifelist of SIMATIC PDM. In this case, TAGs are considered to be all recognized devices with diagnostics capability, whose detailed diagnostics is effected through the device description (EDD).

SIMATIC PDM Software Media Package V8.2

The current SIMATIC PDM installation software is offered without a license in the form of the SIMATIC PDM Software Media Package. Purchasing of corresponding software licenses is necessary to unlock the product-specific functionalities.

With SIMATIC PDM product packages, type of delivery "Package" (not with optional product components), a SIMATIC PDM Software Media Package is supplied together with each ordering item. Further SIMATIC PDM Software Media Packages must be ordered separately as required.

The software of the SIMATIC PDM Media Package without a license can be used for demonstration purposes in demo mode. The SIMATIC PDM functionality is limited as follows in demo mode:

- Stand-alone operation
- Storage functions disabled
- Export and import functions disabled
- Expanded functionality disabled
- Communication functions restricted

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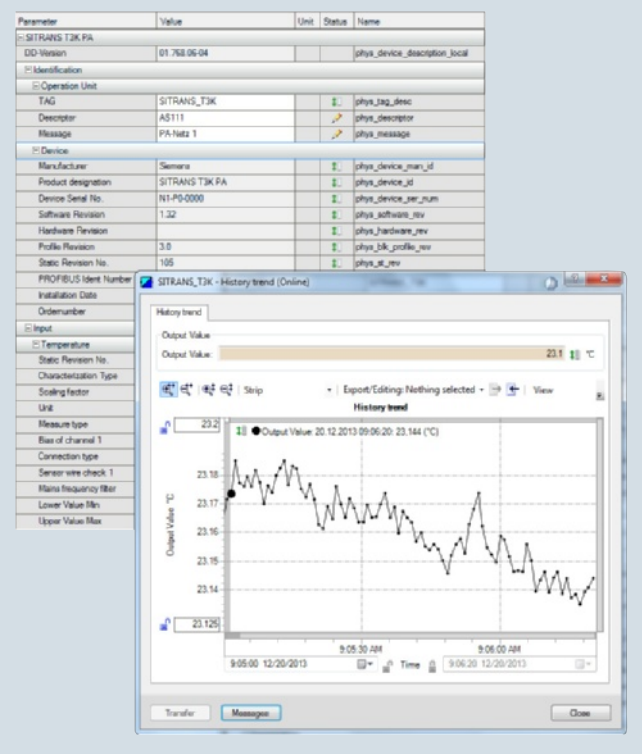
Function



SIMATIC PDM, parameter view and trend window

SIMATIC PDM core functions

- Creation of project-specific device libraries
- Adjustment and modification of device parameters
- Comparing (e.g. project and device data)
- Plausibility testing of data input
- Device identification and testing
- Device status indication (operating modes, interrupts, states)
- Simulation
- Diagnostics (standard, detailed)
- Export/import (parameter data, logs, documents)
- Management (e.g. networks and PCs)
- Commissioning functions, e.g. measuring circuit tests of device data
- Lifecycle management functions, e.g. for device replacement
- Global and device-specific modification logbook for user operations (audit trail)
- Device-specific calibration reports
- Graphic presentations of echo envelope curves, trend displays, valve diagnosis results etc.
- Presentation of incorporated manuals
- Document manager for integration of up to 10 multimedia files

Integration

Device integration

SIMATIC PDM supports all devices described by EDD (Electronic Device Description). EDD is standardized to EN 50391 and IEC 61804. Internationally it is the most widely used standardized technology for device integration. At the same time, it is the guideline of the established organizations for

- PROFIBUS and PROFINET (PI – PROFIBUS & PROFINET International)
- HART (HCF: HART Communication Foundation)
- FF (Fieldbus Foundation)

The devices are integrated directly in SIMATIC PDM through a company-specific EDD or the current HCF or Fieldbus Foundation libraries. To achieve improved transparency, they can be managed in project-specific device libraries.

Field devices are described in the EDD in terms of functionality and construction using the Electronic Device Description Language (EDDL). Using this description, SIMATIC PDM automatically creates its user interfaces with the specific device data. Existing devices can be updated, and further devices integrated into SIMATIC PDM, by simply importing the manufacturer's device-specific EDD.

Fieldbus Foundation provides pre-defined device descriptions (standard DD) for the basic functions of specific field device types. The basic functions are implemented using various standard function and transmission blocks.

Technical support

If you wish to use devices which cannot be found in the SIMATIC PDM device description library, we would be pleased to help you integrate them.

Support Request

You can request support by service specialists at Technical Support by using a "Support Request" on the Internet:

www.siemens.com/automation/support-request

Contacts in the Region

The Technical Support responsible for your Region can be found on the Internet at:

www.automation.siemens.com/partner

Technical specifications

SIMATIC PDM V8.2	
Hardware	• PG/PC/notebook with processor corresponding to operating system requirements
Operating systems (alternative)	• Windows 7 Professional/Ultimate/Enterprise SP1 (32-bit/64-bit) • Windows Server 2008 R2 SP1 Standard Edition (64-bit)
Integration in STEP 7/PCS 7	• SIMATIC PCS 7 V8.1 (incl. update 1) • STEP 7 V5.5+SP4

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Ordering data	Article No.
SIMATIC PDM stand-alone product packages	
Minimum configuration	
SIMATIC PDM Single Point V8.2 including 1 TAG; product package for operation and configuration of one field device; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET	
Additional functions or SIMATIC PDM TAGs are not possible	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position	**6ES7658-3HA28-0YA5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package.	**6ES7658-3HA28-0YH5**
Basic configuration for individual product packages	
SIMATIC PDM Basic V8.2 including 4 TAGs; product package for operation and configuration of field devices and components; communication via PROFIBUS DP/PA, HART (modem, RS 232, PROFIBUS/PROFINET), Modbus, Ethernet or PROFINET	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position	**6ES7658-3AB28-0YA5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package.	**6ES7658-3AB28-0YH5**
Configuration for mobile service	
SIMATIC PDM Service V8.2 Product package for stand-alone user in service, with • SIMATIC PDM Basic incl. 4 TAGs • 100 TAGs	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position	**6ES7658-3JD28-0YA5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package.	**6ES7658-3JD28-0YH5**
SIMATIC PDM system-integrated product packages	
Configuration for integration in SIMATIC S7 configuration environment	
SIMATIC PDM S7 V8.2 Product package for use in a SIMATIC S7 configuration environment, with - SIMATIC PDM Basic incl. 4 TAGs - SIMATIC PDM Extended - SIMATIC PDM integration in STEP 7/PCS 7 - 100 TAGs	
6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
Note: STEP 7 V5.5+SP4 is required to use the full functionality of SIMATIC PDM S7 V8.2!	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position	**6ES7658-3KD28-0YA5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Notes: E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package.	**6ES7658-3KD28-0YH5**

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Configuration for integration in SIMATIC PCS 7 configuration environment

SIMATIC PDM PCS 7 V8.2
Product package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Floating license for 1 user, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- 100 TAGs

Note:
SIMATIC PCS 7 V8.1 is required to use the full functionality of SIMATIC PDM PCS 7 V8.2!

- Delivery form package (without SIMATIC PCS 7 Software Media Package)
  License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3LD28-0YA5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package)
  License key download and online certificate of license
  Notes:
  E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package. — **6ES7658-3LD28-0YH5**

SIMATIC PDM PCS 7-FF V8.2
Product package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Floating license for 1 user, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Communication FOUNDATION Fieldbus
- 100 TAGs

Note:
SIMATIC PCS 7 V8.1 is required to use the full functionality of SIMATIC PDM PCS 7-FF V8.2!

- Delivery form package (without SIMATIC PCS 7 Software Media Package)
  License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3MD28-0YA5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package)
  License key download and online certificate of license
  Notes:
  E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package. — **6ES7658-3MD28-0YH5**

SIMATIC PDM PCS 7 Server V8.2
Product package for integration into the engineering toolset of the SIMATIC PCS 7 engineering system

6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit

Floating license for 1 user, with
- SIMATIC PDM Basic incl. 4 TAGs
- SIMATIC PDM Extended
- SIMATIC PDM integration in STEP 7/PCS 7
- SIMATIC PDM Routing
- SIMATIC PDM Server
- 100 TAGs

Note:
SIMATIC PCS 7 V8.1 is required to use the full functionality of SIMATIC PDM PCS 7 Server V8.2!

- Delivery form package (without SIMATIC PCS 7 Software Media Package)
  License key USB stick and certificate of license, bundled with 1 × SIMATIC PDM Software Media Package per ordering position — **6ES7658-3TD28-0YA5**
- Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package)
  License key download and online certificate of license
  Notes:
  E-mail address required; installation software also available separately as SIMATIC PDM Software Media Package. — **6ES7658-3TD28-0YH5**

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Optional product components for SIMATIC PDM V8.2	
SIMATIC PDM Extended V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license	**6ES7658-3NX28-2YB5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note: E-mail address required!	**6ES7658-3NX28-2YH5**
SIMATIC PDM Integration in STEP 7/SIMATIC PCS 7 V8.2 only required for integration of SIMATIC PDM into HW Config 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license	**6ES7658-3BX28-2YB5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note: E-mail address required!	**6ES7658-3BX28-2YH5**
SIMATIC PDM Routing V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license	**6ES7658-3CX28-2YB5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download, online certificate of license Note: E-mail address required!	**6ES7658-3CX28-2YH5**

SIMATIC PDM Server V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick, certificate of license	**6ES7658-3TX28-2YB5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note: E-mail address required!	**6ES7658-3TX28-2YH5**
SIMATIC PDM Communication FOUNDATION Fieldbus V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license	**6ES7658-3QX28-2YB5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note: E-mail address required!	**6ES7658-3QX28-2YH5**
SIMATIC PDM HART Server V8.2 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license	**6ES7658-3EX28-2YB5**
• Delivery form online (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key download and online certificate of license Note: E-mail address required!	**6ES7658-3EX28-2YH5**

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SIMATIC PDM Process Device Manager

SIMATIC PDM **Command Interface V8.2** 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit, floating license for 1 user	
• Delivery form package (without SIMATIC PCS 7/SIMATIC PDM Software Media Package) License key USB stick and certificate of license	**6ES7658-3SX28-2YB5**
SIMATIC PDM TAGs TAG licenses for expanding the available TAG volume, cumulative, software class A, floating license for 1 user	
• Delivery form package License key on USB stick and certificate of license	
- 10 TAGs	**6ES7658-3XC00-2YB5**
- 100 TAGs	**6ES7658-3XD00-2YB5**
- 1 000 TAGs	**6ES7658-3XE00-2YB5**
• Delivery form online License key download and online certificate of license Note: E-mail address required!	
- 10 TAGs	**6ES7658-3XC00-2YH5**
- 100 TAGs	**6ES7658-3XD00-2YH5**
- 1 000 TAGs	**6ES7658-3XE00-2YH5**

SIMATIC PDM **Software Media Package**	
SIMATIC PDM **Software Media Package V8.2** Installation software without license, 6 languages (English, German, French, Italian, Spanish, Chinese), software class A, runs with Windows 7 Ultimate 32/64-bit or Windows Server 2008 R2 Standard 64-bit Note: Can only be used in conjunction with a valid license or in demo mode!	
• Delivery form package (without SIMATIC PCS 7 Software Media Package) SIMATIC PDM and device library software on DVD	**6ES7658-3GX28-0YT8**
• Delivery form online (without SIMATIC PCS 7 Software Media Package) SIMATIC PDM and device library software download Note: E-mail address required!	**6ES7658-3GX28-0YG8**

More information

Update/Upgrade

Product packages and optional product components from the product range of SIMATIC PDM V6.0, V6.1, V8.0 or V8.1 (incl. service pack) can be directly upgraded to V8.2 using upgrade packages. Excepted from this are SIMATIC PDM Single Point and SIMATIC PDM Communication via standard HART multiplexer.

Product packages and optional product components from the product range of SIMATIC PDM V7.0 can first be upgraded to V8.0 and then to V8.2.

When upgrading to SIMATIC PDM V8.2, be aware of the compatible versions of SIMATIC PCS 7 and STEP 7.

A Software Update Service in the form of a subscription is also offered for SIMATIC PDM.

For further information, see catalog ST PCS 7.

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Overview

SITRANS DTM provides an easy way for Field Device Tool (FDT)/ Device Type Manager (DTM) users to parameterize Siemens Instruments using international standards.

Benefits

- Same look and feel for all Siemens field instruments
- Support for Quick start wizards and other dialog boxes
- Quick overview using table and tree views
- Online and offline configuration
- Conformity to IEC profiles for HART and PROFFIBUS

Application

Electronic Device Description (EDD) is a proven way to describe the behavior and functionality of field instruments and other automation components.

For many years, EDD-based tools such as SIMATIC PDM from Siemens or handheld communicator have been used successfully in the process industry. Some years ago, an additional technology called FDT / DTM with the same approach was introduced to the market. To support the FDT DTM Technology for Siemens devices, the software SITRANS DTM has been developed which combines both EDD and FDT technologies.

SITRANS DTM uses EDDs as the device description and provides the DTM interface to allow the integration of our field instruments into FDT-frame applications.

The following field instruments are currently available in SITRANS DTM:

- SITRANS TH300 HART
- SITRANS TH400 PA
- SITRANS P300 HART
- SITRANS P500
- SITRANS P DSIII HART
- SITRANS F M MAG 6000 DP/PA
- SITRANS F C MASS 6000 PA/PA
- SITRANS FC430
- SITRANS PROBE LU 6 m, 12 m, HART
- SITRANS LR200 HART, PA
- SITRANS LR250 HART, PA
- SITRANS LR260 HART, PA
- SITRANS LR560 HART, PA
- SITRANS LUT400 HART
- SIPART PS2 HART, PA, FF

Technical specifications

SITRANS DTM	
Version	
Current Version	3.1
• Compatible with PACTware versions	3.6, 4.0, 4.1
• Compatible with Windows	XP, 7
• Certified by FDT group	Yes

Free DTM software can be downloaded from:
http://www.siemens.com/sitransdtm

Click on Support in the collateral list on the right side of the web page, and choose Software downloads.

8

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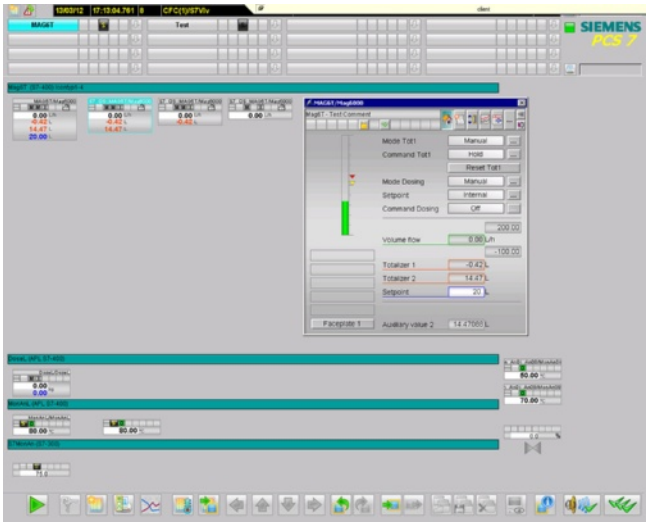
Overview



The SITRANS Library for SIMATIC PCS 7 V8.0 and higher extends standard functionality of the SIMATIC PCS 7 process control system concentrated in the SIMATIC PCS 7 Advanced Process Library (APL) with technological blocks and faceplates for device-specific functions of the SITRANS field devices.

Benefits

This allows you to easily operate all device functions, such as the dosing of the SITRANS FM MAG6000, in a single faceplate. In addition, it also supports operation and monitoring via Touch Panels as well as the integration in SIMATIC S7 applications. The SITRANS Library is based on the modern design of the Advanced Process Library (APL). Together with the APL, the SITRANS Library enables you to create harmonic solutions with a consistent look & feel and optimum use of the functions of the SITRANS field devices in many industries.

It helps accelerate the engineering process, reduces the time-to-market, and simplifies process control. In addition, operator functions (such as "Dosing") and process-related diagnostic information (such as empty pipe detection and flow direction) are provided.

Note:
SITRANS Library can be used in combination with SIMATIC PCS 7 version V8.0 and higher.

Application

The SITRANS Library can be used in combination with SIMATIC PCS 7 and SITRANS field devices.

You can find the current list of the SITRANS field devices and the supported SIMATIC PCS 7 versions at
http://support.automation.siemens.com//WW/view/en/85285872

The SITRANS Library can be used for all core sectors of the process industry. These are:

- Chemical industry
- Pharmaceutical industry
- Water and wastewater
- Glass and solar
- Oil & gas
- Food and beverage industry
- Minerals and mining

Design

The product structure, however, is geared toward the operational environment in the SIMATIC PCS 7 process control system. Consequently, SITRANS Library is offered in the form of an engineering component:

- SITRANS Library
  Engineering software with engineering license for one customer plant
- SITRANS Library
  Runtime license for one automation system (SIMATIC PCS 7 automation systems of all designs and S7-300 controllers)

The SITRANS Library product component enables you to perform configuration work on a SIMATIC PCS 7 engineering station.

The SITRANS Library product component allows you to run blocks from a library on an automation system.

When using function blocks from SITRANS Library in SIMATIC PCS 7 automation systems, note that SIMATIC PCS 7 AS Runtime POs are also booked.

Function

SITRANS Library for SIMATIC PCS 7

Sublibrary for the functional expansion of the SIMATIC PCS 7 Advanced Process Library with:

- Function blocks and faceplates for the SITRANS F M MAG 6000 DP with dosing function for SIMATIC S7-400, SIMATIC S7-300 and panel interface blocks
- Function blocks and faceplates for SITRANS field devices for SIMATIC S7-400 and SIMATIC S7-300 with WinCC.

The function blocks are configured in CFC.

Control and monitoring from a panel is configured with the panel interface blocks for example for the SITRANS F M MAG 6000 DP. Taking operating rights and hierarchical operating concepts (multi-control room operation) into consideration, the technological function can then be operated from both an operator station and a Touch Panel.

Detailed information for which field devices which systems and system versions are supported see under
http://support.automation.siemens.com/WW/view/en/85285872

Selection and Ordering Data

	Article No.
SITRANS Library	
Block library for SIMATIC PCS 7 V8.0 and SIMATIC S7 with function blocks and face plates as well as electronic documentation Engineering software, software class A, two languages (English, German), runs under opreation system Windows XP Professional 32 Bit, Windows 7 Ultimate 32/64 Bit, Windows Server 2003 R2 Standard 32 Bit or Windows Server 2008 R2 Standard 64 Bit, single license for 1 installation	
• Engineering license for one customer plant. Delivery form: can be downloaded, with certificate of license	**7MP2990-0AA00**

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Appendix

9/2 **Siemens Industry Training**
9/3 Course offer for Process Instrumentation

9/4 **PIA Life Cycle Portal**
Engineering, Ordering, Installation and Operation Tool

9/5 **Delivery time**

9/6 **Pressure Equipment Directive (97/23/EC)**

9/9 **Functional safety**

9/10 **Partner at Siemens**

9/11 **Siemens Automation Cooperates with Education**
Simplify your education in automation

9/13 **Online Services**
Information and Ordering in the Internet and on DVD
9/14 Information and Dowload Center, Social Media, Mobile Media

9/15 **Industry Services**
Your machines and plants can do more – with Industry Services
9/16 Industry Services for the entire life cycle

9/20 **Software Licenses**

9/22 **Subject Index**

9/26 **Article No. Index**

9/38 **Notes**

9/46 **Conditions of sale and delivery**

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Faster and more applicable know-how: Hands-on training from the manufacturer

Siemens Industry Training provides you with comprehensive support in solving your tasks.

Training by the market leader in the industry enables you to make independent decisions with confidence. Especially where the optimum and efficient use of products and plants are concerned. You can eliminate deficiencies in existing plants, and exclude expensive faulty planning right from the beginning.

First-class know-how directly pays for itself: In shorter startup times, high-quality end products, faster troubleshooting and reduced downtimes. In other words, increased profits and lower costs.

Achieve more with Siemens Industry Training

- Shorter times for startup, maintenance and servicing
- Optimized production operations
- Reliable configuration and startup
- Minimization of plant downtimes
- Flexible plant adaptation to market requirements
- Compliance with quality standards in production
- Increased employee satisfaction and motivation
- Shorter familiarization times following changes in technology and staff

Contact

Visit our site on the Internet at:

www.siemens.com/sitrain

or let us advise you personally.

Siemens Industry Training Customer Support Germany:

Phone: +49 911 895-7575

Fax: +49 911 895-7576

E-Mail: info@sitrain.com

Highlights Siemens Industry Training

Top trainers

Our trainers are skilled teachers with direct practical experience. Course developers have close contact with product development, and directly pass on their knowledge to the trainers.

Practical experience

The practical experience of our trainers enables them to teach theory effectively. But since theory can be pretty drab, we attach great importance to practical exercises which can comprise up to half of of the course time. You can therefore immediately implement your new knowledge in practice. We train you on state-of-the-art methodically/didactically designed training equipment. This training approach will give you all the confidence you need.

Wide variety

With a total of about 300 local attendance courses, we train the complete range of Siemens Industry products as well as interaction of the products in systems.

Tailor-made training

We are only a short distance away. You can find us at more than 50 locations in Germany, and in 62 countries worldwide. You wish to have individual training instead of one of our 300 courses? Our solution: We will provide a program tailored exactly to your personal requirements. Training can be carried out in our Training Centers or at your company.

The right mixture: Blended learning

"Blended learning" is a combination of various training media and sequences. For example, a local attendance course in a Training Center can be optimally supplemented by a teach-yourself program as preparation or follow-up. Additional effect: Reduced traveling costs and periods of absence.

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	Course suitable for				
	Planning	**Realization**	**Operation**	**Duration/ Medium**	**Course code**
Basis Service Training for Process Instruments	✔	✔	✔	5 days	SC-PI-BST
WirelessHART Basic Training (for Siemens employees)	✔	✔	✔	2 days	SC-PI-WHB
Introduction into Process Instrumentation and Process Analytics (for Siemens employees)	✔	✔	✔	2 days	SC-TP-GS1
PROFIBUS, HART and SIMATIC PDM in Process Automation - Technology and Sales	✔	✔	✔	3 days	SC-TP-T1S
Advanced Trainings PS1 Pressure, Temperature and Positioner (for Siemens enployees)	✔	✔	✔	3,5 days	SC-PI1-ADV
Pressure-, Temperature Measurement and Electropneumatic Positioners - Technology and Sales	✔	✔	✔	4,5 days	SC-PI1-T1S
2 days Training Pressure and Temperature	✔	✔	✔	2 days	SC-PI1-PT
2 days Training Positioner	✔	✔	✔	2 days	SC-PI1-SIP
PI3 Advanced Service-Training - COMPLETE		✔	✔	10 days	AST-ALL
PI3 Advanced Service-Training - Communication		✔	✔	1 day	AST-COM
PI3 Advanced Service-Training - MASS		✔	✔	1 day	AST-FC
PI3 Advanced Service-Training - FC430		✔	✔	1 day	AST-FC400
PI3 Advanced Service-Training - MAG		✔	✔	1 day	AST-FM
PI3 Advanced Service-Training - MAG 8000		✔	✔	1 day	AST-FM8000
PI3 Advanced Service-Training - Transmag		✔	✔	1 day	AST-FMT
PI3 Advanced Service-Training - ClampOn		✔	✔	1 day	AST-FUC
PI3 Advanced Service-Training - SONO Inline		✔	✔	1 day	AST-FUI
PI3 Advanced Service-Training - SONOKIT		✔	✔	1 day	AST-FUK
PI3 Advanced Service-Training - Vortex		✔	✔	1 day	AST-FX
Flow Measurement - Technology and Sales	✔	✔	✔	5 days	SC-PI3-T1S
Level Measurement - Technology and Sales	✔	✔	✔	4 days	SC-PI2-T1S
Siemens Weighing Technolgy, Basic Training (for Siemens employees)	✔	✔	✔	2 Tage	SC-WT-BAS
Static Weighing Technology	✔	✔	✔	4 days	SC-WT-STAT
Dynamic Weighing Technology	✔	✔	✔	3 days	SC-WT-DYN
SIWAREX Sensor System and Electronics FTC-L		✔	✔	3 days	SC-WT-FTCL
Weighing Technology, Belt Scales, Weighfeeder		✔	✔	3 days	SC-WT-BELT
SIWAREX WP231	✔	✔	✔	1 day	SC-WT-WP23

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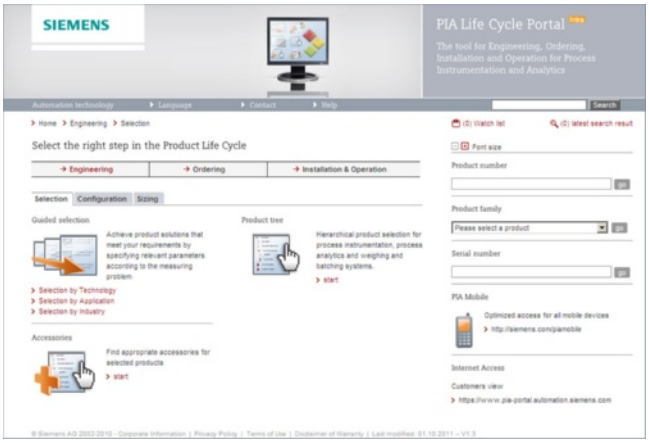
Engineering, Ordering, Installation and Operation Tool

Overview



The PIA Life Cycle Portal provides the appropriate functionality in all stages of the Product Life Cycle for products of Process Instrumentation, Process Analytics and Weighing Technology.

The application guides you through Engineering & Selection, supports you at the Order and provides tools and information for Installation and Operation.

- **Phase 1:** Selection & Planning
- **Phase 2:** Ordering
- **Phase 3:** Installation & Operation
- **Additional features:** e. g. PIA Mobile

Phase 1: Selection & Planning

Selection

Achieve product solutions that meet your requirements by specifying relevant parameters according to the measuring point by using the *guided selection* or select the product directly in the *product and accessories tree*.

Configuration

Configure a selected product step by step and use the integrated configuration knowledge to avoid errors.

Sizing & calculation

Sizing & calculation tools for Gas Analyzers, Weighing and Batching Systems and Flow measurement instruments.

Phase 2: Ordering

Bulk upload

Verify several part numbers in one step by uploading a simple text file.

Watchlist & projects

Collect products in a *watch list* and save it as a *project* for later use.

Interface to the Industry Mall

Order the selected products with the ordering system for Siemens' automation and drive solutions.

Phase 3: Installation & Operation

Spare parts

Find appropriate *spare parts* for selected products or corresponding product families.

After sales support

Go to the *Service and Support Portal* to access manuals, certificates and further information concerning service & support.

Device information and history

Serial number specific product information for installed devices

Additional features

Personalize

Register in order to customize the application to your personal needs.

PIA Mobile

Use the product *selection, configuration and device information and history* with the version optimized for mobile devices.
www.siemens.com/piamobile

Product details

Find all relevant product information at a single glance: commercial and technical data, certificates, images and documents etc.

More information

PIA Life Cycle Portal
Ostliche Rheinbrückenstraße 50
76187 Karlsruhe, Germany
Tel.: +49 (721) 595 2114
E-Mail: support.pia-portal@siemens.com
www.siemens.com/pia-portal

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Overview

Fast Delivery Time

Our devices are anything but products off the rack. Numerous customer requirements can be taken into account when configuring any of our products. This results in large variety.

In the selection and ordering data, we show you how to use various identifiers to locate the products from our standard portfolio and stock items.

Quick Ship Programm

Selection and Ordering data			Article No.
Pressure transmitters for absolute pressure from gauge pressure series, SITRANS P DS III with HART			**7MF4233-**
Measuring cell filling	**Measuring cell cleaning**		
Silicone oil	normal	⬟	1
Inert liquid	grease-free to cleanliness level 2		3
Measuring span (min. ... max.)			
8.3 ... 250 mbar a	(0.12 ... 3.62 psia)	⬟	D
43 ... 1300 mbar a	(0.62 ... 18.85 psia)	⬟	F
0.16 ... 5 bar a	(2.32 ... 72.5 psia)	⬟	G
1 ... 30 bar a	(14.5 ... 435 psia)	⬟	H
Wetted parts materials			
Seal diaphragm	Process connection		
Stainless steel	Stainless steel	⬟	A
Hastelloy	Stainless steel		B
Hastelloy	Hastelloy		C
Version for diaphragm seal			Y
Process connection			
• Connection shank G½B to EN 837-1		⬟	0
• Female thread ½-14 NPT		⬟	1
• Stainless steel oval flange with process connection (Oval flange has no female thread)			
- Mounting thread $^{7}/_{16}$-20 UNF to EN 61518			2
- Mounting thread M10 to DIN 19213			3
- Mounting thread M12 to DIN 19213			4
• Male thread M20 x 1.5			5
• Male thread ½ -14 NPT			6
Non-wetted parts materials			
• Housing made of die-cast aluminium		⬟	0
• Housing stainless steel precision casting			3

Ordering options with the ⬟ identifier refer to products from our Quick Ship Program. If you combine only ordering options that are marked with a ⬟, these product variants can be produced and delivered within 5 to 15 days in limited quantity.

Stock Items

Selection and Ordering data		Article No.	Order code
SIPART PS2 electropneumatic positioner in enclosure made of Makrolon, aluminum and stainless steel		**6DR5**-0**-0A**	
Version			
2-wire (4 to 20 mA)			
• Without HART	▶	0	
• With HART, not explosion-protected	▶	1	
2-, 3-, 4-wire (0/4 to 20 mA)			
• With HART, explosion-protected	▶	2	
• Without HART, not explosion -protected		3	
PROFIBUS PA connection		5	
FOUNDATION Fieldbus connection		6	
For actuator			
Single-acting	▶	1	
Double-acting	▶	2	
Enclosure			
Makrolon	▶	0	
Aluminum; only single-acting		1 1	
Stainless steel (without window)		2	
Explosion protection			
Without	▶	N	
In type of protection (ATEX/IECEx/FM/CSA)	▶	E	
• intrinsic safety			
With protection type (ATEX/IECEx)[1]		D	
• Non-sparking			
• Dust protection via enclosure			

Ordering options with the ▶ identifier refer to stock items. If you combine only ordering options that are marked with a ▶, such a combination can be ordered from stock. If your order quantity is available from stock, your order usually leaves the warehouse within one day.

Contact

If you have questions about delivery time or the Quick Ship program, please contact your Siemens sales representative.

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General

The pressure equipment directive **97/23/EC** applies to the alignment of the statutory orders of the European member states for pressure equipment. Such equipment in the sense of the directive includes vessels, pipelines and accessories with a maximum permissible pressure of more than **0.5 bar** above atmospheric.

The pressure equipment directive can be used starting November 29, 1999, and is compulsory starting May 29, 2002.

Division according to the danger potential

Equipment is divided in line with the pressure equipment directive according to the danger potential (medium/pressure/volume/nominal diameter) into the categories I to IV or Article 3 Paragraph 3.

The following criteria are decisive for assessment of the danger potential, and are also shown in Diagrams 1 to 4 and 6 to 9:

• Fluid group	Group 1 or 2
• Aggregate state	Liquid or gaseous
• Type of pressurized equipment	
- Vessel	Product of pressure and volume (PS * V [barL])
- Pipeline	Nominal diameter, pressure or product of pressure and nominal diameter (PS * DN)

Fuelled pressure equipment or equipment heated in another manner are shown separately in Diagram 5.

Note:
Liquids according to Article 3 are those liquids whose steam pressure is **not** more than **0.5 bar** above standard atmospheric pressure (1013 mbar) at the maximum permissible temperature.

The **maximum permissible temperature** for the used liquids is the maximum process temperature which can occur, as defined by the user. This must be within the limits defined for the equipment.

ZERTIFIKAT

Qualitätssicherungs-System
nach Richtlinie 97/23/EG

CE 0045

Division of media (liquid/gaseous) into the fluid groups

Fluids are divided according to Article 9 into the following fluid groups:

Group 1

Explosive
R phrases:
e.g.: 2, 3 (1, 4, 5, 6, 9, 16, 18, 19, 44)

Very toxic
R phrases:
e.g.: 26, 27, 28, 39 (32)

Extremely flammable
R phrases:
e.g.: 12 (17)

Toxic
R phrases:
e.g.: 23, 24, 25 (29, 31)

Highly flammable
R phrases:
e.g.: 11, 15, 17 (10, 30)

Oxidizing
R phrases:
e.g.: 7, 8, 9 (14, 15, 19)

Flammable (where the maximum allowable temperature is above flashpoint)

Group 2

All fluids not belonging to Group 1.

Also applies to fluids which are e.g. dangerous to the environment, corrosive, dangerous to health, irritant or carcinogenic (if not highly toxic).

Conformity rating

Pressure equipment of categories I to IV must comply with the safety requirements of the directive and be assigned the CE symbol.

They must comply with a conformity rating procedure according to Appendix III of the directive.

Pressure equipment according to Article 3 Paragraph 3 must be designed and manufactured in agreement with the sound engineering practice SEP applying in a member country, and must not be assigned a CE symbol (CE symbols from other directives are not affected).

Siemens has carried out a conformity rating, assigned a CE symbol, and issued a declaration of conformity for its products (providing the equipment is not within the context of Article 3 Paragraph 3).

Supervision of the design, dimensioning, testing and manufacture is carried out according to module H (comprehensive quality assurance).

Notes:

- Equipment designed for media with a high danger potential (e.g. gases of fluid group 1) may also be used for media with a lower danger potential (e.g. gases of fluid group 2, or liquids of fluid groups 1 and 2).
- The pressure equipment directive according to Article 1 Paragraph 1 does not apply to equipment such as e.g. mobile offshore plants, ships, aircraft, water supply and waste water networks, nuclear plants, rockets and pipelines outside industrial plants.

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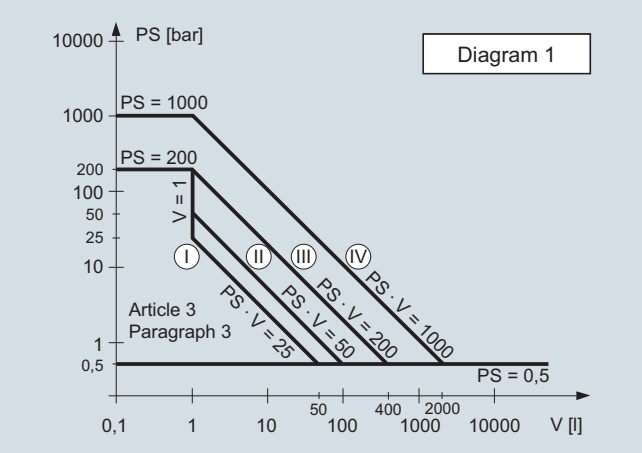
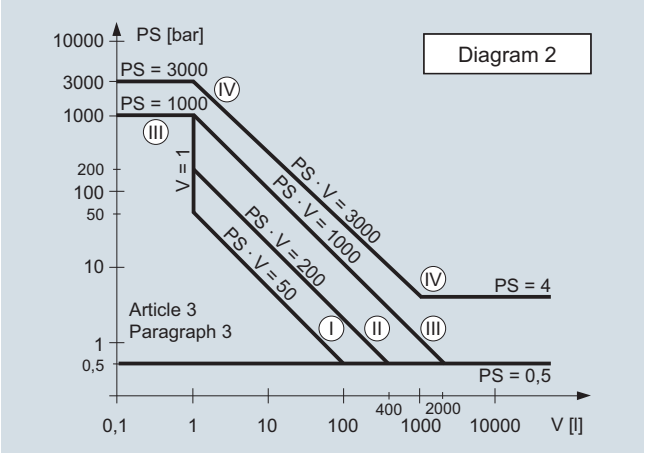
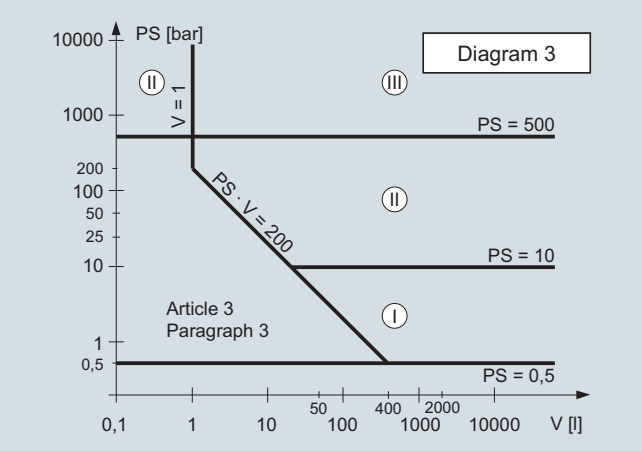
Diagrams



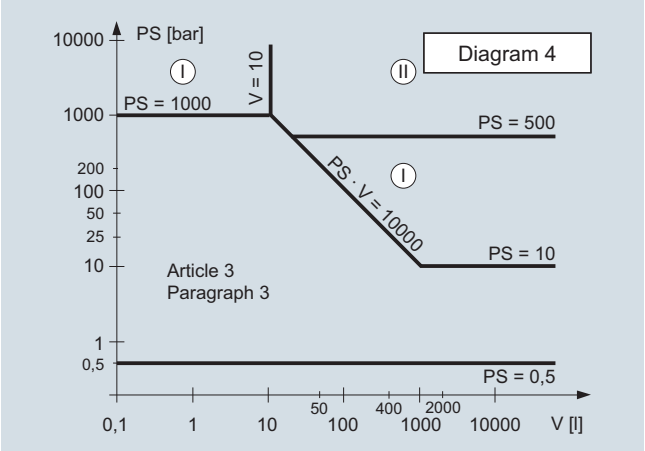
- Gases of fluid group 1
- Vessels according to Article 3 Number 1.1 Letter a) First dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.



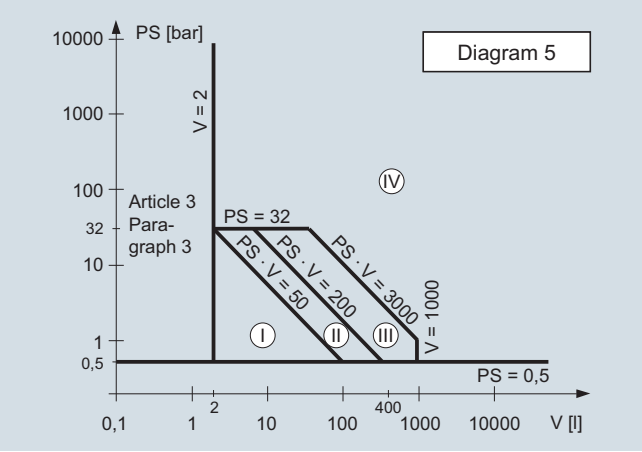
- Gases of fluid group 2
- Vessels according to Article 3 Number 1.1 Letter a) Second dash
- Exception: fire extinguishers and bottles for breathing apparatus: at least Category III.



- Liquids of fluid group 1
- Vessels according to Article 3 Number 1.1 Letter b) First dash



- Liquids of fluid group 2
- Vessels according to Article 3 Number 1.1 Letter b) Second dash
- Exception: modules for producing warm water



- Fuelled pressure equipment or equipment heated in another manner above 110 °C and liable to overheating.
- Vessel according to Article 3 Number 1.2
- Exception: pressure cooker, test procedure at least according to Category III.

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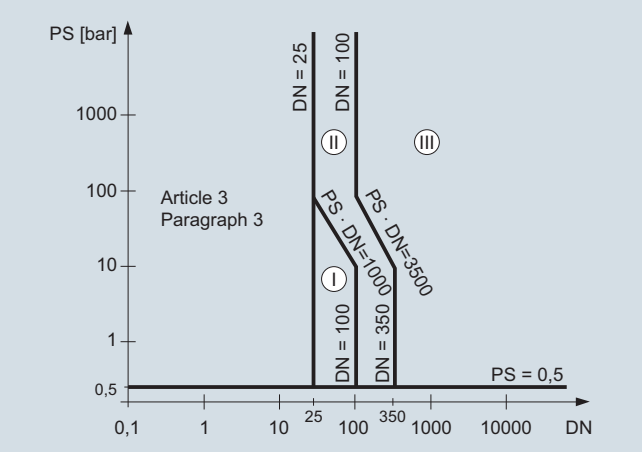
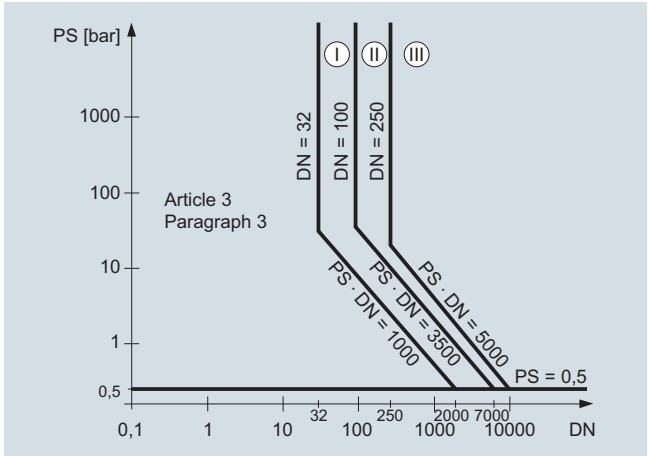
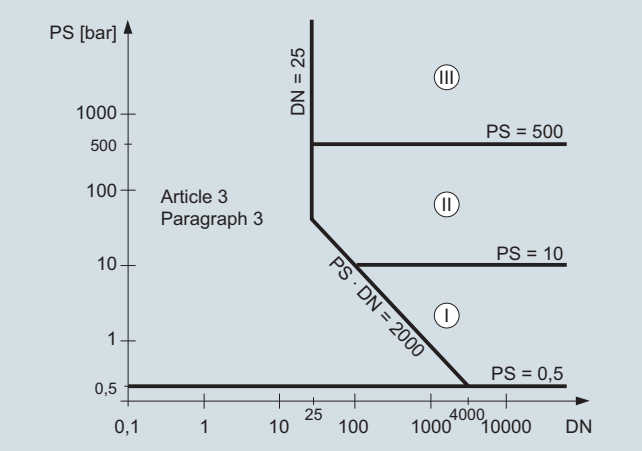


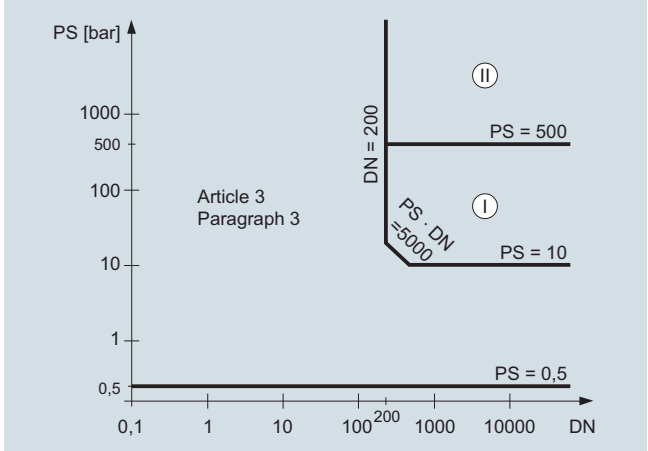
- Gases of fluid group 1
- Pipelines according to Article 3 Number 1.3 Letter a) First dash
- Exception: unstable gases belonging to Categories I and II must be included in Category III.



- Gases of fluid group 2
- Pipelines according to Article 3 Number 1.3 Letter a) Second dash
- Exception: liquids at temperatures > 350 °C belonging to Category II must be included in Category III.



- Liquids of fluid group 1
- Pipelines according to Article 3 Number 1.3 Letter b) First dash



- Liquids of fluid group 2
- Pipelines according to Article 3 Number 1.3 Letter b) Second dash

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Overview

Functional safety

Functional safety is a strong tradition at Siemens. Werner von Siemens realized as early as 1880 that safety in automated processes is not only a human obligation, it also makes economic sense. In the process industry, hazards for humans, plants and the environment must be minimized without affecting the production process. With Safety Integrated for Process Automation from Siemens, you benefit from a comprehensive product and service offering for safe, fault-tolerant applications.

What is the Safety Integrity Level (SIL)?

The Safety Integrity Level is a term from the field of functional safety. It helps you assess electrical/electronic/programmable electronic systems in terms of the reliability of their safety functions. The goal is to minimize the risk of malfunction of the system and thereby increase the protection of the employed personnel, the environment and property.

The international standard IEC 61508 describes the type of risk assessment as well as measures for designing appropriate safety functions ranging from sensors, logic processing and extending to actuators. The requirements for the process industry are further specified in IEC 61511-1.

Since the standards IEC 61508 and IEC 61511 for functional safety have been in effect, the demand for process instrumentation equipment conforming to SIL classification has continually increased. For this reason, the product portfolio is constantly expanded to include devices that meet the SIL standard.

You will find the current list of SIL devices from Siemens for process instrumentation available today at:

www.siemens.com/SIL

Additional information

Brochure: "Functional Safety in Process Instrumentation with SIL Rating"

http://www.automation.siemens.com/w1/efiles/automation-technology/pi/SIL/SIL_Broschuere_en.pdf

Website: "Functional Safety"

http://www.industry.siemens.com/topics/global/en/safety-integrated

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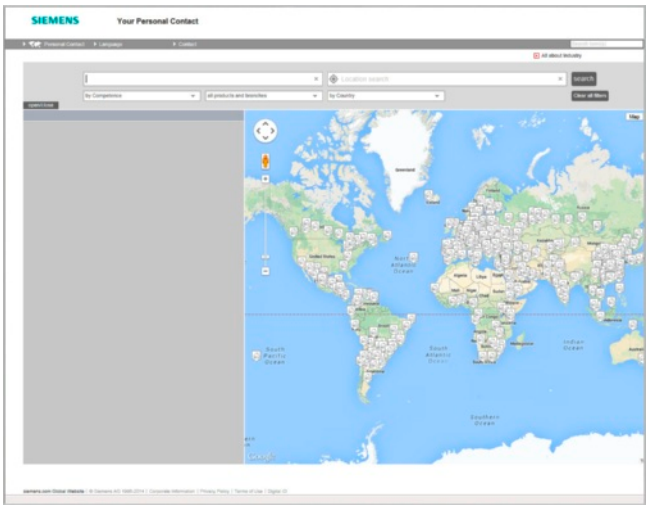

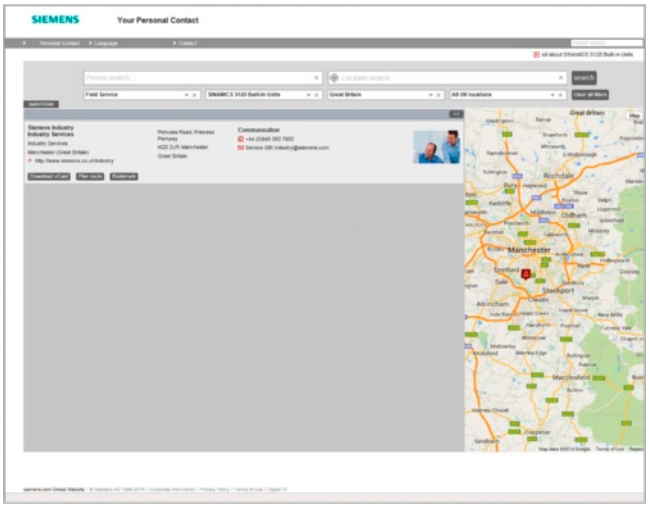

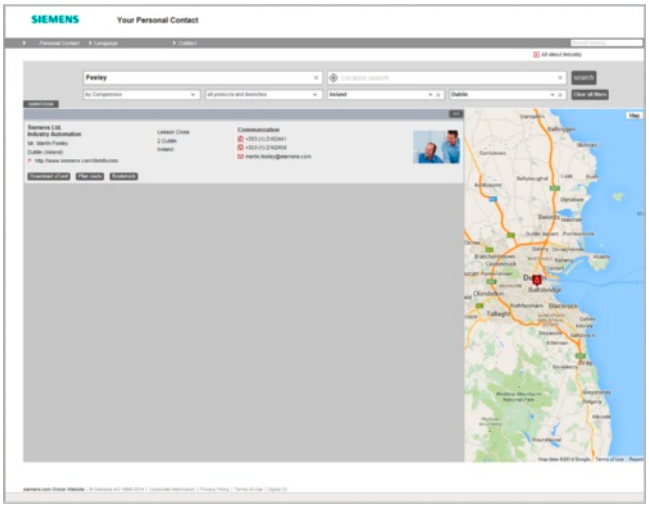

At Siemens Industry we are resolutely pursuing the same goal: long-term improvement of your competitive ability.
We are committed to this goal. Thanks to our commitment, we continue to set new standards in automation and drive technology. In all industries – worldwide.

At your service locally, around the globe for consulting, sales, training, service, support, spare parts ... on the entire Industry Automation and Drive Technologies range.

Your personal contact can be found in our Contacts Database at:
www.siemens.com/automation/partner

You start by selecting

- the required competence,
- products and branches,
- a country,
- a city

or by a

- location search or
- person search.

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Unique support for educators and students in educational institutions

Cooperates with Education

Automation

SIEMENS

Siemens Automation Cooperates with Education (SCE) offers a global system for sustained support of technical skills. SCE supports educational institutions in their teaching assignment in the industrial automation sector and offers added value in the form of partnerships, technical expertise, and know-how. As the technological leader, our comprehensive range of services can support you in the knowledge transfer for Industry 4.0.

Our services at a glance

- Training curriculums for your lessons
- Trainer packages for hands-on learning
- Courses convey up-to-date, specialist knowledge
- Support for your projects/textbooks
- Complete didactic solutions from our partners
- Personal contact for individual support

Training curriculums for your lessons

Use our profound industrial know-how for practice-oriented and individual design of your course. We offer you more than 100 didactically prepared training curriculums on the topics of automation and drives technology free of charge. These materials are perfectly matched to your curricula and syllabuses, and optimally suited for use with our trainer packages. This takes into account all aspects of a modern industrial solution: installation, configuration, programming, and commissioning. All documents, including projects, can be individually matched to your specific requirements.

Particular highlights:

- With the new SIMATIC PCS 7 curriculums and trainer packages, you can pass on basic, practice-oriented PCS 7 knowledge at universities within about 60 hours (= 1 semester), using plant simulation.
- The new TIA Portal training materials for SIMATIC S7-1200 are available in English, German, French, Italian, Spanish and Chinese for download.

www.siemens.com/sce/documents

Trainer packages for hands-on learning

Our SCE trainer packages offer a specific combination of original industrial components which are perfectly matched to your requirements and can be conveniently used in your course. These price reduced bundles available exclusively to schools include innovative and flexible hardware and software packages. SCE can currently offers more than 90 SCE trainer packages including related equipment. These cover both the factory and process automation sectors. You can use them to impart the complete course contents on industrial automation at a very low cost.

Trainer packages are available for:

- Introduction to automation technology with LOGO! logic module and SIMATIC S7-1200 compact controller
- PLC engineering with SIMATIC S7 hardware and STEP 7 software (S7-300, S7-1500 and TIA Portal)
- Operator control and monitoring with SIMATIC HMI
- Industrial networking over bus systems with SIMATIC NET (PROFINET, PROFIBUS, IO-Link)
- Sensor systems with VISION, RFID and SIWAREX
- Process automation with SIMATIC PCS 7
- Power Monitoring Devices SENTRON PAC 4200
- Motor Management SIMOCODE
- Networked drive and motion technologies with SINAMICS/ SIMOTION
- CNC programming with SinuTrain

Important ordering notes:

Only the following institutions are authorized to obtain trainer packages: vocational schools, Colleges and Universities, in-house vocational training departments, non commercial research institutions and non commercial training departments.

To purchase a trainer package, you require a specific end-use certificate, which you can obtain from your regional sales office.

www.siemens.com/sce/tp

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Unique support for educators and students in educational institutions (continued)

Courses convey up-to-date specialist knowledge

Profit from our excellent know-how as the leader in industrial technologies. We offer you specific courses for automation and drive technology worldwide. These support you in the practice-oriented transferring of product and system know-how, are in conformance with curriculums, and derived from the training fields. Compact technical courses especially for use at universities are also available.

Our range of courses comprises a wide variety of training modules based on the principle of Totally Integrated Automation (TIA). The focus is on the same subject areas as with the SCE trainer packages.

Every PLC and drive course is oriented on state-of-the-art technology. Your graduates can thus be prepared optimally for their future professional life.

In some countries we are offering classes based on our training curriculums. Please inquire with your SCE contact partner.

www.siemens.com/sce/contact

Support for your projects/textbooks

Automation and drive technology is characterized by continuous and rapid developments. Service and Support therefore play an important role.

We can provide you with consulting for selected projects and support from your personal SCE contact as well as our web based and regional Customer Support.

As a particular service, SCE supports technical authors with our know-how as well as with intensive technical consulting. Siemens library of special textbooks covering the industrial automation sector provides an additional resource for you and your students. These can be found at the SCE web site.

www.siemens.com/sce/contact
www.siemens.com/sce/books

Complete didactic solutions

Our partners for learning systems offer a wide range of training systems and solutions for use in your courses or laboratory.

These models have been designed based on our trainer packages and thus save you the time and cost of self-construction of individual components. The Partner systems provide you with simple and effective help in the fulfillment of your teaching assignment.

www.siemens.com/sce/partner

Contact for individual support

You can find your personal SCE contact on our Internet site. Your local SCE Promoter will answer all your questions concerning the complete SCE offering, and provide you with timely and competent information about innovations. When you encounter challenges, you can profit from our global team of excellence.

If a direct SCE contact is not listed for your country, please contact your local Siemens office.

www.siemens.com/sce/contact

SCE Support Finder for your Internet request

You are an educator and need support on the topic of industry automation? Send us your request:

www.siemens.com/sce/supportfinder

Scan the QR code for further information (SCE homepage)

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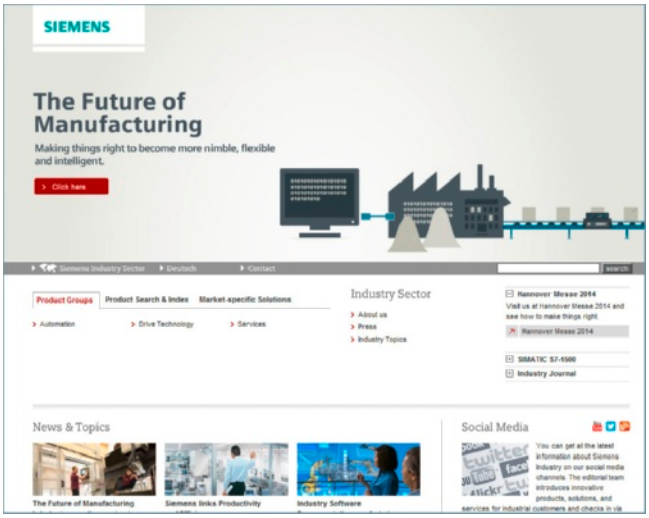
Siemens Industry Automation and Drive Technologies in the WWW



A detailed knowledge of the range of products and services available is essential when planning and configuring automation systems. It goes without saying that this information must always be fully up-to-date.

Siemens Industry Automation and Drive Technologies has therefore built up a comprehensive range of information in the World Wide Web, which offers quick and easy access to all data required.

Under the address

www.siemens.com/industry

you will find everything you need to know about products, systems and services.

Product Selection Using the Interactive Catalog CA 01 of Industry

Detailed information together with convenient interactive functions:
The interactive catalog CA 01 covers more than 80 000 products and thus provides a full summary of the Siemens Industry Automation and Drive Technologies product base.

Here you will find everything that you need to solve tasks in the fields of automation, switchgear, installation and drives.
All information is linked into a user interface which is easy to work with and intuitive.

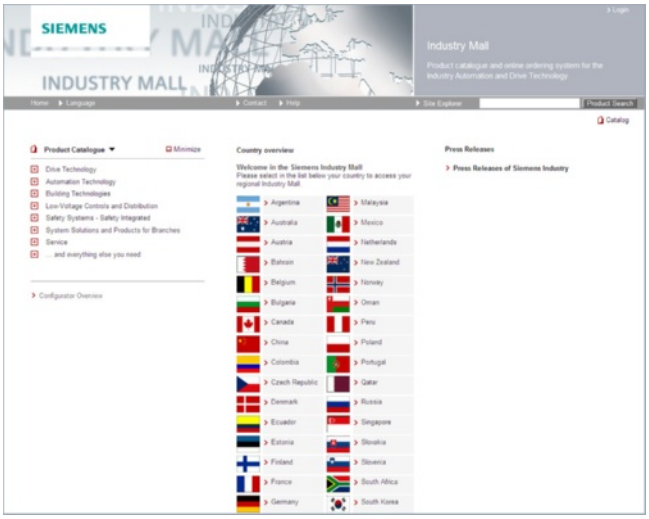
After selecting the product of your choice you can order at the press of a button, by fax or by online link.

Information on the interactive catalog CA 01 can be found in the Internet under

www.siemens.com/automation/ca01

or on DVD.

Easy Shopping with the Industry Mall



The Industry Mall is the electronic ordering platform of Siemens AG on the Internet. Here you have online access to a huge range of products presented in an informative and attractive way.

Data transfer via EDIFACT allows the whole procedure from selection through ordering to tracking and tracing of the order to be carried out. Availability checks, customer-specific discounts and preparation of quotes are also possible.

Numerous additional functions are available to support you.

For example, powerful search functions make it easy to select the required products. Configurators enable you to configure complex product and system components quickly and easily. CAx data types are also provided here.

Please visit the Industry Mall on the Internet under:

www.siemens.com/industrymall

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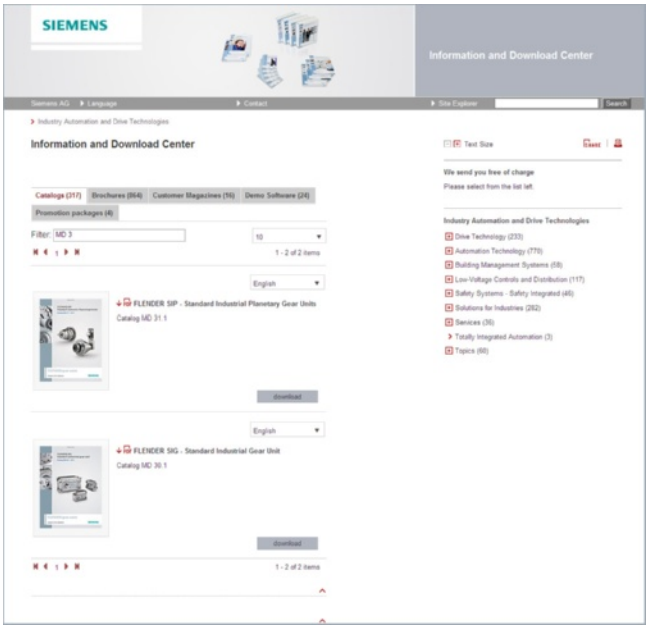
Information and Download Center, Social Media, Mobile Media

Downloading Catalogs



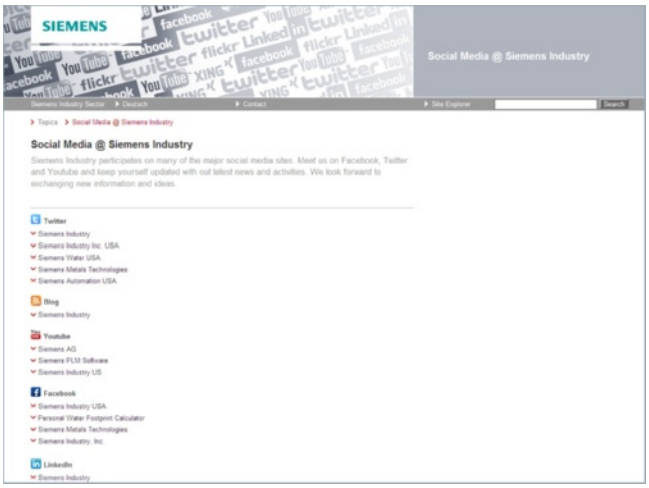
In addition to numerous other useful documents, you can also find the catalogs listed on the back inside cover of this catalog in the Information and Download Center. Without having to register, you can download these catalogs in PDF format or increasingly as digital page-turning e-books.

The filter dialog box above the first catalog displayed makes it possible to carry out targeted searches. If you enter “MD 3” for example, you will find both the MD 30.1 and MD 31.1 catalogs. If you enter “ST 70” both the ST 70 catalog and the associated news or add-ons are displayed.

Visit us on the web at:

www.siemens.com/industry/infocenter

Social Media



Connect with Siemens through social media: visit our social networking sites for a wealth of useful information, demos on products and services, the opportunity to provide feedback, to exchange information and ideas with customers and other Siemens employees, and much, much more. Stay in the know and follow us on the ever-expanding global network of social media.

Connect with Siemens Industry at our central access point:

www.siemens.com/industry/socialmedia

Or via our product pages at:

www.siemens.com/automation

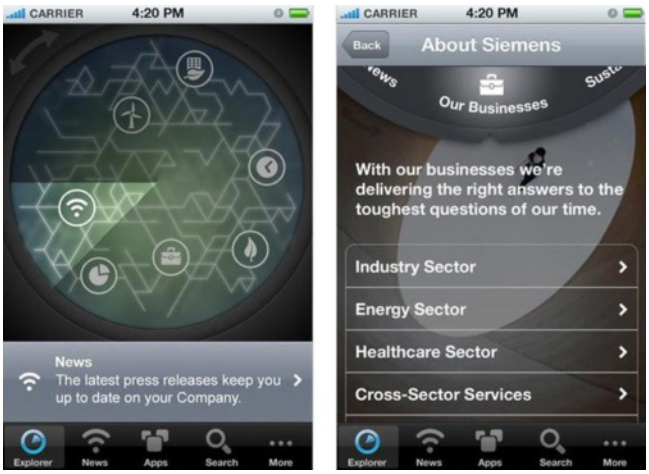
or

www.siemens.com/drives

To find out more about Siemens' current social media activities visit us at:

www.siemens.com/socialmedia

Mobile Media



Discover the world of Siemens.

We are also constantly expanding our offering of cross-platform apps for smartphones and tablets. You will find the current Siemens apps at the app store (iOS) or at Google Play (Android).

The Siemens app, for example, tells you all about the history, latest developments and future plans of the company – with informative pictures, fascinating reports and the most recent press releases.

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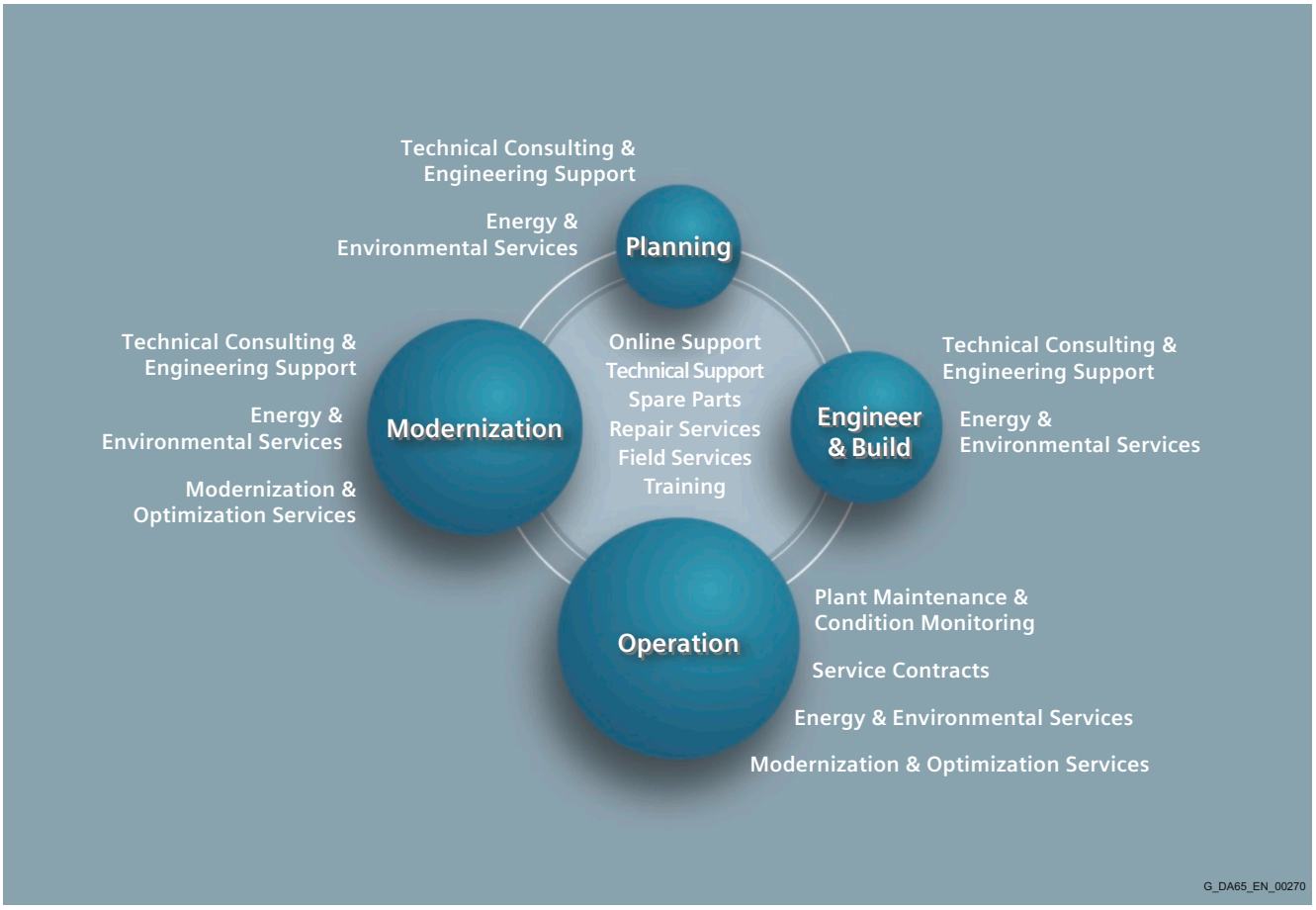
Your machines and plant can do more – with Industry Services.

Whether it is production or process industry - in view of rising cost pressure, growing energy costs, and increasingly stringent environmental regulations, services for industry are a crucial competitive factor in manufacturing as well as in process industries.

All over the world Siemens supports its customers with product, system, and application-related services throughout the entire life cycle of a plant. Right from the earliest stages of planning, engineering, and building, all the way to operation and modernization. These services enable customers to benefit from the Siemens experts' unique technological and product knowledge and industry expertise.

Thus downtimes are reduced and the utilization of resources is optimized. The bottom line: increased plant productivity, flexibility, and efficiency, plus reduced overall costs.

Discover all advantages of our service portfolio:
www.siemens.com/industry-services



Siemens supports its clients with technology based Services across a plants entire life cycle.

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Industry Services for the entire life cycle

Online Support

Online support is a comprehensive information system for all questions relating to products, systems, and solutions that Siemens has developed for industry over time. With more than 300,000 documents, examples and tools, it offers users of automation and drive technology a way to quickly find up-to-date information. The 24-hour service enables direct, central access to detailed product information as well as numerous solution examples for programming, configuration and application.

The content, in six languages, is increasingly multimediabased – and now also available as a mobile app. Online support's "Technical Forum" offers users the opportunity to share information with each other. The "Support Request" option can be used to contact Siemens' technical support experts. The latest content, software updates, and news via newsletters and Twitter ensure that industry users are always up to date.

www.siemens.com/industry/onlinesupport

Online Support App

Using the Online Support app, you can access over 300,000 documents covering all Siemens industrial products - anywhere, any time. Regardless of whether you need help implementing your project, fault-finding, expanding your system or are planning a new machine.

You have access to FAQs, manuals, certificates, characteristics curves, application examples, product notices (e.g. announcements of new products) and information on successor products in the event that a product is discontinued.

Just scan the product code printed on the product directly using the camera of your mobile device to immediately see all technical information available on this product at a glance. The graphical CAx information (3D model, circuit diagrams or EPLAN macros) is also displayed. You can forward this information to your workplace using the e-mail function.

The search function retrieves product information and articles and supports you with a personalized suggestion list. You can find your favorite pages – articles you need frequently – under "mySupport". You also receive selected news on new functions, important articles or events in the News section.

Scan the QR code for information on our Online Support app.

The app is available free of charge from the Apple App Store (iOS) or from Google Play (Android).

www.siemens.com/industry/onlinesupportapp

Technical Support

The ability to quickly analyze system and error messages and take appropriate action are key factors in ensuring that plants run safely and efficiently. Questions can arise at any time and in any industry, whether it's an individual product or a complete automation solution. Siemens technical support offers individual technical assistance in matters related to functionality, how to operate, applications, and fault clearance in industrial products and systems – at any time and globally, over the phone, by e-mail, or via remote access. Experienced experts from Siemens answer incoming questions promptly. Depending on the requirements, they first consult specialists in the areas of development, on-site services, and sales. Technical support is also available for discontinued products that are no longer available. Using the support request number, any inquiry can be clearly identified and systematically tracked.

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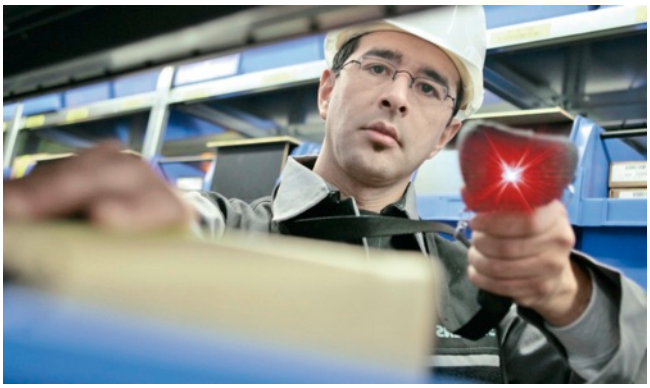
Spare Parts

Drive and automation systems must be available at all times. Even a single missing spare part can bring the entire plant to a standstill – and result in substantial financial losses for the operator. The spare parts services from Siemens protects against such losses – with the aid of quickly available, original spare parts that ensure smooth interaction with all other system components. Spare parts are kept on hand for up to ten years; defective parts can be returned. For many products and solutions, individual spare parts packages ensure a preventive stock of spare parts on-site. The spare parts services is available around the world and around the clock. Optimum supply chain logistics ensure that replacement components reach their destination as quickly as possible. Siemens' logistics experts take care of planning and management as well as procurement, transportation, customs handling, warehousing, and complete order management for spare parts.



Repair Services

Reliable electrical and electronic equipment is crucial for operating continuous processes. That is why it is essential that motors and converters always undergo highly specialized repair and maintenance. Siemens offers complete customer and repair services – on site and in repair centers – as well as technical emergency services worldwide. The repair services include all measures necessary to quickly restore the functionality of defective units. In addition, services such as spare parts logistics, spare parts storage and rapid manufacturing are available to plant operators in all verticals. With a global network of certified repair shops operated by Siemens as well as third parties, Siemens handles the maintenance and overhaul of motors, converters, and other devices as an authorized service partner.

Field Services

It's a top priority in all industries: the availability of plants and equipment. Siemens offers specialized maintenance services such as inspection and upkeep as well as rapid fault clearance in industrial plants – worldwide, continuously, and even with emergency services as needed. The services include startup as well as maintenance and fault clearance during operation. The startup service includes checking the installation, function tests, parameterization, integration tests for machines and plants, trial operation, final acceptance, and employee training. All services, including remote maintenance of drives, are also available as elements of customized service contracts.

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Industry Services for the entire life cycle

Training

Increasingly, up-to-date knowledge is becoming a determining factor in success. One of the key resources of any company is well-trained staff that can make the right decision at the right moment and take full advantage of the potential. With SITRAIN – Training for Industry, Siemens offers comprehensive advanced training programs. The technical training courses convey expertise and practical knowledge directly from the manufacturer. SITRAIN covers Siemens' entire product and system portfolio in the field of automation and drives. Together with the customer, Siemens determines the company's individual training needs and then develops an advanced training program tailored to the desired requirements. Additional services guarantee that the knowledge of all Siemens partners and their employees is always up-to-date.

Technical Consulting & Engineering Support

The efficiency of plants and processes leads to sustainable economic success. Individual services from Siemens help save substantial time and money while also guaranteeing maximum safety. Technical consulting covers the selection of products and systems for efficient industrial plants. The services include planning, consulting, and conceptual design as well as product training, application support, and configuration verification – in all phases of a plant's lifecycle and in all questions related to product safety. Engineering support offers competent assistance throughout the entire project, from developing a precise structure for startup to product-specific preparation for implementation as well as support services in areas such as prototype development, testing and acceptance.

Energy & Environmental Services

Efficient energy use and resource conservation – these top sustainability concerns pay off – both for the environment and for companies. Siemens offers integrated solutions that unlock all technical and organizational potential for successful environmental management. Customized consulting services are aimed at sustainably lowering the cost of energy and environmental protection and thus increasing plant efficiency and availability. The experts provide support in the conceptual design and implementation of systematic solutions in energy and environmental management, enabling maximum energy efficiency and optimized water consumption throughout the entire company. Improved data transparency makes it possible to identify savings potential, reduce emissions, optimize production processes, and thereby noticeably cut costs.

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Modernization & Optimization Services

High machine availability, expanded functionality and selective energy savings – in all industries, these are decisive factors for increasing productivity and lowering costs. Whether a company wants to modernize individual machines, optimize drive systems, or upgrade entire plants, Siemens' experts support the projects from planning to commissioning.

Expert consulting and project management with solution responsibility lead to security and make it possible to specifically identify savings potential in production. This secures investments over the long term and increases economic efficiency in operation.

Plant Maintenance & Condition Monitoring

Modern industrial plants are complex and highly automated. They must operate efficiently in order to ensure the company's competitive strength. In addition, the steadily increasing networking of machines and plants require consistent security concepts. Maintenance and status monitoring as well as the implementation of integrated security concepts by Siemens' experts support optimum plant use and avoid downtime. The services include maintenance management as well as consulting on maintenance concepts, including the complete handling and execution of the necessary measures. Complete solutions also cover remote services, including analysis, remote diagnosis, and remote monitoring. These are based on the Siemens Remote Services platform with certified IT security.

Service Contracts

Making maintenance costs calculable, reducing interfaces, speeding up response times, and unburdening the company's resources – the reduced downtimes that these measures achieve increase the productivity of a plant. Service contracts from Siemens make maintenance and repairs more cost-effective and efficient. The service packages include local and remote maintenance for a system or product group in automation and drive technology. Whether you need extended service periods, defined response times, or special maintenance intervals, the services are compiled individually and according to need. They can be adjusted flexibly at any time and used independently of each other. The expertise of Siemens' specialists and the capabilities of remote maintenance thus ensure reliable and fast maintenance processes throughout a plant's entire lifecycle.

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Overview

Software types

Software requiring a license is categorized into types.
The following software types have been defined:

- Engineering software
- Runtime software

Engineering software

This includes all software products for creating (engineering) user software, e.g. for configuring, programming, parameterizing, testing, commissioning or servicing.

Data generated with engineering software and executable programs can be duplicated for your own use or for use by third-parties free-of-charge.

Runtime software

This includes all software products required for plant/machine operation, e.g. operating system, basic system, system expansions, drivers, etc.

The duplication of the runtime software and executable programs created with the runtime software for your own use or for use by third-parties is subject to a charge.

You can find information about license fees according to use in the ordering data (e.g. in the catalog). Examples of categories of use include per CPU, per installation, per channel, per instance, per axis, per control loop, per variable, etc.

Information about extended rights of use for parameterization/configuration tools supplied as integral components of the scope of delivery can be found in the readme file supplied with the relevant product(s).

License types

Siemens Industry Automation & Drive Technologies offers various types of software license:

- Floating license
- Single license
- Rental license
- Rental floating license
- Trial license
- Demo license
- Demo floating license

Floating license

The software may be installed for internal use on any number of devices by the licensee. Only the concurrent user is licensed. The concurrent user is the person using the program. Use begins when the software is started.
A license is required for each concurrent user.

Single license

Unlike the floating license, a single license permits only one installation of the software per license.

The type of use licensed is specified in the ordering data and in the Certificate of License (CoL). Types of use include for example per instance, per axis, per channel, etc.

One single license is required for each type of use defined.

Rental license

A rental license supports the "sporadic use" of engineering software. Once the license key has been installed, the software can be used for a specific period of time (the operating hours do not have to be consecutive).
One license is required for each installation of the software.

Rental floating license

The rental floating license corresponds to the rental license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Trial license

A trial license supports "short-term use" of the software in a non-productive context, e.g. for testing and evaluation purposes. It can be transferred to another license.

Demo license

The demo license support the "sporadic use" of engineering software in a non-productive context, for example, use for testing and evaluation purposes. It can be transferred to another license. After the installation of the license key, the software can be operated for a specific period of time, whereby usage can be interrupted as often as required.

One license is required per installation of the software.

Demo floating license

The demo floating license corresponds to the demo license, except that a license is not required for each installation of the software. Rather, one license is required per object (for example, user or device).

Certificate of license (CoL)

The CoL is the licensee's proof that the use of the software has been licensed by Siemens. A CoL is required for every type of use and must be kept in a safe place.

Downgrading

The licensee is permitted to use the software or an earlier version/release of the software, provided that the licensee owns such a version/release and its use is technically feasible.

Delivery versions

Software is constantly being updated.
The following delivery versions

- PowerPack
- Upgrade

can be used to access updates.

Existing bug fixes are supplied with the ServicePack version.

PowerPack

PowerPacks can be used to upgrade to more powerful software. The licensee receives a new license agreement and CoL (Certificate of License) with the PowerPack. This CoL, together with the CoL for the original product, proves that the new software is licensed.
A separate PowerPack must be purchased for each original license of the software to be replaced.

Upgrade

An upgrade permits the use of a new version of the software on the condition that a license for a previous version of the product is already held.
The licensee receives a new license agreement and CoL with the upgrade. This CoL, together with the CoL for the previous product, proves that the new version is licensed.
A separate upgrade must be purchased for each original license of the software to be upgraded.

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Overview

ServicePack

ServicePacks are used to debug existing products. ServicePacks may be duplicated for use as prescribed according to the number of existing original licenses.

License key

Siemens Industry Automation & Drive Technologies supplies software products with and without license keys.

The license key serves as an electronic license stamp and is also the "switch" for activating the software (floating license, rental license, etc.).

The complete installation of software products requiring license keys includes the program to be licensed (the software) and the license key (which represents the license).

Software Update Service (SUS)

As part of the SUS contract, all software updates for the respective product are made available to you free of charge for a period of one year from the invoice date. The contract will automatically be extended for one year if it is not canceled three months before it expires.

The possession of the current version of the respective software is a basic condition for entering into an SUS contract.

You can download explanations concerning license conditions from www.siemens.com/automation/salesmaterial-as/catalog/en/terms_of_trade_en.pdf

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SINAMICS GM150, SINAMICS SM150 Medium-Voltage Converters	D 12
SINAMICS PERFECT HARMONY GH180 Medium-Voltage Air-Cooled Drives Germany Edition	D 15.1
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To ensure the secure operation of a plant or machine it is also necessary to take suitable preventive action (e.g. cell protection concept) and to integrate the automation and drive components into a state-of-the-art holistic industrial security concept for the entire plant or machine. Any third-party products that may be in use must also be taken into account. Please find further information at:
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Get more information

All the latest information on field instruments for process automation can be found on the internet at
www.siemens.com/processinstrumentation

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