

Level Measurement



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

Level Measurement

Product overview

Overview

	Application	Device description	Page	Programming Software
Point level measurement - 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	5/10	-
		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	5/15	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	5/41	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	5/61	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	5/79	-
		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 SIL-2 Safety Functions in terms of IEC 61511-1 First Edition 2003-01	5/85	-
	Reliable vibrating point level switches for bulk solids in a wide variety of applications at a competitive price	SITRANS LVS100/LVS200	5/101, 5/104	-
		Vibrating point level switch designed to be impervious to external vibrations and to provide reliable performance in demanding bulk solids applications		
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	5/112	-
		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		
Point level measurement - Heading				
	Electro-mechanical tilt switch for point level detection, and feed loss detection on conveyor belts	Milltronics Tilt switch	5/122	-
		- Rugged, stainless steel encapsulated probe - Provides a signal when material tilts it through an angle of more than 17° in any direction		

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Product overview

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	5/127	-
Continuous level measurement - Ultrasonic transmitters			
	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 5 m model 24 V DC - Two-wire system with current loop	5/131	-
	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 - Patented Sonic Intelligence signal processing - Extremely high signal-to-noise ratio - Auto False-Echo Suppression of false echoes	5/134	SIMATIC PDM
Continuous level measurement - Ultrasonic controllers			
	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	5/138	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	5/143	SIMATIC PDM
	Non-contacting, cost-effective solution for reliable control of level and flow measurements in water and wastewater applications HydroRanger Plus - Available as 19" rack, for panel mounting or in wall enclosure - Compatible with Echomax® ultrasonic transducers	5/147	Dolphin Plus
	Complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms SITRANS LUC500 - Monitoring and control in one device - Integral telemetry interface (Modbus® RTU/ASCII) - Expandable platform to handle any liquid application from tank level measurement to pump control	5/151	Dolphin Plus
	Ultrasonic long-range level monitoring system for liquids and solids SITRANS LU01/LU02/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	5/156, 5/161	Dolphin Plus

Level Measurement

Product overview

	Application	Device description	Page	Programming Software
	Output modules for SITRANS LU10	SITRANS LU SAM/SITRANS LU AO		
		- SITRANS LU SAM satellite alarm module provides up to 20 relay contacts for the measurement points connected to a SITRANS LU10 - SITRANS LU AO analog output module provides remote analog outputs for the measurement points of the SITRANS LU10 transceiver	5/164 5/166	- -
Continuous level measurement - Ultrasonic transducers				
	ST-H: ETFE or PVDF transducer for chemicals	ST-H/Echomax XRS-5	5/169	-
	XRS-5: Standard transducer for applications to 8 m (26 ft)	- The narrow design of the ST-H allows the sensor to be mounted using a 2" connection - XRS-5: narrow beam angle of only 10°, measuring range maximum 8 m (26 ft) for measurement of liquids, solids and slurries	5/172	-
	Transducers for liquids and bulk solids	Echomax XPS and XCT/XLT	5/175	-
	XPS and XCT series: Hermetically sealed PVDF enclosure for chemical immunity	- XPS series offers versions for various distances up to 40 m (130 ft) and up to a max. temperature of +95 °C (+203 °F) - XCT series for applications at high temperatures, for measurement of levels at distances up to 12 m (40 ft) and up to a max. temperature of +145 °C (+293 °F)	5/175	-
	XLT: Designed for high temperature and long range applications	XLT: measuring ranges from 0.9 ... 60 m (1.8 ... 200 ft) and temperatures up to +150 °C (+302 °F). Beam angle of just 5° provides accurate readings in solids storage bunkers	5/185	
Continuous level 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	5/196	SIMATIC PDM AMS
	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	5/200	SIMATIC PDM AMS
		- 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		
	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); ideal for small vessels and low dielectric media	SITRANS LR250	5/215	SIMATIC PDM AMS
		- 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 nozzels - Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions - Communication using HART® or PROFIBUS PA		

	Application	Device description	Page	Programming Software
	2-wire, 25 GHz pulse radar level transmitter for continuous monitoring of solids up to 20 m (66 ft); ideal for measurement in extreme dust	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 nozzels • Process Intelligence signal processing for improved measurement reliability and Auto False-Echo Suppression of fixed obstructions • Communication using HART® or PROFIBUS PA	5/224	SIMATIC PDM
	4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media	SITRANS LR400 • Minimum maintenance requirements and wear as result of non-contacting measuring principle • High long-term stability resulting from self-calibration with highly stable internal reference • High measuring accuracy and repeatability as result of 24 GHz; narrow beam angle for tall, narrow vessels	5/229	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	5/237	SIMATIC PDM
Continuous level measurement - Guided wave radar transmitter				
	Guided wave radar transmitter for short- and medium-range level, level/interface and volume measurement of liquids and solids. It is unaffected by changes in process conditions, high temperatures and pressures, and steam	SITRANS LG200 • Measures accurately on materials with dielectric (dK) as low as 1.4 • Guided wave radar measurement for up to 2.5 mm (0.12") accuracy • Measures level and interface on challenging applications including foam • 3 button programming for quick setup • Reliable level measurement on harsh applications with pressure up to 430 bar g (6250 psi g) and temperatures as high as +427 °C (+800 °F)	5/246	SIMATIC PDM
Continuous level measurement - 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 • Patented active shield technology ensures measurements are unaffected by vapors, product deposits, dust and condensation	5/271	-
	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 • Patented active shield technology ensures measurements are unaffected by vapors, product deposits, dust and condensation	5/282	SIMATIC PDM

Level Measurement

Product overview

Application	Device description	Page	Programming Software
Continuous measurement - Open channel flow - Ultrasonic controller			
	High accuracy ultrasonic flow monitor for open channels OCM III • Compatible with most standard open channel weirs and flumes • AC and DC operation • Automatically switches to battery operation for uninterrupted power • MCERTS approved device	5/307	-
Communications and Displays			
	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	5/310 5/312	- -

Level Measurement

Point level measurement - Capacitance switches

Capacitance

Overview

Introduction

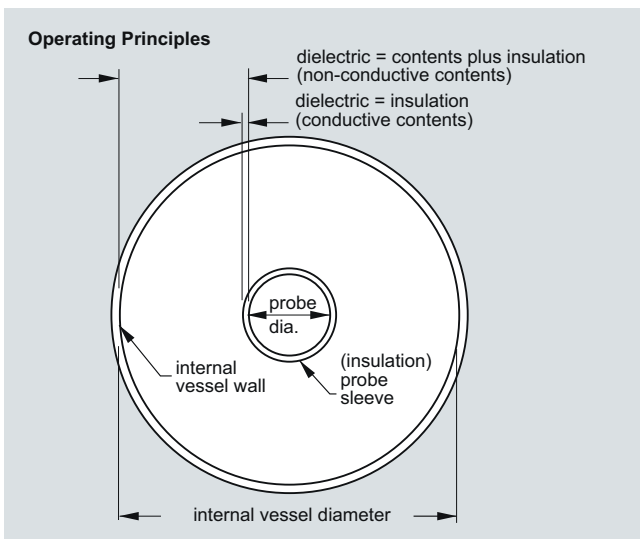
Inverse frequency shift capacitance point level switches and continuous level transmitters are designed to withstand the harsh environments of high pressure and high temperature applications.

Inverse Frequency Technology

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

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 vapour concentration, material buildup, dust or condensation.

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.

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 sites of the dielectric layer oppositely charged by a source of voltage, the electrical energy of the charged system is stored in the polarized dielectric.

Level Measurement

Point level measurement - Capacitance switches

Capacitance

Technical specifications

Criteria	Point level measurement				Continuous level/ Interface measurement	
	Pointek CLS100	Pointek CLS200	Pointek CLS300	Pointek CLS500	SITRANS LC300	SITRANS LC500
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	Conductive or non-conductive liquids, Water in oil, foam or liquid/foam level	Water in oil, foam or liquid/foam level, high-pressure coalescers, LNG (Liquified Natural Gas)
Max. length including sensor	100 mm (4")	Rod: 5.5 m (18 ft) Cable: up to 30 m (98 ft)	Rod: 1 m (40") Cable: 25 m (82 ft)	Rod: 1 m (40")	Rod: 5 m (18 ft) Cable: 25 m (82 ft)	Rod: 5.5 m (18 ft) Cable: 35 m (115 ft)
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)	-40 ... +200 °C (-40 ... +392 °F)	-50 ... +200 °C (-58 ... +392 °F) - Option: -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 (2175 psi g) - HP version: Up to 345 bar g (5004 psi g)	Up to 35 bar g (511 psi g)	- Up to 150 bar g (2175 psi g) - Option: Up to 345 bar g (5004 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	CLS200 Standard: 1 SPDT Form C relay, solid-state switch CLS200 Digital: - solid-state switch included	CLS300 Standard: 1 SPDT Form relay, solid-state switch CLS300 Digital: - solid-state switch included	4 ... 20/20 ... 4 mA 2-wire current loop - Solid-state switch	4 ... 20/20 ... 4 mA 2-wire current loop	4 ... 20/20 ... 4 mA 2-wire current loop - Solid-state switch
Communications		CLS200 Standard: 3 LED indicators CLS200 Digital: - PROFIBUS PA; SIMATIC PDM compatible	CLS300 Standard: 3 LED indicators CLS300 Digital: - PROFIBUS PA; SIMATIC PDM compatible	HART, SIMATIC PDM compatible		HART, SIMATIC PDM compatible
Power Specifications	- Standard: 12 ... 33 V DC - Intrinsically Safe (Stainless steel version only): 10 ... 30 V DC	CLS200 Standard: 12 ... 250 V AC/DC, 0-60 Hz, 2 W max. CLS200 Digital: - bus voltage: 12 ... 30 V DC, IS version 12 ... 24 V DC - current consumption: 12.5 mA	CLS300 Standard: 12 ... 250 V AC/DC, 0-60 Hz, 2 W max. CLS300 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)	12 ... 32 V DC any polarity, 2-wire current loop circuit	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, C-TICK, Lloyd's Register, WHG Fully-synthetic version (PPS): CSA, FM	CE, CSA, FM, ATEX, C-TICK, Lloyd's Register, WHG, Vlare II	CE, CSA, FM, ATEX, C-TICK, Lloyd's Register, WHG, Vlare II	CE, CSA, FM, ATEX, C-TICK, Lloyd's Register, Bureau Veritas, Current Signalling according to NAMUR NE 43	CE, CSA, FM, ATEX, C-TICK, Bureau Veritas, ABS, Current Signalling according to NAMUR NE 43	CE, CSA, FM, ATEX, C-TICK, Lloyd's Register, Bureau Veritas, Current Signalling according to NAMUR NE 43

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/in
Nozzle Diameter: _____ cm/in

Tank top: ☐ Open **Tank bottom:** ☐ Sloped **Mounting:** ☐ Top Mount
☐ Flat ☐ Flat ☐ Side Mount
☐ Conical ☐ Conical ☐ Pipe Mount
☐ Parabolic ☐ Parabolic

Process Data

Material being measured: _____ ☐ Liquid ☐ Solid ☐ Slurry

Material temperature: Norm: _____ °C/°F Max: _____ °C/°F

Measurement type: ☐ Point level
☐ Continuous level

Constant dielectric: ☐ No ☐ Yes DK Value _____

☐ Interface level

Upper material: _____ DK Value _____

Lower material: _____ DK Value _____

Process pressure: _____ Min. _____ Max. **Atmosphere steam:** ☐ No ☐ Yes

Coating build-up: ☐ No ☐ Yes **Conductive material:** ☐ No ☐ Yes pH Value _____

Installation

(indicate all that apply)

Power available: _____

Outputs required:

☐ 4 to 20 mA ☐ Relay ☐ Solid state

Communications

☐ HART ® / 4 to 20 mA ☐ PROFIBUS PA

Products recommended:

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS100

Overview



Pointek CLS100 is a compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries and foam.

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") 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.

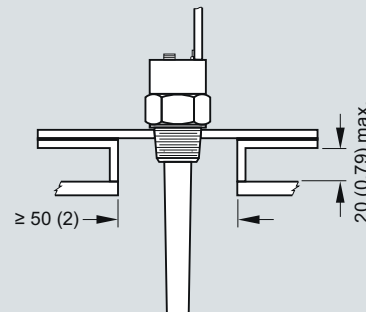
The Pointek CLS100 is available in three versions. The integral cable version has a stainless steel process connection and probe options of PPS or PVDF. The fully synthetic version has a thermoplastic polyester enclosure with a PPS process connection combined with a PPS probe. The standard enclosure 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

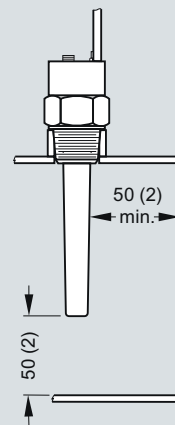
Configuration

Installation

Standpipes



Wall Restriction



Pointek CLS100 installation, dimensions in mm (inch)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS100

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 or 20/20 or 4 mA 2-wire loop	4 or 20/20 or 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")	2 mm (0.08")
Rated operating conditions²⁾		
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		
	<u>Enclosure/Integral cable version</u>	<u>Fully synthetic version</u>
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
Sensor length (nominal)	100 mm (4")	100 mm (4")

	Stainless steel process connection (integral cable or enclosure version) (7ML5501)	Fully synthetic process connection (enclosure version only) (7ML5610)
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 all one word, ½" NPT wiring entrance, M20 x 1.5 optional
Connection (Integral cable version)	4 conductors, 1 m (3.3 ft), 0.5 mm ² (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, C-TICK 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 nacc.smpi@siemens.com for alternative O Rings.
- 4) When FFKM O-ring (Option A22) is selected, process temperature is restricted to -20 °C (-4 °F).

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS100

Selection and Ordering data	Order No.
Pointek CLS100, stainless steel process connection	C) 7ML5501-0
Compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries and foam	
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, C-TICK	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), M20x1.5 cable inlet	7
Enclosure version with PVDF probe body, M20x1.5 cable inlet	8
WHG approval, German overfill protection	
Not required	0
Required	1

¹⁾ Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: 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	Order No.
Quick start manual, multi-language	7ML1998-5QJ82
Note: due to ATEX regulations one Quick start manual is included with every product. This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and Operating Instructions.	
Optional equipment	
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
Siemens Intrinsically Safe Barrier (DC powered), ATEX II 1 G EEx ia	7NG4122-1AA10
½" NPT cable gland, nickel plated brass, fits cable diameter 6 ... 12 mm (0.24 ... 0.47") -40 ... +100 °C (-40 ... +212 °F), IP68 (General Purpose)	7ML1830-1JA
M20x1.5 cable gland, PA polyamide, ATEX II 2G EEx e II, fits cable diameter 7 ... 12 mm (0.28 ... 0.47"), -20 ... +70 °C (-4 ... +158 °F), IP68 (General Purpose)	7ML1830-1JC

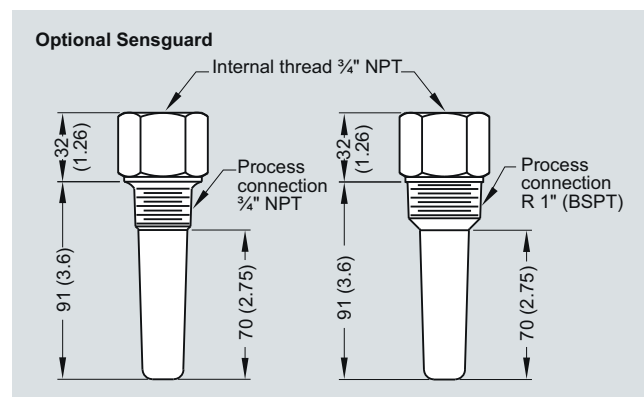
¹⁾ See Temperature restriction on page 5/13

Selection and Ordering data	Order No.
Pointek CLS100, PPS process connection	C) 7ML5610-0
Compact 2-wire inverse frequency shift capacitance switch for level detection in constricted spaces, interfaces, solids, liquids, slurries and foam	
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, M20x1.5	2

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: 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	Order No.
Quick start manual, multi-language	7ML1998-5QJ82
Note: due to ATEX regulations one Quick start manual is included with every product. This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and Operating Instructions.	
Optional equipment	
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

¹⁾ See Temperature restriction on page 5/13

Options



Optional Sensguard, dimensions in mm (inch)

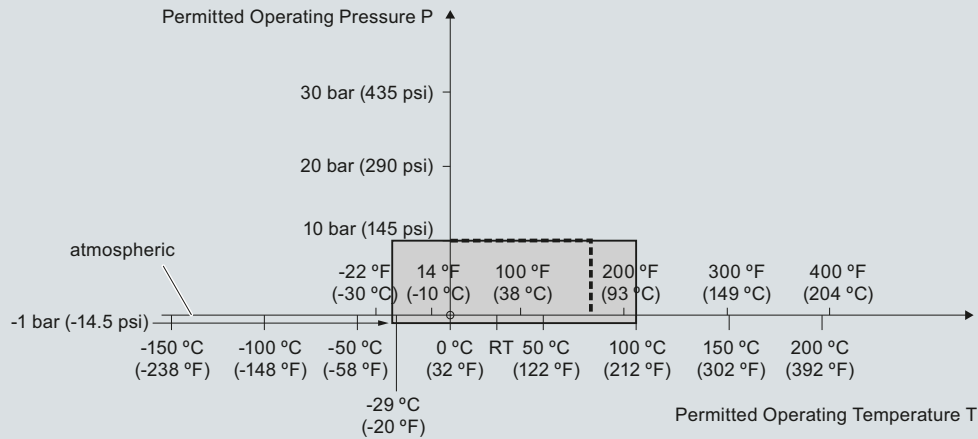
Level Measurement

Point level measurement - Capacitance switches

Pointek CLS100

Characteristic curves

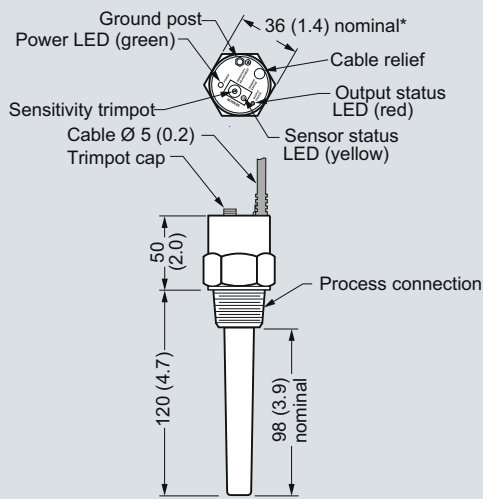
Pressure/Temperature Curve
CLS100
Threaded Process Connections
(7ML5501)



Pointek CLS100 Process Pressure/Temperature derating curves

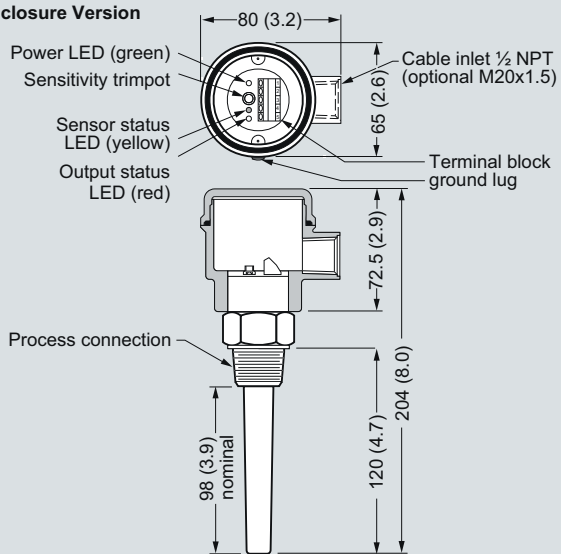
Dimensional drawings

Integral Cable Version



*Some G thread configurations deviate from this size.

Enclosure Version



Pointek CLS100, dimensions in mm (inch)

Level Measurement

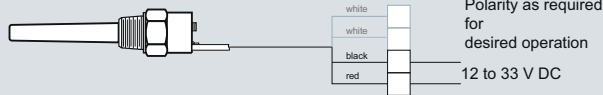
Point level measurement - Capacitance switches

Pointek CLS100

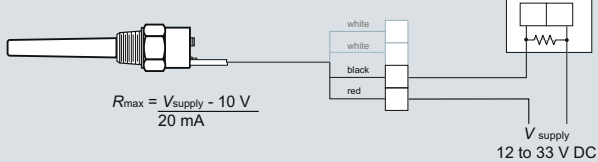
Schematics

Integral Cable Version - Non Intrinsically Safe only

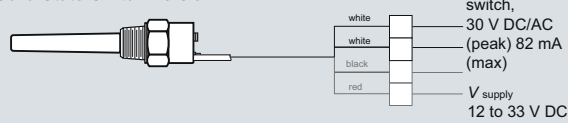
LOW/HIGH Alarm



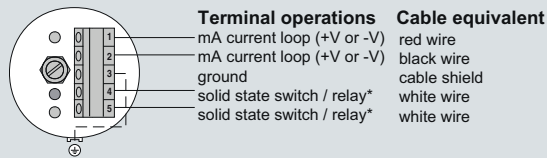
4 to 20 mA Loop Alarm



Solid State Switch Version



Enclosure and Fully Synthetic Version



* 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

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Overview



Pointek CLS200 (standard version) is 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.

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

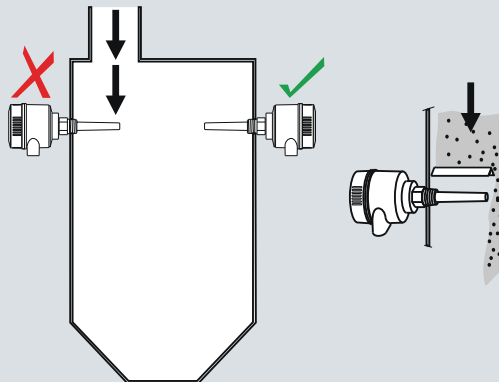
Pointek CLS200 standard version has 3 LED indicators with basic relay and solid-state switch alarms.

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

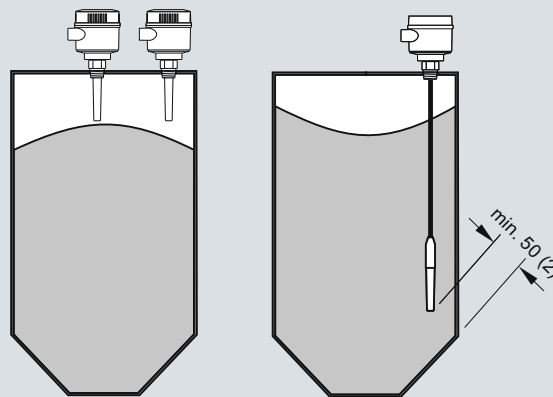
Installation



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") mm from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Technical specifications

Mode of operation		Design	
Measuring principle	Inverse frequency shift capacitive level detection	Material	Epoxy-coated aluminum with gasket
Input		• Enclosure	316L stainless steel
Measured variable	Change in picoFarad (pF)	• Optional thermal isolator	Removable terminal block, max. 2.5 mm ²
Output		Connection	IP65/Type 4/NEMA 4 (optional IP68)
Output signal		Degree of protection	2 x M20x1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)
• Relay output	1 SPDT Form C relay	Cable inlet	
- Max. contact voltage	• 30 V DC	Power supply	
- Max. contact current	• 250 V AC	12 ... 250 V AC/DC, 0 ... 60 Hz max. 2 W	
- Max. switching capacity	• 5 A (DC)	Certificates and approvals	
- Time delay (ON and/or OFF)	• 8 A (AC)	General Purpose	CSA, FM, CE, C-TICK
• Solid-state output	150 W (DC)	Dust Ignition Proof	ATEX II 1/2 D T100°C
- Output	2000 VA (AC)	Flameproof Enclosure With IS Probe	ATEX II 1 G EEx d[ia] IIC T6...T4
- Protection	1 ... 60 s	Dust Ignition Proof with IS Probe	ATEX II 1/2 D T100°C
- Max. switching voltage	Galvanically isolated	Explosion Proof Enclosure With IS Probe	CSA/FM Class II, Div. 1, Gr. E, F, G
- Max. load current	Against reversed polarity (bipolar)	Marine	CSA/FM Class III T4
- Voltage drop	• 30 V (DC)	Overfill Protection	CSA/FM Class I, Div. 1, Gr. A, B, C, D
- Time delay (pre or post switching)	• 30 V peak (AC)	Others	CSA/FM Class II, Div. 1, Gr. E, F, G
Rated operating conditions¹⁾			CSA/FM Class III T4
Installation conditions			Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
• Location	Indoor/outdoor		WHG (Germany)
Ambient conditions			VLAREM II
• Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾		Pattern Approval (China)
• 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 only be used under these conditions:		
	- Installed in a metallic vessel		
	- Wired with shielded cable		
	- Cable shields are terminated in suitable EMC rated cable glands at the device cable entry point.		

- 1) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/34.
- 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 5/34.

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard

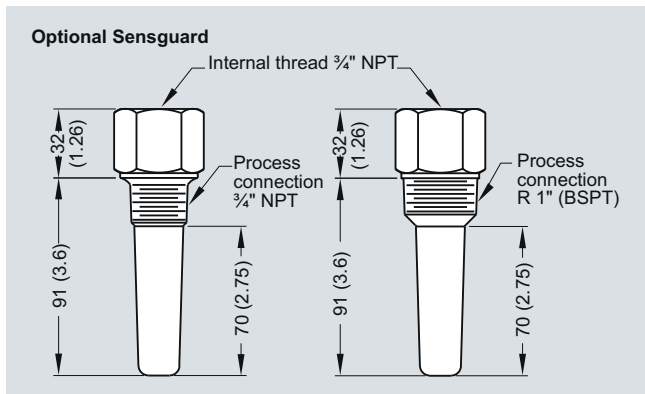
Design: Probe	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5500 mm (216.53")	5500 mm (216.53")	30000 mm (1181.1") liquids and slurries 5000 mm (196.85") solids (under loads)	5500 mm (216.53")
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 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 nacc.smpi@siemens.com for alternative O-rings.

³⁾ Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

Options



Optional Sensguard, dimensions in mm (inch)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data

Order No.

Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection

C) 7 M L 5 6 3 0 - 0

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

Process Connection

Threaded, 316L stainless steel

¾" NPT [(Taper), ANSI/ASME B1.20.1]
 1" NPT [(Taper), ANSI/ASME B1.20.1]
 1¼" NPT [(Taper), ANSI/ASME B1.20.1]
 1½" NPT [(Taper), ANSI/ASME B1.20.1]
 R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
 R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
 R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
 G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
 G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
 G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

0 A
 0 B
 0 C
 0 D
 1 A
 1 B
 1 D
 3 A
 3 B
 3 D

Welded flange, 316L stainless steel, raised face

1" ASME, 150 lb
 1" ASME, 300 lb
 1" ASME, 600 lb
 1½" ASME, 150 lb
 1½" ASME, 300 lb
 1½" ASME, 600 lb
 2" ASME, 150 lb
 2" ASME, 300 lb
 2" ASME, 600 lb
 3" ASME, 150 lb
 3" ASME, 300 lb
 3" ASME, 600 lb
 4" ASME, 150 lb
 4" ASME, 300 lb
 4" ASME, 600 lb

5 A
 5 B
 5 C
 5 D
 5 E
 5 F
 5 G
 5 H
 5 J
 5 K
 5 L
 5 M
 5 N
 5 P
 5 Q

Welded flange, 316L stainless steel, Type A flat faced

DN 25, PN 16
 DN 25, PN 40
 DN 40, PN 16
 DN 40, PN 40
 DN 50, PN 16
 DN 50, PN 40
 DN 80, PN 16
 DN 80, PN 40
 DN 100, PN 16
 DN 100, PN 40

6 A
 6 B
 6 C
 6 D
 6 E
 6 F
 6 G
 6 H
 6 J
 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"), Flanged 98 mm (3.86")]
 Extended rod, 250 mm (9.84")
 Extended rod, 350 mm (13.78")
 Extended rod, 500 mm (19.69")
 Extended rod, 750 mm (29.53")
 Extended rod, 1000 mm (39.37")
 Extended rod, 1250 mm (49.21")
 Extended rod, 1350 mm (53.15")
 Extended rod, 1500 mm (59.06")
 Extended rod, 1750 mm (68.90")
 Extended rod, 2000 mm (78.74")

A
 B
 C
 D
 E
 F
 G
 H
 J
 K
 L

Selection and Ordering data

Order No.

Pointek CLS200 - Standard - Rod Version with Threaded or Flanged process connection

C) 7 M L 5 6 3 0 - 0

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

Add order code Y01 and plain text:

"Insertion length ... mm"

Extended rod, 200 ... 1000 mm (7.87 ... 39.37")
 Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")
 Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")
 Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")
 Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")
 Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")

M
 N
 P
 Q
 R
 S

Thermal Isolator

Without thermal isolator
 With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]

0
 1

Remote mount electronics and mounting bracket

With 2 m (79") of cable
 With 5 m (197") of cable

2
 3

Wetted Seals

FKM
 FFKM [for process temperatures above -20 °C (-4 °F)]

0
 1

Probe Material

316L Stainless Steel with PPS probe body
 316L Stainless Steel with PVDF probe body

0
 1

Approvals

Dust Ignition Proof:
 CE, C-TICK, ATEX II 1/2 D T100 °C
 Flameproof Enclosure with IS Probe:
 CE, C-TICK, ATEX II 1 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C
 Flameproof Enclosure with IS Probe, with WHG approval:
 CE, C-TICK, 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, Gr. E, F, G
 CSA/FM Class III T4
 Explosion Proof Enclosure with IS Probe:
 CSA/FM Class I, Div. 1, Gr. A, B, C, D
 CSA/FM Class II, Div. 1, Gr. E, F, G
 CSA/FM Class III T4

C
 D
 E
 F
 G
 H
 J
 K

General Purpose (CSA, FM)

General Purpose (CE, C-TICK)

General Purpose (CSA, FM, CE, C-TICK) with WHG approval

Enclosure and Lid

Aluminum epoxy coated
 2 x ½" NPT via adapter - cable inlet, IP65
 2 x M20 x 1.5 cable inlet IP65
 2 x ½" NPT via adapter - cable inlet, IP68
 2 x M20 x 1.5 cable inlet IP68

A
 B
 C
 D

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.	See page 5/33
Accessories	See page 5/33

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data	Order No.
Pointek CLS200 - Standard - Cable Version with C)	7ML5631-
Threaded or Flanged process connection	0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
Process Connection	
<u>Threaded, 316L stainless steel</u>	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	0A
1" NPT [(Taper), ANSI/ASME B1.20.1]	0B
1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0C
1½" NPT [(Taper), ANSI/ASME B1.20.1]	0D
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1A
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1D
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3A
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3B
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3D
<u>Welded flange, 316L stainless steel, raised face</u>	
1" ASME, 150 lb	5A
1" ASME, 300 lb	5B
1" ASME, 600 lb	5C
1½" ASME, 150 lb	5D
1½" ASME, 300 lb	5E
1½" ASME, 600 lb	5F
2" ASME, 150 lb	5G
2" ASME, 300 lb	5H
2" ASME, 600 lb	5J
3" ASME, 150 lb	5K
3" ASME, 300 lb	5L
3" ASME, 600 lb	5M
4" ASME, 150 lb	5N
4" ASME, 300 lb	5P
4" ASME, 600 lb	5Q
<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
DN 25, PN 16	6A
DN 25, PN 40	6B
DN 40, PN 16	6C
DN 40, PN 40	6D
DN 50, PN 16	6E
DN 50, PN 40	6F
DN 80, PN 16	6G
DN 80, PN 40	6H
DN 100, PN 16	6J
DN 100, PN 40	6K
(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	
<u>Extended cable, 3000 mm (118.11"), length can be determined by customer on assembly</u>	A
<u>Extended cable, 6000 mm (236.22"), length can be determined by customer on assembly</u>	B
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
Extended cable, 500 ... 5000 mm (19.69 ... 196.85")	C
Extended cable, 5001 ... 10000 mm (196.89 ... 393.70")	D
Extended cable, 10001 ... 15000 mm (393.74 ... 590.55")	E
Extended cable, 15001 ... 20000 mm (590.59 ... 787.4")	F
Extended cable, 20001 ... 25000 mm (787.44 ... 984.25")	G
Extended cable, 25001 ... 30000 mm (984.29 ... 1181.1")	H

Selection and Ordering data	Order No.
Pointek CLS200 - Standard - Cable Version with C)	7ML5631-
Threaded or Flanged process connection	0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
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") of cable	2
With 5 m (197") 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	
Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C	C
Flameproof Enclosure with IS Probe: CE, C-TICK, 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, C-TICK, 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, Gr. E, F, G CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CE, C-TICK)	J
General Purpose (CSA, FM, CE, C-TICK) 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

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.	See page 5/33
Accessories	
	See page 5/33

C)Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data	Order No.
Pointek CLS200 - Standard - Rod with Sanitary process connection	7 M L 5 6 3 2 - 0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
Process Connection <u>Sanitary 316L stainless steel</u>	
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)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Compact 98 mm (3.86")	A
Extended rod, 250 mm (9.84")	B
Extended rod, 350 mm (13.78")	C
Extended rod, 500 mm (19.69")	D
Extended rod, 750 mm (29.53")	E
Extended rod, 1000 mm (39.37")	F
Extended rod, 1250 mm (49.21")	G
Extended rod, 1350 mm (53.15")	H
Extended rod, 1500 mm (59.06")	J
Extended rod, 1750 mm (68.90")	K
Extended rod, 2000 mm (78.74")	L
Add order code Y01 and plain text: <u>"Insertion length ... mm"</u>	
Extended rod, 110 ... 350 mm (4.3 ... 13.78")	M
Extended rod, 351 ... 1000 mm (13.82 ... 39.33")	N
Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")	P
Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")	Q
Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")	R
Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")	S
Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")	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") of cable	2
Remote mount electronics with 5 m (197") of cable	3
Wetted Seals	
FKM	0
FFKM	1
[for process temperatures above -20 °C (-4 °F)]	
Probe Material	
316L Stainless Steel with PPS probe body	0
316L Stainless Steel with PVDF probe body	1

Selection and Ordering data	Order No.
Pointek CLS200 - Standard - Rod with Sanitary process connection	7 M L 5 6 3 2 - 0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
Approvals	
Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C	C
Flameproof Enclosure with IS Probe: CE, C-TICK, 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, C-TICK, 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, Gr. E, F, G CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	G
General Purpose (CSA, FM)	H
General Purpose (CE, C-TICK)	J
General Purpose (CSA, FM, CE, C-TICK) with WHG approval	K
Enclosure and Lid <u>Aluminum epoxy coated</u>	
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
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.	See page 5/33
Accessories	See page 5/33

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data

Order No.

Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection

C) 7 M L 5 6 3 3 -

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

Process Connection

Threaded, 316L stainless steel

¾" NPT [(Taper), ANSI/ASME B1.20.1]

1" NPT [(Taper), ANSI/ASME B1.20.1]

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]

G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

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")

Extended rod, 500 mm (19.69")

Extended rod, 750 mm (29.53")

Extended rod, 1000 mm (39.37")

Extended rod, 1250 mm (49.21")

Extended rod, 1350 mm (53.15")

Extended rod, 1500 mm (59.06")

Extended rod, 1750 mm (68.90")

Extended rod, 2000 mm (78.74")

Add order code Y01 and plain text:

"Insertion length ... mm"

Extended rod, 350 ... 1000 mm (13.82 ... 39.33")

Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")

Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")

Extended rod, 3001 ... 4000 mm

(118.15 ... 157.48")

Extended rod, 4001 ... 5000 mm

(157.52 ... 196.85")

Extended rod, 5001 ... 5500 mm

(196.89 ... 216.53")

Thermal Isolator

Without thermal isolator

With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]

Remote mount electronics and mounting bracket

With 2 m (79") of cable

With 5 m (197") of cable

Wetted Seals

FKM and PTFE

FFKM and PTFE [for process temperatures above -20 °C (-4 °F)]

Probe Material

316L Stainless Steel with PPS probe body

316L Stainless Steel with PVDF probe body

Selection and Ordering data

Order No.

Pointek CLS200 - Standard - Sliding Coupling with Threaded process connection

C) 7 M L 5 6 3 3 -

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

Approvals

Dust Ignition Proof:

CE, C-TICK, ATEX II 1/2 D T100 °C

Flameproof Enclosure with IS Probe:

CE, C-TICK, ATEX II 1 G EEx d[ia] IIC T6...T4,

ATEX II 1/2 D T100 °C

Flameproof Enclosure with IS Probe, with WHG approval:

CE, C-TICK, 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, Gr. E, F, G

CSA/FM Class III T4

Explosion Proof Enclosure with IS Probe:

CSA/FM Class I, Div. 1, Gr. A, B, C, D

CSA/FM Class II, Div. 1, Gr. E, F, G

CSA/FM Class III T4

General Purpose (CSA, FM)

General Purpose (CE, C-TICK)

General Purpose (CSA, FM, CE, C-TICK) with WHG approval

Enclosure and Lid

Aluminum epoxy coated

2 x ½" NPT via adapter - cable inlet, IP65

2 x M20x1.5 cable inlet, IP65

2 x ½" NPT via adapter - cable inlet, IP68

2 x M20x1.5 cable inlet, IP68

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:

Measuring-point number/identification

(max. 16 characters) specify in plain text

Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000

Inspection Certificate Type 3.1 per EN 10204

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 CD containing the complete ATEX Quick Start and manual library.

Accessories

See page 5/33

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard

Selection and Ordering data	Order No.
Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection	7 ML 5 6 3 4 - 0
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	
Process Connection	
<u>Welded flange, 316L stainless steel, raised face</u>	
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
<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
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)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Compact (Threaded 98 mm (3.86"))	A
Extended rod, 250 mm (9.84")	B
Extended rod, 350 mm (13.78")	C
Extended rod, 500 mm (19.69")	D
Extended rod, 750 mm (29.53")	E
Extended rod, 1000 mm (39.37")	F
Extended rod, 1250 mm (49.21")	G
Extended rod, 1350 mm (53.15")	H
Extended rod, 1500 mm (59.06")	J
Extended rod, 1750 mm (68.90")	K
Extended rod, 2000 mm (78.74")	L
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
Extended rod, 200 ... 1000 mm (7.87 ... 39.33")	M
Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")	N
Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")	P
Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")	Q
Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")	R
Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")	S

Selection and Ordering data	Order No.
Pointek CLS200 - Standard - PFA Coated Rod with PFA Coated Flanged process connection	7 ML 5 6 3 4 - 0
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	
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") of cable	2
With 5 m (197") 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, Gr. E, F, G CSA/FM Class III T4	F
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. 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
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.	See page 5/33
Accessories	See page 5/33

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Overview



Pointek CLS200 (digital version) is 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. 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.

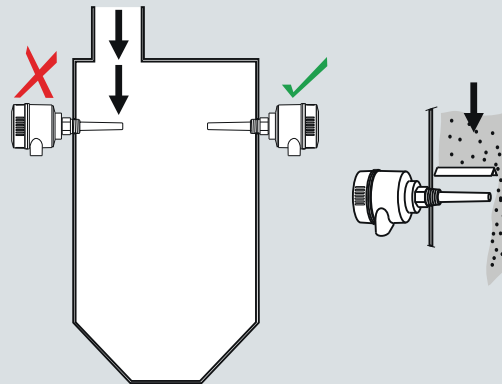
When connected to the PROFIBUS network, advanced diagnostics and set up using SIMATIC PDM are possible.

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

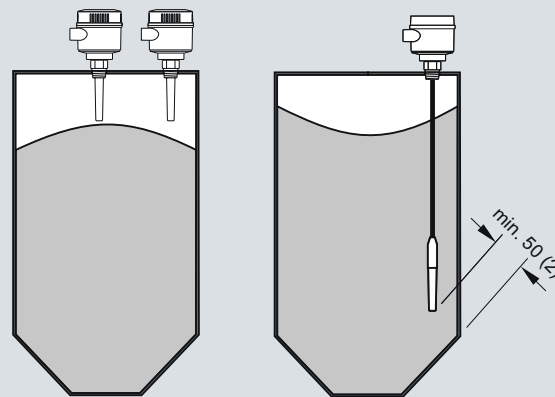
Installation



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") mm from tank wall.

Pointek CLS200 installation, dimensions in mm (inch)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Technical specifications

Mode of operation		Power supply	
Measuring principle	Inverse frequency shift capacitive level detection	Bus voltage	Standard: 12 ... 30 V DC Intrinsically Safe: 12 ... 24 V DC
Input		Current consumption	12.5 mA
Measured variable	Change in picoFarad (pF)	Certificates and approvals	
Output		General Purpose	CSA, FM, CE, C-TICK
Output signal		Dust Ignition Proof	ATEX II 1/2 D T100 °C
• Solid-state output		Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
- Output	Galvanically isolated	Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6...T4 ATEX II 1/2 D T100 °C
- Protection	Against reversed polarity (bipolar)	Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
- Max. switching voltage	• 30 V (DC) • 30 V peak (AC)	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, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
- Max. load current	82 mA	Non-incendive	CSA/FM Class I, Div. 2, Gr. A, B, C, D CSA/FM Class II, Div. 2, Gr. F, G CSA/FM Class III T4 or T6
- Voltage drop	< 1 V, typical at 50 mA	Non-Sparking	ATEX II 3 G Ex nA II T6...T4 ATEX II 2 D IP6X T100 °C
- Time delay (ON and/or OFF)	Programmable by user (0 ... 100 s)	Marine	Lloyds Register of Shipping, Cat- egories ENV1, ENV2 and ENV5
• Fail-safe mode	Min. or max	Others	Pattern Approval (China)
• Connection	Removable terminal block	Communication	
Rated operating conditions ¹⁾		PROFIBUS PA (IEC 61158 CPF3 CP3/2) Bus physical layer: IEC 61158-2 MBP (IS) Device profile: PROFIBUS PA pro- file for Process Control Devices Version 3.0, Class B FISCO field device	
Installation conditions		¹⁾ When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/34. 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 5/34. ⁴⁾ Barrier or Intrinsically safe power supply required for Intrinsically Safe protection	
• 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 gas-ket		
• Optional thermal isolator	316L stainless steel		
Connection	Removable terminal block, max. 2.5 mm ²		
Degree of protection	IP65/Type 4/NEMA 4 (optional IP68)		
Cable inlet	2 x M20x1.5 thread (option: 2 x 1/2" NPT conduit entry including 1 plugged entry)		
Electromagnetic Compatibility	To comply with CE EMC regulations (where applicable); the CLS200 should only be used under these conditions: - Installed in a metallic vessel - Wired with shielded cable - Cable shields are terminated in suitable EMC rated cable glands at the device cable entry point.		

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Digital

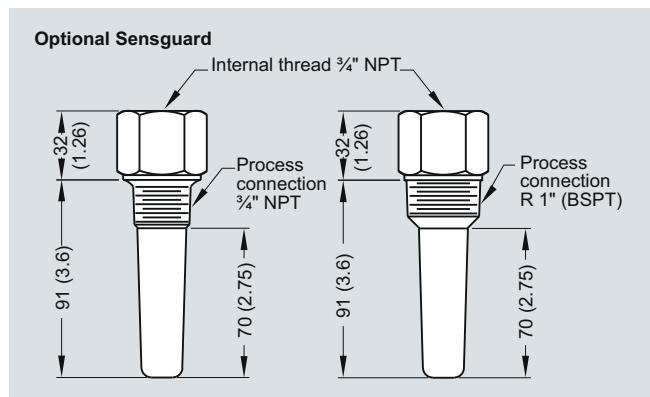
Design: Probe	Rod version	Sanitary version	Cable version	Sliding Coupling version
Max. length	5500 mm (216.53")	5500 mm (216.53")	30000 mm (1181.1") liquids and slurries 5000 mm (196.85") solids (under loads)	5500 mm (216.53")
Process connection	R ¾", 1", 1¼", 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 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 nacc.smpi@siemens.com for alternative O-rings

³⁾ Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

Options



Optional Sensguard, dimensions in mm (inch)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Threaded or C) Flanged process connection	7 M L 5 6 4 0 -
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	0
Process Connection	
<u>Threaded, 316L stainless steel</u>	
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
<u>Welded flange, 316L stainless steel, raised face</u>	
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
<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
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)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Compact [threaded 120 mm (4.72"), Flanged 98 mm (3.86")]	A
Extended rod, 250 mm (9.84")	B
Extended rod, 350 mm (13.78")	C
Extended rod, 500 mm (19.69")	D
Extended rod, 750 mm (29.53")	E
Extended rod, 1000 mm (39.37")	F
Extended rod, 1250 mm (49.21")	G
Extended rod, 1350 mm (53.15")	H
Extended rod, 1500 mm (59.06")	J
Extended rod, 1750 mm (68.90")	K
Extended rod, 2000 mm (78.74")	L

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Threaded or C) Flanged process connection	7 M L 5 6 4 0 -
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	0
Add order code Y01 and plain text:	
<u>"Insertion length ... mm"</u>	
Extended rod, 200 ... 1000 mm (7.87 ... 39.37")	M
Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")	N
Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")	P
Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")	Q
Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")	R
Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")	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") of cable	2
With 5 m (197") 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:	B
CE, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	
Dust Ignition Proof:	C
CE, C-TICK, ATEX II 1/2 D T100 °C	
Intrinsically Safe: ¹⁾	D
CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	
Flameproof Enclosure with IS Probe:	E
CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C	
Non-incendive:	F
CSA/FM Class I, Div. 2, Gr. A, B, C, D	
CSA/FM Class II, Div. 2, Gr. F, G	
CSA/FM Class III T4 or T6	
Dust Ignition Proof with IS Probe:	G
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
Intrinsically Safe: ¹⁾	H
CSA/FM Class I, Div. 1, Gr. A, B, C, D	
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
Explosion Proof with IS Probe:	J
CSA/FM Class I, Div. 1, Gr. A, B, C, D	
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
General Purpose (CSA, FM)	K
General Purpose (CE, C-TICK)	L
Enclosure and Lid	
<u>Aluminum epoxy coated</u>	
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

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
Further designs		Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection	7ML5641-0
Please add "-Z" to Order No. and specify Order code(s).		Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
Total insertion length: enter the total insertion length in plain text description	Y01	Process Connection	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15	<u>Threaded, 316L stainless steel</u>	
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11	¾" NPT [(Taper), ANSI/ASME B1.20.1]	0A
Inspection Certificate Type 3.1 per EN 10204	C12	1" NPT [(Taper), ANSI/ASME B1.20.1]	0B
Operating Instructions		1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0C
Note: The Operating Instructions should be ordered as a separate line on the order.	See page 5/33	1½" NPT [(Taper), ANSI/ASME B1.20.1]	0D
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.		R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1A
Accessories	See page 5/33	R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1B
		R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1D
		G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3A
		G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3B
		G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3D
		<u>Welded flange, 316L stainless steel, raised face</u>	
		1" ASME, 150 lb	5A
		1" ASME, 300 lb	5B
		1" ASME, 600 lb	5C
		1½" ASME, 150 lb	5D
		1½" ASME, 300 lb	5E
		1½" ASME, 600 lb	5F
		2" ASME, 150 lb	5G
		2" ASME, 300 lb	5H
		2" ASME, 600 lb	5J
		3" ASME, 150 lb	5K
		3" ASME, 300 lb	5L
		3" ASME, 600 lb	5M
		4" ASME, 150 lb	5N
		4" ASME, 300 lb	5P
		4" ASME, 600 lb	5Q
		<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
		DN 25, PN 16	6A
		DN 25, PN 40	6B
		DN 40, PN 16	6C
		DN 40, PN 40	6D
		DN 50, PN 16	6E
		DN 50, PN 40	6F
		DN 80, PN 16	6G
		DN 80, PN 40	6H
		DN 100, PN 16	6J
		DN 100, PN 40	6K
		(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)	
		<u>Note: No Y01 needed in order code for standard lengths</u>	
		Extended cable, 3000 mm (118.11"), length can be determined by customer on assembly	A
		Extended cable, 6000 mm (236.22"), length can be determined by customer on assembly	B
		<u>Add order code Y01 and plain text:</u>	
		<u>"Insertion length ... mm"</u>	
		Extended cable, 500 ... 5000 mm (19.69 ... 196.85")	C
		Extended cable, 5001 ... 10000 mm (196.89 ... 393.70")	D
		Extended cable, 10001 ... 15000 mm (393.74 ... 590.55")	E
		Extended cable, 15001 ... 20000 mm (590.59 ... 787.4")	F
		Extended cable, 20001 ... 25000 mm (787.44 ... 984.25")	G
		Extended cable, 25001 ... 30000 mm (984.29 ... 1181.1")	H

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Cable with Threaded or Flanged process connection C)	7ML5641-
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
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") of cable	2
With 5 m (197") 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, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	B
Dust Ignition Proof:	
CE, C-TICK, ATEX II 1/2 D T100 °C	C
Intrinsically Safe: ¹⁾	
CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	D
Flameproof Enclosure with IS Probe:	
CE, C-TICK, 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, Gr. A, B, C, D	F
CSA/FM Class II, Div. 2, Gr. F, G	
CSA/FM Class III T4 or T6	
Dust Ignition Proof with IS Probe:	
CSA/FM Class II, Div. 1, Gr. E, F, G	G
CSA/FM Class III T4	
Intrinsically Safe: ¹⁾	
CSA/FM Class I, Div. 1, Gr. A, B, C, D	H
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
Explosion Proof with IS Probe:	
CSA/FM Class I, Div. 1, Gr. A, B, C, D	J
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
General Purpose (CSA, FM)	K
General Purpose (CE, C-TICK)	L
Enclosure and Lid	
<u>Aluminum epoxy coated</u>	
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

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.	See page 5/33
Accessories	
	See page 5/33

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data

Order No.

Pointek CLS200 - Digital - Rod with Sanitary process connection

C) 7 M L 5 6 4 2 - 0

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

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")

A

Extended rod, 250 mm (9.84")

B

Extended rod, 350 mm (13.78")

C

Extended rod, 500 mm (19.69")

D

Extended rod, 750 mm (29.53")

E

Extended rod, 1000 mm (39.37")

F

Extended rod, 1250 mm (49.21")

G

Extended rod, 1350 mm (53.15")

H

Extended rod, 1500 mm (59.06")

J

Extended rod, 1750 mm (68.90")

K

Extended rod, 2000 mm (78.74")

L

Add order code Y01 and plain text:

"Insertion length ... mm"

Extended rod, 110 ... 350 mm (4.3 ... 13.78")

M

Extended rod, 351 ... 1000 mm (13.82 ... 39.33")

N

Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")

P

Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")

Q

Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")

R

Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")

S

Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")

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") of cable

2

With 5 m (197") 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, C-TICK, ATEX II 3 G Ex nA II T6...T4,
ATEX II 2 D IP6X T100 °C

B

Dust Ignition Proof:

CE, C-TICK, ATEX II 1/2 D T100 °C

C

Intrinsically Safe:¹⁾

CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4,
ATEX II 1/2 D IP6X T100 °C

D

Flameproof Enclosure with IS Probe:

CE, C-TICK, 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, Gr. A, B, C, D

CSA/FM Class II, Div. 2, Gr. F, G

CSA/FM Class III T4 or T6

F

Dust Ignition Proof with IS Probe:

CSA/FM Class II, Div. 1, Gr. E, F, G

CSA/FM Class III T4

G

Selection and Ordering data

Order No.

Pointek CLS200 - Digital - Rod with Sanitary process connection

C) 7 M L 5 6 4 2 - 0

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

Intrinsically Safe:¹⁾

CSA/FM Class I, Div. 1, Gr. A, B, C, D

CSA/FM Class II, Div. 1, Gr. E, F, G

CSA/FM Class III T4

H

Explosion Proof with IS Probe:

CSA/FM Class I, Div. 1, Gr. A, B, C, D

CSA/FM Class II, Div. 1, Gr. E, F, G

CSA/FM Class III T4

J

General Purpose (CSA, FM)

K

General Purpose (CE, C-TICK)

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

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order 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")]:
Measuring-point number/identification
(max. 16 characters) specify in plain text

Y15

Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.

See page 5/33

Accessories

See page 5/33

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection	C) 7 M L 5 6 4 3 - 0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
Process Connection <u>Threaded, 316L stainless steel</u>	
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)	
<u>Note: No Y01 needed in order code for standard lengths</u>	
Extended rod, 350 mm (13.78")	C
Extended rod, 500 mm (19.69")	D
Extended rod, 750 mm (29.53")	E
Extended rod, 1000 mm (39.37")	F
Extended rod, 1250 mm (49.21")	G
Extended rod, 1350 mm (53.15")	H
Extended rod, 1500 mm (59.06")	J
Extended rod, 1750 mm (68.90")	K
Extended rod, 2000 mm (78.74")	L
Add order code Y01 and plain text: <u>"Insertion length ... mm"</u>	
Extended rod, 350 ... 1000 mm (13.82 ... 39.33")	M
Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")	N
Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")	P
Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")	Q
Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")	R
Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")	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") of cable	2
With 5 m (197") 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, C-TICK, ATEX II 3 G Ex nA II T6...T4, ATEX II 2 D IP6X T100 °C	B
Dust Ignition Proof: CE, C-TICK, ATEX II 1/2 D T100 °C	C
Intrinsically Safe: ¹⁾ CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D IP6X T100 °C	D
Flameproof Enclosure with IS Probe: CE, C-TICK, 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, Gr. A, B, C, D CSA/FM Class II, Div. 2, Gr. F, G CSA/FM Class III T4 or T6	F

Selection and Ordering data	Order No.
Pointek CLS200 - Digital - Rod with Sliding coupling with Threaded process connection	C) 7 M L 5 6 4 3 - 0
Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
Dust Ignition Proof with IS Probe: CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	G
Intrinsically Safe: ¹⁾ CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	H
Explosion Proof with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	J
General Purpose (CSA, FM)	K
General Purpose (CE, C-TICK)	L
Enclosure and Lid <u>Aluminum epoxy coated</u>	
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	
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.	See page 5/33
Accessories	See page 5/33

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Digital

Selection and Ordering data

Order No.

Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection

C) 7 ML 5 6 4 4 -

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

Process Connection

Welded flange, PFA coated, 316L stainless steel, raised face

1" ASME, 150 lb
1" ASME, 300 lb
1" ASME, 600 lb
1½" ASME, 150 lb
1½" ASME, 300 lb
1½" ASME, 600 lb
2" ASME, 150 lb
2" ASME, 300 lb
2" ASME, 600 lb
3" ASME, 150 lb
3" ASME, 300 lb
3" ASME, 600 lb
4" ASME, 150 lb
4" ASME, 300 lb
4" ASME, 600 lb

5 A
5 B
5 C
5 D
5 E
5 F
5 G
5 H
5 J
5 K
5 L
5 M
5 N
5 P
5 Q

Welded flange, PFA coated, 316L stainless steel, Type A flat faced

DN 25, PN 16
DN 25, PN 40
DN 40, PN 16
DN 40, PN 40
DN 50, PN 16
DN 50, PN 40
DN 80, PN 16
DN 80, PN 40
DN 100, PN 16
DN 100, PN 40

6 A
6 B
6 C
6 D
6 E
6 F
6 G
6 H
6 J
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 (Threaded 98 mm (3.86")
Extended rod, 250 mm (9.84")
Extended rod, 350 mm (13.78")
Extended rod, 500 mm (19.69")
Extended rod, 750 mm (29.53")
Extended rod, 1000 mm (39.37")

Extended rod, 1250 mm (49.21")
Extended rod, 1350 mm (53.15")
Extended rod, 1500 mm (59.06")
Extended rod, 1750 mm (68.90")
Extended rod, 2000 mm (78.74")

Add order code Y01 and plain text: "Insertion length ... mm"

Extended rod, 200 ... 1000 mm (7.87 ... 39.33")
Extended rod, 1001 ... 2000 mm (39.41 ... 78.74")
Extended rod, 2001 ... 3000 mm (78.78 ... 118.11")
Extended rod, 3001 ... 4000 mm (118.15 ... 157.48")
Extended rod, 4001 ... 5000 mm (157.52 ... 196.85")
Extended rod, 5001 ... 5500 mm (196.89 ... 216.53")

A
B
C
D
E
F
G
H
J
K
L
M
N
P
Q
R
S

Thermal Isolator

Without thermal isolator
With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]

0
1

Remote mount electronics and mounting bracket

With 2 m (79") of cable
With 5 m (197") of cable

2
3

Selection and Ordering data

Order No.

Pointek CLS200 - Digital - PFA Rod with PFA Flanged process connection

C) 7 ML 5 6 4 4 -

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

Wetted Seals

FKM
FFKM [for process temperatures above -20°C (-4°F)]

0
1

Probe Material

PFA Coated 316L Stainless Steel with PPS probe body
PFA Coated 316L Stainless Steel with PVDF probe body

0
1

Approvals

Non-incendive:
CSA/FM Class I, Div. 2, Gr. A, B, C, D
CSA/FM Class II, Div. 2, Gr. F, G
CSA/FM Class III T4 or T6

Dust Ignition Proof with IS Probe:
CSA/FM Class II, Div. 1, Gr. E, F, G
CSA/FM Class III T4

Intrinsically Safe:¹⁾
CSA/FM Class I, Div. 1, Gr. A, B, C, D
CSA/FM Class II, Div. 1, Gr. E, F, G
CSA/FM Class III T4

Explosion Proof with IS Probe:
CSA/FM Class I, Div. 1, Gr. A, B, C, D
CSA/FM Class II, Div. 1, Gr. E, F, G
CSA/FM Class III T4

General Purpose (CSA, FM)

Enclosure and Lid

Aluminum epoxy coated

2 x ½" NPT via adapter - cable inlet, IP65
2 x M20x1.5 cable inlet, IP65
2 x ½" NPT via adapter - cable inlet, IP68
2 x M20x1.5 cable inlet, IP68

A
B
C
D

1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order 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")]:
Measuring-point number/identification
(max. 16 characters) specify in plain text

Y15

Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.

See page 5/33

Accessories

See page 5/33

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard and Digital

Selection and Ordering data	Order code
Operating Instructions - Standard	
English	C) 7ML1998-5JH02
German	C) 7ML1998-5JH32
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	C) 7ML1998-5QY82
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Operating Instructions - Digital	
English	C) 7ML1998-5JJ02
German	C) 7ML1998-5JJ32
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	C) 7ML1998-5XA82
This device is shipped with the Siemens Milltronics manual CD containing the complete 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 C) NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 6 ... 12 mm (0.236 ... 0.472")	A5E03252530
M20x1.5 General Purpose Cable Entry IP68/IP69K C) NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472")	A5E03252531
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")	A5E03252527
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")	A5E03252528
Blind threaded flanges are available. Please contact nacc.smpi@siemens.com with a completed application data sheet on page 5/9	
Pointek Specials	See page 5/77

C) Subject to export regulations AL: N, ECCN: EAR99

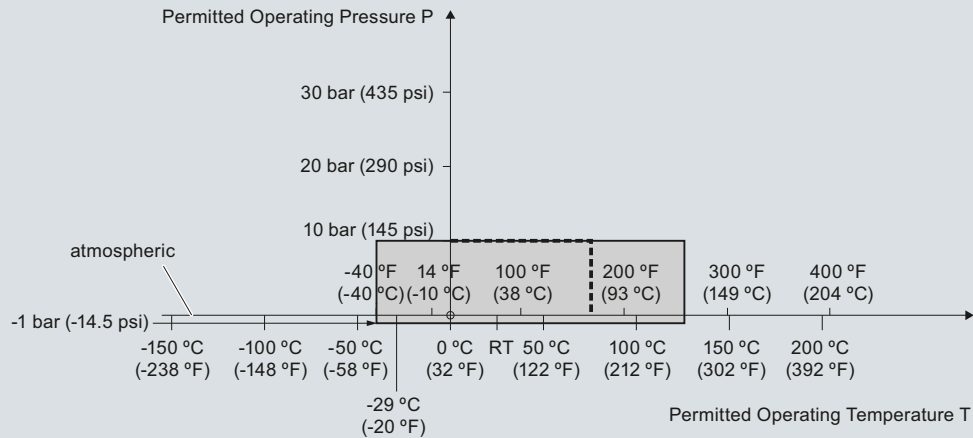
Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard and Digital

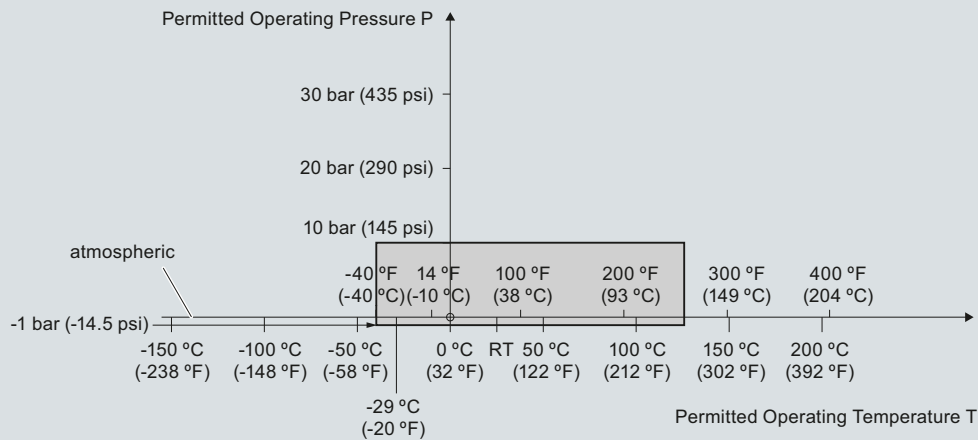
Characteristic curves

Pressure/Temperature Curve
CLS200 Sliding Coupling
Threaded Process Connections
(7ML5633 and 7ML5643)



Pointek CLS200 Process Pressure/Temperature derating curves (7ML5633 and 7ML5643)

Pressure/Temperature Curve
CLS200 Cable
Threaded Process Connections
(7ML5631 and 7ML5641)



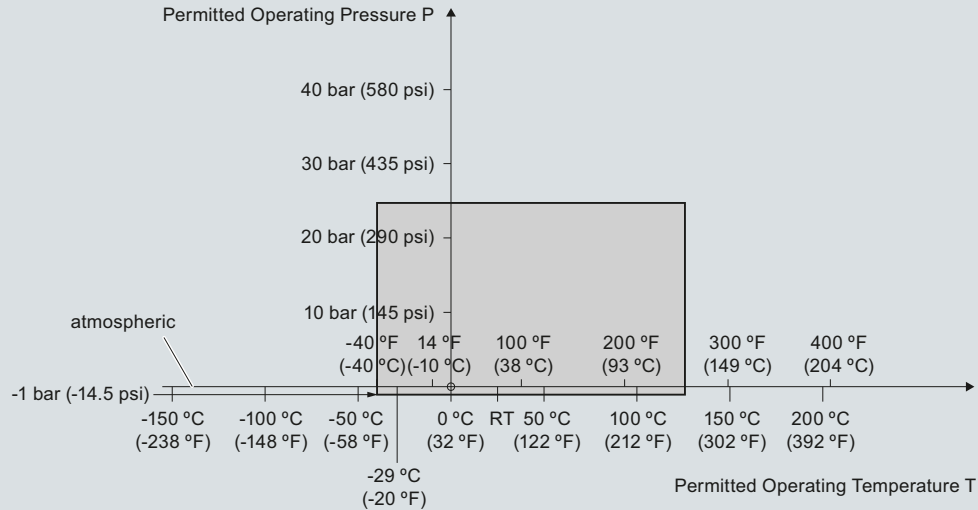
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5631 and 7ML5641)

Level Measurement

Point level measurement - Capacitance switches

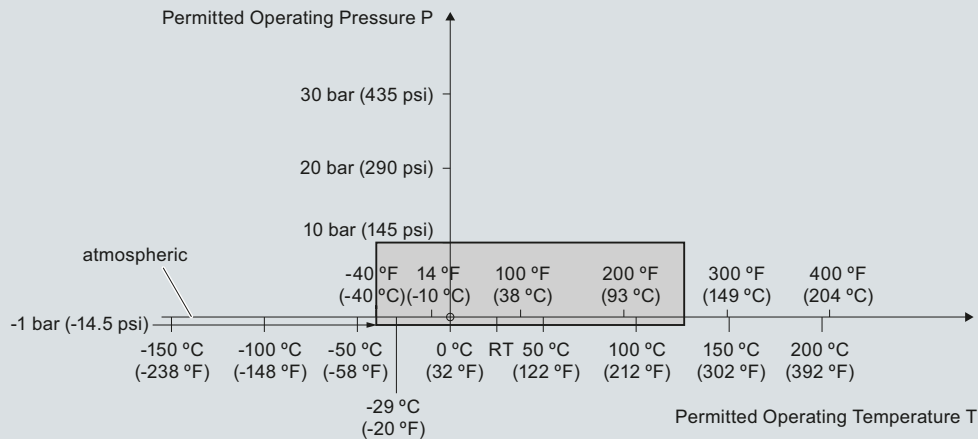
Pointek CLS200 - Standard and Digital

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)



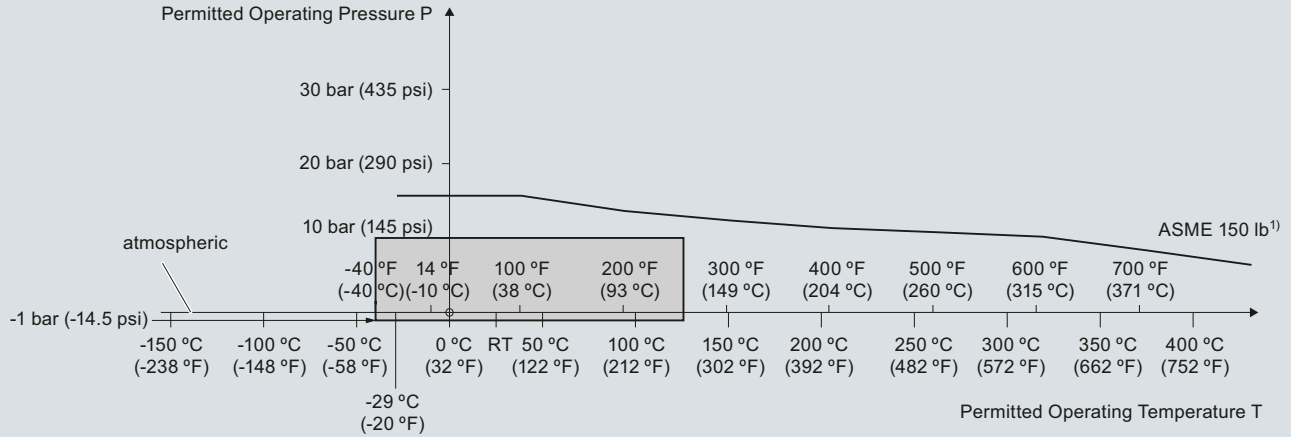
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5632 and 7ML5642)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard and Digital

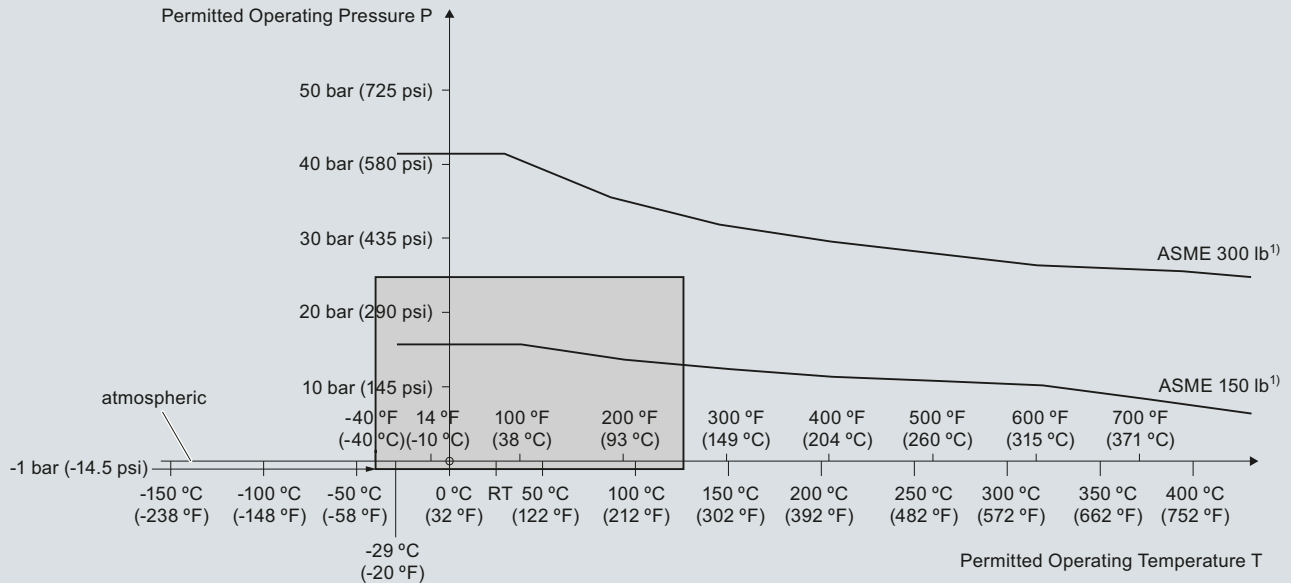
Pressure/Temperature Curve
CLS200 Cable
ASME Flanged Process Connections
(7ML5631 and 7ML5641)



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.

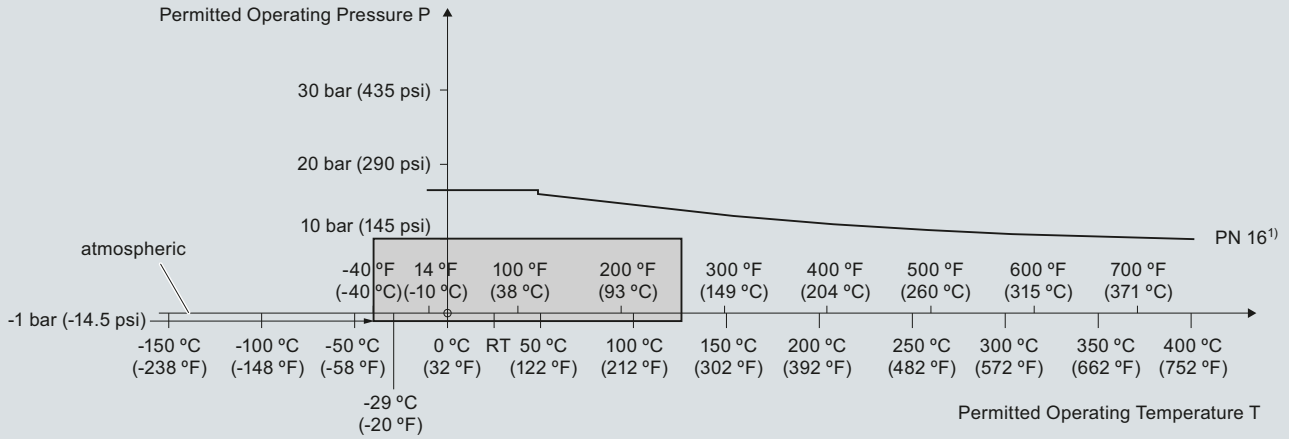
Pointek CLS200 Process Pressure/Temperature derating curves (7ML5630 and 7ML5640)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard and Digital

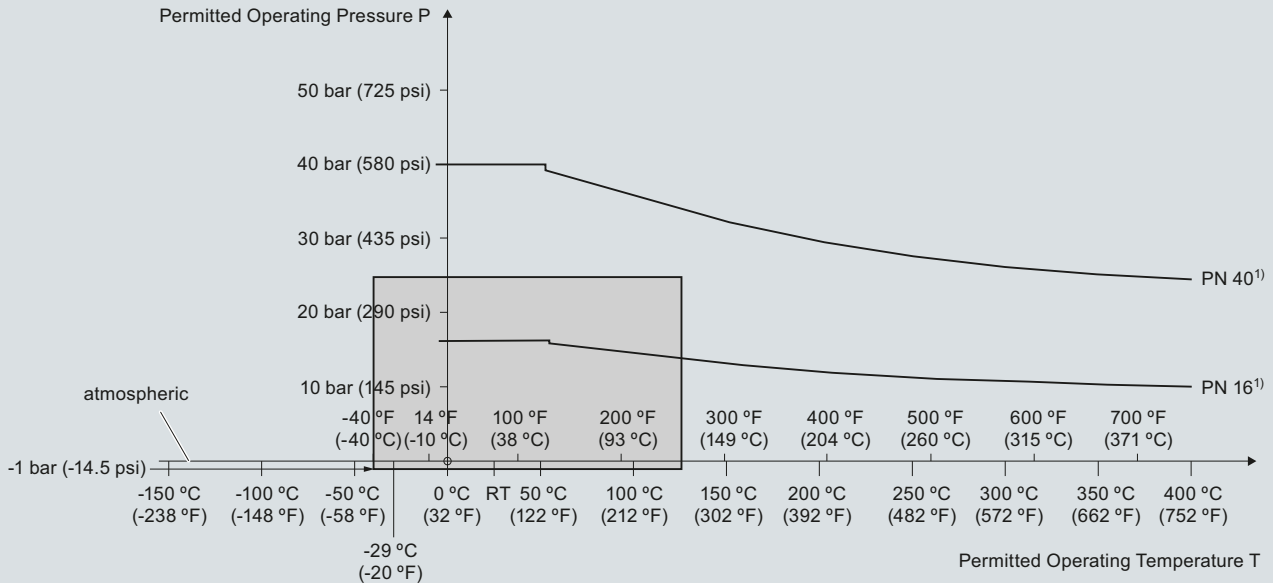
Pressure/Temperature Curve
CLS200 Cable
EN Flanged Process Connections
(7ML5631 and 7ML5641)



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)

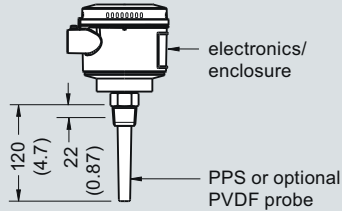
Level Measurement

Point level measurement - Capacitance switches

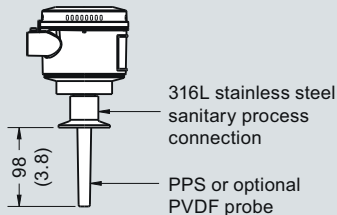
Pointek CLS200 - Standard and Digital

Dimensional drawings

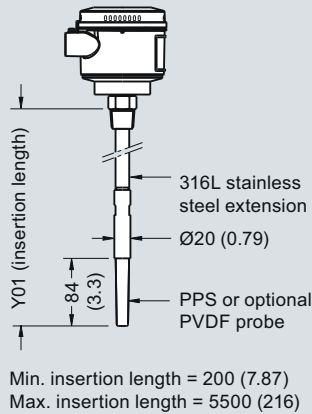
**Compact version
Threaded
(7ML5630 and 7ML5640)**



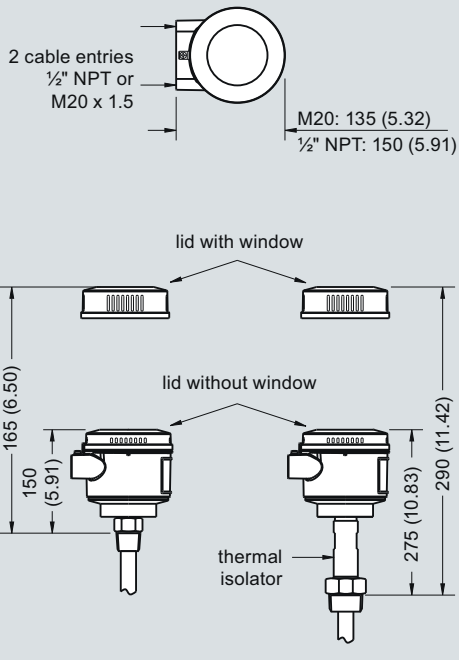
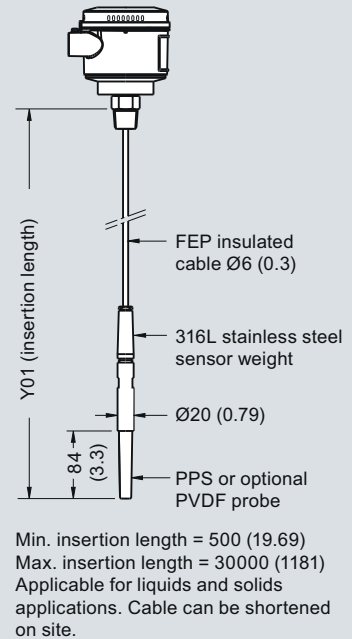
**Sanitary compact version
Sanitary fitting
(7ML5632 and 7ML5642)**



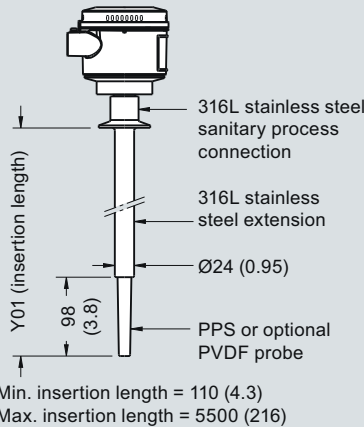
**Extended rod version
Threaded
(7ML5630 and 7ML5640)**



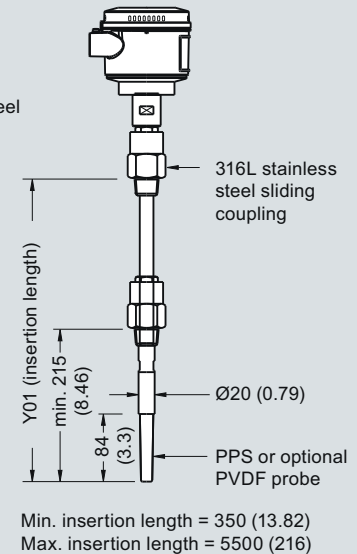
**Extended cable version
Threaded
(7ML5631 and 7ML5641)**



**Sanitary extended version
Sanitary fitting
(7ML5632 and 7ML5642)**



**Sliding coupling version
Threaded
(7ML5633 and 7ML5643)**



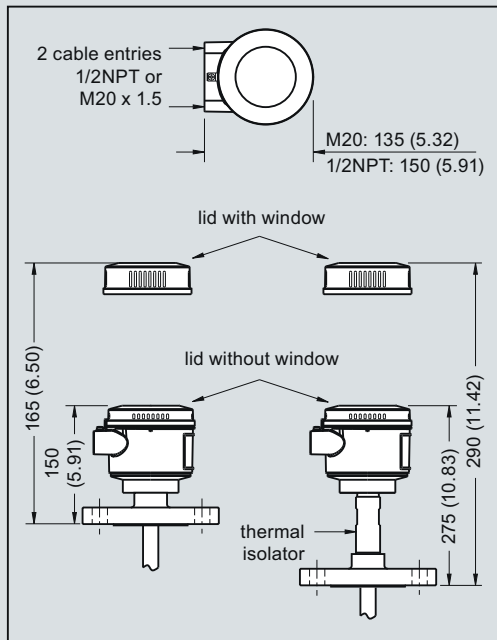
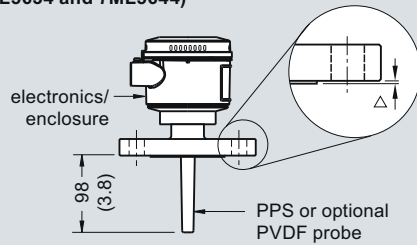
Pointek CLS200 - Threaded/Sanitary Process Connections, dimensions in mm (inch)

Level Measurement

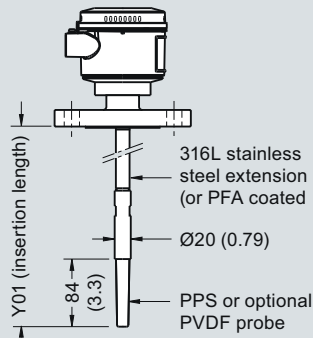
Point level measurement - Capacitance switches

Pointek CLS200 - Standard and Digital

Compact version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)

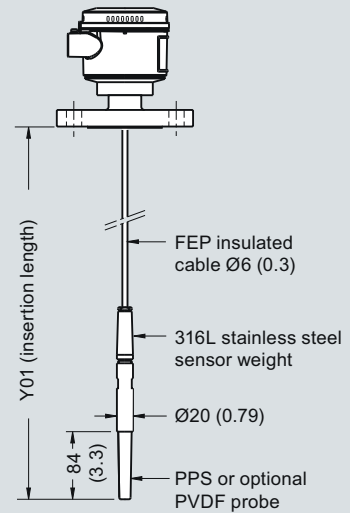


Extended rod version
Welded Flange (7ML5630 and 7ML5640)
Welded Flange, PFA coated
(7ML5634 and 7ML5644)



Min. insertion length = 200 (7.87)
Max. insertion length = 5500 (216)

Extended cable version
Welded Flange
(7ML5631 and 7ML5641)



Min. insertion length = 500 (19.69)
Max. insertion length = 30000 (1181)
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)

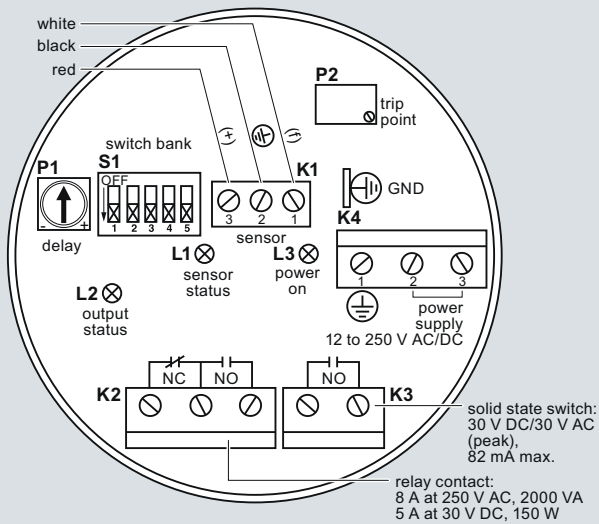
Level Measurement

Point level measurement - Capacitance switches

Pointek CLS200 - Standard and Digital

Schematics

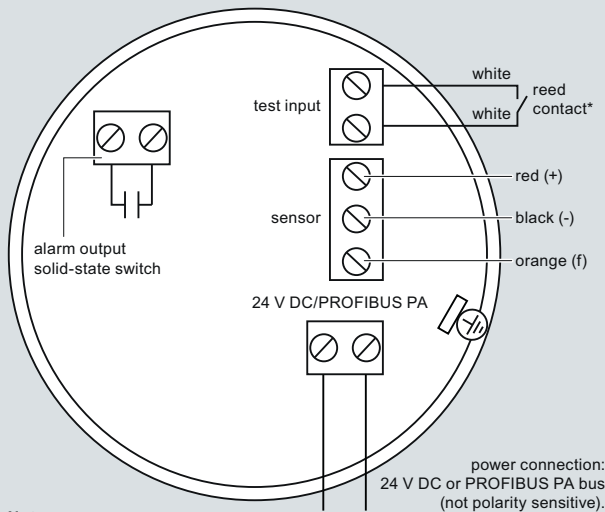
Wiring: Pointek CLS200 Standard



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

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Overview



Pointek CLS300 (standard version) is an 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.

Benefits

- Patented 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 (+185 °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.

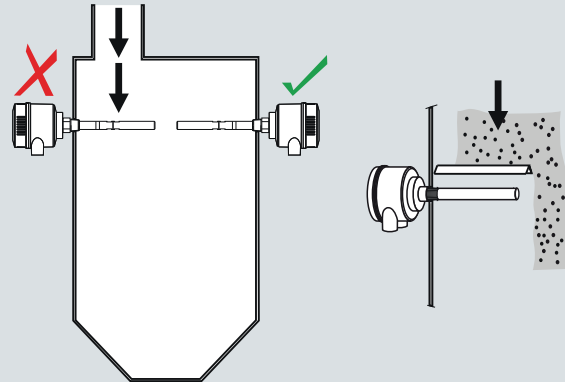
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup 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.

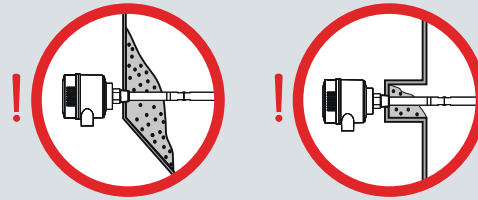
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration

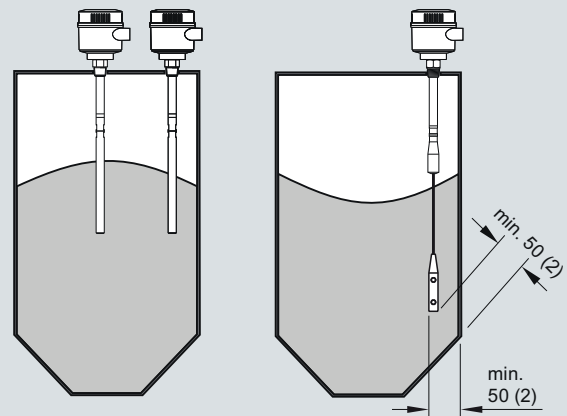
Installation



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 mm (2") from tank wall. Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Technical specifications

Mode of operation		Design	
Measuring principle	Inverse frequency shift capacitive level detection	Material (enclosure)	Powder-coated aluminum with gasket
Input		Degree of Protection	Standard: Type 4/NEMA 4/IP65 Optional: Type 4/NEMA 4/IP68
Measured variable	Change in picoFarad (pF)	Cable inlet	2 x M20x1.5 thread (option: 2 x ½" NPT conduit entry including 1 plugged entry)
Output		Controls and displays	
Output signal		Displays	3 LEDs, for probe status, output status and power supply
• Relay output	1 SPDT Form C relay	Potentiometers	2 potentiometers for time delay and sensitivity
- Max. contact voltage	• 30 V DC • 250 V AC	Switches	5 DIP switches for delay on/off, fail-safe high/low, time delay test/adjust, high/low sensitivity, test delay settings
- Max. contact current	• 5 A (DC) • 8 A (AC)	Power supply	
- Max. switching capacity	• 150 W (DC) • 2000 VA (AC)	Supply	12 ... 250 V AC/DC, 0 ... 60 Hz, galvanically isolated, 2 W
- Time delay (ON and/or OFF)	1 ... 60 s	Certificates and approvals	
• Solid-state output		General Purpose	CSA, FM, CE, C-TICK
- Output	Galvanically isolated	Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6...T1 ATEX II 1/2 D T100 °C
- Protection	Against reversed polarity (bipolar)	Dust Ignition Proof with IS Probe	ATEX II 1/2 D T100 °C CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
- Max. switching voltage	• 30 V (DC) • 30 V peak (AC)	Explosion Proof Enclosure with IS Probe	CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
- Max. load current	82 mA	Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
- Voltage drop	< 1 V, typical at 50 mA	Overfill Protection	WHG (Germany) VLAREM II (Belgium)
- Time delay (pre or post switching)	1 ... 60 s	Others	Pattern Approval (China)
Accuracy		- When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves starting on page 5/55. - Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F). - Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves starting on page 5/55.	
Resolution			
• Min. sensitivity (pF)	1 % change in actual capacitance		
• Max. temperature error	0.2 % of actual capacitance value		
Rated operating conditions¹⁾			
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: Probe	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8"), max. 1000 mm (40")	Min. 250 mm (9.8"), max. 1000 mm (40")	Min. 1000 mm (40"), max. 25000 mm (984")
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 nacc.smpi@siemens.com for alternative O-rings

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data		Order No.	Selection and Ordering data		Order No.
Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection		C) 7 M L 5 6 5 0 -	Pointek CLS300 - Standard - Rod Version with Threaded or Flanged process connection		C) 7 M L 5 6 5 0 -
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.			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.		
Process Connection			Add order code Y01 and plain text:		
<u>Threaded, 316L stainless steel</u>			<u>"Insertion length ... mm"</u>		
¾" NPT [(Taper), ANSI/ASME B1.20.1]		0 A	Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65")		E
1" NPT [(Taper), ANSI/ASME B1.20.1]		0 B	Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49")		F
1¼" NPT [(Taper), ANSI/ASME B1.20.1]		0 C	Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3")		G
1½" NPT [(Taper), ANSI/ASME B1.20.1]		0 D	Thermal Isolator		
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1 A	Without thermal isolator		0
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1 B	With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]		1
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1 D	Wetted Seals		
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3 A	FKM		0
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3 B	FFKM [for process temperatures above -20°C (-4°F)]		1
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3 D	Probe Material		
<u>Welded flange, 316L stainless steel, raised face</u>			316L stainless steel with PFA lining and PEEK isolators		0
1" ASME, 150 lb		5 A	Approvals		
1" ASME, 300 lb		5 B	Dust Ignition Proof with IS Probe:		
1" ASME, 600 lb		5 C	CE, C-TICK, ATEX II 1/2 D T100 °C		C
1½" ASME, 150 lb		5 D	Flameproof Enclosure with IS Probe:		
1½" ASME, 300 lb		5 E	CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C		D
1½" ASME, 600 lb		5 F	Flameproof Enclosure with IS Probe, with WHG approval:		
2" ASME, 150 lb		5 G	CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1, ATEX II 1/2 D T100 °C		E
2" ASME, 300 lb		5 H	Dust Ignition Proof with IS Probe:		
2" ASME, 600 lb		5 J	CSA/FM Class II, Div. 1, Gr. E, F, G		F
3" ASME, 150 lb		5 K	CSA/FM Class III T4		
3" ASME, 300 lb		5 L	Explosion Proof Enclosure with IS Probe:		
3" ASME, 600 lb		5 M	CSA/FM Class I, Div. 1, Gr. A, B, C, D		G
4" ASME, 150 lb		5 N	CSA/FM Class II, Div. 1, Gr. E, F, G		
4" ASME, 300 lb		5 P	CSA/FM Class III T4		
4" ASME, 600 lb		5 Q	General Purpose (CSA, FM)		H
<u>Welded flange, 316L stainless steel, Type A flat faced</u>			General Purpose (CE, C-TICK)		J
DN 25, PN 16		6 A	General Purpose with WHG approval (CSA, FM, CE, C-TICK)		K
DN 25, PN 40		6 B	Enclosure and Lid		
DN 40, PN 16		6 C	<u>Aluminum epoxy coated</u>		
DN 40, PN 40		6 D	2 x ½" NPT via adapter - cable inlet, IP65		A
DN 50, PN 16		6 E	2 x M20x1.5 cable inlet, IP65		B
DN 50, PN 40		6 F	2 x ½" NPT via adapter - cable inlet, IP68		C
DN 80, PN 16		6 G	2 x M20x1.5 cable inlet, IP68		D
DN 80, PN 40		6 H	Active Shield Length		
DN 100, PN 16		6 J	Standard length -		0
DN 100, PN 40		6 K	(125 mm threaded, 105 mm flanged)		
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)			Extended shield -		1
Probe length (length from flange face)			(250 mm threaded, 230 mm flanged) ¹⁾		
(threaded lengths include process thread)			Extended shield -		2
<u>Note: No Y01 needed in order code for standard lengths</u>			(400 mm threaded, 380 mm flanged) ²⁾		
Standard version, rod 350 mm (13.78")		A			
Extended rod, length 500 mm (19.69")		B			
Extended rod, length 750 mm (29.53")		C			
Extended rod, length 1000 mm (39.37")		D			

¹⁾ Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")]

²⁾ Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")]

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
Further designs		Pointek CLS300 - Standard - Cable Version with C)	7 M L 5 6 5 1 -
Please add "-Z" to Order No. and specify Order code(s).		Threaded or Flanged process connection	
Total insertion length: enter the total insertion length in plain text description	Y01	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.	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15	Process Connection	
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11	<u>Threaded, 316L stainless steel</u>	
Inspection Certificate Type 3.1 per EN 10204	C12	1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
Operating Instructions		1½" NPT [(Taper), ANSI/ASME B1.20.1]	0 D
Note: The Operating Instructions should be ordered as a separate line on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.	See page 5/54	R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]	1 D
Accessories	See page 5/54	G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]	3 D
		<u>Welded flange, 316L stainless steel, raised face</u>	
		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
		<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
		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)	
		<u>Note: No Y01 needed in order code for standard lengths</u>	
		Extended cable, 3000 mm (118.11"), length can be shortened by customer	A
		Extended cable, 6000 mm (236.22"), length can be shortened by customer	B
		Add order code Y01 and plain text: <u>"Insertion length ... mm"</u>	
		Extended cable, 500 ... 1000 mm (19.69 ... 39.37")	E
		Extended cable, 1001 ... 5000 mm (39.41 ... 196.85")	F
		Extended cable, 5001 ... 10000 mm (196.89 ... 393.70")	G
		Extended cable, 10001 ... 15000 mm (393.74 ... 590.55")	H
		Extended cable, 15001 ... 20000 mm (590.59 ... 787.40")	J
		Extended cable, 20001 ... 25000 mm (787.44 ... 984.25")	K
		Thermal Isolator	
		Without thermal isolator	0
		With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]	1

Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data		Order No.
Pointek CLS300 - Standard - Cable Version with Threaded or Flanged process connection	7 M L 5 6 5 1 -	
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.		
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, C-TICK, ATEX II 1/2 D T100 °C	C	
Flameproof Enclosure with IS Probe: CE, C-TICK, 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, C-TICK, 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, Gr. E, F, G CSA/FM Class III T4	F	
Explosion Proof Enclosure with IS Probe: CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4	G	
General Purpose (CSA, FM)	H	
General Purpose (CE, C-TICK)	J	
General Purpose with WHG approval (CSA, FM, CE, C-TICK)	K	
Enclosure and Lid		
<u>Aluminum epoxy coated</u>		
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	

Selection and Ordering data		Order code
Further designs		
Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text		Y15
Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.		See page 5/54
Accessories		
		See page 5/54

¹⁾ Available with Probe version options A, B, F to K, only [≥ 1000 mm (39.7")]

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data

Order No.

Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection

C) 7 M L 5 6 5 2 -

0 0 - 0

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.

Process Connection

Threaded, 316L stainless steel

¾" NPT [(Taper), ANSI/ASME B1.20.1]
 1" NPT [(Taper), ANSI/ASME B1.20.1]
 1¼" NPT [(Taper), ANSI/ASME B1.20.1]
 1½" NPT [(Taper), ANSI/ASME B1.20.1]
 R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
 R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
 R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]
 G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
 G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]
 G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

0 A
 0 B
 0 C
 0 D
 1 A
 1 B
 1 D
 3 A
 3 B
 3 D

Welded flange, 316L stainless steel, raised face

1" ASME, 150 lb
 1" ASME, 300 lb
 1" ASME, 600 lb
 1½" ASME, 150 lb
 1½" ASME, 300 lb
 1½" ASME, 600 lb
 2" ASME, 150 lb
 2" ASME, 300 lb
 2" ASME, 600 lb
 3" ASME, 150 lb
 3" ASME, 300 lb
 3" ASME, 600 lb
 4" ASME, 150 lb
 4" ASME, 300 lb
 4" ASME, 600 lb

5 A
 5 B
 5 C
 5 D
 5 E
 5 F
 5 G
 5 H
 5 J
 5 K
 5 L
 5 M
 5 N
 5 P
 5 Q

Welded flange, 316L stainless steel, Type A flat faced

DN 25, PN 16
 DN 25, PN 40
 DN 40, PN 16
 DN 40, PN 40
 DN 50, PN 16
 DN 50, PN 40
 DN 80, PN 16
 DN 80, PN 40
 DN 100, PN 16
 DN 100, PN 40

6 A
 6 B
 6 C
 6 D
 6 E
 6 F
 6 G
 6 H
 6 J
 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

Rod 350 mm (13.78")
 Extended rod, length 500 mm (19.69")
 Extended rod, length 750 mm (29.53")
 Extended rod, length 1000 mm (39.37")

A
 B
 C
 D

Selection and Ordering data

Order No.

Pointek CLS300 - Standard - High Temperature Rod Version with Threaded or Flanged process connection

C) 7 M L 5 6 5 2 -

0 0 - 0

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.

Add order code Y01 and plain text:

"Insertion length ... mm"

Extended rod, factory adjusted length
 250 ... 499 mm (9.8 ... 19.65")
 Extended rod, factory adjusted length
 500 ... 749 mm (19.69 ... 29.49")
 Extended rod, factory adjusted length
 750 ... 999 mm (29.53 ... 39.3")

E
 F
 G

Wetted Seals

Graphite

0

Probe Material

316L stainless steel with ceramic (ZrO₂) isolators

0

Approvals

Dust Ignition Proof with IS Probe:
 CE, C-TICK, ATEX II 1/2 D T100 °C

C
 D

Flameproof Enclosure with IS Probe:
 CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1,
 ATEX II 1/2 D T100 °C

E
 F

Flameproof Enclosure with IS Probe, with WHG approval:
 CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T1,
 ATEX II 1/2 D T100 °C

G
 H

Dust Ignition Proof with IS Probe:
 CSA/FM Class II, Div. 1, Gr. E, F, G
 CSA/FM Class III T4

J
 K

Explosion Proof Enclosure with IS Probe:
 CSA/FM Class I, Div. 1, Gr. A, B, C, D
 CSA/FM Class II, Div. 1, Gr. E, F, G
 CSA/FM Class III T4

L
 M
 N

General Purpose (CSA, FM)

General Purpose (CE, C-TICK)

General Purpose with WHG approval (CSA, FM,
 CE, C-TICK)

O
 P
 Q

Enclosure and Lid

Aluminum epoxy coated

2 x ½" NPT via adapter - cable inlet, IP65
 2 x M20x1.5 cable inlet, IP65
 2 x ½" NPT via adapter - cable inlet, IP68
 2 x M20x1.5 cable inlet, IP68

A
 B
 C
 D

Active Shield Length

Standard length -
 (125 mm threaded, 105 mm flanged)
 Extended shield -
 (250 mm threaded, 230 mm flanged)¹⁾
 Extended shield -
 (400 mm threaded, 380 mm flanged)²⁾

0
 1
 2

¹⁾ Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")]

²⁾ Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")]

C) Subject to export regulations AL: N, ECCN: EAR99H

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Standard

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.	See page 5/54
Accessories	See page 5/54

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Digital

Overview



Pointek CLS300 (digital version) is an 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. The digital version includes PROFIBUS PA, an LCD display, and advanced diagnostic features.

Benefits

- Patented 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.

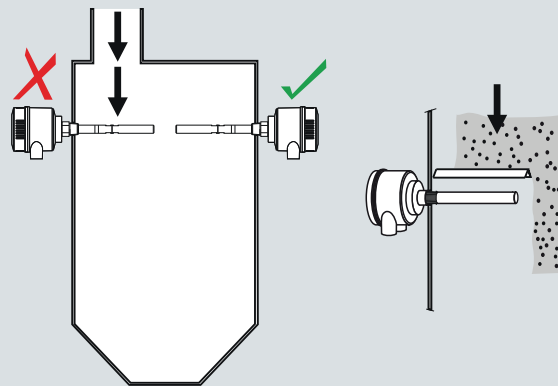
Wetted parts are made of stainless steel with a PFA shield for high chemical resistance, and of ceramic and stainless steel for high temperature version. Materials with low or high dielectric constants can be accurately detected. The unique Active Shield suppresses interference from material buildup 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.

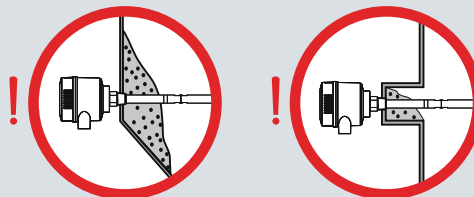
- Key Applications: liquids, slurries, bulk solids, relatively high pressure and temperature, hazardous areas, milling and mining applications

Configuration

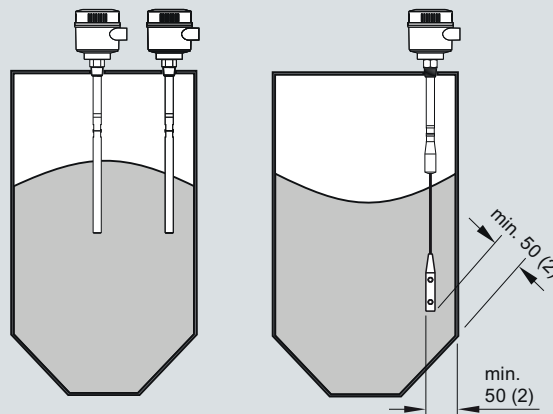
Installation



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 mm (2") from tank wall.
Note angle of repose and adjust accordingly.

Pointek CLS300 installation, dimensions in mm (inch)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Digital

Technical specifications

Mode of operation		Controls and displays	
Measuring principle	Inverse frequency shift capacitive level detection	Local display	LCD
Input		Configuration	- Locally, using 3 button keypad (for standalone operation) - Remotely, using SIMATIC PDM (for installation on a network)
Measured variable	Change in picoFarad (pF)	Power supply	
Output		Bus voltage (at process connection)	- Standard: 12 ... 30 V DC - Intrinsically Safe: 12 ... 24 V DC
Solid-state output		Current consumption	12.5 mA
- Output - Protection - Max. switching voltage	Galvanically isolated Against reversed polarity (bipolar) 30 V (DC) 30 V peak (AC)	Certificates and approvals	
- Max. load current - Voltage drop - Time delay (pre or post switching)	82 mA < 1 V, typical at 50 mA Programmable by user (0 ... 100 s)	General Purpose	CSA, FM, CE, C-TICK
Fail-safe mode	Min. or max.	Dust Ignition Proof	ATEX II 1/2 D, 2 D IP6X T100 °C
Connection	Removable terminal block	Flameproof Enclosure with IS Probe	ATEX II 1/2 G EEx d[ia] IIC T6...T4 ATEX II 1/2 D T100 °C
Accuracy		Dust Ignition Proof with IS Probe	CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Resolution		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, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
- Min. sensitivity (pF) - Max. temperature error	1 % change in actual capacitance 0.2 % of actual capacitance value	Non-incendive	CSA/FM Class I, Div. 2, Gr. A, B, C, D CSA/FM Class II, Div. 2, Gr. F, G CSA/FM Class III T4 or T6
Rated operating conditions ¹⁾		Explosion Proof with IS Probe	CSA/FM Class I, Div. 1, Gr. A, B, C, D CSA/FM Class II, Div. 1, Gr. E, F, G CSA/FM Class III T4
Installation conditions		Marine	Lloyds Register of Shipping, Categories ENV1, ENV2 and ENV5
Location	Indoor/outdoor	Others	Pattern Approval (China)
Ambient conditions		Communication	
Ambient temperature	-40 ... +85 °C (-40 ... +185 °F) ²⁾	PROFIBUS PA (IEC 61158 CPF3 CP3/2)	
Medium conditions		Bus physical layer: IEC 61158-2 MBP-(IS)	
- Relative dielectric constant ϵ_r - Process temperature - Rod/Cable version - High Temperature version	Min. 1.5 -40 ... +200 °C (-40 ... +392 °F) ²⁾ -40 ... +400 °C (-40 ... +752 °F)	Device profile: PROFIBUS PA profile for Process Control Devices Version 3.0, Class B	
Process pressure³⁾	-1 ... +35 bar g (-14.6 ... +511 psi g)	FISCO field device	
Design		¹⁾ When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. 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 5/55. ⁴⁾ Barrier or Intrinsically safe power supply required for Intrinsically Safe protection	
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 1/2" NPT conduit entry including 1 plugged entry)		

Design: Probe	Rod version	High Temperature version	Cable version
Length	Min. 250 mm (9.8"), max. 1000 mm (40")	Min. 250 mm (9.8"), max. 1000 mm (40")	Min. 1000 mm (40"), max. 25000 mm (984")
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 Oxide²⁾ For Caustic Materials please contact nacc.smpi@siemens.com for alternative O-rings

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data

Order No.

Pointek CLS300 - Digital - Rod with Threaded or C) Flanged process connection

7 ML 5 6 6 0 -

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.

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") A
 Extended rod, length 500 mm (19.69") B
 Extended rod, length 750 mm (29.53") C
 Extended rod, length 1000 mm (39.37") D

Selection and Ordering data

Order No.

Pointek CLS300 - Digital - Rod with Threaded or C) Flanged process connection

7 ML 5 6 6 0 -

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.

Add order code Y01 and plain text:

"Insertion length ... mm"

Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65") E
 Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49") F
 Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3") 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, C-TICK, ATEX II 1/2 D, 2 D IP6X T100 °C B

Intrinsically Safe¹⁾
 CE, C-TICK, 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, C-TICK, 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, Gr. E, F, G E
 CSA/FM Class III T4

Intrinsically Safe¹⁾
 CSA/FM Class I, Div. 1, Gr. A, B, C, D F
 CSA/FM Class II, Div. 1, Gr. E, F, G
 CSA/FM Class III T4

Explosion Proof Enclosure with IS Probe:
 CSA/FM Class I, Div. 1, Gr. A, B, C, D G
 CSA/FM Class II, Div. 1, Gr. E, F, G
 CSA/FM Class III T4

General Purpose (CSA, FM) H

General Purpose (CSA, FM, CE, C-TICK) 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 - 0
 (125 mm threaded, 105 mm flanged)
 Extended shield - 1
 (250 mm threaded, 230 mm flanged)²⁾
 Extended shield - 2
 (400 mm threaded, 380 mm flanged)³⁾

¹⁾ Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

²⁾ Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")]

³⁾ Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")]

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data	Order code	Selection and Ordering data	Order No.
Further designs		Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection	7 M L 5 6 6 1 -
Please add "-Z" to Order No. and specify Order code(s).		Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces	
Total insertion length: enter the total insertion length in plain text description	Y01	Process Connection	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15	<u>Threaded, 316L stainless steel</u>	
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11	1¼" NPT [(Taper), ANSI/ASME B1.20.1]	0 C
Inspection Certificate Type 3.1 per EN 10204	C12	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
Operating Instructions		<u>Welded flange, 316L stainless steel, raised face</u>	
Note: The Operating Instructions should be ordered as a separate line on the order.	See page 5/54	1½" ASME, 150 lb	5 D
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.		1½" ASME, 300 lb	5 E
		1½" ASME, 600 lb	5 F
Accessories	See page 5/54	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
		<u>Welded flange, 316L stainless steel, Type A flat faced</u>	
		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)	
		<u>Note: No Y01 needed in order code for standard lengths</u>	
		Extended cable, 3000 mm (118.11"), length can be shortened by customer	A
		Extended cable, 6000 mm (236.22"), length can be shortened by customer	B
		<u>Add order code Y01 and plain text:</u>	
		<u>"Insertion length ... mm"</u>	
		Extended cable, 500 ... 1000 mm (19.69 ... 39.37")	E
		Extended cable, 1001 ... 5000 mm (39.41 ... 196.85")	F
		Extended cable, 5001 ... 10000 mm (196.89 ... 393.70")	G
		Extended cable, 10001 ... 15000 mm (393.74 ... 590.55")	H
		Extended cable, 15001 ... 20000 mm (590.59 ... 787.40")	J
		Extended cable, 20001 ... 25000 mm (787.44 ... 984.25")	K

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data

Order No.

Pointek CLS300 - Digital - Cable with Threaded or Flanged process connection

7 ML 5 6 6 1 -

Versatile inverse frequency shift capacitance level switch with optional process connection choices and configurable output, ideal for detection of liquids, solids, slurries, foam and interfaces

Thermal Isolator

Without thermal isolator

With thermal isolator [for process connection temperatures over +85 °C (+185 °F)]

Wetted Seals

FKM

FFKM [for process temperatures above -20°C (-4°F)]

Probe Material

Bare 316L stainless steel cable, PEEK isolators and 316L stainless steel cable weight

PFA coated cable, PEEK isolators and 316L stainless steel cable weight

Approvals

Dust Ignition Proof:

CE, C-TICK, ATEX II 1/2 D, 2 D IP6X T100 °C

Intrinsically Safe¹⁾

CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D, 2 D IP6X T100 °C

Flameproof Enclosure with IS Probe:

CE, C-TICK, 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, Gr. E, F, G

CSA/FM Class III T4

Intrinsically Safe¹⁾

CSA/FM Class I, Div. 1, Gr. A, B, C, D

CSA/FM Class II, Div. 1, Gr. E, F, G

CSA/FM Class III T4

Explosion Proof Enclosure with IS Probe:

CSA/FM Class I, Div. 1, Gr. A, B, C, D

CSA/FM Class II, Div. 1, Gr. E, F, G

CSA/FM Class III T4

General Purpose (CSA, FM)

General Purpose (CSA, FM, CE, C-TICK)

Enclosure and Lid

Aluminum epoxy coated

2 x ½" NPT via adapter - cable inlet, IP65

2 x M20x1.5 cable inlet, IP65

2 x ½" NPT via adapter - cable inlet, IP68

2 x M20x1.5 cable inlet, IP68

Active Shield Length

Standard length -
(125 mm threaded, 105 mm flanged)

Extended shield -
250 mm threaded, 230 mm flanged²⁾

Extended shield -
(400 mm threaded, 380 mm flanged)²⁾

¹⁾ Barrier or Intrinsically safe power supply required for Intrinsically Safe protection

²⁾ Available with Probe version options A, B and, F to K only
[≥ 1000 mm (39.7")]

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order 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")]:
Measuring-point number/identification
(max. 16 characters) specify in plain text

Y15

Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.

See page 5/54

Accessories

See page 5/54

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Digital

Selection and Ordering data		Order No.	Selection and Ordering data		Order No.
Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection		C) 7 ML 5 6 6 2 - 0 0 - 0	Pointek CLS300 - Digital - High Temperature Rod version with Threaded or Flanged process connection		C) 7 ML 5 6 6 2 - 0 0 - 0
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.			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.		
Process Connection			Probe Material		
<u>Threaded, 316L stainless steel</u>			316L stainless steel with ceramic (ZrO ₂) isolators		0
¾" NPT [(Taper), ANSI/ASME B1.20.1]		0 A	Approvals		
1" NPT [(Taper), ANSI/ASME B1.20.1]		0 B	Dust Ignition Proof:		B
1¼" NPT [(Taper), ANSI/ASME B1.20.1]		0 C	CE, C-TICK, ATEX II 1/2 D, 2 D IP6X T100 °C		
1½" NPT [(Taper), ANSI/ASME B1.20.1]		0 D	Intrinsically Safe ¹⁾		C
R ¾" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1 A	CE, C-TICK, ATEX II 1 G EEx ia IIC T6...T4, ATEX II 1/2 D, 2 D IP6X T100 °C		
R 1" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1 B	Flameproof Enclosure with IS Probe:		D
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1 D	CE, C-TICK, ATEX II 1/2 G EEx d[ia] IIC T6...T4, ATEX II 1/2 D T100 °C		
G ¾" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3 A	Dust Ignition Proof with IS Probe:		E
G 1" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3 B	CSA/FM Class II, Div. 1, Gr. E, F, G		
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3 D	CSA/FM Class III T4		
<u>Welded flange, 316L stainless steel, raised face</u>			Intrinsically Safe ¹⁾		F
1" ASME, 150 lb		5 A	CSA/FM Class I, Div. 1, Gr. A, B, C, D		
1" ASME, 300 lb		5 B	CSA/FM Class II, Div. 1, Gr. E, F, G		G
1" ASME, 600 lb		5 C	CSA/FM Class III T4		
1½" ASME, 150 lb		5 D	Explosion Proof Enclosure with IS Probe:		
1½" ASME, 300 lb		5 E	CSA/FM Class I, Div. 1, Gr. A, B, C, D		H
1½" ASME, 600 lb		5 F	CSA/FM Class II, Div. 1, Gr. E, F, G		
2" ASME, 150 lb		5 G	CSA/FM Class III T4		J
2" ASME, 300 lb		5 H	General Purpose (CSA, FM)		
2" ASME, 600 lb		5 J	General Purpose (CSA, FM, CE, C-TICK)		
3" ASME, 150 lb		5 K	Enclosure and Lid		
3" ASME, 300 lb		5 L	<u>Aluminum epoxy coated</u>		
3" ASME, 600 lb		5 M	2 x ½" NPT via adapter - cable inlet, IP65		A
4" ASME, 150 lb		5 N	2 x M20x1.5 cable inlet, IP65		B
4" ASME, 300 lb		5 P	2 x ½" NPT via adapter - cable inlet, IP68		C
4" ASME, 600 lb		5 Q	2 x M20x1.5 cable inlet, IP68		D
<u>Welded flange, 316L stainless steel, Type A flat faced</u>			Active Shield Length		
DN 25, PN 16		6 A	Standard length -		0
DN 25, PN 40		6 B	(125 mm threaded, 105 mm flanged)		
DN 40, PN 16		6 C	Extended shield -		1
DN 40, PN 40		6 D	(250 mm threaded, 230 mm flanged) ²⁾		
DN 50, PN 16		6 E	Extended shield -		2
DN 50, PN 40		6 F	(400 mm threaded, 380 mm flanged) ³⁾		
DN 80, PN 16		6 G	1) Barrier or Intrinsically safe power supply required for Intrinsically Safe protection		
DN 80, PN 40		6 H	2) Available with Probe version options B to D, F, G only [≥ 500 mm (19.69")]		
DN 100, PN 16		6 J	3) Available with Probe version options C, D, and, G only [≥ 750 mm (29.53")]		
DN 100, PN 40		6 K	C) Subject to export regulations AL: N, ECCN: EAR99		
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)			Selection and Ordering data		Order code
Probe length (length from flange face) (threaded lengths include process thread)			Further designs		
<u>Note: No Y01 needed in order code for standard lengths</u>			Please add "-Z" to Order No. and specify Order code(s).		
Standard version, rod 350 mm (13.78")		A	Total insertion length: enter the total insertion length in plain text description		Y01
Extended rod, length 500 mm (19.69")		B	Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text		Y15
Extended rod, length 750 mm (29.53")		C	Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000		C11
Extended rod, length 1000 mm (39.37")		D	Inspection Certificate Type 3.1 per EN 10204		C12
Add order code Y01 and plain text: <u>"Insertion length ... mm"</u>			Operating Instructions		
Extended rod, factory adjusted length 250 ... 499 mm (9.8 ... 19.65")		E	Note: The Operating Instructions should be ordered as a separate line on the order.		See page 5/54
Extended rod, factory adjusted length 500 ... 749 mm (19.69 ... 29.49")		F	This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and manual library.		
Extended rod, factory adjusted length 750 ... 999 mm (29.53 ... 39.3")		G	Accessories		See page 5/54
Wetted Seals					
Graphite		0			

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Standard and Digital

Selection and Ordering data	Order No.
Operating Instructions - Standard	
English	C) 7ML1998-5JH02
German	C) 7ML1998-5JH32
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	C) 7ML1998-5QY82
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Operating Instructions - Digital	
English	C) 7ML1998-5JJ02
German	C) 7ML1998-5JJ32
Note: The Operating Instructions should be ordered as a separate line on the order.	
Quick Start manual, multi-language	C) 7ML1998-5XA82
This device is shipped with the Siemens Milltronics manual CD containing the complete 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
<u>General Purpose</u>	
1/2" NPT General Purpose Cable Entry IP68/IP69K C) NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 6 ... 12 mm (0.236 ... 0.472")	A5E03252530
M20x1.5 General Purpose Cable Entry IP68/IP69K C) NEMA6, -40 ... -100 °C (-40 ... -212 °F), cable size 7 ... 12 mm (0.275 ... 0.472")	A5E03252531
<u>Hazardous Locations</u>	
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")	A5E03252527
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")	A5E03252528
Blind threaded flanges are available. Please contact nacc.smpi@siemens.com with a completed application data sheet on page 5/9	
Pointek Specials	See page 5/77

C) Subject to export regulations AL: N, ECCN: EAR99

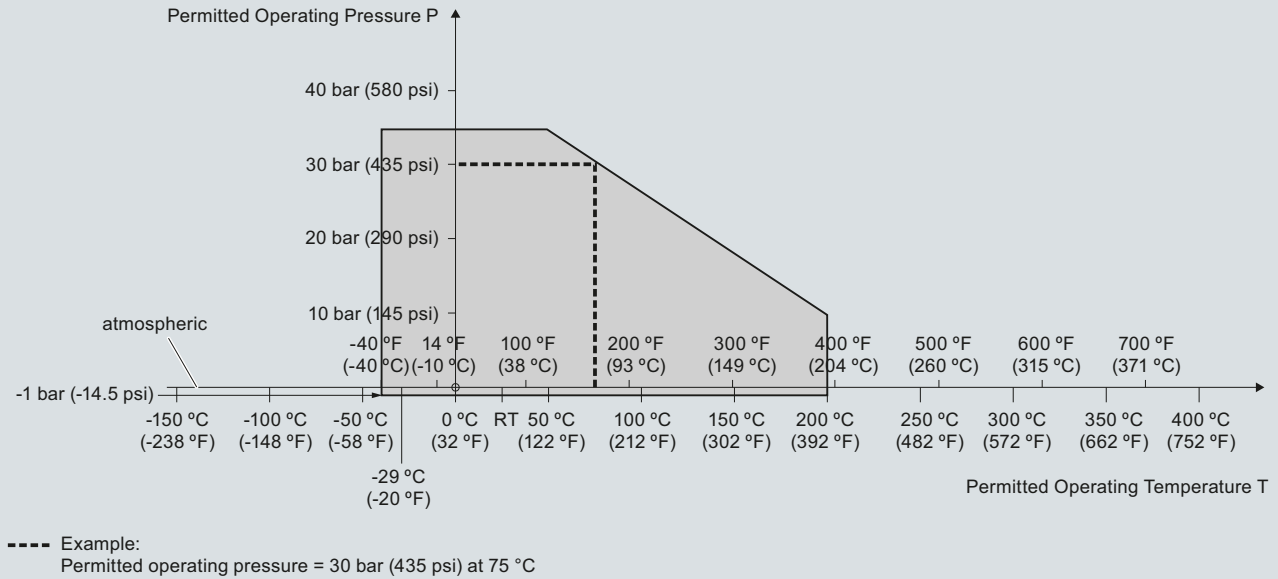
Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Standard and Digital

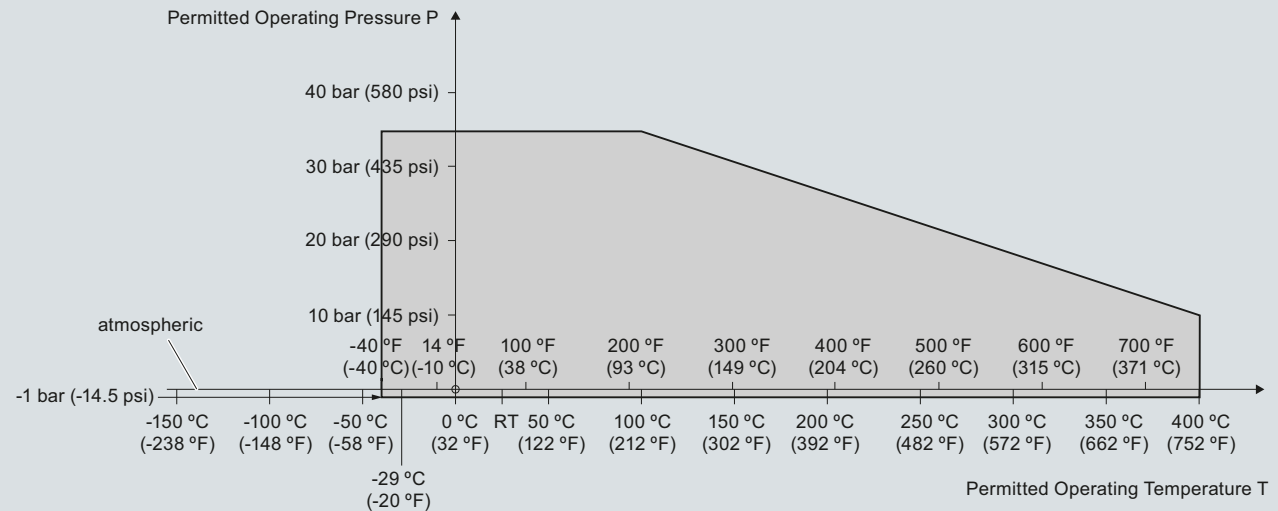
Characteristic curves

Pressure/Temperature Curve
CLS300 Extended Rod and Cable Probes
Threaded Process Connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



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)



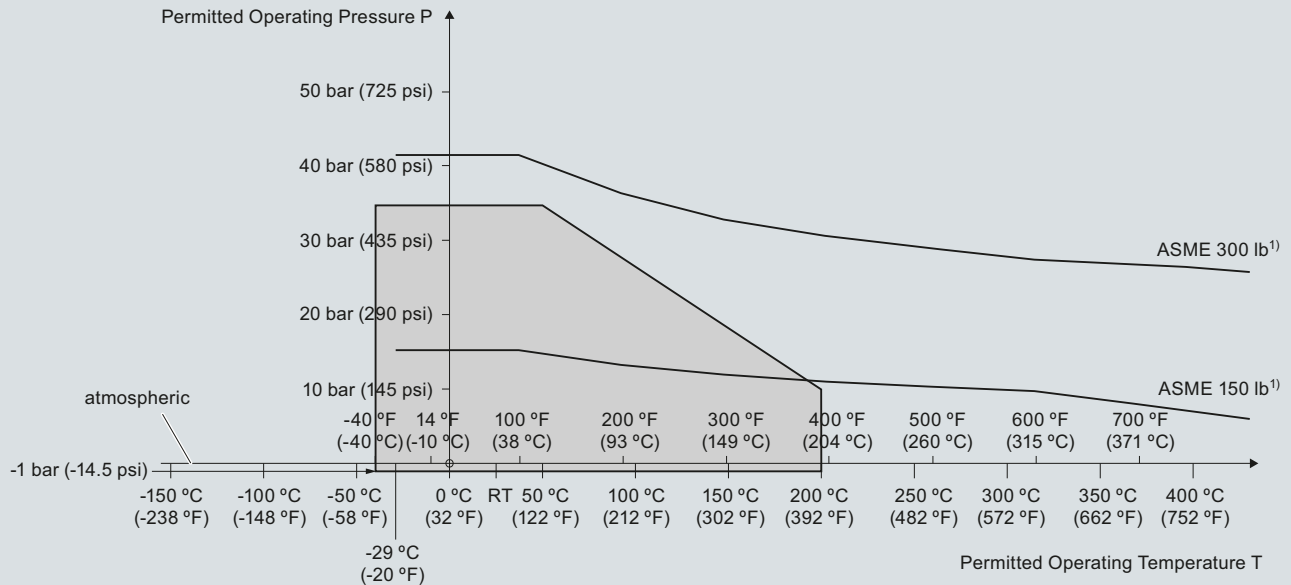
Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

Level Measurement

Point level measurement - Capacitance switches

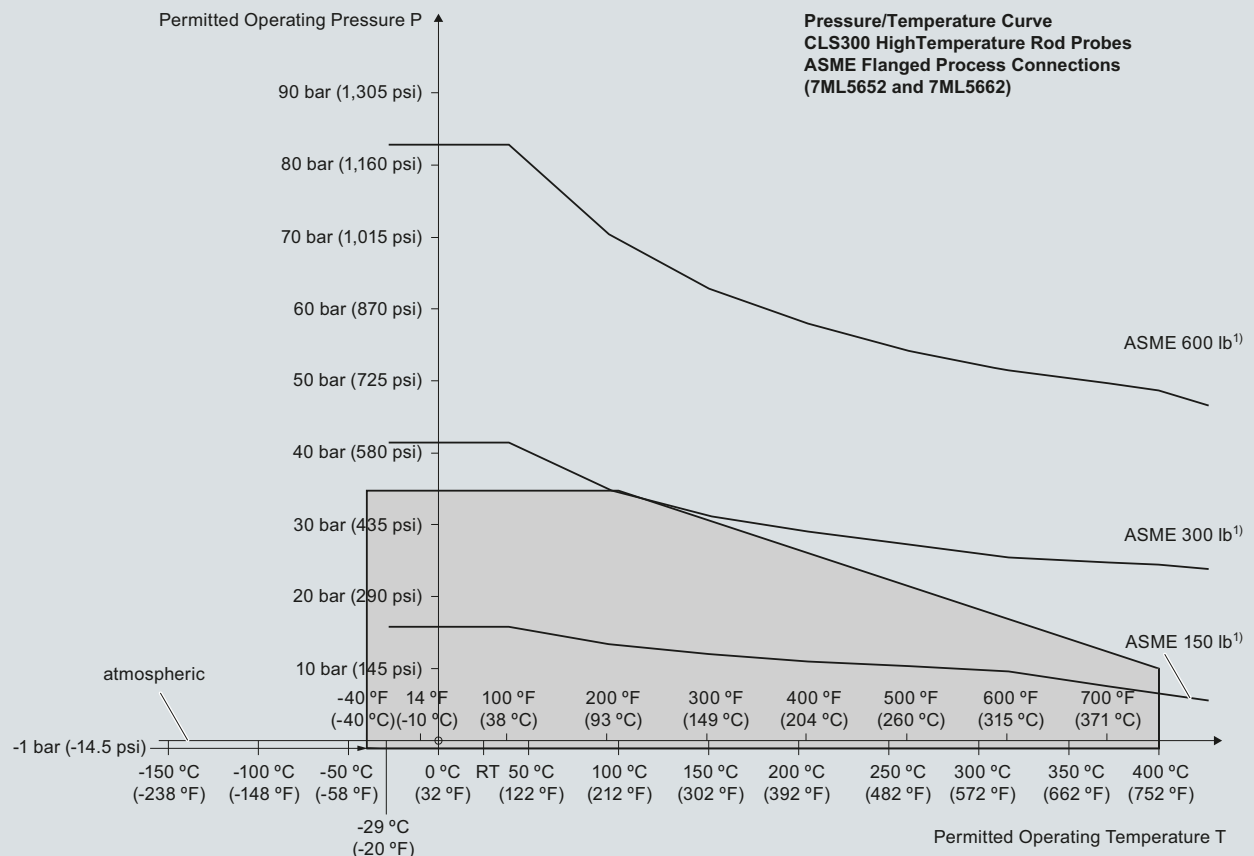
Pointek CLS300 - Standard and Digital

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.

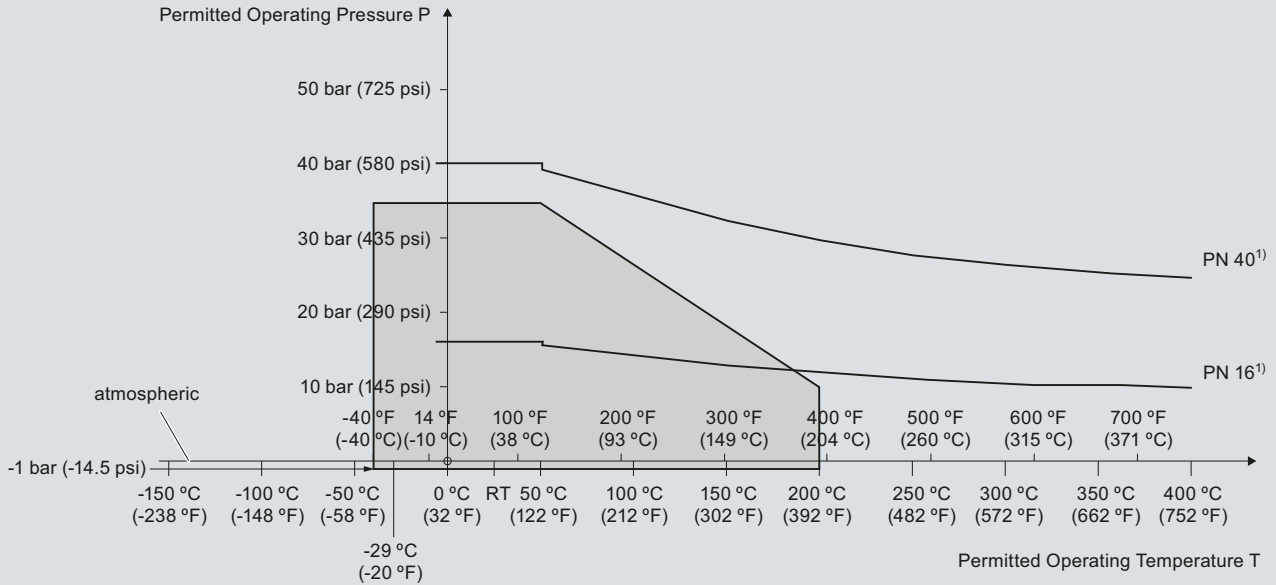
Pointek CLS300 Process Pressure/Temperature derating curves (7ML5650, 7ML5651, 7ML5660, and 7ML5661)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS300 Process Pressure/Temperature derating curves (7ML5652 and 7ML5662)

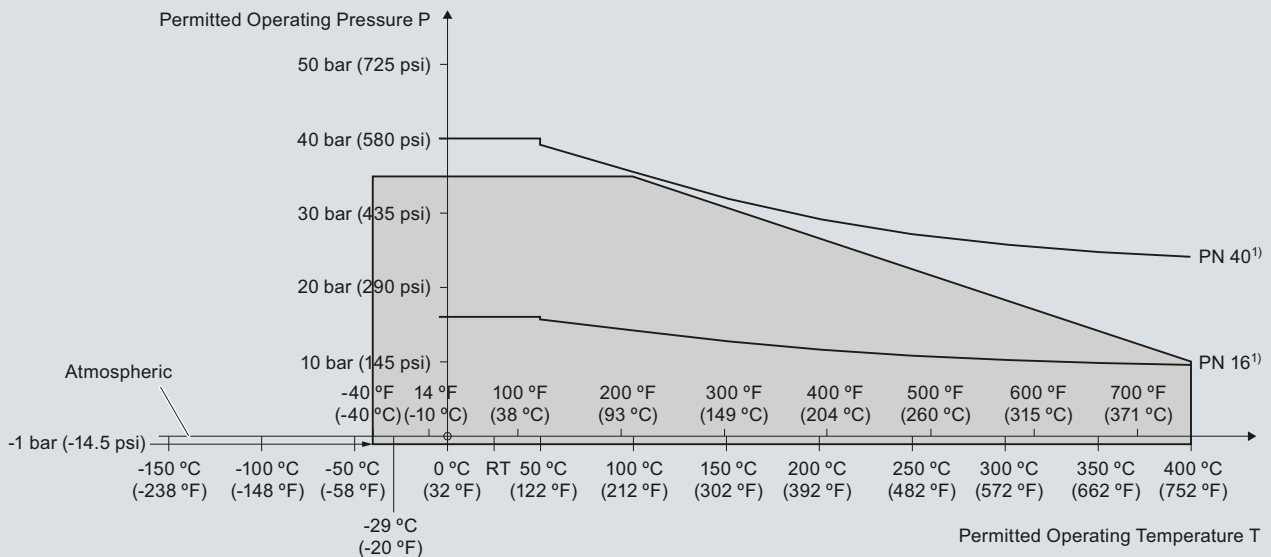
Pressure/Temperature Curve
CLS300 Extended Rod and Cable Probes
EN Flanged Process Connections
(7ML5650, 7ML5651, 7ML5660 and 7ML5661)



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 (7ML56552 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)

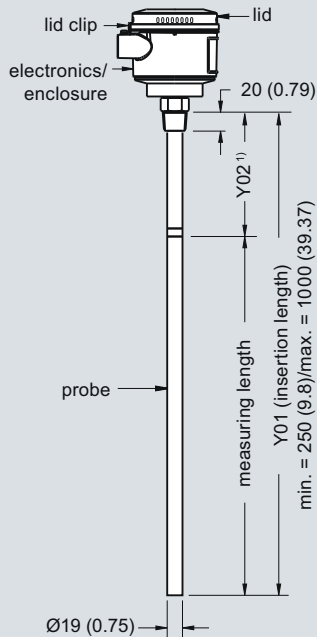
Level Measurement

Point level measurement - Capacitance switches

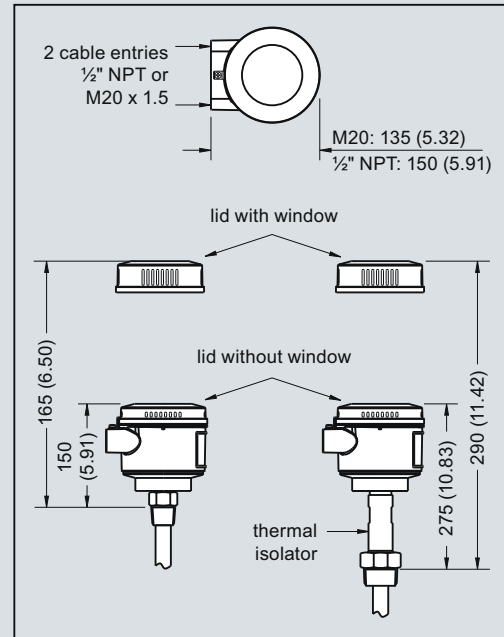
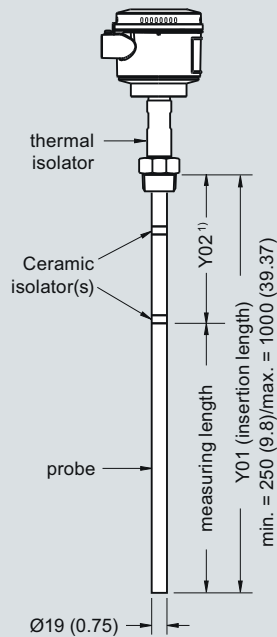
Pointek CLS300 - Standard and Digital

Dimensional drawings

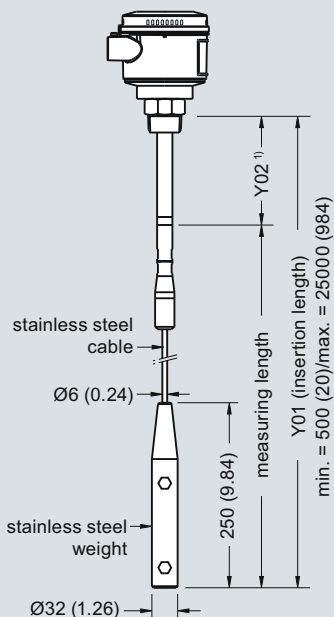
Rod version
Threaded (7ML5650 and 7ML5660)



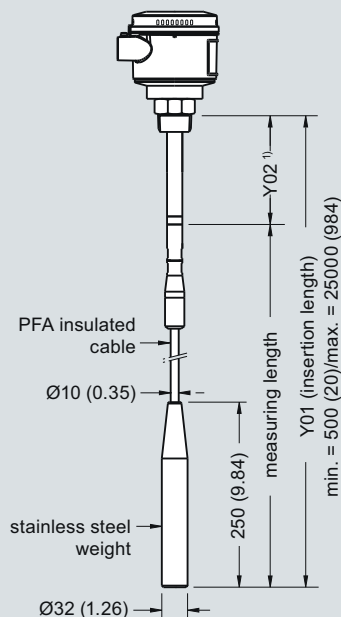
High temperature rod version
Threaded (7ML5652 and 7ML5662)



Cable version, non-insulated
Threaded (7ML5651 and 7ML5661)



Cable version, insulated
Threaded (7ML5651 and 7ML5661)



Note:

¹⁾ Extended Active Shield (Y02): standard length 125 mm (4.92"). Optional active shield lengths: 250 mm (9.84") or 400 mm (15.75").

Pointek CLS300 - Threaded Process Connections, dimensions in mm (inch)

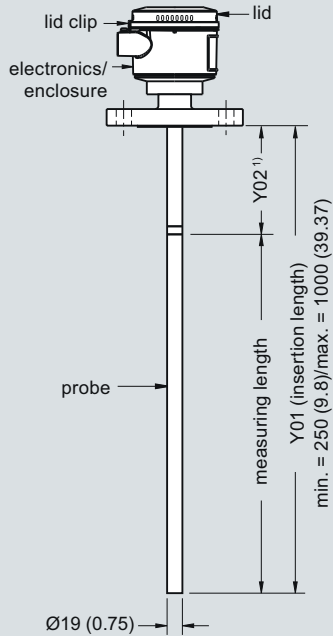
Level Measurement

Point level measurement - Capacitance switches

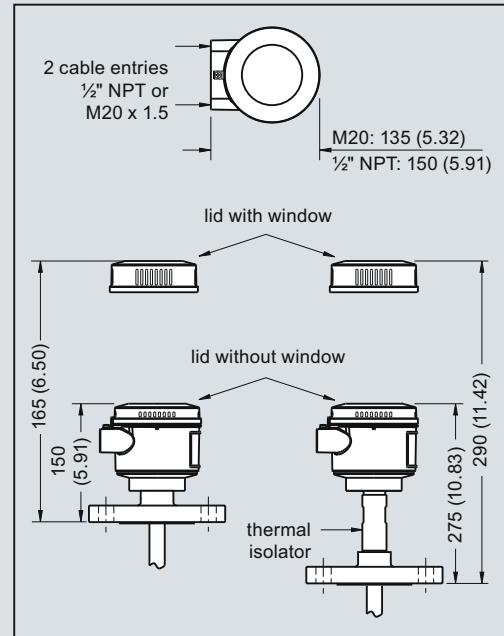
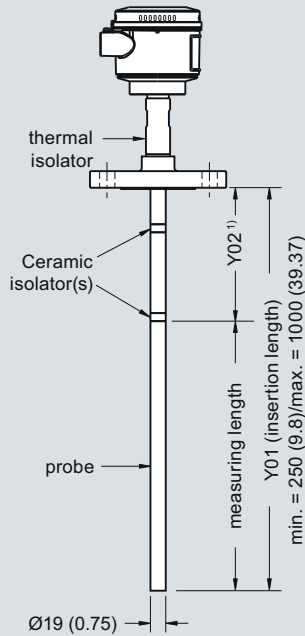
Pointek CLS300 - Standard and Digital

5

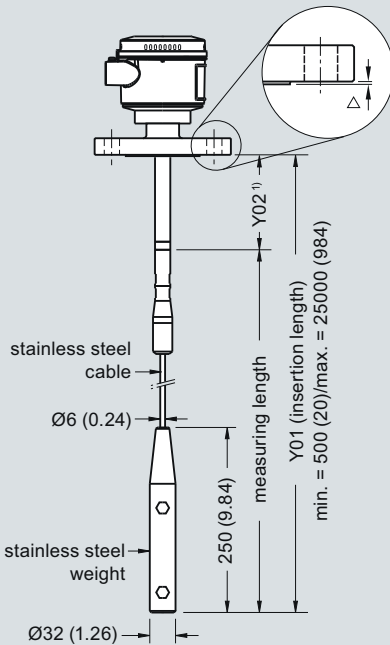
Rod version
Welded flange (7ML5650 and 7ML5660)



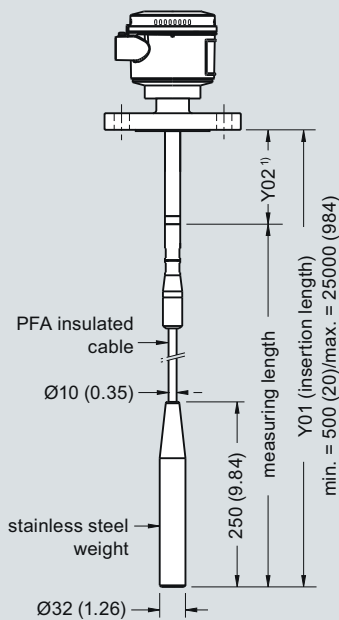
High temperature rod version
Welded flange (7ML5652 and 7ML5662)



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 mm (4.13"). Optional active shield lengths: 230 mm (9.06") or 380 mm (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)

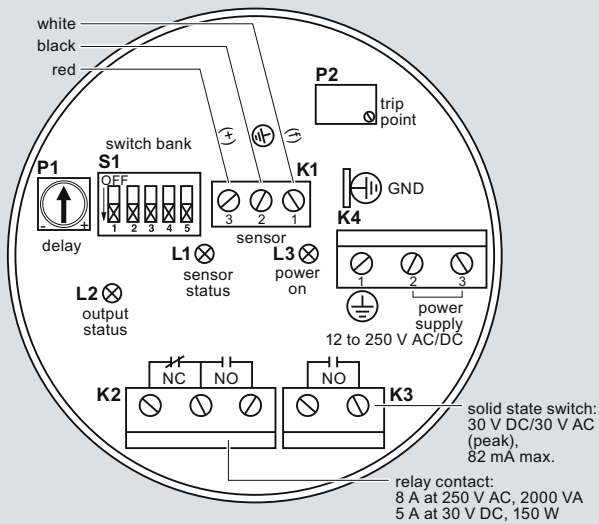
Level Measurement

Point level measurement - Capacitance switches

Pointek CLS300 - Standard and Digital

Schematics

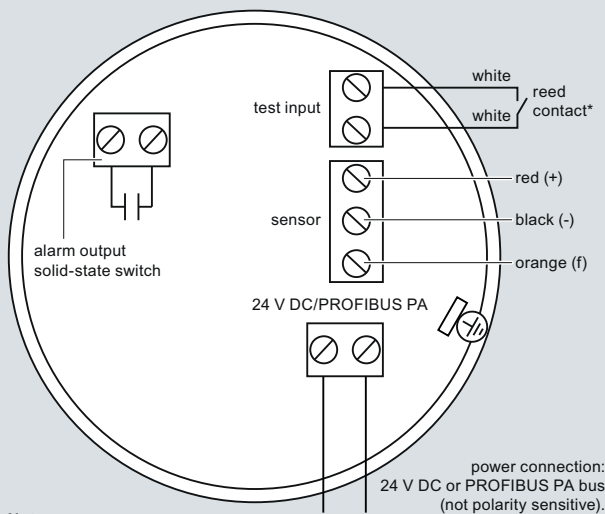
Wiring: Pointek CLS300 Standard



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

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

Overview



Pointek CLS500 is an inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of high temperature and pressure

Benefits

- Patented 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

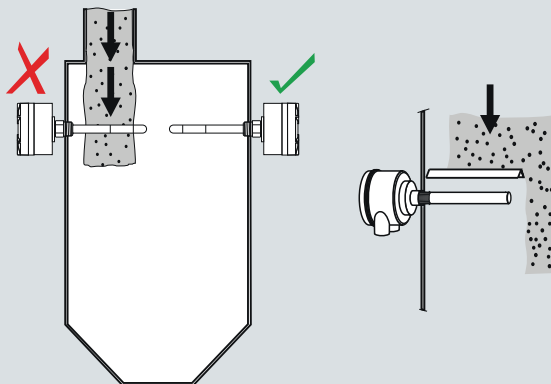
Patented Active-Shield technology ensures that measurement is unaffected by vapours, product deposits, dust and condensation. The unique mechanical probe design coupled with a high performance transmitter gives superior performance in a wide range of level detection applications.

Pointek CLS500's microprocessor-based electronics provide one-point calibration, making setup possible without shutting down your production process.

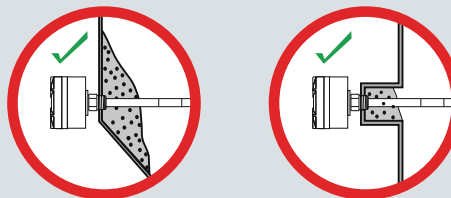
- Key Applications: foam or liquid/foam level, glycol regenerators, high-pressure coalescers, LNG applications

Configuration

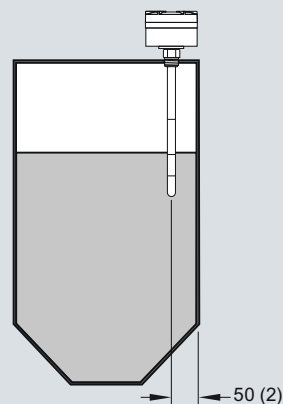
Installation



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 mm (2") from tank wall.

Pointek CLS500 installation, dimensions in mm (inch)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

Technical specifications

Input		Design	
Measuring range	0 ... 330 pF	Material	
Span	Min. 1 pF	- Wetted parts material - Standard rod	316L stainless steel
Output		Probe isolation (rod)	PFA, enamel
Solid-state switch		Probe diameter	
- Output - Protection - Max. switching voltage	Galvanically isolated Against reversed polarity (bipolar) 30 V (DC) 30 V peak (AC)	- Standard rod version (PFA) - High temperature rod version (Enamel)	16 mm (0.63")
- Max. load current - Voltage drop - Time delay (pre or post switching)	82 mA < 1 V, typical at 50 mA 1 ... 60 s	High temperature rod version (Stainless steel)	Contact nacc.smpi@siemens.com for details.
Current loop	4 ... 20 mA/20 ... 4 mA	Probe length	19 mm (0.75")
Accuracy (transmitter)		Standard rod version (PFA)	Max. 1000 mm (39.4") with 16 mm (0.63") diameter probe
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	- High temperature rod version (Enamel) - High temperature rod version (Stainless steel)	Contact nacc.smpi@siemens.com for details.
Non-linearity and repeatability	0.1 % of full scale and actual measurement respectively	Process connection of probe	Max. measuring length 1000 mm (39.4") with 19 mm (0.75") diameter probe
Accuracy	Deviation < 0.1 % of measured value	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] ASME, EN 1092-1
Rated operating conditions¹⁾		Flange mounting	
Installation conditions		Enclosure	
Location	Indoor/outdoor	Material	Aluminium, epoxy-coated (Stainless steel option available). Contact nacc.smpi@siemens.com
Ambient conditions		- Cable inlet - Degree of protection	2 x 1/2" NPT Type 4X/NEMA4X/IP65, IP68
- Ambient temperature (transmitter) - Installation category - Pollution degree	-40 ... +85 °C (-40 ... +185 °F) ²⁾ I 4	Power supply	Max. 33 V DC
Medium conditions		Features	
- Relative dielectric constant ϵ_r - Process temperature	Min. 1.5 Temperature ratings are pressure dependent. See Pressure/Temperature curves on page 5/67.	Measurement current signalling	NAMUR NE 43
- Standard (PFA) - High temperature stainless steel version with enamel insulation and thermal isolator - High temperature stainless steel version with thermal isolator - Cryogenic version	-50 ... +200 °C (-58 ... +392 °F) Contact nacc.smpi@siemens.com	Safety	Inputs/outputs fully galvanically isolated Polarity-insensitive current loop Fully potted Integrated safety barrier
	-60 ... +400 °C (-76 ... +752 °F) -200 ... +200 °C (-328 ... +392 °F) Contact nacc.smpi@siemens.com for details.	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
Process pressure	Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/67.	- Function rotary switch - SMART communication	Positions 0 ... 9, A ... F Conforming to HART Communication Foundation (HCF)
- Standard (PFA) - High temperature version (Enamel)³⁾ - High temperature version (Stainless steel)	-1 ... +150 bar g (-14.6 ... +2175 psi g) Contact nacc.smpi@siemens.com		
	-1 ... +35 bar g (-14.6 ... +507.6 psi g)		

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

Certificates and approvals

General Purpose	CE, CSA/FM, C-TICK
Non incensive/Non sparking	CSA/FM Class I, Div. 2, Groups A, B, C, D T4 ATEX II 3G 2D EEx n A [ib] IIC T6 to 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 to 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 to 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 5/67.
- 2) Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F)
- 3) Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact nacc.smpi@siemens.com

Pointek CLS500 probe version	Standard	HT Series
Process connection types	Standard (PFA) (7ML5601, 7ML5602, 7ML5603)	High Temperature (Enamel or 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	–
Enamel		HT Enamel: available as special order ¹⁾
Length parameters		
Max. rod length	1000 mm (40")	1000 mm (40")
Process conditions²⁾		
Max. process pressure	150 bar g (2175 psi g)	Stainless steel: ³⁾ 35 bar g (507 psi g) Enamel: ³⁾ 345 bar g (5004 psi g)
Max. process temperature	+200 °C (+392 °F)	+400 °C (+752 °F)

1) Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact nacc.smpi@siemens.com

2) When operation is in areas classified as hazardous, observe restrictions according to relevant certificate. See also Pressure/Temperature curves on page 5/67.

3) Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/67.

– Not available as standard

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

Selection and Ordering data

Pointek CLS500, threaded

Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.

Electronic transmitter

No transmitter supplied
MSP 2002-1 (330 pF)

Process connection

¾"
1"
1¼"
1½"
2"

Threaded connection and rating

NPT [(Taper), ANSI/ASME B1.20.1]
R [(BSPT), EN 10226/PT (JIS-T) JIS B 0203]
G [(BSPP), EN ISO 228-1/PT (JIS-P), JIS B 0202]

Probe insulation/material of process connection

PFA insulation/316L stainless steel

Approvals

General Purpose: CE, CSA/FM, C-TICK
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
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C
FM Class I, Div. 1, Groups A, B, C, D T4

Probe/electrode diameter

16 mm (0.63") rigid rod, minimum insertion length 200 mm (7.9"), maximum insertion length 1000 mm (39.4")¹⁾

Thermal isolator/remote version

Rigid thermal isolator [for process connection temperature over +85 °C (+185 °F)]
No thermal isolator

¹⁾ Add order code Y01 and Y02 in plain text:
"Insertion/active shield length to mm"

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

C) 7ML5601 -

A 0

0
1A
B
C
D
EA
B
D

1

1
2
4
6

1

A
B

Selection and Ordering data

Pointek CLS500, welded flange

Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.

Electronic transmitter

MSP 2002-1 (330 pF)

Process connection and pressure rating

Welded flange, 316L stainless steel, raised face

2" ASME, 150 lb
2" ASME, 300 lb
3" ASME, 150 lb
3" ASME, 300 lb¹⁾
4" ASME, 150 lb¹⁾
4" ASME, 300 lb¹⁾
6" ASME, 150 lb¹⁾
6" ASME, 300 lb¹⁾

Welded flange, 316L stainless steel,

Type A flat faced

DN 50 PN 16

DN 50 PN 25

DN 80 PN 16

DN 80 PN 25

DN 100 PN 16¹⁾

DN 125 PN 16¹⁾

(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

Approvals

General Purpose
CSA/FM Class I, Div. 2, Groups A, B, C, D T4;
ATEX II 3G 2D EEx nA [ib] IIC T6 to T4 T100 °C;
CSA/FM Class II and III Div. 1, Groups E, F, G T4
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C
FM Class I, Div. 1, Groups A, B, C, D T4

Probe/electrode diameter

16 mm (0.63") rigid rod, min. length 200 mm (7.9"), max. length 1000 mm (39.4")

Thermal isolator

Rigid thermal isolator
[for process temperature over +85 °C (+185 °F)]
No thermal isolator

¹⁾ Custom shipping methods required. Contact factory for more details.

Order No.

C) 7ML5602 -

A 0

1

AA
AB
BA
BB
CA
CB
DA
DBEC
ED
FC
FD
GC
HC

1

1
2
4
6A
B

Selection and Ordering data

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description

Active Shield length - minimum length is 50 mm Y02: to mm¹⁾

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text

Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000

Inspection Certificate Type 3.1 per EN 10204

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 CD containing the complete ATEX Quick Start and manual library.

Pointek Specials

¹⁾ See dimension drawings on page 5/74 for further explanation of Y02

Order code

Y01

Y02

Y15

C11

C12

See page 5/66

See page 5/77

Selection and Ordering data

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Total insertion length: enter the total insertion length in plain text description

Active Shield length - minimum length is 50 mm.Y02: to mm¹⁾

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text

Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000

Inspection Certificate Type 3.1 per EN 10204

Operating Instructions

Note: The Operating Instructions should be ordered as a separate line on the order.
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Pointek Specials

¹⁾ See dimensional drawings on page 5/74 for further explanation of Y02

Order code

Y01

Y02

Y15

C11

C12

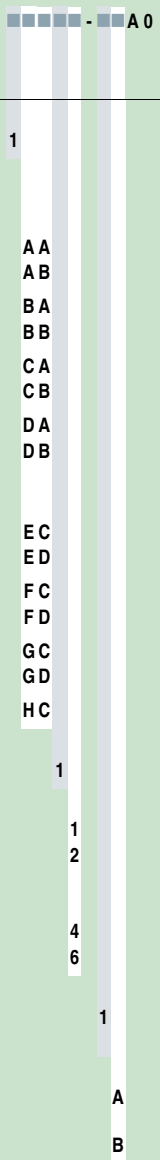
See page 5/66

See page 5/77

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

Selection and Ordering data	Order No.
Pointek CLS500, single piece flange Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.	C) 7 ML 5 6 0 3 - 
Electronic transmitter MSP 2002-1 (330 pF)	1
Process connection and pressure rating <u>Single piece flange, 316L stainless steel, raised face</u> 2" ASME, 150 lb 2" ASME, 300 lb 3" ASME, 150 lb 3" ASME, 300 lb ¹⁾ 4" ASME, 150 lb ¹⁾ 4" ASME, 300 lb ¹⁾ 6" ASME, 150 lb ¹⁾ 6" ASME, 300 lb ¹⁾ <u>Single piece flange, 316L stainless steel, Type B1 raised faced</u> DN 50 PN 16 DN 50 PN 25 DN 80 PN 16 DN 80 PN 25 DN 100 PN 16 ¹⁾ DN 100 PN 25 ¹⁾ DN 125 PN 16 ¹⁾	AA AB BA BB CA CB DA DB EC ED FC FD GC GD HC
Probe insulation/material of process connection PFA insulation/316L stainless steel	1
Approvals General Purpose: CE, CSA/FM, C-TICK CSA/FM Class I, Div. 2, Groups A, B, C, D T4; ATEX II 3G 2D EEx nA [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III Div. 1, Groups E, F, G T4 ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C FM Class I, Div. 1, Groups A, B, C, D T4	1 2 4 6
Probe/electrode diameter 16 mm (0.63") rigid rod, maximum length 1000 mm (39.4") (Y01)	1
Thermal isolator Rigid thermal isolator [for process connection temperature over +85 °C (+185 °F)] No thermal isolator	A B

¹⁾ Custom shipping methods required. Contact factory for more details

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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 CD containing the complete ATEX Quick Start and manual library.	See page 5/66
Accessories	See page 5/77

¹⁾ See dimensional drawings on page 5/74 for further explanation of Y02

Pointek CLS500

Selection and Ordering data

Pointek CLS500 High temperature

Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.

Electronic transmitter

MSP 2002-1 (330 pF)

Process connection and pressure rating

316L stainless steel, raised face¹⁾

2" ASME, 150 lb
2" ASME, 300 lb
2" ASME, 600 lb
2" ASME, 900 lb

3" ASME, 150 lb
3" ASME, 300 lb²⁾
3" ASME, 600 lb²⁾
3" ASME, 900 lb²⁾

4" ASME, 150 lb²⁾
4" ASME, 300 lb²⁾
4" ASME, 600 lb²⁾
4" ASME, 900 lb²⁾

6" ASME, 150 lb²⁾
6" ASME, 300 lb²⁾
6" ASME, 600 lb²⁾
6" ASME, 900 lb²⁾

316L stainless steel, Type B1 raised face³⁾

DN 50 PN 16
DN 50 PN 25
DN 50 PN 40
DN 50 PN 63

DN 80 PN 16
DN 80 PN 25
DN 80 PN 40²⁾
DN 80 PN 63²⁾

DN 100 PN 16²⁾
DN 100 PN 25²⁾
DN 100 PN 40²⁾
DN 100 PN 63²⁾

DN 125 PN 16²⁾
DN 125 PN 25²⁾
DN 125 PN 40²⁾
DN 125 PN 63²⁾

(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.)

Order No.

C) 7ML 5 6 0 4 -

A 1

A 2

A 3

A 4

1

A 1

A 2

A 3

A 4

B 1

B 2

B 3

B 4

C 1

C 2

C 3

C 4

D 1

D 2

D 3

D 4

E 1

E 2

E 3

E 4

F 1

F 2

F 3

F 4

G 1

G 2

G 3

G 4

H 1

H 2

H 3

H 4

Selection and Ordering data

Pointek CLS500 High temperature

Inverse frequency shift capacitance level switch for detecting interfaces, solids, liquids, toxic and aggressive chemicals in critical conditions of extreme temperature and pressure.

Probe insulation/material of process connection

NOTE:

Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact nacc.smpi@siemens.com

No insulation/316L stainless steel^{4) 5)}

Stilling well

No stilling well

Approvals

General Purpose

CSA/FM Class I, Div. 2, Groups A, B, C, D T4;
ATEX II 3G 2D EEx nA [ib] IIC T6 to T4 T100 °C;
CSA/FM Class II and III Div. 1, Groups E, F, G T4

ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 T100 °C
FM Class I, Div. 1, Groups A, B, C, D T4

Probe/electrode diameter

Maximum length 1000 mm (39.37")⁵⁾

Thermal isolator

Rigid thermal isolator

1) Welded flange for no insulation option only

2) Custom shipping methods required

3) Contact factory for more details. Flat faced flange for no insulation option only

4) Non-conductive material only, stainless steel non-insulated probe diameter 19 mm (0.75")

5) 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 5/74 for more details.

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order 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 mm¹⁾

Y02

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:
Measuring-point number/identification (max. 16 characters) specify in plain text

Y15

Acceptance test certificate: 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

English

German

French

Dutch

Note: The Operating Instructions should be ordered as a separate line on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

7ML1998-5GG02

7ML1998-5GG32

7ML1998-5GG11

7ML1998-5GG41

Pointek Specials

See page 5/77

1) See dimensional drawings on page 5/74 for further explanation of Y02

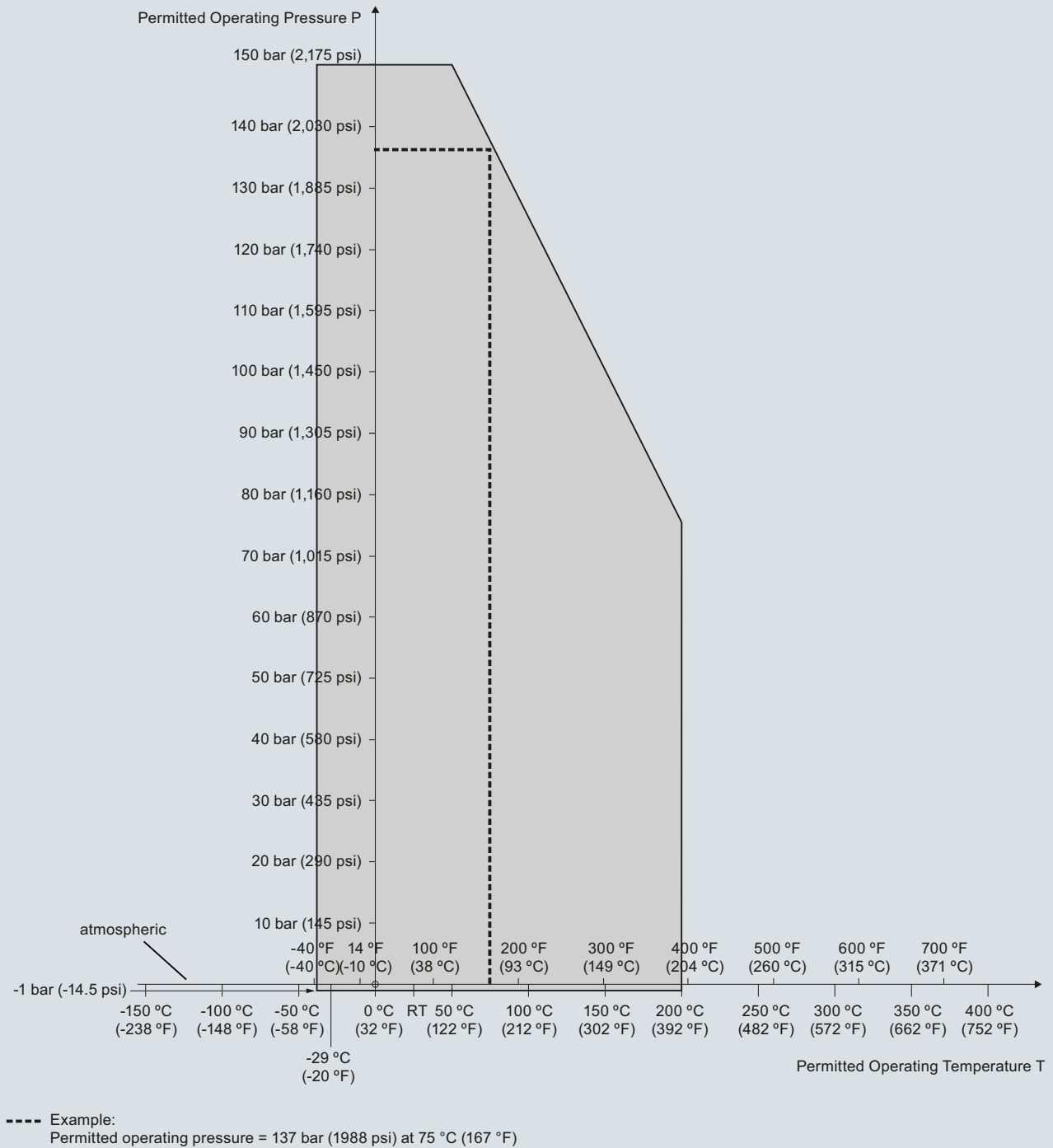
Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

Characteristic curves

Pressure/Temperature Curve
CLS500 Rod Probes
Threaded Process Connections
(7ML5601)



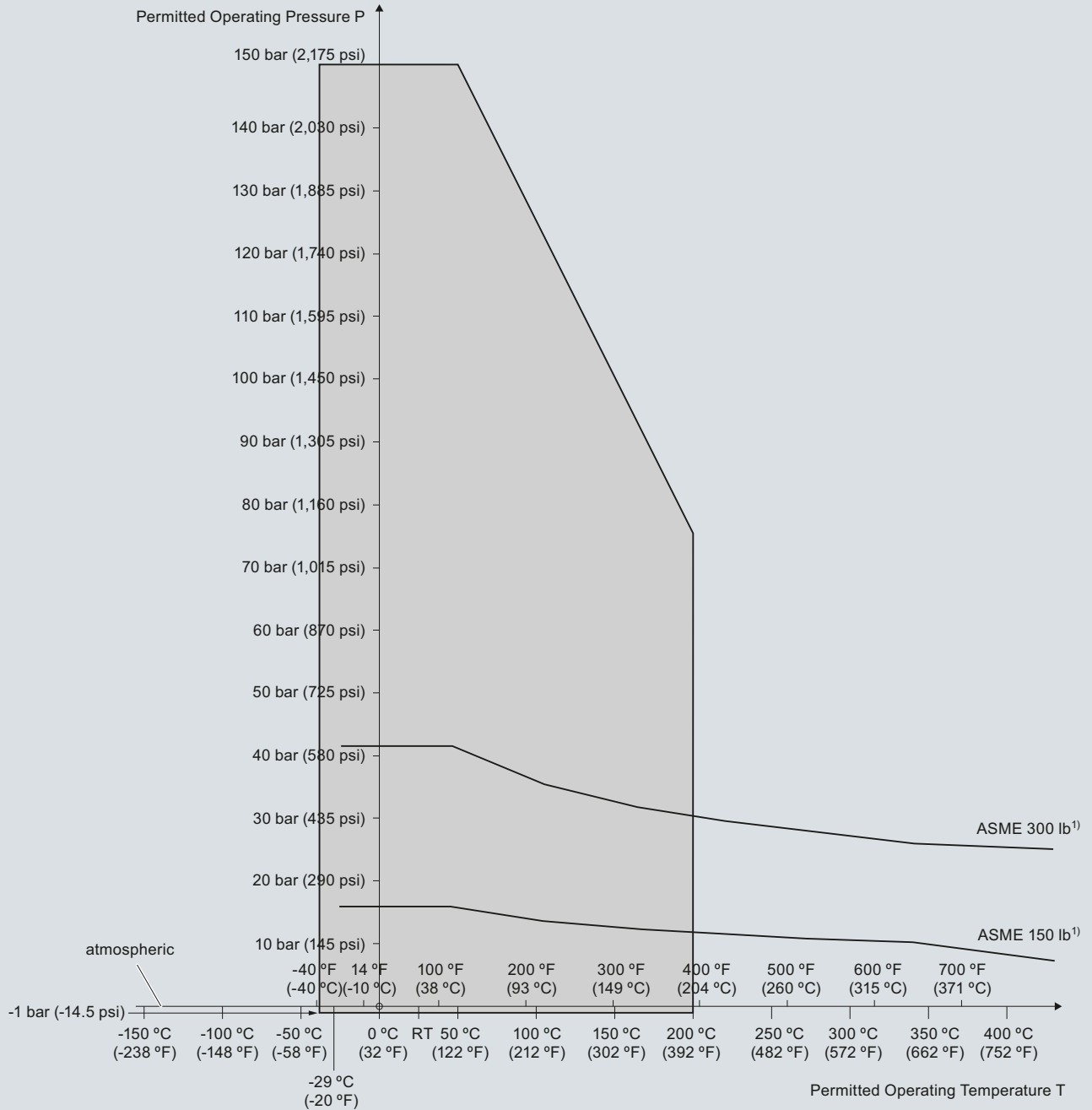
Pointek CLS500 Process Pressure/Temperature derating curves (7ML5601)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

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)

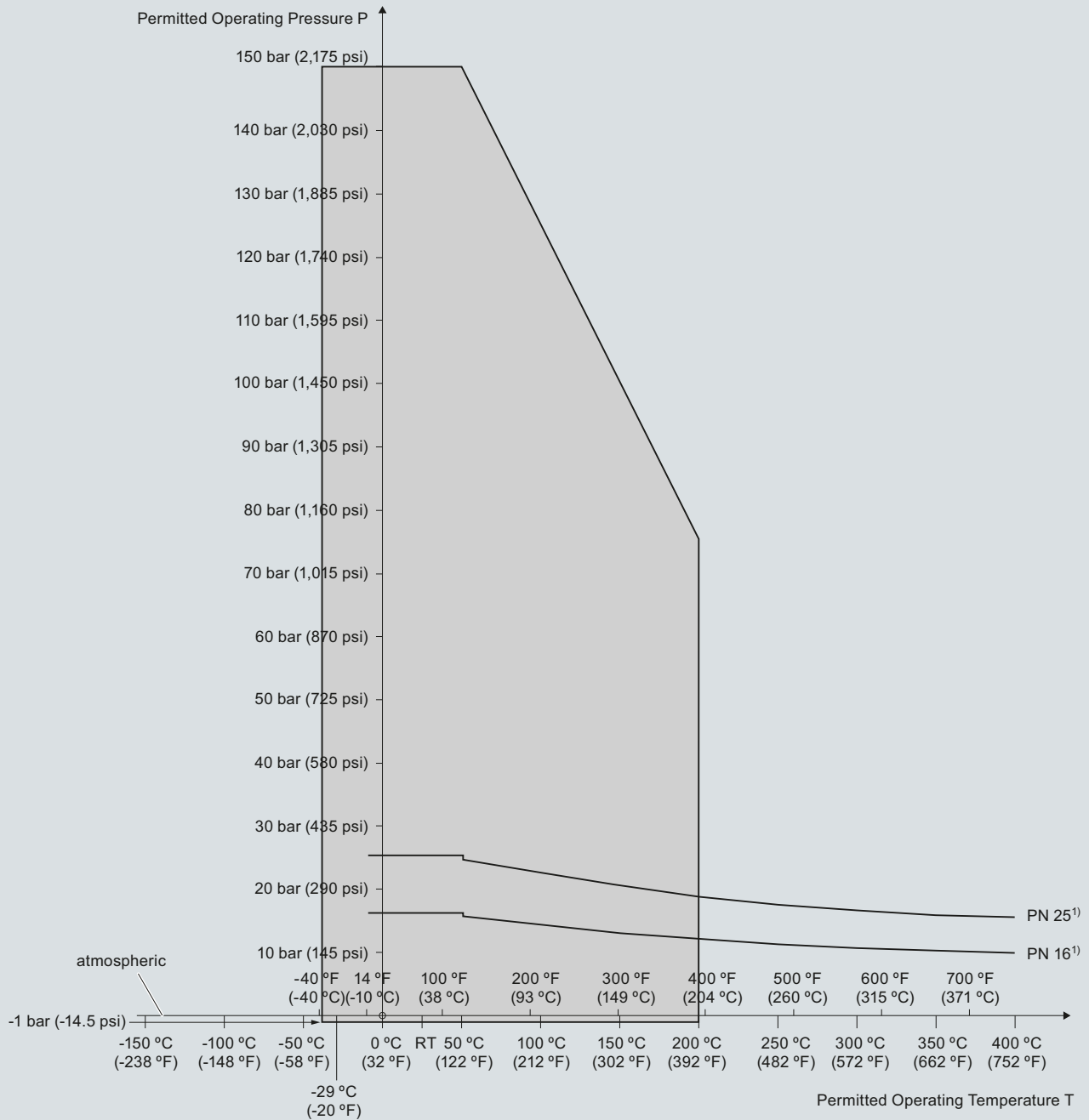
Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

5

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.

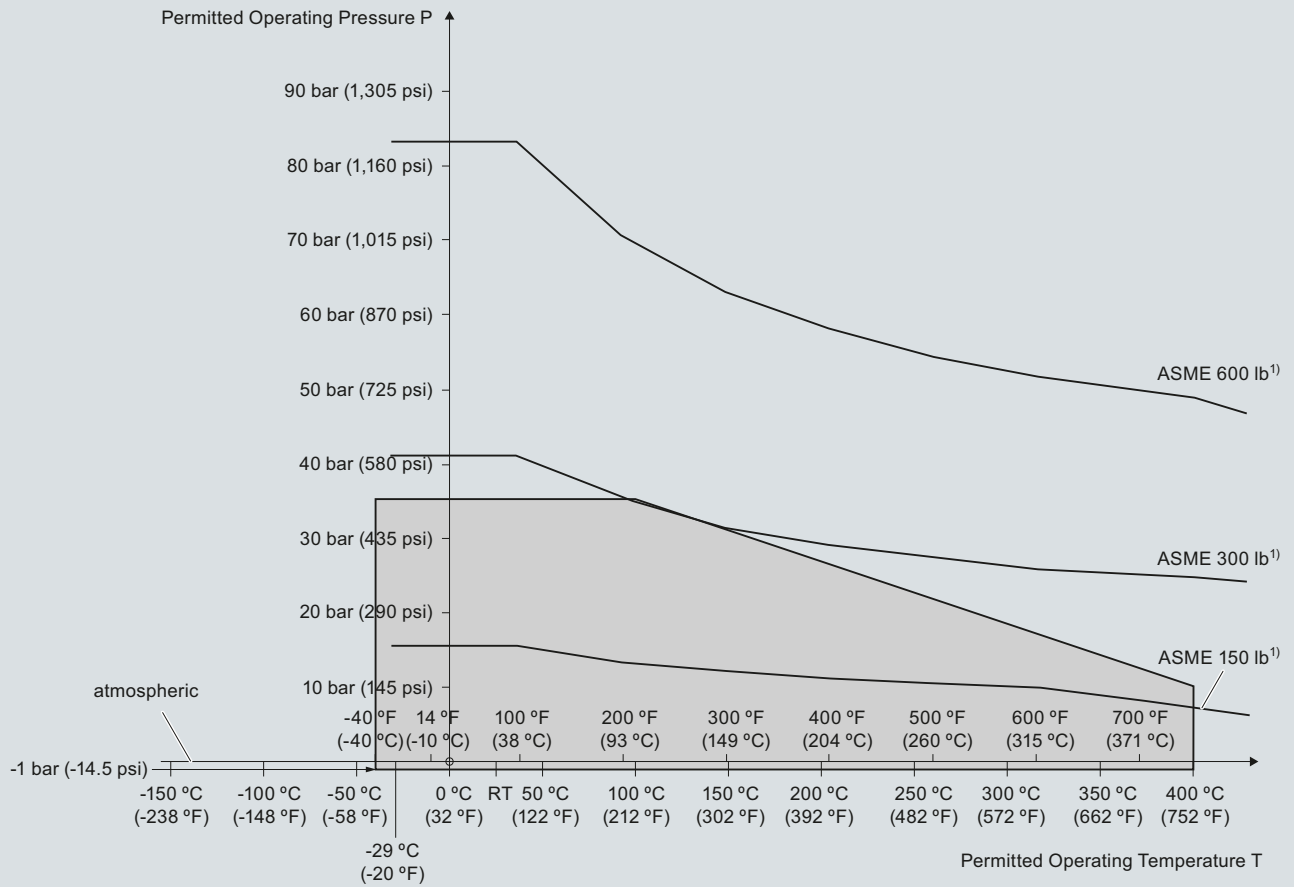
Pointek CLS500 Process Pressure/Temperature derating curves (7ML5602 and 7ML5603)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

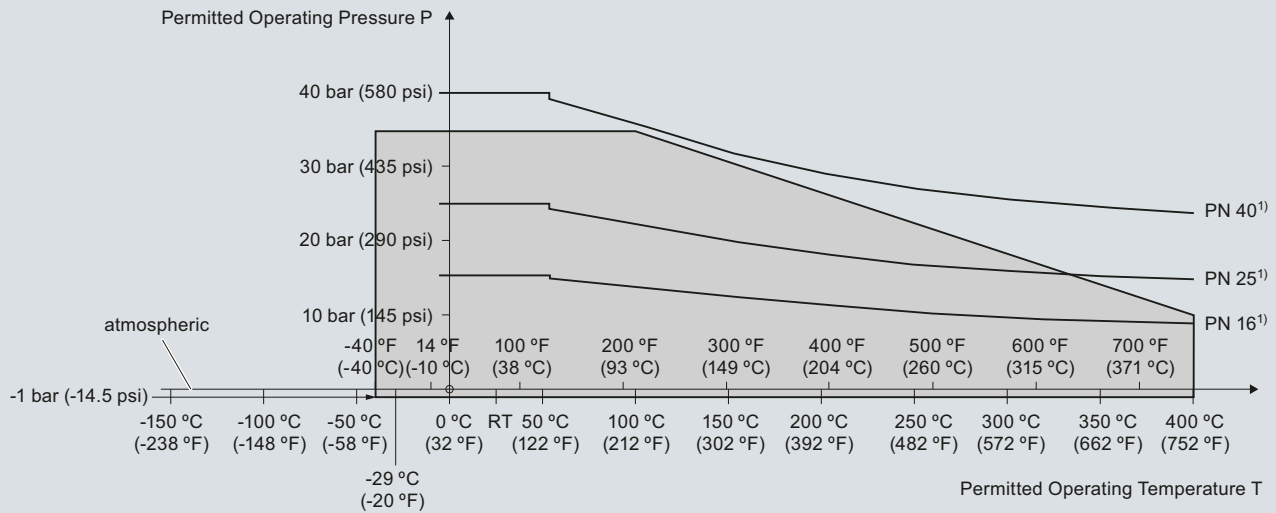
Pressure/Temperature Curve
CLS500 HighTemperature (no insulation)
ASME Flanged Process Connections
(7ML5604)



¹) The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

Pressure/Temperature Curve
CLS500 HighTemperature (no insulation)
EN Flanged Process Connections
(7ML5604)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

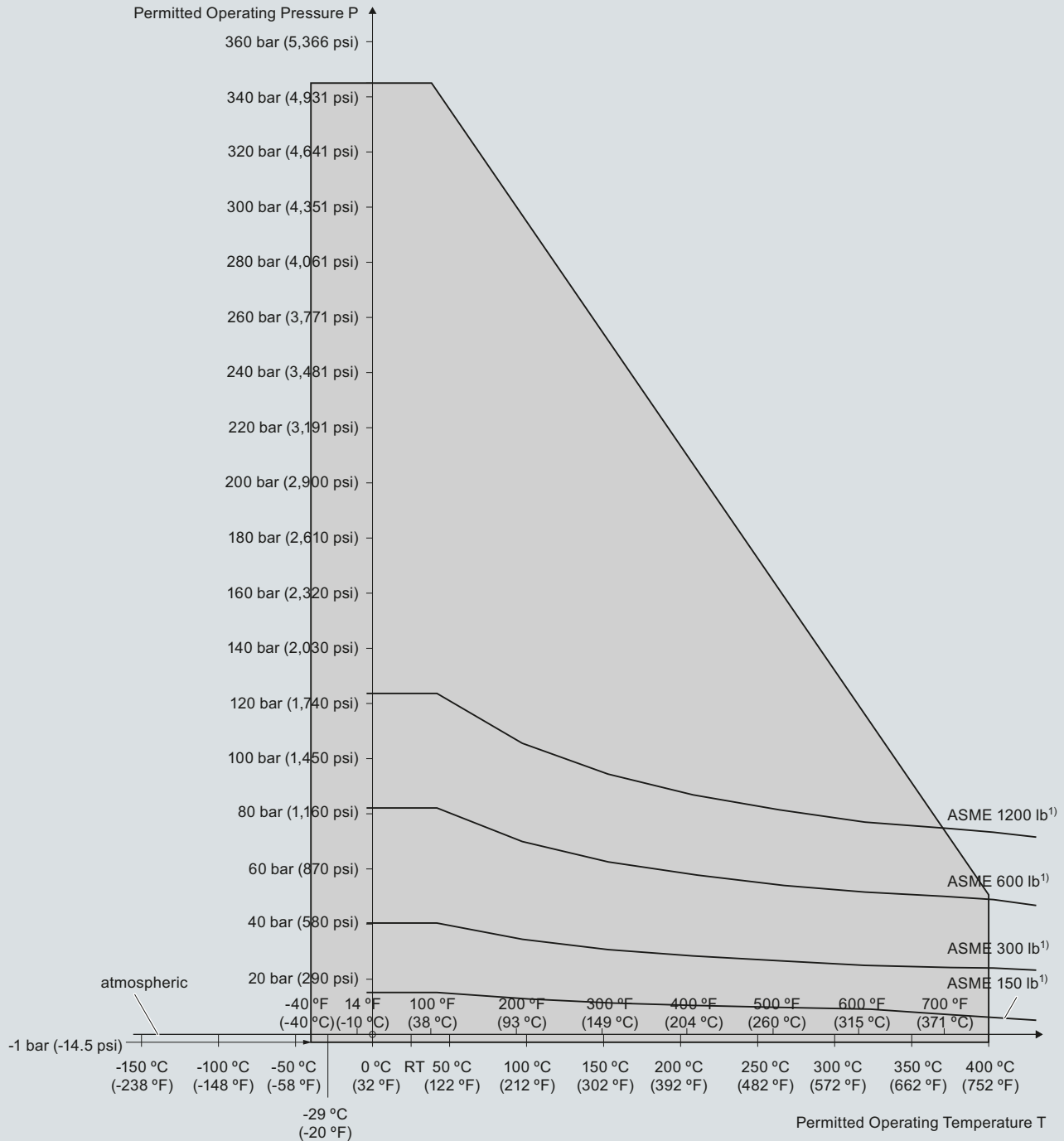
Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

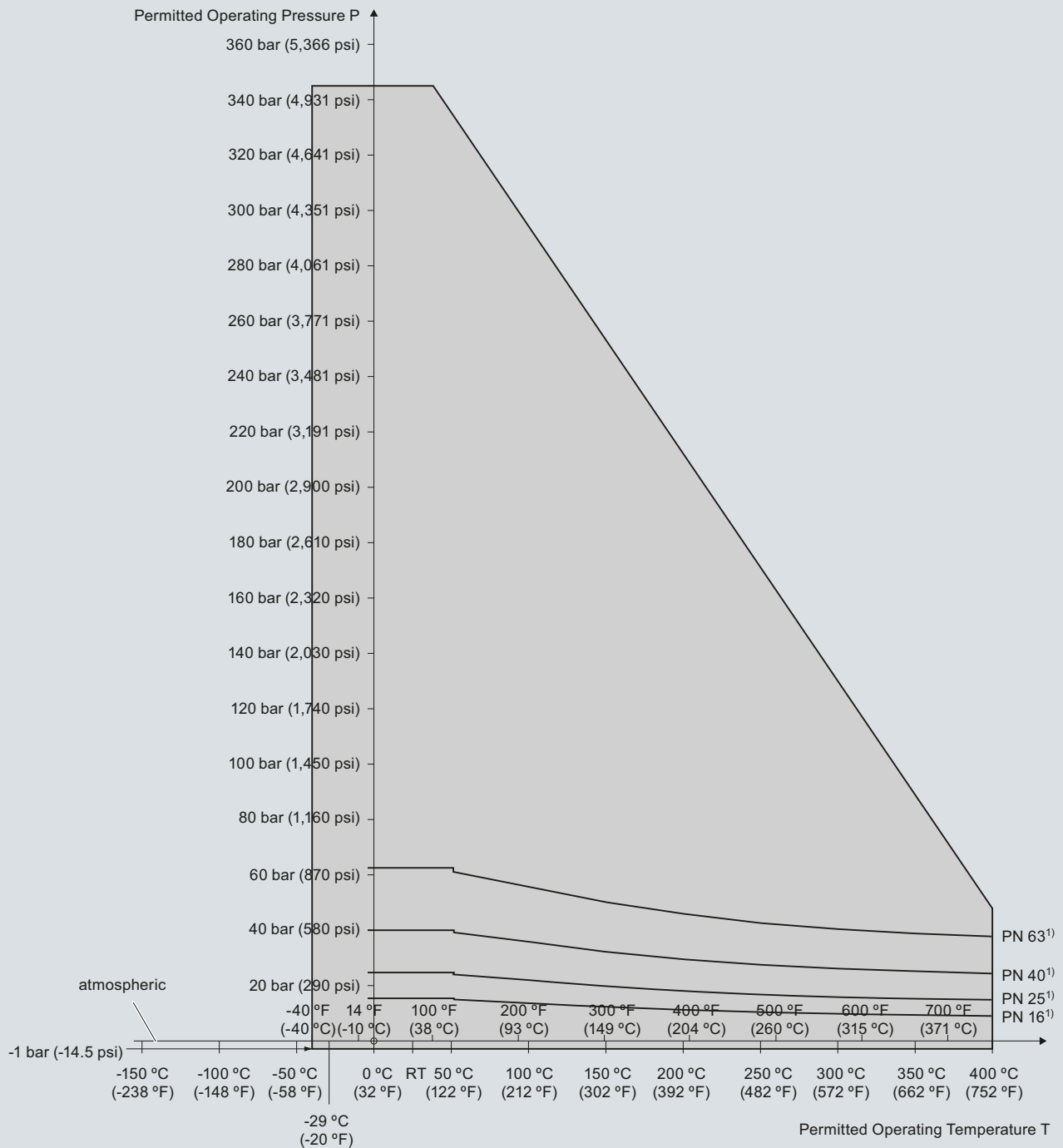
Pressure/Temperature Curve
CLS500 HighTemperature Enamel Rod Probes
ASME Flanged Process Connections (7ML5604)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

Pointek CLS500 Process Pressure/Temperature derating curves (7ML5604)

Pressure/Temperature Curve
CLS500 High Temperature Enamel Rod Probes
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)

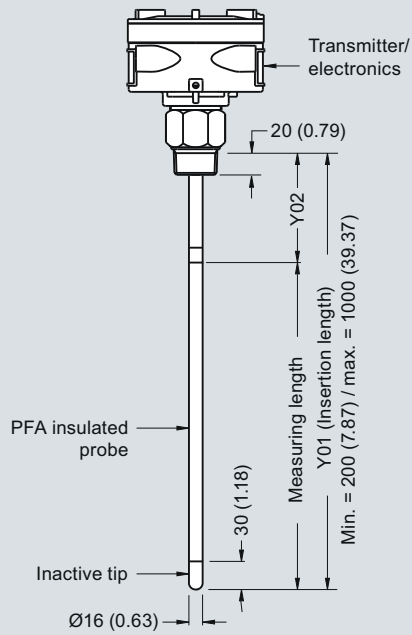
Level Measurement

Point level measurement - Capacitance switches

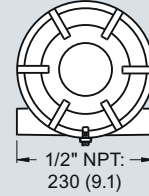
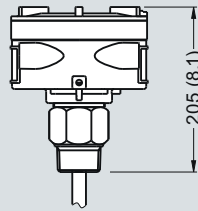
Pointek CLS500

Dimensional drawings

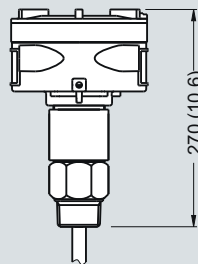
Standard Rod version Threaded (7ML5601)



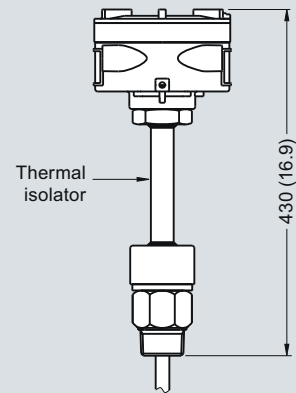
Standard configuration (7ML5601)



With explosion-proof seal option (all versions)



With thermal isolator option (all versions)



Pointek CLS500 - Threaded Process Connections, dimensions in mm (inch)

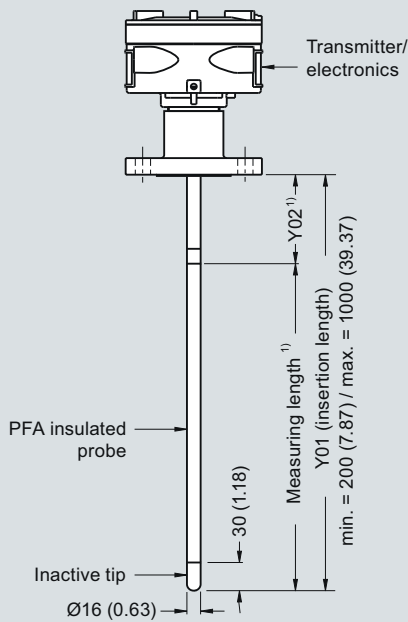
Level Measurement

Point level measurement - Capacitance switches

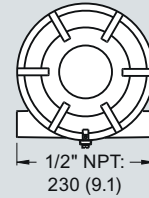
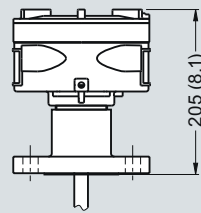
Pointek CLS500

5

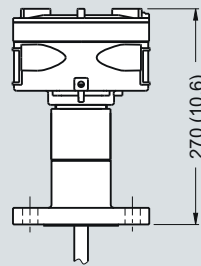
Standard Rod version Welded Flange (7ML5602) Single Piece Flange (7ML5603)



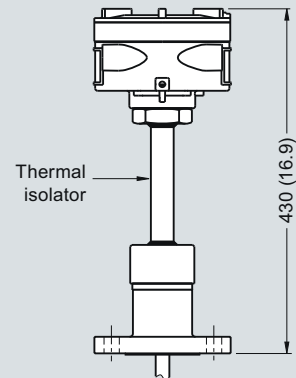
Standard configuration (7ML5602, 7ML5603)



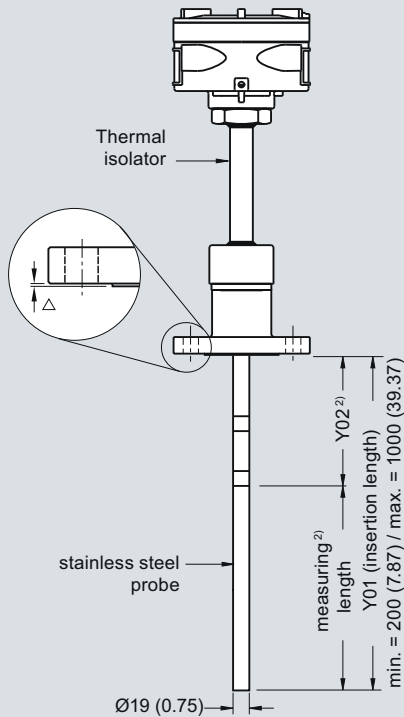
With explosion-proof seal option (all versions)



With thermal isolator option (all versions)



High temperature rod version Welded Flange (7ML5604), Stainless steel rod³⁾



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) Non conductive materials only

Insertion length does not include any raised face/gasket face dimension (see Flange Facing Table above)

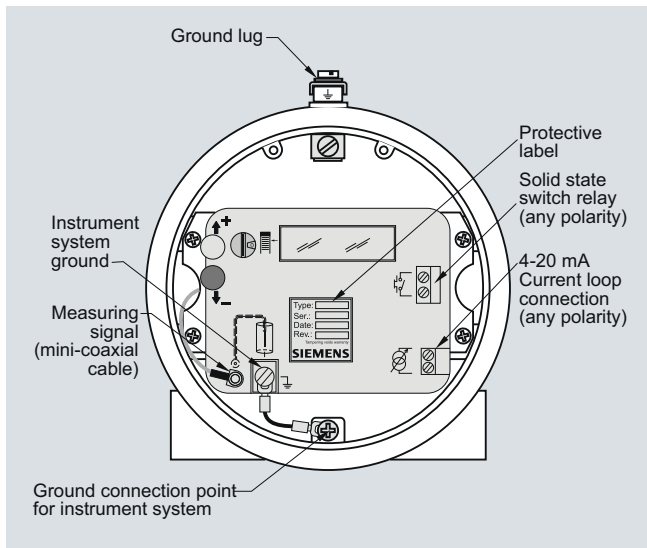
Pointek CLS500 - Flanged Process Connections, dimensions in mm (inch)

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS500

Schematics

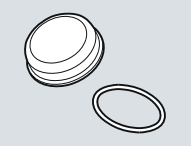
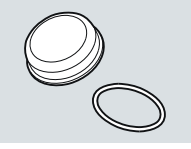
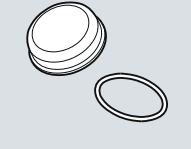
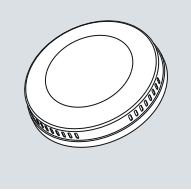
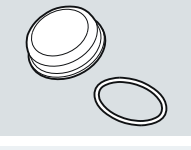


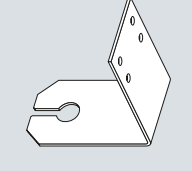
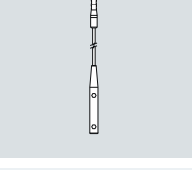
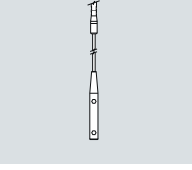
Pointek CLS500 connections

Level Measurement

Point level measurement - Capacitance switches

Pointek CLS Specials

Pointek Specials ¹⁾	
	Order No.
CLS100 Polycarbonate Lid and Gasket, FKM	
	
Kit, Lid and gasket, CLS100 enclosure version	F) 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)	F) A5E01163672
	
CLS200 Gasket (IP68), Silicone	
	
Spare gasket, enclosure version (IP68 versions)	F) 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	C) A5E01163677
Kit, Sensor for cable units, PPS, Digital, FKM	C) A5E01163678
Kit, Sensor for cable units, PPS, Standard, FFKM	C) A5E01163679
Kit, Sensor for cable units, PPS, Digital, FFKM	C) A5E01163680
Kit, Sensor for cable units, PVDF, Standard, FKM	C) A5E01163681
Kit, Sensor for cable units, PVDF, Digital, FKM	C) A5E01163682

Pointek Specials ¹⁾	
	Order No.
Kit, Sensor for cable units, PVDF, Standard, FFKM	C) A5E01163683
Kit, Sensor for cable units, PVDF, Digital, FFKM	C) 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	C) A5E03251681
Amplifier/power supply, digital version	L) 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
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, adj.by customer	A5E01163702

Level Measurement

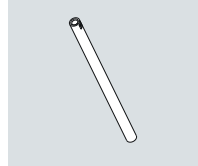
Point level measurement - Capacitance switches

Pointek CLS Specials

Pointek Specials. ¹⁾

Order No.

CLS300 Rod Kits, 316L stainless steel



A5E01163719

Kit, Stainless steel rod 180 mm (7.09") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 350 mm (13.78").

A5E01163720

Kit, Stainless steel rod 330 mm (12.99") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 500 mm (19.69").

A5E01163721

Kit, Stainless steel rod 580 mm (22.83") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 750 mm (29.53").

A5E01163722

Kit, Stainless steel rod 830 mm (32.68") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1000 mm (39.37").

Kit, Stainless steel rod 1330 mm (52.36") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 1500 mm (59.06").

2)

Kit, Stainless steel rod 1830 mm (72.05") to be used with CLS300 units only (with standard active shield). Insertion length after installation is 2000 mm (78.74").

2)

Kit, Stainless steel rod customized length up to 1 m

2)

Kit, Stainless steel rod customized length up to 2 m

2)

CLS300 Electronics Kits with drivers (for rod or cable versions)



A5E01163723

Kit, Electronics with driver, standard CLS300. To be used in rod or cable versions with length less than 5 m. ^{3) 4)}

A5E01163725

Kit, Electronics with driver, digital CLS300. To be used in rod or cable versions with length less than 5 m. ^{3) 4)}

CLS300 Electronics Kits with drivers (for cable versions)



A5E01163724

Kit, Electronics with driver, standard CLS300. To be used in cable versions with length greater than 5 m. ^{3) 4)}

A5E01163726

Kit, Electronics with driver, digital CLS300. To be used in cable versions with length greater than 5 m. ^{3) 4)}

Pointek Specials. ¹⁾

Order No.

CLS300 Electronics



Test magnet, digital version

7ML1830-1JE

Amplifier/power supply kit, standard version C)

A5E03251683

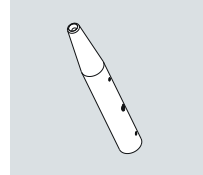
Amplifier/power supply, digital version L)

7ML1830-1JF

LCD display, digital version

7ML1830-1JK

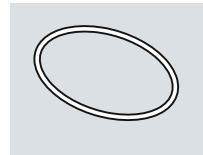
CLS300 Weight Kit, 316L stainless steel



Kit, Spare stainless steel weight. To be used in any cable version of CLS300

A5E01163727

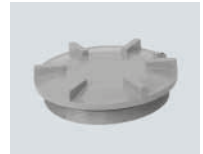
CLS500 Gasket (IP65), Silicone



Spare gasket, CLS500 enclosure version, IP65

J) A5E01163728

CLS500 Blind Lid



Spare CLS500 aluminum blind lid

A5E01163729

CLS500 Electronics Kit

Transmitter, MSP 2002-1, 330 PF

C) 7ML1830-1JP

¹⁾ Special flange sizes and facings are available. Please contact nacc.smpi@siemens.com for part number and pricing. Submit Application Questionnaire found on page 5/9.

²⁾ Please contact nacc.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 nacc.smpi@siemens.com for special requests.

C) Subject to export regulations AL: N, ECCN: EAR99.

F) Subject to export regulations AL: 91999, ECCN: N.

L) Subject to export regulations AL: N, ECCN: 3A991X.

J) Subject to export regulations AL: 91999, ECCN: EAR99H.

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL100

Overview



SITRANS LVL100 is a compact vibrating level switch for use 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") 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

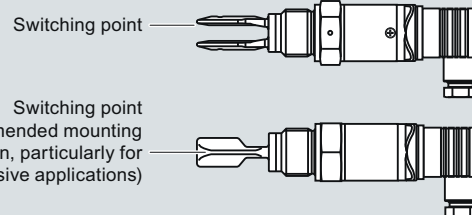
SITRANS LVL100 is a compact level switch designed for industrial use in all areas of process technology and can be used with liquids and slurries. With an insertion length of only 40 mm (1.57"), SITRANS LVL100 can be mounted in small pipes and confined space applications. It is virtually unaffected by the chemical and physical properties of the liquid. The LVL100 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or strong external vibration.

The tuning fork is piezoelectrically energized and vibrates at a mechanical resonance frequency of approximately 1200 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.

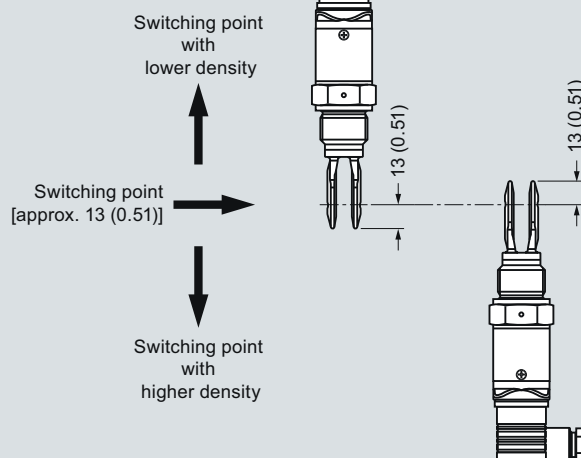
- Key Applications: For use in liquids and slurries, for level measurement, overflow, and dry run protection

Configuration

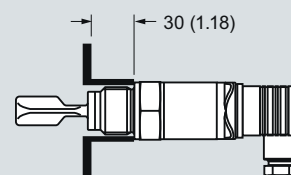
Horizontal mounting



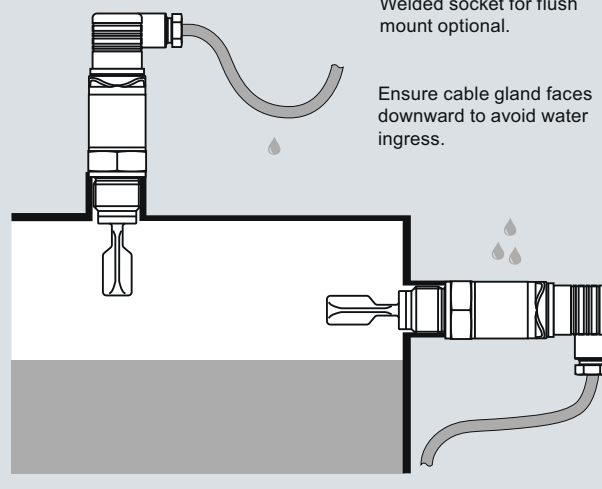
Vertical mounting



Horizontal mounting in viscous or adhesive applications



Moisture protection



SITRANS LVL100 Installation, dimensions in mm (inch)

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL100

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") with vertical installation

Switching delay approx. 500 ms (on/off)

Frequency approx. 1200 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 lbs/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 ¾" A or G 1" A

• Pipe thread, tapered ¾" NPT or 1" NPT

• Hygienic fittings Bolting DN40 PN40

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 1 ... 8 VA (AC), approx. 1.3 W (DC)

Certificates and approvals

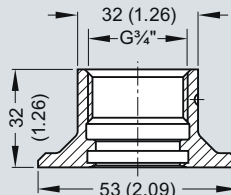
Overfill protection (WHG)

Shipping approvals

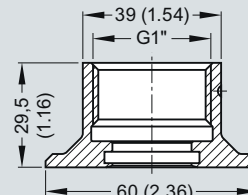
Options

LVL100 Threaded Welded Socket

G¾" A/316L



G1" A/316L



SITRANS LVL100 welded socket, dimensions in mm

Point level measurement - Vibrating switches

SITRANS LVL100

Selection and Ordering data	Order No.
SITRANS LVL100 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.	7 ML 5 7 4 5 - - A 0
Approvals Without approvals Shipping approvals ¹⁾ Overfill protection (WHG) ²⁾	1 2 3
Process temperature Standard -40 ... +100 °C (-40 ... +212 °F) ³⁾ Extended -40 ... +150 °C (-40 ... +302 °F) ³⁾ Hygienic applications -40 ... +150 °C (-40 ... +302 °F) ⁴⁾	A B C
Process connection Thread G¾" A PN64/316L Thread G¾" A PN64/316L Ra< 0.8 µm ⁵⁾ Thread ¾" NPT PN64/316L Thread ¾" NPT PN64/316L Ra< 0.8 µm ⁵⁾ Thread G1" A PN64/316L Thread G1" A PN64/316L Ra< 0.8 µm ⁵⁾ Thread 1" NPT PN64/316L Thread 1" NPT PN64/316L Ra< 0.8 µm ⁵⁾ Tri-Clamp 1" PN16 DIN 32676/316L Ra< 0.8 µm ⁵⁾ Tri-Clamp 1½" PN16 DIN 32676/316L Ra< 0.8 µm ⁵⁾ Tri-Clamp 2" PN16 DIN 32676/316L Ra< 0.8 µm ⁵⁾ Bolting DN25 PN40 DIN 11851/316L Ra< 0.8 µm ⁵⁾ Bolting DN40 PN40 DIN 11851/316L Ra< 0.8 µm ⁵⁾ Bolting DN50 PN25 DIN 11851/316L Ra< 0.8 µm ⁵⁾ SMS DN38 PN6 SMS 1145/316L Ra< 0.8 µm ⁵⁾ Hygienic fitting with compression nut F40 ⁵⁾ PN25/316L Ra < 0.8 µm	A 0 A 1 A 2 A 3 A 4 A 5 A 6 A 7 A 8 B 0 B 1 B 2 B 3 B 4 B 5 B 6
Electronics Contactless electronic switch 20 ... 250 V AC/DC ⁶⁾ Transistor output PNP 10 ... 55 V DC	1 2
Housing 316L	1
Electrical connection/Protection M12x1/IP67 According to DIN 43650 including plug/IP65 Acc. to DIN 43650 incl. plug with QuickOn connection/IP65 M12x1 incl. 5 m cable/IP68 (0.2 bar)	A B C D

Selection and Ordering data	Order code
Further designs	
Please add '-Z' to Order No. and specify Order code(s).	
Cleaning including Certificate (oil, grease and sili- cone free)	W01
Identification Label, foil laser marking	Y16
Acceptance test certificate 3.1 for instrument	C12
Acceptance test certificate 2.2 for instrument	C14
Additional Operating Instructions	Order No.
<u>LVL 100 (Contactless electronic switch)</u>	
• English • French • Spanish • German	7ML1998-5KN01 7ML1998-5KN11 7ML1998-5KN21 7ML1998-5KN31
<u>LVL 100 (Transistor PNP)</u>	
• English • French • Spanish • German This device is shipped with the Siemens Milltronics manual CD containing the complete Operating Instructions library.	7ML1998-5KP01 7ML1998-5KP11 7ML1998-5KP21 7ML1998-5KP31
Spare Parts	
<u>LVL 100 Threaded Welded Socket</u>	
G ¾" A/316L with FKM Seal	7ML1930-1EE
G 1 A/316L with FKM Seal	7ML1930-1EF
M27x1.5/316L with FKM Seal	7ML1930-1EG
G ¾ A/316L with EPDM Seal	7ML1930-1EH
G 1 A/316L with EPDM Seal	7ML1930-1EJ
M27x1.5/316L with EPDM Seal	7ML1930-1EK

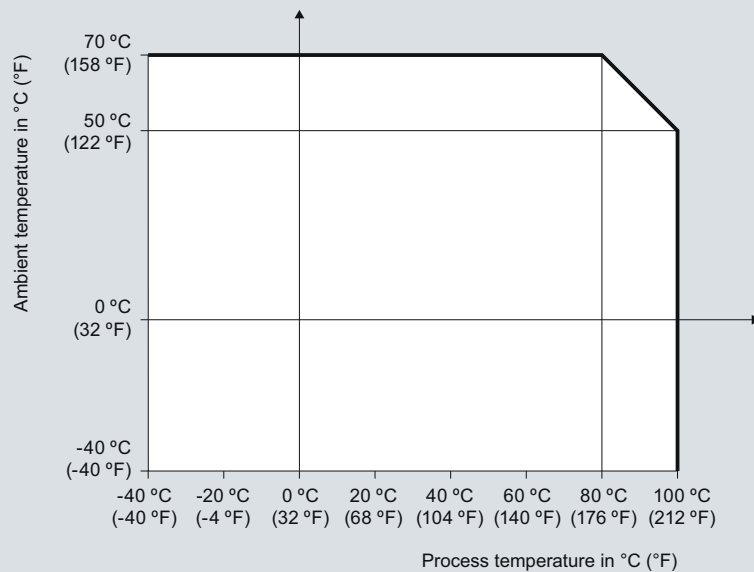
Level Measurement

Point level measurement - Vibrating switches

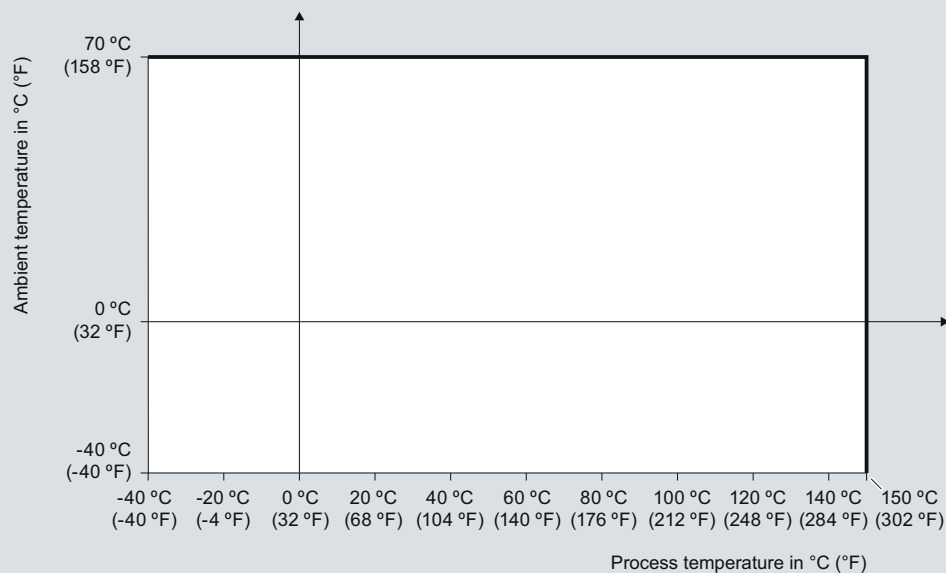
SITRANS LVL100

Characteristic curves

Ambient Temperature to Process Temperature dependency
(Standard version)



Ambient Temperature to Process Temperature dependency
(High temperature version)



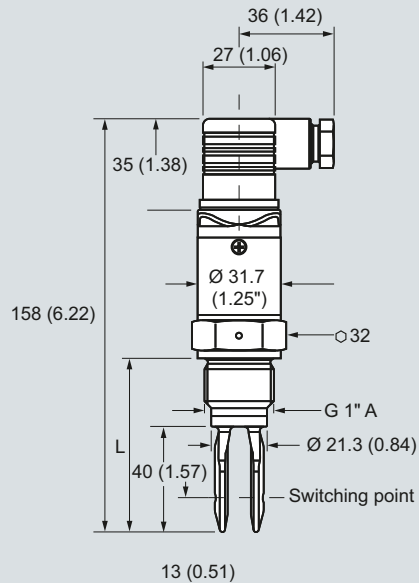
SITRANS LVL100 Ambient Temperature/Process Temperature derating curves

Point level measurement - Vibrating switches

SITRANS LVL100

Dimensional drawings

SITRANS LVL100 (standard)

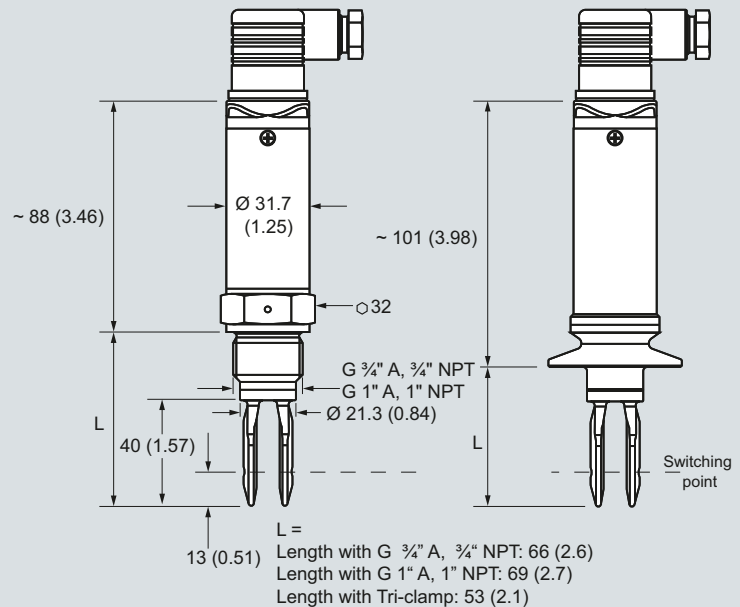


L =
Length with G 3/4" A, 3/4" NPT: 66 (2.6)
Length with G 1" A, 1" NPT: 69 (2.7)

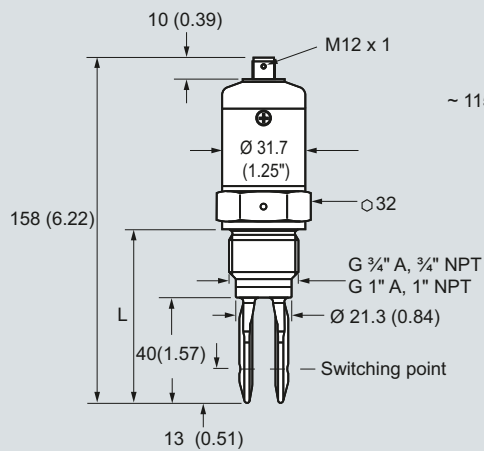
SITRANS LVL100 (extended)

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)



SITRANS LVL100 (standard with M12 connector)

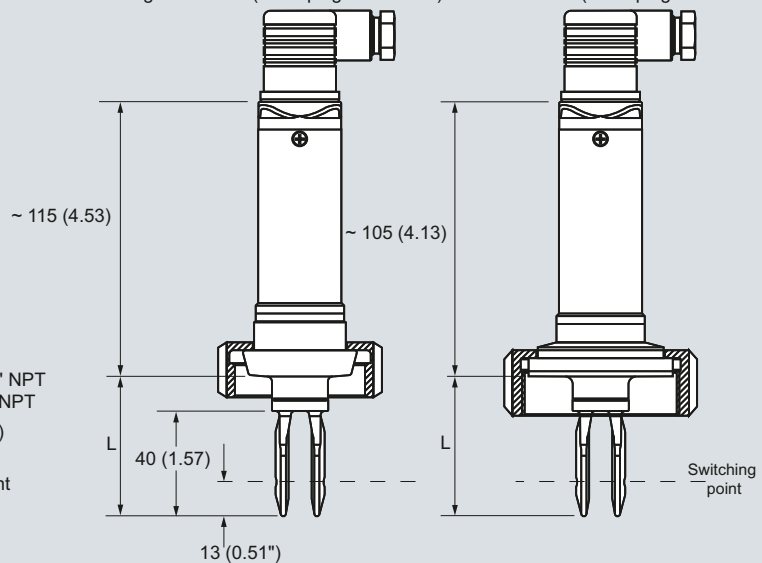


L =
Length with G $\frac{3}{4}$ " A, $\frac{3}{4}$ " NPT: 66 (2.6)
Length with G 1" A, 1" NPT: 69 (2.7)

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)

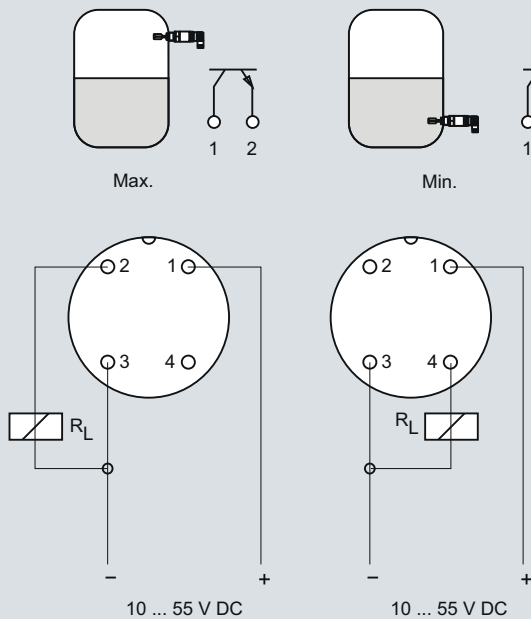
Level Measurement

Point level measurement - Vibrating switches

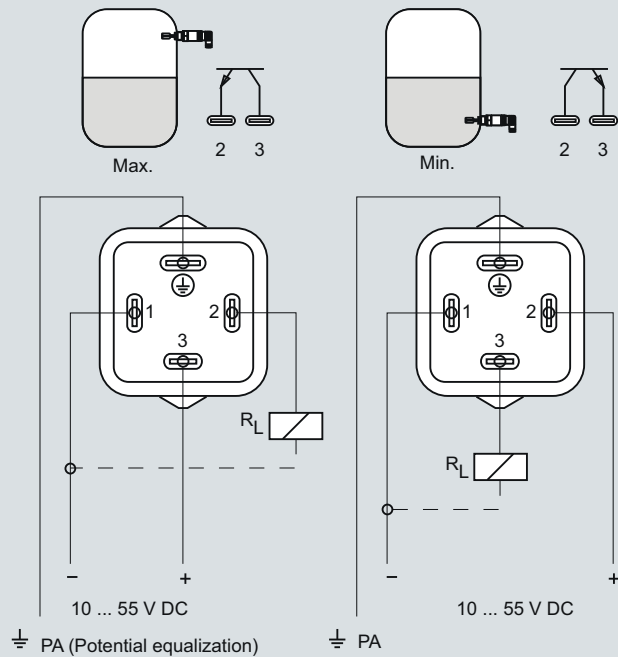
SITRANS LVL100

Schematics

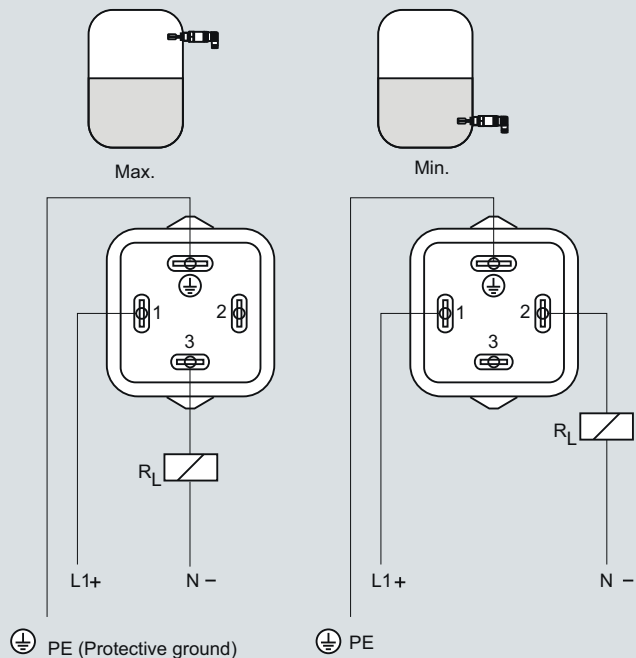
Transistor PNP (M12 x 1 Plug connection)



Transistor PNP (with valve plug DIN 43650)



Contactless electronic switch (Valve plug DIN 43650)



SITRANS LVL100 connections

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Overview



SITRANS LVL200 is a standard vibrating level switch for use 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") for confined space applications
- Fault monitoring for corrosion, loss of vibration or line break to the piezo drive
- SIL-2 qualified for high level and dry run applications
- 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"), 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 $> 0.5 \text{ g/cm}^3$ (0.018 lbs/in³). The LVL200 can be used in difficult conditions including turbulence, air bubbles, foam generation, buildup, or strong external vibration.

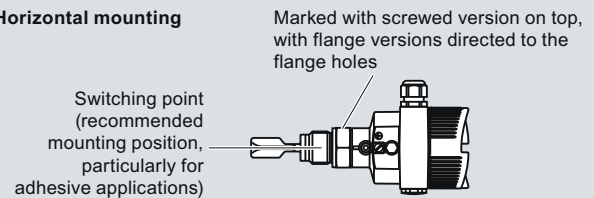
SITRANS LVL200 continuously monitors faults via frequency evaluation, providing early detection of strong corrosion or damage on the tuning fork, loss of vibration, or a line break to the piezo drive.

The tuning fork is piezoelectrically energized and vibrates at its mechanical resonance frequency of approx. 1200 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.

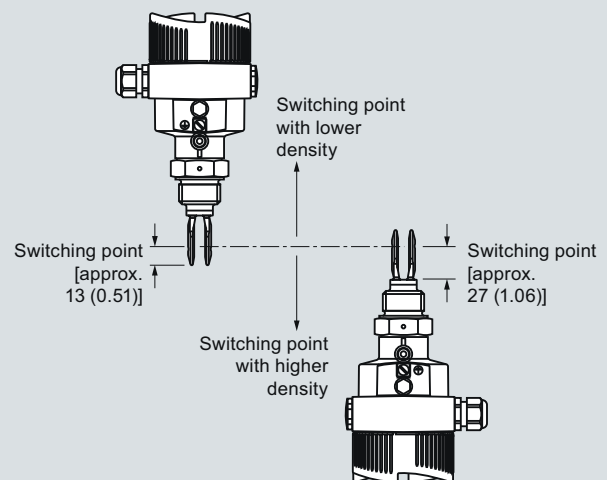
- Key Applications: For use in liquids and slurries, for level measurement, overflow, and dry run protection

Configuration

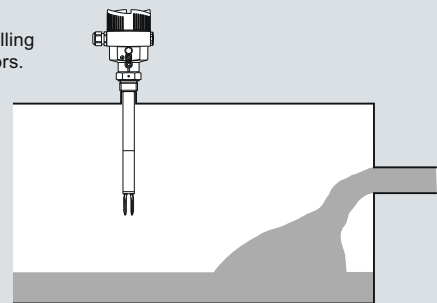
Horizontal mounting



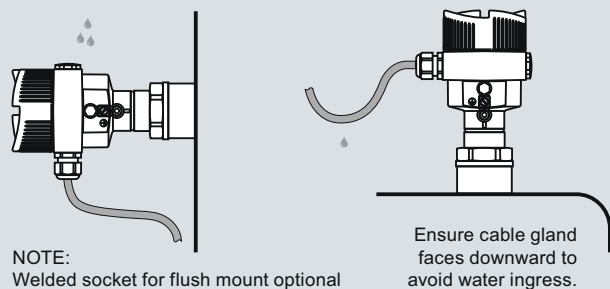
Vertical mounting



Mount away from filling openings or agitators.



Moisture protection



SITRANS LVL200 installation, dimensions in mm (inch)

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Technical specifications

Mode of operation		Process connection	
Measuring principle	Vibrating point level switch	- Pipe thread, cylindrical (ISO 228 T1) - Pipe thread, tapered - Flanges - Hygienic fittings	G ¾" A, G 1" A
Input			
Measured variable	High and low and demand (via mode switch)		
Output			
Output options	- Relay output (DPDT), 2 floating SPDTs - Contactless electronic switch		
Measuring Accuracy		Degree of protection	
Repeatability	0.1 mm (0.004")	Type 4X/NEMA 4X/IP66/IP67	
Hysteresis	approx. 2 mm (0.08") with vertical installation	Conduit entry	
Switching delay	approx. 500 ms (on/off)	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	
Frequency	approx. 1200 Hz		
Rated operating conditions		Weight	
Installation conditions		- Device weight (dependent on process fitting) - Tube extension (extended version)	
Location	Indoor/outdoor		
Ambient conditions			
- Ambient temperature - Installation category - Pollution degree	-40 ... +70 °C (-40 ... +158 °F) III 2		
Medium conditions		Power supply	
Temperature		Supply voltage	
- LVL200S Standard - LVL200S High temperature option - LVL200E Standard: with 316L/Hastelloy - LVL200E High temperature option: with 316L/Hastelloy	-50 ... +150 °C (-58 ... +302 °F) -50 ... +250 °C (-58 ... +482 °F) -50 ... +150 °C (-58 ... +302 °F) -50 ... +250 °C (-58 ... +482 °F)	Relay DPDT	
- Pressure (vessel) - Density	-1 ... 64 bar g (-14.5 ... 928 psi g) 0.7 ... 2.5 g/cm³ (0.025 ... 0.09 lbs/in³); 0.5 ... 2.5 g/cm³ (0.018 ... 0.09 bs/in³) by switching over	Contactless	
Design		Power consumption	
Material		- Relay DPDT - Contactless	
- Enclosure - Tuning fork - Extension tube [ø 21.3 mm (0.839")] - Process connection: threaded - Process connection: flange - Process seal	Aluminum die-cast AlSi10Mg, powder-coated, basis: Polyester 316L (1.4404 or 1.4435), Hastelloy 316L (1.4404 or 1.4435), Hastelloy 316L (1.4404 or 1.4435), Hastelloy 316L (1.4404 or 1.4435), 316L with Hastelloy, ECTFE, or PFA coating Klingersil C-4400	1 ... 8 VA (AC), approx. 1.3 W (DC) 1 ... 8 VA (AC), approx. 1.3 W (DC)	
		Certificates and approvals	
		- 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 ... 40 ms (not WHG specified)	
		- CE, CSA - Overfill protection (WHG) - 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 - Shipping approvals: ABS, DNV, LR, RINA, GL, CCS - SIL/IEC61508 Declaration of Conformity [SIL-2 (overfill)]	

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.
SITRANS LVL200, Standard Compact vibrating level switch for use 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.	7 M L 5 7 4 6 - - A 0
Electronics Contactless electronic switch 20...250 V AC/DC Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC NAMUR signal ¹⁾	1 2 4
Approvals Without approvals Overfill protection (WHG) ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + WHG ²⁾ ATEX II 1/2G, 2G EEx d IIC T6 + WHG ³⁾ ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + shipping approvals ²⁾ ATEX II 1/2G, 2G EEx d IIC T6 + shipping approvals ³⁾ ATEX II 1G, 1/2G, 2G EEx ia IIC T6 + ATEX II 1/2 D IP6X T ²⁾ Shipping approvals FM (XP) Class I, Div. 1, Groups A, B, C, D; (DIP) Class II, III, Div. 1, Groups E, F, G ^{3) 5)} FM (NI) Class I, Div. 2, Groups A, B, C, D ⁵⁾ IECEx d IIC T6...T2 Ga/Gb CSA(XP)CL I,II,III DIV 1,GP A B C D E F G CSA(NI)CL I,II,III, DIV 2,GP A B C D E F G	A B C D E F G K P Q R S T
Process connection Thread G $\frac{3}{4}$ " A, PN64/316L Thread G $\frac{3}{4}$ " A, PN64/316L Ra < 0.8 µm Thread $\frac{3}{4}$ " NPT, PN64/316L Thread $\frac{3}{4}$ " NPT, PN64/316L Ra < 0.8 µm Thread $\frac{3}{4}$ " NPT, PN64/Monel Thread G $\frac{3}{4}$ " A, PN64/Hastelloy Thread $\frac{3}{4}$ " NPT, PN64/Hastelloy Thread G1" A, PN64/316L Thread G1" A, PN64/316L ECTFE coated MB1982 ⁶⁾ Thread G1" A, PN64/316L PFA coated ⁶⁾ Thread G1" A, PN64/Monel Thread G1" A, PN64/316L Ra < 0.8 µm Thread 1" NPT, PN64/316L Thread 1" NPT, PN64/316L ECTFE coated MB1982 ⁶⁾ Thread 1" NPT, PN64/316L PFA-coated ⁶⁾ Thread 1" NPT, PN64/Monel Thread 1" NPT, PN64/316L Ra < 0.8 µm Thread G1" A, PN64/Hastelloy Thread G1" A, PN64/Hastelloy Thread G1 $\frac{1}{2}$ " A, PN64/316L Thread G1 $\frac{1}{2}$ " A, PN64/316L Ra<0,8µm Thread G1 $\frac{1}{2}$ " A, PN64/Hastelloy Thread 1" NPT, PN64/Hastelloy Thread 1 $\frac{1}{2}$ " NPT, PN64/316L Thread 1 $\frac{1}{2}$ " NPT, PN64/316L Ra<0,8µm Thread 1 $\frac{1}{2}$ " NPT, PN64/Hastelloy Thread G2" A, PN64/316L Thread M27x1.5, PN64/316L Conus DN25, PN40/316L Ra < 0.3 µm Conus DN25, PN40/316L Ra < 0.8 µm Conus DN25, PN40/ECTFE (ZB3033) ⁶⁾ Conus M52, PN40/316L Conus M52, PN40/316L Ra < 0.3 µm Conus M52, PN40/316L Ra < 0.8 µm Tri-Clamp 1", PN16/316L Ra < 0.3 µm Tri-Clamp 1", PN16/Hastelloy Tri-Clamp 1", PN16 DIN 32676/316L Ra < 0.8 µm Tri-Clamp 1 $\frac{1}{2}$ ", PN16/316L Ra < 0.3 µm Tri-Clamp 1 $\frac{1}{2}$ ", PN16/Hastelloy	A 0 0 A 0 1 A 0 2 A 0 3 A 0 4 A 0 5 A 0 6 A 0 7 A 0 8 A 1 0 A 1 1 A 1 2 A 1 3 A 1 4 A 1 5 A 1 6 A 1 7 A 1 8 A 2 0 A 2 1 A 2 2 A 2 3 A 2 4 A 2 5 A 2 6 A 2 7 A 2 8 A 3 0 A 3 1 A 3 2 A 3 3 A 3 4 A 3 5 A 3 6 A 3 7 A 3 8 A 4 0 A 4 1 A 4 2

Selection and Ordering data	Order No.
SITRANS LVL200, Standard Compact vibrating level switch for use 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.	7 M L 5 7 4 6 - - A 0
Tri-Clamp 1 $\frac{1}{2}$ ", PN16/316L Ra < 0.8 µm Tri-Clamp 2", PN16/316L Ra < 0.3 µm Tri-Clamp 2", PN16/Hastelloy Tri-Clamp 2", PN16/316L Ra < 0.8 µm Tri-Clamp 2 $\frac{1}{2}$ ", PN10/316L Ra < 0.3 µm Tri-Clamp 2 $\frac{1}{2}$ ", PN10/316L Ra < 0.8 µm Tri-Clamp 3", PN10/316L Ra < 0.3 µm Tri-Clamp 3", PN10/316L Ra < 0.8 µm Bolting DN32, PN40 DIN11851/316L Ra < 0.3 µm Bolting DN32, PN40 DIN11851/316L Ra < 0.8 µm Bolting DN25, PN40 DIN11851/316L Ra < 0.3 µm Bolting DN25, PN40 DIN11851/316L Ra < 0.8 µm Bolting DN25, PN40 DIN11851/316L Ra < 0.8 µm Bolting DN40, PN40 DIN11851/316L Ra < 0.3 µm Bolting DN40, PN40 DIN11851/316L Ra < 0.8 µm Bolting DN 40, PN40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 Bolting DN50, PN25 DIN11851/316L Ra < 0.3 µm Bolting DN50, PN25 DIN11851/316L Ra < 0.8 µm Bolting DN50, PN25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052 Hygienic w. compr. nut F40, PN25/316L Hygienic w. compr. nut F40, PN25/316L Ra < 0.3 µm Hygienic w. compr. nut F40, PN25/316L Ra < 0.8 µm Varivent N50-40/316L Ra < 0.3 µm Varivent N50-40/316L Ra < 0.8 µm Varivent N125/100/316L Ra < 0.8 µm DRD flange, PN40/316L ZB3007 SMS DN38/316L Ra < 0.8 µm ⁶⁾ SMS DN51, PN6/316L Ra < 0.8 µm ⁶⁾ Swagelok VCR screwing ZG2579, PN64/316L Neumo biocontrol Gr. 25, PN16/316L Ra < 0.8 µm Neumo biocontrol Gr. 50, PN16/316L Ra < 0.8 µm ⁶⁾ Neumo biocontrol Gr. 65, PN16/316L Ra < 0.8 µm Neumo biocontrol Gr. 80, PN16/316L Ra < 0.8 µm SÜDMO DN50, PN10/316L/316L Ra<0,8µm Small flange DN25, PN1.5 DIN 28403/316L pol.Ra < 0.8 µm Small flange DN40, PN1.5 DIN 28403/316L pol.Ra < 0.8 µm Ingold connection, PN16/316L Ra < 0.8 µm Ingold connection, PN16/Hastelloy Terminal DN 33,7 PN40 DIN11864-3-A-/316L BN2 Ra < 0.8 µm ⁶⁾ Hygienic fl. DN50 PN16 DIN11864-2-A-/316L Ra < 0.8 µm Flange DN25, PN6 Form C, DIN 2501/316L Flange DN25, PN6 Form C, DIN 2501/PFA ⁶⁾ Flange DN25, PN40 Form C, DIN 2501/316L Flange DN25, PN40 Form C, DIN 2501/Hastelloy Flange DN25, PN40 Form C, DIN 2501/ECTFE ⁶⁾ Flange DN25, PN40 Form C, DIN 2501/PFA ⁶⁾ Flange DN25, PN40 Form C, DIN 2501/Enamelled Flange DN25, PN40 Form D, DIN 2501/316L Flange DN25, PN40 Form F, DIN 2501/316L Flange DN25, PN40 Form N, DIN 2501/316L Flange DN25, PN40 Form N, DIN 2501/Hastelloy Flange DN25, PN40 Form N, DIN 2501/Monel solid Flange DN25, PN40 V13, DIN 2501/316L Flange DN32, PN40 Form C, DIN 2501/316L Flange DN32, PN40 Form C, DIN 2501/ECTFE ⁶⁾	A 4 3 A 4 4 A 4 5 A 4 6 A 4 7 A 4 8 A 5 0 A 5 1 A 5 2 A 5 3 A 5 4 A 5 5 A 5 6 A 5 7 A 5 8 A 6 0 A 6 1 A 6 2 A 6 3 A 6 4 A 6 5 A 6 6 A 6 7 A 6 8 A 7 0 A 7 1 A 7 2 A 7 3 A 7 4 A 7 5 A 7 6 A 7 7 A 7 8 A 8 0 A 8 1 A 8 2 A 8 3 A 8 4 A 8 5 A 8 6 A 8 7 A 8 8 B 0 0 B 0 1 B 0 2 B 0 3 B 0 4 B 0 5 B 0 6 B 0 7 B 0 8 B 1 0 B 1 1 B 1 2

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data

Order No.

SITRANS LVL200, Standard

Compact vibrating level switch for use 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.

7 M L 5 7 4 6 -

- A 0

Flange DN40, PN6 Form C, DIN 2501/316L	B 1 3
Flange DN40, PN6 Form C, DIN 2501/ECTFE ⁶⁾	B 1 4
Flange DN40, PN40 Form C, DIN 2501/316L	B 1 5
Flange DN40, PN40 Form C, DIN 2501/Hastelloy	B 1 6
Flange DN40, PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 1 7
Flange DN40, PN40 Form C, DIN 2501/PFA ⁶⁾	B 1 8
Flange DN40, PN40 Form C, DIN 2501/Enamelled ⁷⁾	B 2 0
Flange DN40, PN40 Form F, DIN 2501/316L	B 2 1
Flange DN40, PN40 Form N, DIN 2501/316L	B 2 2
Flange DN40, PN40 Form E, DIN 2501/316L	B 2 3
Flange DN40, PN40 V13, DIN 2501/316L	B 2 4
Flange DN50, PN40 Form C, DIN 2501/316L	B 2 5
Flange DN50, PN40 Form C, DIN 2501/Hastelloy	B 2 6
Flange DN50, PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 2 7
Flange DN50, PN40 Form C, DIN 2501/ECTFE (ZB3108) ⁶⁾	B 2 8
Flange DN50, PN40 Form C, DIN 2501/PFA ⁶⁾	B 3 0
Flange DN50, PN40 Form D, DIN 2501/316L	B 3 1
Flange DN50, PN40 Form D, DIN 2501/Hastelloy	B 3 2
Flange DN50, PN40 Form F, DIN 2501/316L	B 3 3
Flange DN50, PN40 Form N, DIN 2501/316L	B 3 4
Flange DN50, PN40 Form N, DIN 2501/Hastelloy	B 3 5
Flange DN50, PN40 Form E, DIN 2501/316L	B 3 6
Flange DN50, PN40 V13, DIN 2501/316L	B 3 7
Flange DN50, PN40 R13, DIN 2501/316L	B 3 8
Flange DN50, PN64 Form F, DIN 2501/316L	B 4 0
Flange DN50, PN64 Form N, DIN 2501/Hastelloy	B 4 1
Flange DN50, PN64 Form C, DIN 2501/316L	B 4 2
Flange DN50, PN64 Form L, DIN 2501/316L	B 4 3
Flange DN50, PN100 Form E, DIN 2501/316L	B 4 4
Flange DN50, PN100 Form L, DIN 2501/316L	B 4 5
Flange DN65, PN40 Form C, DIN 2501/316L	B 4 6
Flange DN65, PN40 Form C, DIN 2501/Hastelloy	B 4 7
Flange DN65, PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 4 8
Flange DN65, PN40 Form C, DIN 2501/PFA ⁶⁾	B 5 0
Flange DN65, PN40 Form F, DIN 2501/316L	B 5 1
Flange DN65, PN64 Form E, DIN 2501/316L	B 5 2
Flange DN80, PN40 Form C, DIN 2501/316L	B 5 3
Flange DN80, PN40 Form C, DIN 2501/Hastelloy	B 5 4
Flange DN80, PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 5 5
Flange DN80, PN40 Form C, DIN 2501/PFA ⁶⁾	B 5 6
Flange DN80, PN40 Form C, DIN 2501/Enamelled ⁷⁾	B 5 7
Flange DN80, PN40 Form F, DIN 2501/316L	B 5 8
Flange DN80, PN40 Form N, DIN 2501/316L	B 6 0
Flange DN80, PN40 Form N, DIN 2501/Hastelloy	B 6 1
Flange DN100, PN16 Form C, DIN 2501/316L	B 6 2
Flange DN100, PN16 Form C, DIN 2501/Hastelloy	B 6 3
Flange DN100, PN16 Form C, DIN 2501/ECTFE ⁶⁾	B 6 4
Flange DN100, PN16 Form C, DIN 2501/PFA ⁶⁾	B 6 5
Flange DN100, PN16 Form C, DIN 2501/Enamelled ⁷⁾	B 6 6
Flange DN100, PN16 Form D, DIN 2501/316L	B 6 7
Flange DN100, PN16 Form F, DIN 2501/316L	B 6 8
Flange DN100, PN16 Form N, DIN 2501/316L	B 7 0
Flange DN100, PN40 Form C, DIN 2501/316L	B 7 1
Flange DN100, PN40 Form C, DIN 2501/ECTFE ⁶⁾	B 7 2
Flange DN100, PN40 Form C, DIN 2501/PFA ⁶⁾	B 7 3
Flange DN100, PN40 Form C, DIN 2501/Enamelled ⁷⁾	B 7 4

Selection and Ordering data

Order No.

SITRANS LVL200, Standard

Compact vibrating level switch for use 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.

7 M L 5 7 4 6 -

- A 0

Flange DN100, PN40 Form F, DIN 2501/316L	B 7 5
Flange DN100, PN40 Form N, DIN 2501/316L	B 7 6
Flange DN100, PN40 V13, DIN 2501/316L	B 7 7
Flange DN100, PN64 Form E, DIN 2501/316L	B 7 8
Flange DN100, PN100 Form E, DIN 2501/316L	B 8 0
Flange DN100, PN100 Form L, DIN 2501/316L	B 8 1
Flange DN125, PN16 Form F, DIN 2501/316L	B 8 2
Flange DN125, PN40 Form C, DIN 2501/316L	B 8 3
Flange DN125, PN40 Form N, DIN 2512/ 316L	B 8 4
Flange DN150, PN16 Form C, DIN 2501/316L	B 8 5
Flange DN150, PN16 Form C, DIN 2501/Hastelloy	B 8 6
Flange DN150, PN16 Form C, DIN 2501/ECTFE ⁶⁾	B 8 7
Flange DN150, PN16 Form C, DIN 2501/PFA ⁶⁾	B 8 8
Flange DN150, PN16 Form D, DIN 2501/316L	C 0 0
Flange DN150, PN40 Form C, DIN 2501/316L	C 0 1
Flange DN150, PN40 Form C, DIN 2501/Hastelloy	C 0 2
Flange DN150, PN40 Form F, DIN 2501/316L	C 0 3
Flange DN150, PN40 Form N, DIN 2512/316L	C 0 4
Flange DN200, PN10 Form C, DIN 2501/ECTFE ⁶⁾	C 0 5
Flange DN200, PN16 Form C, DIN 2501/316L	C 0 6
Flange DN25, PN40 Form B1, EN 1092-1/316L	C 0 7
Flange DN25, PN40 Form B1, EN 1092-1/Hastelloy	C 0 8
Flange DN25, PN40 Form B1, EN/ 316L/ PFA ⁶⁾	C 1 0
Flange DN25, PN40 Form B1, EN 1092-1/Enamelled ⁷⁾	C 1 1
Flange DN25, PN40 Form B2, EN 1092-1/316L	C 1 2
Flange DN25, PN40 Form F, EN 1092-1/316L	C 1 3
Flange DN25, PN63 Form B1, EN 1092-1/316L	C 1 4
Flange DN25, PN100 Form B2, EN 1092-1/316L	C 1 5
Flange DN40, PN40 Form B1, EN/ 316L	C 1 6
Flange DN40, PN40 Form B1, EN 1092-1/PFA ⁶⁾	C 1 7
Flange DN40, PN40 Form B2, EN/316L	C 1 8
Flange DN50, PN40 Form B1, EN/316L	C 2 0
Flange DN50, PN40 Form B1, EN 1092-1/Hastelloy	C 2 1
Flange DN50, PN40 Form B1, EN 1092-1/Monel ZB2977	C 2 2
Flange DN50, PN40 Form B1, EN 1092-1/ECTFE ⁶⁾	C 2 3
Flange DN50, PN40 Form B1, EN/ 316L/PFA ⁶⁾	C 2 4
Flange DN50, PN40 Form B1, EN 1092-1/Enamelled ⁷⁾	C 2 5
Flange DN50, PN40 Form C, EN 1092-1/316L	C 2 6
Flange DN50, PN40 Form D, EN/316L	C 2 7
Flange DN50, PN40 Form D, EN 1092-1/Hastelloy	C 2 8
Flange DN50, PN40 Form B2, EN 1092-1/316L	C 3 0
Flange DN50, PN40 Form E, EN 1092-1/316L	C 3 1
Flange DN80, PN40 Form B1, EN 1092-1/316L	C 3 2
Flange DN80, PN40 Form B1, EN 1092-1/Hastelloy	C 3 3
Flange DN80, PN40 Form B1, EN 1092-1/ECTFE ⁶⁾	C 3 4
Flange DN80, PN40 Form B1, EN 1092-1/Enamelled ⁷⁾	C 3 5
Flange DN80, PN40 Form B2, EN 1092-1/316L	C 3 6
Flange DN100, PN16 Form B1, EN 1092-1/316L	C 3 7
Flange DN100, PN16 Form B1, EN 1092-1/Hastelloy	C 3 8
Flange DN100, PN16 Form B1, EN 1092-1/Enamelled ⁷⁾	C 4 0
Flange DN100, PN40 Form B1, EN 1092-1/316L	C 4 1
Flange DN100, PN40 Form B1, EN 1092-1/Enamelled ⁷⁾	C 4 2
Flange DN100, PN40 Form C, EN 1092-1/316L	C 4 3
Flange DN100, PN63 Form B2, EN 1092-1/316L	C 4 4
Flange DN150, PN16 Form B1, EN 1092-1/316L	C 4 5

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data		Order No.	Selection and Ordering data		Order No.
SITRANS LVL200, Standard		7 M L 5 7 4 6 -	SITRANS LVL200, Standard		7 M L 5 7 4 6 -
Compact vibrating level switch for use 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.			Compact vibrating level switch for use 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.		
Flange DN150, PN16 Form B1, EN 1092-1/PFA ⁶⁾	C 4 6		Flange 3" 300lb RF, ANSI B16.5/Hastelloy	D 2 2	
Flange DN150, PN40 Form B1, EN 1092-1/316L	C 4 7		Flange 3" 300lb RF, ANSI B16.5/ECTFE ⁶⁾	D 2 3	
Flange DN150, PN40 Form B1, EN 1092-1/ECTFE ⁶⁾	C 4 8		Flange 3" 300lb RF, ANSI B16.5/PFA ⁶⁾	D 2 4	
Flange DN150, PN40 Form B2, EN 1092-1/316L	C 5 0		Flange 3" 300lb RF, ANSI B16.5/Enamelled ⁷⁾	D 2 5	
Flange 1" 150lb ANSI B16.5/316L	C 5 1		Flange 3" 600lb RF, ANSI B16.5/316L	D 2 6	
Flange 1" 150lb RF, ANSI B16.5/Hastelloy	C 5 2		Flange 3½" 150lb RF, ANSI B16.5/316L	D 2 7	
Flange 1" 150lb RF, ANSI B16.5/Monel ZB2977	C 5 3		Flange 3½" 150lb RF, ANSI B16.5/ECTFE ⁶⁾	D 2 8	
Flange 1" 150lb RF, ANSI B16.5/ECTFE ⁶⁾	C 5 4		Flange 4" 150lb RF, ANSI B16.5/316L	D 3 0	
Flange 1" 150lb RF, ANSI B16.5/PFA ⁶⁾	C 5 5		Flange 4" 150lb RF, ANSI B16.5/Hastelloy	D 3 1	
Flange 1" 150lb RF, ANSI B16.5/Enamelled ⁷⁾	C 5 6		Flange 4" 150lb RF, ANSI B16.5/ECTFE ⁶⁾	D 3 2	
Flange 1" 300lb RF, ANSI B16.5/316L	C 5 7		Flange 4" 150lb RF, ANSI B16.5/PFA ⁶⁾	D 3 3	
Flange 1" 300lb RF, ANSI B16.5/ECTFE ⁶⁾	C 5 8		Flange 4" 150lb RF, ANSI B16.5/Enamelled ⁷⁾	D 3 4	
Flange 1" 600lb RF, ANSI B16.5/316L	C 6 0		Flange 4" 150lb LT, ANSI B16.5/316L	D 3 5	
Flange 1½" 150lb RF, ANSI B16.5/316L	C 6 1		Flange 4" 300lb RF, ANSI B16.5/316L	D 3 6	
Flange 1½" 150lb RF, ANSI B16.5/Hastelloy	C 6 2		Flange 4" 300lb RF, ANSI B16.5/Hastelloy	D 3 7	
Flange 1½" 150lb RF, ANSI B16.5/ECTFE ⁶⁾	C 6 3		Flange 4" 300lb RF, ANSI B16.5/ECTFE ⁶⁾	D 3 8	
Flange 1½" 150lb RF, ANSI B16.5/PFA ⁶⁾	C 6 4		Flange 4" 300lb RJF, ANSI B16.5/316L	D 4 0	
Flange 1½" 150lb RF, ANSI B16.5 Enamelled ⁷⁾	C 6 5		Flange 4" 300lb LG, ANSI B16.5/316L	D 4 1	
Flange 1½" 150lb FF, ANSI B16.5/ECTFE ⁶⁾	C 6 6		Flange 4" 300lb LT, ANSI B16.5/316L	D 4 2	
Flange 1½" 300lb RF, ANSI B16.5/316L	C 6 7		Flange 4" 600lb RF, ANSI B16.5/316L	D 4 3	
Flange 1½" 300lb RF, ANSI B16.5/Monel ZB2977	C 6 8		Flange 4" 600lb RJF, ANSI B16.5/316L	D 4 4	
Flange 1½" 300lb RF, ANSI B16.5/ECTFE ⁷⁾	C 7 0		Flange 6" 150lb RF, ANSI B16.5/316L	D 4 5	
Flange 1½" 600lb RF, ANSI B16.5/316L	C 7 1		Flange 6" 150lb RF, ANSI B16.5/Hastelloy	D 4 6	
Flange 2" 150lb RF, ANSI B16.5/316L	C 7 2		Flange 6" 150lb RF, ANSI B16.5/ECTFE ⁶⁾	D 4 7	
Flange 2" 150lb RF, ANSI B16.5/Hastelloy	C 7 3		Flange 6" 150lb RF, ANSI B16.5/PFA ⁶⁾	D 4 8	
Flange 2" 150lb RF, ANSI B16.5/Monel ZB2977	C 7 4		Flange 6" 150lb RJF, ANSI B16.5/316L	D 5 0	
Flange 2" 150lb RF, ANSI B16.5/ECTFE ⁶⁾	C 7 5		Flange 6" 300lb RF, ANSI B16.5/316L	D 5 1	
Flange 2" 150lb RF, ANSI B16.5/PFA ⁶⁾	C 7 6		Flange 8" 150lb RF, ANSI B16.5/316L	D 5 2	
Flange 2" 150lb RF, ANSI B16.5/Enamelled ⁷⁾	C 7 7		Flange 8" 150lb RF, ANSI B16.5/ECTFE ⁶⁾	D 5 3	
Flange 2" 150lb FF, ANSI B16.5/316L	C 7 8		Flange 1" BS.10 Table E/316L	D 5 4	
Flange 2" 150lb FF, ANSI B16.5/ECTFE ⁶⁾	C 8 0		Flange 1" BS.10 Table E/PFA ⁶⁾	D 5 5	
Flange 2" 150lb SG (small groove), ANSI B16.5/316L	C 8 1		Flange 1½" BS.10 Table E/316L	D 5 6	
Flange 2" 300lb RF, ANSI B16.5/316L	C 8 2		Flange 3½" BS.10 Table E/316L	D 5 7	
Flange 2" 300lb RF, ANSI B16.5/Hastelloy	C 8 3		Flange 4" BS.10 Table E/ECTFE ⁶⁾	D 5 8	
Flange 2" 300lb RF, ANSI B16.5/Hastelloy	C 8 4		Flange DN40 10K, JIS/316L	D 6 0	
Flange 2" 300lb RF, ANSI B16.5/ECTFE ⁶⁾	C 8 5		Flange DN50 10K, JIS/316L	D 6 1	
Flange 2" 300lb RF, ANSI B16.5/PFA ⁶⁾	C 8 6		Flange DN80 10K, JIS/316L	D 6 2	
Flange 2" 300lb RF, ANSI B16.5 Enamelled ⁷⁾	C 8 7		Flange DN100 10K, JIS/316L	D 6 3	
Flange 2" 300lb RJF, ANSI B16.5/316L	C 8 8		Adapter/Process temperature		
Flange 2" 300lb ST, ANSI B16.5/316L	D 0 0		Without adapter/-50 ... +150 °C (-58 ... +302 °F)	1	
Flange 2" 300lb LG (large groove), ANSI B16.5/316L	D 0 1		With adapter/-50 ... +200 °C (-58 ... +392 °F) ⁸⁾	2	
Flange 2" 300lb LT, ANSI B16.5/316L	D 0 2		With adapter/-50 ... +250 °C (-58 ... +482 °F)	3	
Flange 2" 600lb RF, ANSI B16.5/316L	D 0 3		With gas-tight leadthrough/-50 ... +150 °C (-58 ... +302 °F)	4	
Flange 2" 600lb RF, ANSI B16.5/Monel ZB2977	D 0 4		With gas-tight leadthrough/-50 ... +250 °C (-58 ... +482 °F)	5	
Flange 2" 600lb RF, ANSI B16.5/ECTFE ⁶⁾	D 0 5		Housing/ Cable entry		
Flange 2" 600lb RJF, ANSI B16.5/316L	D 0 6		Aluminium IP66/IP67/M20x1.5	A	
Flange 2" 600lb LG, ANSI B16.5/316L	D 0 7		Aluminium IP66/IP67/½" NPT	B	
Flange 2" 900lb RJF, ANSI B16.5/316L	D 0 8		1) Available with Approval options A to G, and K, and Adapter/Process temperature options 1, and 3 to 5 only		
Flange 2½" 150lb RF, ANSI B16.5/316L	D 1 0		2) Available with Electronics option 4 only		
Flange 2½" 300lb RF, ANSI B16.5/316L	D 1 1		3) Available with Adapter/Process temperature options 1 and 3 only		
Flange 3" 150lb RF, ANSI B16.5/316L	D 1 2		5) Available with Housing/Cable entry option B only		
Flange 3" 150lb RF, ANSI B16.5/Hastelloy	D 1 3		6) Available with Adapter/Process temperature options 1 and 4 only		
Flange 3" 150lb RF, ANSI B16.5/ECTFE ⁶⁾	D 1 4		7) Available with Adapter/Process temperature options 1, 2, and 4 only		
Flange 3" 150lb RF, ANSI B16.5/PFA ⁶⁾	D 1 5		8) Available with enamelled Process connection options only		
Flange 3" 150lb RF, ANSI B16.5/Enamelled ⁷⁾	D 1 6				
Flange 3" 150lb FF, ANSI B16.5/316L	D 1 7				
Flange 3" 150lb FF, ANSI B16.5/ECTFE ⁶⁾	D 1 8				
Flange 3" 150lb FF, ANSI B16.5/PFA ⁶⁾	D 2 0				
Flange 3" 300lb RF, ANSI B16.5/316L	D 2 1				

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Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Cleaning including Certificate (oil, grease and silicone free)

W01

Identification Label (measurement loop) SS: max. 16 characters add in plain text

Y17

Identification Label (measurement loop) Foil: max. 16 characters add in plain text

Y18

Acceptance test certificate 3.1 NACE MR 0775 for material EN10204

D07

Acceptance test certificate 3.1 for instrument

C12

Acceptance test certificate 2.2 for instrument

C14

Acceptance test Certificate 2.2 for material EN10204

C15

SIL/IEC61508 Certificate of conformity (SIL-2/3 min. and max. detection)

C20

Additional Operating Instructions

Order No.

LVL 200 (DPDT Relay)

- English
- French
- Spanish
- German

7ML1998-5KR01

7ML1998-5KR11

7ML1998-5KR21

7ML1998-5KR31

LVL 200 (Contactless electronic switch)

- English
- French
- Spanish
- German

7ML1998-5KQ01

7ML1998-5KQ11

7ML1998-5KQ21

7ML1998-5KQ31

Electronics module LVL 200 Relay

- English
- French
- Spanish
- German

7ML1998-5LS01

7ML1998-5LS11

7ML1998-5LS21

7ML1998-5LS31

This device is shipped with the Siemens Milltronics manual CD containing the complete Operating Instructions library.

Spare Parts

Electronics module SITRANS LVL200 Relay

7ML1830-1NC

LVL100 Threaded Welded Socket

- G ¾" A / 316L with FKM Seal
- G 1 A / 316L with FKM Seal
- M27x1.5 / 316L with FKM Seal
- G ¾" A / 316L with EPDM Seal
- G 1 A / 316L with EPDM Seal
- M27x1.5 / 316L with EPDM Seal

7ML1930-1EE

7ML1930-1EF

7ML1930-1EG

7ML1930-1EH

7ML1930-1EJ

7ML1930-1EK

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML 5 7 4 7 -
Electronics	
Contactless electronic switch 20...250 V AC/DC	1
Double relay (DPDT) 20 ... 72 V DC/20 ... 250 V AC NAMUR signal ¹⁾	2 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 1/2D IP6X T ²⁾	G
Shipping approvals	K
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,GP A B C D E F G...T2 Ga/Gb	S
CSA(NI)CL I,II,III, DIV 2,GP A B C D E F G	T
Process connection	
Thread G ³ / ₄ " A, PN64/316L	A 0 0
Thread G ³ / ₄ " A, PN64/316L Ra < 0.8 µm	A 0 1
Thread ³ / ₄ " NPT, PN64/316L	A 0 2
Thread ³ / ₄ " NPT, PN64/316L Ra < 0.8 µm	A 0 3
Thread ³ / ₄ " NPT, PN64/Monel	A 0 4
Thread G ³ / ₄ " A, PN64/Hastelloy	A 0 5
Thread ³ / ₄ " NPT, PN64/Hastelloy	A 0 6
Thread G1" A, PN64/316L	A 0 7
Thread G1" A, PN64/316L ECTFE coated MB1982 ⁵⁾	A 0 8
Thread G1" A, PN64/316L PFA coated ⁵⁾	A 1 0
Thread G1" A, PN64/Monel	A 1 1
Thread G1" A, PN64/316L Ra < 0.8 µm	A 1 3
Thread 1" NPT, PN64/316L	A 1 4
Thread 1" NPT, PN64/316L ECTFE coated MB1982 ⁵⁾	A 1 5
Thread 1" NPT, PN64/316L PFA coated ⁵⁾	A 1 6
Thread 1" NPT, PN64/Monel	A 1 7
Thread 1" NPT, PN64/316L Ra < 0.8 µm	A 1 8
Thread G1" A, PN64/Hastelloy	A 2 0
Thread G1 ¹ / ₂ " A, PN64/316L	A 2 1
Thread G1 ¹ / ₂ " A, PN64/316L Ra < 0.8 µm	A 2 2
Thread G1 ¹ / ₂ " A, PN64/Hastelloy	A 2 3
Thread 1" NPT, PN64/Hastelloy	A 2 4
Thread 1 ¹ / ₂ " NPT, PN64/316L	A 2 5
Thread 1 ¹ / ₂ " NPT, PN64/316L Ra < 0.8 µm	A 2 6
Thread 1 ¹ / ₂ " NPT, PN64/Hastelloy	A 2 7
Thread G2" A, PN64/316L	A 2 8
Thread M27x1.5 PN64/316L	A 3 0
Cyl. socket/316Ti/1.4581 ECTFE coated ZB2984 ⁵⁾	A 3 1
Conus DN25 PN40/316L Ra < 0.3 µm	A 3 2
Conus DN25 PN40/316L Ra < 0.8 µm.	A 3 3
Conus DN25 PN40/ECTFE (ZB3033) ⁵⁾	A 3 4
Conus M52 PN40/316L	A 3 5
Conus M52 PN40/316L Ra < 0.3 µm	A 3 6
Conus M52 PN40/316L Ra < 0.8 µm	A 3 7
Tri-Clamp 1" PN16 DIN 32676/316L Ra < 0.3 µm	A 3 8
Tri-Clamp 1" PN16/Hastelloy	A 4 0
Tri-Clamp 1" PN16/316L Ra < 0.8 µm	A 4 1

Selection and Ordering data	Order No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML 5 7 4 7 -
Tri-Clamp 1 ¹ / ₂ " PN16/316L Ra < 0.3 µm	A 4 2
Tri-Clamp 1 ¹ / ₂ " PN16/Hastelloy	A 4 3
Tri-Clamp 1 ¹ / ₂ " PN16/316L Ra < 0.8 µm	A 4 4
Tri-Clamp 2" PN16/316L Ra < 0.3 µm	A 4 5
Tri-Clamp 2" PN16/Hastelloy	A 4 6
Tri-Clamp 2" PN16/316L Ra < 0.8 µm	A 4 7
Tri-Clamp 2 ¹ / ₂ " PN10/316L Ra < 0.3 µm	A 4 8
Tri-Clamp 2 ¹ / ₂ " PN10/316L Ra < 0.8 µm	A 5 0
Tri-Clamp 3" PN10/316L Ra < 0.3 µm	A 5 1
Tri-Clamp 3" PN10/316L Ra < 0.8 µm	A 5 2
Bolting DN32 PN40 DIN11851/316L Ra < 0.3 µm	A 5 3
Bolting DN32 PN40 DIN11851/316L Ra < 0.8 µm	A 5 4
Bolting DN25 PN40 DIN11851/316L Ra < 0.3 µm	A 5 5
Bolting DN25 PN40 DIN11851/316L Ra < 0.8 µm	A 5 6
Bolting DN40 PN40 DIN11851/316L Ra < 0.3 µm	A 5 7
Bolting DN40 PN40 DIN11851/316L Ra < 0.8 µm	A 5 8
Bolting DN40 PN40 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	A 6 0
Bolting DN50 PN25 DIN11851/316L Ra < 0.3 µm	A 6 1
Bolting DN50 PN25 DIN11851/316L Ra < 0.8 µm	A 6 2
Bolting DN50 PN25 DIN11864-1 A/316L Ra < 0.8 µm ZB3052	A 6 3
Hygienic w.compr.nut F40 PN25/316L	A 6 4
Hygienic w.compr.nut F40 PN25/316L Ra < 0.3 µm	A 6 5
Hygienic w.compr.nut F40 PN25/316L Ra < 0.8 µm	A 6 6
Varivent N50-40/316L Ra < 0.3 µm	A 6 7
Varivent N50-40/316L Ra < 0.8 µm	A 6 8
Varivent N125/100/316L Ra < 0.8 µm	A 7 0
DRD flange PN40/316L ZB3007	A 7 1
SMS DN38/316L Ra < 0.8 µm ⁵⁾	A 7 2
SMS DN51 PN6/316L Ra < 0.8 µm ⁵⁾	A 7 3
Swagelok VCR screwing ZG2579 PN64/316L	A 7 4
Neumo biocontrol Gr.25 PN16/316L Ra < 0.8 µm	A 7 5
Neumo biocontrol Gr.50 PN16/316L Ra < 0.8 µm	A 7 6
Neumo biocontrol Gr.65 PN16/316L Ra < 0.8 µm	A 7 7
Neumo biocontrol Gr.80 PN16/316L Ra < 0.8 µm	A 7 8
SÜDMO DN50 PN10/316L/316L Ra < 0.8 µm	A 8 0
Small flange DN25 PN1.5 DIN 28403/316L pol.Ra < 0.8 µm	A 8 1
Small flange DN40 PN1.5 DIN 28403/316L pol.Ra < 0.8 µm	A 8 2
Ingold connection PN16/316L Ra < 0.8 µm	A 8 3
Terminal DN33.7 PN40 DIN 11864-3-A-/316L BN2 Ra < 0.8 µm	A 8 4
Hygienic fl. DN50 PN16 DIN 11864-2-A-/316L Ra < 0.8 µm	A 8 5
Flange DN25 PN6 Form C, DIN 2501/316L	A 8 6
Flange DN25 PN6 Form C, DIN 2501/PFA ⁵⁾	A 8 7
Flange DN25 PN40 Form C, DIN 2501/316L	A 8 8
Flange DN25 PN40 Form C, DIN 2501/Hastelloy	B 0 0
Flange DN25 PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 0 1
Flange DN25 PN40 Form C, DIN 2501/PFA ⁵⁾	B 0 2
Flange DN25 PN40 Form D, DIN 2501/316L	B 0 3

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Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data

Order No.

SITRANS LVL200, Rigid extension

Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7ML 5 747 -

Flange DN25 PN40 Form F, DIN 2501/316L	B 04
Flange DN25 PN40 Form N, DIN 2501/316L	B 05
Flange DN25 PN40 Form N, DIN 2501/Hastelloy	B 06
Flange DN25 PN40 Form N, DIN 2501/Monel solid	B 07
Flange DN25 PN40 V13, DIN 2501/316L	B 08
Flange DN32 PN40 Form C, DIN 2501/316L	B 10
Flange DN32 PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 11
Flange DN40 PN6 Form C, DIN 2501/316L	B 12
Flange DN40 PN6 Form C, DIN 2501/ECTFE ⁵⁾	B 13
Flange DN40 PN40 Form C, DIN 2501/316L	B 14
Flange DN40 PN40 Form C, DIN 2501/Hastelloy	B 15
Flange DN40 PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 16
Flange DN40 PN40 Form C, DIN 2501/PFA ⁵⁾	B 17
Flange DN40 PN40 Form C, DIN 2501/Enamelled ⁶⁾	B 18
Flange DN40 PN40 Form F, DIN 2501/316L	B 20
Flange DN40 PN40 Form N, DIN 2501/316L	B 21
Flange DN40 PN40 Form E, DIN 2501/316L	B 22
Flange DN40 PN40 V13, DIN 2501/316L	B 23
Flange DN50 PN40 Form C, DIN 2501/316L	B 24
Flange DN50 PN40 Form C, DIN 2501/Hastelloy	B 25
Flange DN50 PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 26
Flange DN50 PN40 Form C, DIN 2501/ECTFE (ZB3108) ⁵⁾	B 27
Flange DN50 PN40 Form C, DIN 2501/PFA ⁵⁾	B 28
Flange DN50 PN40 Form D, DIN 2501/316L	B 30
Flange DN50 PN40 Form D, DIN 2501/Hastelloy	B 31
Flange DN50 PN40 Form F, DIN 2501/316L	B 32
Flange DN50 PN40 Form N, DIN 2501/316L	B 33
Flange DN50 PN40 Form N, DIN 2501/Hastelloy	B 34
Flange DN50 PN40 Form E, DIN 2501/316L	B 35
Flange DN50 PN40 V13, DIN 2501/316L	B 36
Flange DN50 PN40 R13, DIN 2501/316L	B 37
Flange DN50 PN64 Form F, DIN 2501/316L	B 38
Flange DN50 PN64 Form N, DIN 2501/Hastelloy	B 40
Flange DN50 PN64 Form C, DIN 2501/316L	B 41
Flange DN50 PN64 Form L, DIN 2501/316L	B 42
Flange DN50 PN100 Form E, DIN 2501/316L	B 43
Flange DN50 PN100 Form L, DIN 2501/316L	B 44
Flange DN65 PN40 Form C, DIN 2501/316L	B 45
Flange DN65 PN40 Form C, DIN 2501/Hastelloy	B 46
Flange DN65 PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 47
Flange DN65 PN40 Form C, DIN 2501/PFA ⁵⁾	B 48
Flange DN65 PN40 Form F, DIN 2501/316L	B 50
Flange DN65 PN64 Form E, DIN 2501/316L	B 51
Flange DN80 PN40 Form C, DIN 2501/316L	B 52
Flange DN80 PN40 Form C, DIN 2501/Hastelloy	B 53
Flange DN80 PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 54
Flange DN80 PN40 Form C, DIN 2501/PFA ⁵⁾	B 55
Flange DN80 PN40 Form F, DIN 2501/316L	B 56
Flange DN80 PN40 Form N, DIN 2501/316L	B 57
Flange DN80 PN40 Form N, DIN 2501/Hastelloy	B 58
Flange DN100 PN16 Form C, DIN 2501/316L	B 60
Flange DN100 PN16 Form C, DIN 2501/Hastelloy	B 61
Flange DN100 PN16 Form C, DIN 2501/ECTFE ⁵⁾	B 62
Flange DN100 PN16 Form C, DIN 2501/PFA ⁵⁾	B 63
Flange DN100 PN16 Form D, DIN 2501/316L	B 64
Flange DN100 PN16 Form F, DIN 2501/316L	B 65
Flange DN100 PN16 Form N, DIN 2501/316L	B 66

Selection and Ordering data

Order No.

SITRANS LVL200, Rigid extension

Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7ML 5 747 -

Flange DN100 PN40 Form C, DIN 2501/316L	B 67
Flange DN100 PN40 Form C, DIN 2501/ECTFE ⁵⁾	B 68
Flange DN100 PN40 Form C, DIN 2501/PFA ⁵⁾	B 70
Flange DN100 PN40 Form C, DIN 2501/Enamelled ⁶⁾	B 71
Flange DN100 PN40 Form F, DIN 2501/316L	B 72
Flange DN100 PN40 Form N, DIN 2501/316L	B 73
Flange DN100 PN40 V13, DIN 2501/316L	B 74
Flange DN100 PN64 Form E, DIN 2501/316L	B 75
Flange DN100 PN100 Form E, DIN 2501/316L	B 76
Flange DN100 PN100 Form L, DIN 2501/316L	B 77
Flange DN125 PN16 Form F, DIN 2501/316L	B 78
Flange DN125 PN40 Form C, DIN 2501/316L	B 80
Flange DN125 PN40 Form N, DIN 2512/316L	B 81
Flange DN150 PN16 Form C, DIN 2501/316L	B 82
Flange DN150 PN16 Form C, DIN 2501/Hastelloy	B 83
Flange DN150 PN16 Form C, DIN 2501/ECTFE ⁵⁾	B 84
Flange DN150 PN16 Form C, DIN 2501/PFA ⁵⁾	B 85
Flange DN150 PN16 Form D, DIN 2501/316L	B 86
Flange DN150 PN40 Form C, DIN 2501/316L	B 87
Flange DN150 PN40 Form C, DIN 2501/Hastelloy	B 88
Flange DN150 PN40 Form F, DIN 2501/316L	C 00
Flange DN150 PN40 Form N, DIN 2512/316L	C 01
Flange DN200 PN10 Form C, DIN 2501/ECTFE ⁵⁾	C 02
Flange DN200 PN16 Form C, DIN 2501/316L	C 03
Flange DN25 PN40 Form B1, EN 1092-1/316L	C 04
Flange DN25 PN40 Form B1, EN 1092-1/Hastelloy	C 05
Flange DN25 PN40 Form B1, EN/316L/PFA ⁵⁾	C 06
Flange DN25 PN40 Form B1, EN 1092-1/Enamelled ⁶⁾	C 07
Flange DN25 PN40 Form B2, EN 1092-1/316L	C 08
Flange DN25 PN40 Form F, EN 1092-1/316L	C 10
Flange DN25 PN63 Form B1, EN 1092-1/316L	C 11
Flange DN25 PN100 Form B2, EN 1092-1/316L	C 12
Flange DN40 PN40 Form B1, EN/316L	C 13
Flange DN40 PN40 Form B1, EN 1092-1/PFA ⁵⁾	C 14
Flange DN40 PN40 Form B2, EN/316L	C 15
Flange DN50 PN40 Form B1, EN/316L	C 16
Flange DN50 PN40 Form B1, EN 1092-1/Hastelloy	C 17
Flange DN50 PN40 Form B1, EN 1092-1/Monel ZB2977	C 18
Flange DN50 PN40 Form B1, EN 1092-1/ECTFE ⁵⁾	C 20
Flange DN50 PN40 Form B1, EN/316L/PFA ⁵⁾	C 21
Flange DN50 PN40 Form B1, EN 1092-1/Enamelled ⁶⁾	C 22
Flange DN50 PN40 Form C, EN 1092-1/316L	C 23
Flange DN50 PN40 Form D, EN/316L	C 24
Flange DN50 PN40 Form D, EN 1092-1/Hastelloy	C 25
Flange DN50 PN40 Form B2, EN 1092-1/316L	C 26
Flange DN50 PN40 Form E, EN 1092-1/316L	C 27
Flange DN80 PN40 Form B1, EN 1092-1/316L	C 28
Flange DN80 PN40 Form B1, EN 1092-1/Hastelloy	C 30
Flange DN80 PN40 Form B1, EN 1092-1/ECTFE ⁵⁾	C 31
Flange DN80 PN40 Form B1, EN 1092-1/Enamelled ⁶⁾	C 32
Flange DN80 PN40 Form B2, EN 1092-1/316L	C 33
Flange DN100 PN16 Form B1, EN 1092-1/316L	C 34
Flange DN100 PN16 Form B1, EN 1092-1/Hastelloy	C 35
Flange DN100 PN16 Form B1, EN 1092-1/Enamelled ⁶⁾	C 36

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML 5 7 4 7 -
Flange DN100 PN40 Form B1, EN 1092-1/316L	C 37
Flange DN100 PN40 Form B1, EN 1092-1/Enamelled ⁶⁾	C 38
Flange DN100 PN40 Form C, EN 1092-1/316L	C 40
Flange DN100 PN63 Form B2, EN 1092-1/316L	C 41
Flange DN150 PN16 Form B1, EN 1092-1/316L	C 42
Flange DN150 PN16 Form B1, EN 1092-1/PFA ⁵⁾	C 43
Flange DN150 PN40 Form B1, EN 1092-1/316L	C 44
Flange DN150 PN40 Form B1, EN 1092-1/ECTFE ⁵⁾	C 45
Flange DN150 PN40 Form B2, EN 1092-1/316L	C 46
Flange 1" 150lb ANSI B16.5/316L	C 47
Flange 1" 150lb RF, ANSI B16.5/Hastelloy	C 48
Flange 1" 150lb RF, ANSI B16.5/Monel ZB2977	C 50
Flange 1" 150lb RF, ANSI B16.5/ECTFE ⁵⁾	C 51
Flange 1" 150lb RF, ANSI B16.5/PFA ⁵⁾	C 52
Flange 1" 150lb RF, ANSI B16.5/Enamelled ⁶⁾	C 53
Flange 1" 300lb RF, ANSI B16.5/316L	C 54
Flange 1" 300lb RF, ANSI B16.5/ECTFE ⁵⁾	C 55
Flange 1" 600lb RF, ANSI B16.5/316L	C 56
Flange 1½" 150lb RF, ANSI B16.5/316L	C 57
Flange 1½" 150lb RF, ANSI B16.5/Hastelloy	C 58
Flange 1½" 150lb RF, ANSI B16.5/ECTFE ⁵⁾	C 60
Flange 1½" 150lb RF, ANSI B16.5/PFA ⁵⁾	C 61
Flange 1½" 150lb RF, ANSI B16.5 Enamelled ⁶⁾	C 62
Flange 1½" 150lb FF, ANSI B16.5/ECTFE ⁵⁾	C 63
Flange 1½" 300lb RF, ANSI B16.5/316L	C 64
Flange 1½" 300lb RF, ANSI B16.5/Monel ZB2977	C 65
Flange 1½" 300lb RF, ANSI B16.5/ECTFE ⁵⁾	C 66
Flange 1½" 600lb RF, ANSI B16.5/316L	C 67
Flange 2" 150lb RF, ANSI B16.5/316L	C 68
Flange 2" 150lb RF, ANSI B16.5/Hastelloy	C 70
Flange 2" 150lb RF, ANSI B16.5/Monel ZB2977	C 71
Flange 2" 150lb RF, ANSI B16.5/ECTFE ⁵⁾	C 72
Flange 2" 150lb RF, ANSI B16.5/PFA ⁵⁾	C 73
Flange 2" 150lb RF, ANSI B16.5/Enamelled ⁶⁾	C 74
Flange 2" 150lb FF, ANSI B16.5/316L	C 75
Flange 2" 150lb FF, ANSI B16.5/ECTFE ⁵⁾	C 76
Flange 2" 150lb SG (small groove), ANSI B16.5/316L	C 77
Flange 2" 300lb RF, ANSI B16.5/316L	C 78
Flange 2" 300lb RF, ANSI B16.5/Hastelloy	C 80
Flange 2" 300lb RF, ANSI B16.5/Hastelloy	C 81
Flange 2" 300lb RF, ANSI B16.5/ECTFE ⁵⁾	C 82
Flange 2" 300lb RF, ANSI B16.5/PFA ⁵⁾	C 83
Flange 2" 300lb RF, ANSI B16.5 Enamelled ⁶⁾	C 84
Flange 2" 300lb RJF, ANSI B16.5/316L	C 85
Flange 2" 300lb ST, ANSI B16.5/316L	C 86
Flange 2" 300lb LG (large groove), ANSI B16.5/316L	C 87
Flange 2" 300lb LT, ANSI B16.5/316L	C 88
Flange 2" 600lb RF, ANSI B16.5/316L	D 00
Flange 2" 600lb RF, ANSI B16.5/Monel ZB2977	D 01
Flange 2" 600lb RF, ANSI B16.5/ECTFE ⁵⁾	D 02
Flange 2" 600lb RJF, ANSI B16.5/316L	D 03
Flange 2" 600lb LG, ANSI B16.5/316L	D 04
Flange 2" 900lb RJF, ANSI B16.5/316L	D 05
Flange 2½" 150lb RF, ANSI B16.5/316L	D 06
Flange 2½" 300lb RF, ANSI B16.5/316L	D 07
Flange 3" 150lb RF, ANSI B16.5/316L	D 08
Flange 3" 150lb RF, ANSI B16.5/Hastelloy	D 10

Selection and Ordering data	Order No.
SITRANS LVL200, Rigid extension Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.	7ML 5 7 4 7 -
Flange 3" 150lb RF, ANSI B16.5/Monel ZB2977	D 11
Flange 3" 150lb RF, ANSI B16.5/ECTFE ⁵⁾	D 12
Flange 3" 150lb RF, ANSI B16.5/PFA ⁵⁾	D 13
Flange 3" 150lb RF, ANSI B16.5/Enamelled ⁶⁾	D 14
Flange 3" 150lb FF, ANSI B16.5/316L	D 15
Flange 3" 150lb FF, ANSI B16.5/ECTFE ⁵⁾	D 16
Flange 3" 150lb FF, ANSI B16.5/PFA ⁵⁾	D 17
Flange 3" 300lb RF, ANSI B16.5/316L	D 18
Flange 3" 300lb RF, ANSI B16.5/Hastelloy	D 20
Flange 3" 300lb RF, ANSI B16.5/ECTFE ⁵⁾	D 21
Flange 3" 300lb RF, ANSI B16.5/PFA ⁵⁾	D 22
Flange 3" 300lb RF, ANSI B16.5/Enamelled ⁶⁾	D 23
Flange 3" 600lb RF, ANSI B16.5/316L	D 24
Flange 3½" 150lb RF, ANSI B16.5/316L	D 25
Flange 3½" 150lb RF, ANSI B16.5/ECTFE ⁵⁾	D 26
Flange 4" 150lb RF, ANSI B16.5/316L	D 27
Flange 4" 150lb RF, ANSI B16.5/Hastelloy	D 28
Flange 4" 150lb RF, ANSI B16.5/ECTFE ⁵⁾	D 30
Flange 4" 150lb RF, ANSI B16.5/PFA ⁵⁾	D 31
Flange 4" 150lb RF, ANSI B16.5/Enamelled ⁶⁾	D 32
Flange 4" 150lb LT, ANSI B16.5/316L	D 33
Flange 4" 300lb RF, ANSI B16.5/316L	D 34
Flange 4" 300lb RF, ANSI B16.5/Hastelloy	D 35
Flange 4" 300lb RF, ANSI B16.5/ECTFE ⁵⁾	D 36
Flange 4" 300lb RJF, ANSI B16.5/316L	D 37
Flange 4" 300lb LG, ANSI B16.5/316L	D 38
Flange 4" 300lb LT, ANSI B16.5/316L	D 40
Flange 4" 600lb RF, ANSI B16.5/316L	D 41
Flange 4" 600lb RJF, ANSI B16.5/316L	D 42
Flange 5" 150lb RF, ANSI B16.5/316L	D 43
Flange 6" 150lb RF, ANSI B16.5/316L	D 44
Flange 6" 150lb RF, ANSI B16.5/Hastelloy	D 45
Flange 6" 150lb RF, ANSI B16.5/ECTFE ⁵⁾	D 46
Flange 6" 150lb RF, ANSI B16.5/PFA ⁵⁾	D 47
Flange 6" 150lb RJF, ANSI B16.5/316L	D 48
Flange 6" 300lb RF, ANSI B16.5/316L	D 50
Flange 8" 150lb RF, ANSI B16.5/316L	D 51
Flange 8" 150lb RF, ANSI B16.5/ECTFE ⁵⁾	D 52
Flange 1" BS.10 Table E/316L	D 53
Flange 1" BS.10 Table E/PFA ⁵⁾	D 54
Flange 1½" BS.10 Table E/316L	D 55
Flange 3½" BS.10 Table E/316L	D 56
Flange 4" BS.10 Table E/ECTFE ⁵⁾	D 57
Flange DN40 10K, JIS/316L	D 58
Flange DN50 10K, JIS/316L	D 60
Flange DN80 10K, JIS/316L	D 61
Flange DN100 10K, JIS/316L	D 62

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data

Order No.

SITRANS LVL200, Rigid extension

Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7 M L 5 7 4 7 -



Adapter/Process temperature

Without adapter/-50 ... 150 °C

1

With adapter/-50 ... 200 °C⁷⁾

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

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 ... 1000 mm

A 1

1001 ... 1500 mm

A 2

1501 ... 2000 mm

A 3

2001 ... 2500 mm

A 4

2501 ... 3000 mm

A 5

3001 ... 3500 mm

A 6

3501 ... 4000 mm

A 7

Rigid Extension ECTFE coated⁵⁾

80 ... 500 mm

B 0

501 ... 1000 mm

B 1

1001 ... 1500 mm

B 2

1501 ... 2000 mm

B 3

2001 ... 2500 mm

B 4

2501 ... 3000 mm

B 5

3001 ... 3500 mm

B 6

3501 ... 4000 mm

B 7

Rigid Extension PFA coated⁵⁾

80 ... 500 mm

C 0

501 ... 1000 mm

C 1

1001 ... 1500 mm

C 2

1501 ... 2000 mm

C 3

2001 ... 2500 mm

C 4

2501 ... 3000 mm

C 5

Rigid Extension 316L Ra ≤ 0.8 µm

80 ... 500 mm

D 0

501 ... 1000 mm

D 1

1001 ... 1500 mm

D 2

1501 ... 2000 mm

D 3

2001 ... 2500 mm

D 4

2501 ... 3000 mm

D 5

3001 ... 3500 mm

D 6

3501 ... 4000 mm

D 7

Rigid Extension 316L Ra ≤ 0.3 µm

80 ... 500 mm

E 0

501 ... 1000 mm

E 1

1001 ... 1500 mm

E 2

1501 ... 2000 mm

E 3

2001 ... 2500 mm

E 4

2501 ... 3000 mm

E 5

3001 ... 3500 mm

E 6

3501 ... 4000 mm

E 7

Selection and Ordering data

Order No.

SITRANS LVL200, Rigid extension

Compact vibrating level switch for use in liquid applications such as overflow, high, low and demand applications, as well as pump protection. For use in SIL-2 and hazardous applications.

7 M L 5 7 4 7 -



Rigid Extension Enamelled version⁶⁾

80 ... 250 mm

F 0

251 ... 500 mm

F 1

501 ... 750 mm

F 2

751 ... 1000 mm

F 3

1001 ... 1250 mm

F 4

1251 ... 1500 mm

F 5

Rigid Extension Hastelloy

80 ... 500 mm

G 0

501 ... 1000 mm

G 1

1001 ... 1500 mm

G 2

1501 ... 2000 mm

G 3

2001 ... 2500 mm

G 4

2501 ... 3000 mm

G 5

3001 ... 3500 mm

G 6

3501 ... 4000 mm

G 7

Rigid Extension Monel

80 ... 500 mm

H 0

501 ... 1000 mm

H 1

1001 ... 1500 mm

H 2

1501 ... 2000 mm

H 3

2001 ... 2500 mm

H 4

2501 ... 3000 mm

H 5

¹⁾ Available with Approval options A to G, and K, and Adapter/Process temperature options 1, and 3 to 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 and Extension options only

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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. 4000 mm (157.48")	Y01
Identification Label (measurement loop) SS: max. 16 characters add in plain text	Y17
Identification Label (measurement loop) Foil: max. 16 characters add in plain text	Y18
Acceptance test certificate 3.1 NACE MR 0775 for material EN10204	D07
Acceptance test certificate 3.1 for instrument	C12
Acceptance test certificate 2.2 for instrument	C14
Acceptance test Certificate 2.2 for material EN10204	C15
SIL/IEC61508 Certificate of conformity (SIL-2/3 min. and max. detection)	C20
Additional Operating Instructions	
<u>LVL 200 Extended (DPDT Relay)</u>	Order No.
• English	7ML1998-5KW01
• French	7ML1998-5KW11
• Spanish	7ML1998-5KW21
• German	7ML1998-5KW31
<u>LVL200 (Contactless electronic switch)</u>	
• English	7ML1998-5KV01
• French	7ML1998-5KV11
• Spanish	7ML1998-5KV21
• German	7ML1998-5KV31
<u>Electronics module LVL 200 Relay</u>	
• English	7ML1998-5LS01
• French	7ML1998-5LS11
• Spanish	7ML1998-5LS21
• German	7ML1998-5LS31
This device is shipped with the Siemens Milltronics manual CD containing the complete Operating Instructions library.	
Spare Parts	
Electronics module SITRANS LVL200 Relay	7ML1830-1NC
Lock fitting, unpressurized, G1A/316L	7ML1930-1DQ
Lock fitting, unpressurized, 1NPT/316L	7ML1930-1DR
Lock fitting, unpressurized, 1-1/2NPT/316L	7ML1930-1DS
Lock fitting, unpressurized, G1-1/2A/316L	7ML1930-1DT
Lock fitting, unpressurized, 1-1/2NPT/316L	7ML1930-1DU
Lock fitting, -1... 16 bar, G1A/316L	7ML1930-1DV
Lock fitting, -1... 16 bar, 1NPT/316L	7ML1930-1DW
Lock fitting, -1... 16 bar, G1-1/2A/316L	7ML1930-1DX
Lock fitting, -1... 16 bar, 1-1/2NPT/316L	7ML1930-1EA
Lock fitting, -1... 64 bar, G1A/316L	7ML1930-1EB
Lock fitting, -1... 64 bar, 1NPT/316L	7ML1930-1EC
Lock fitting, -1... 64 bar, G1-1/2A/316L	7ML1930-1ED

Level Measurement

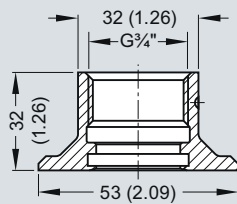
Point level measurement - Vibrating switches

SITRANS LVL200

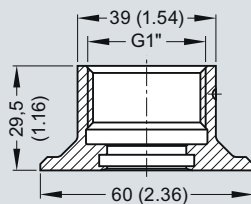
Options

LVL200 Threaded Welded Socket

G $\frac{3}{4}$ " A/316L

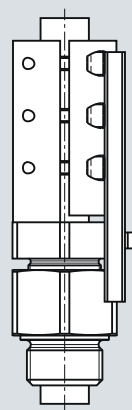


G1" A/316L

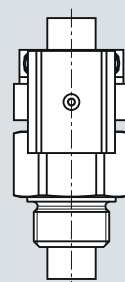


Lock fitting

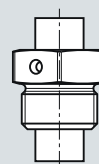
LVL200 Extended
64 bar



LVL200 Extended
16 bar



LVL200 Extended
Unpressurized



SITRANS LVL200 welded socket and lock fitting, dimensions in mm (inch)

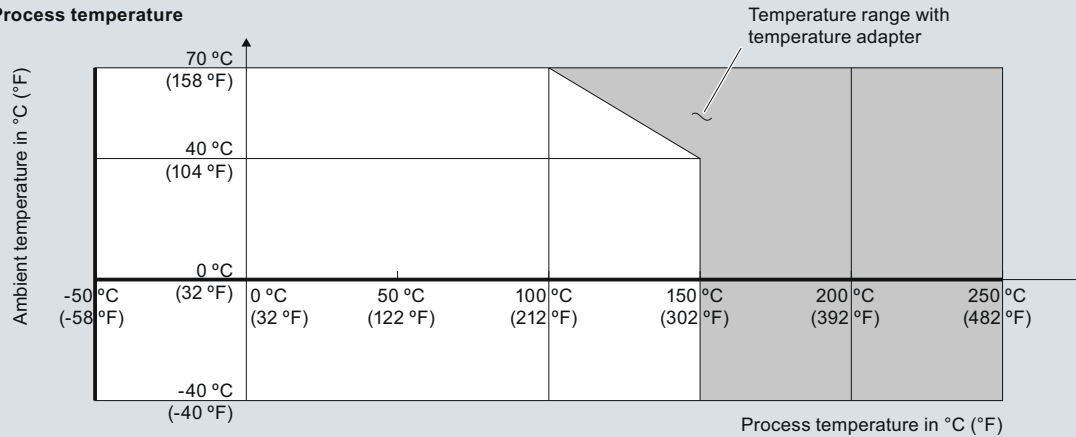
Level Measurement

Point level measurement - Vibrating switches

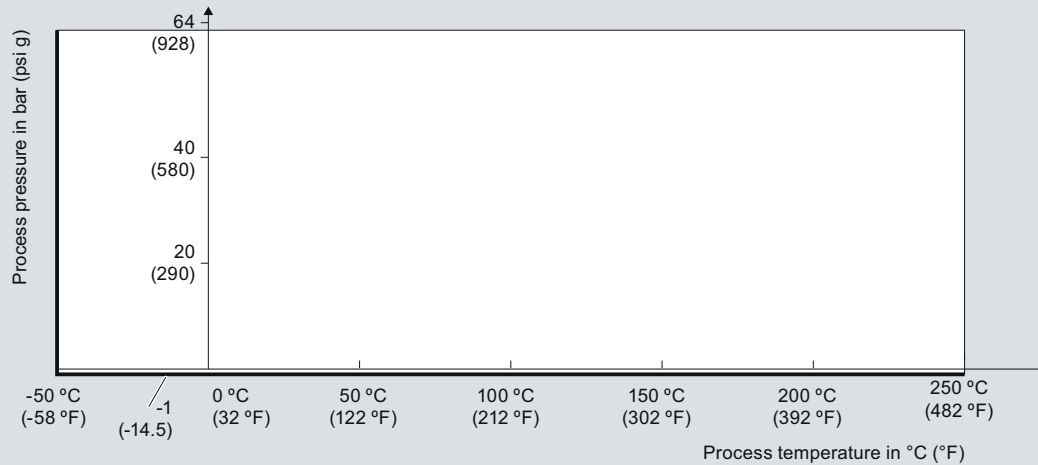
SITRANS LVL200

Characteristic curves

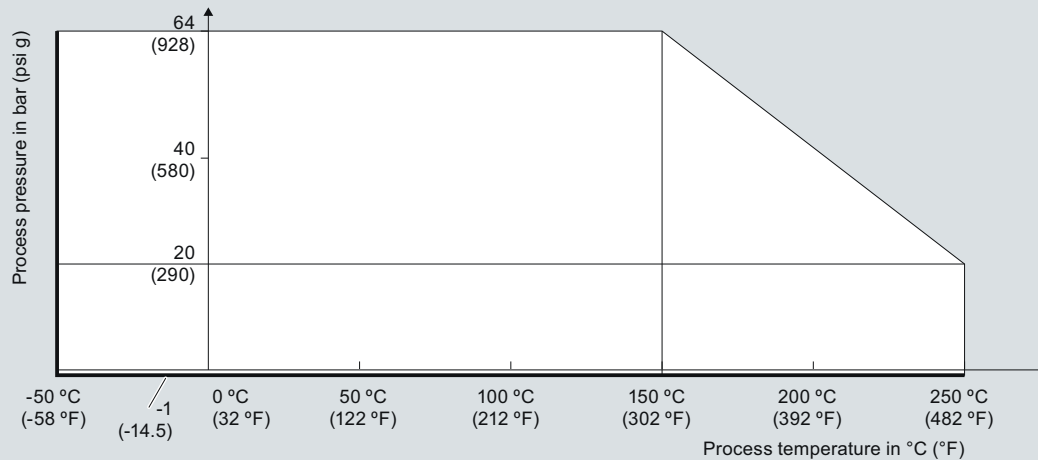
Ambient/Process temperature



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

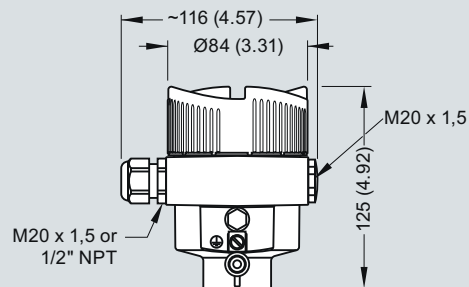
Level Measurement

Point level measurement - Vibrating switches

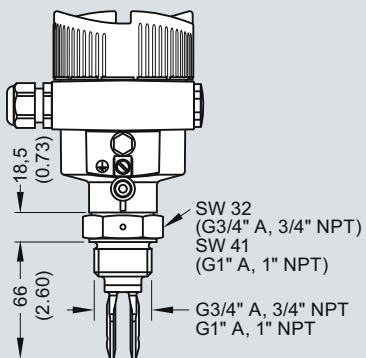
SITRANS LVL200

Dimensional drawings

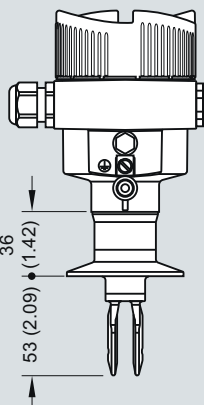
SITRANS LVL200 (Standard)



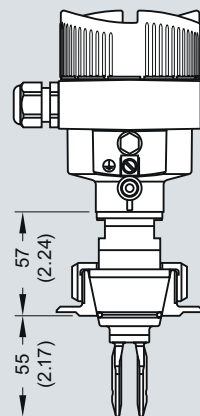
Threaded



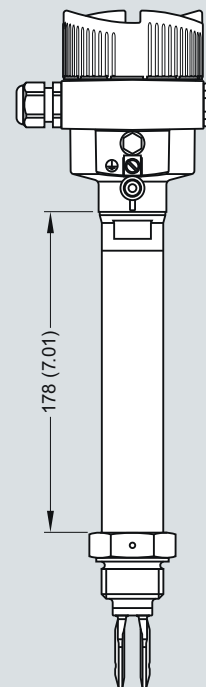
Tri-Clamp



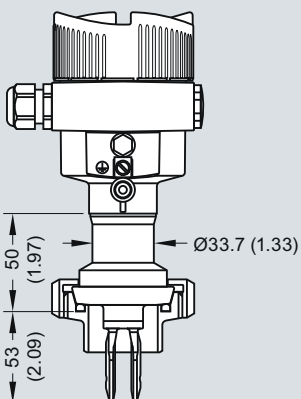
Cone DN25



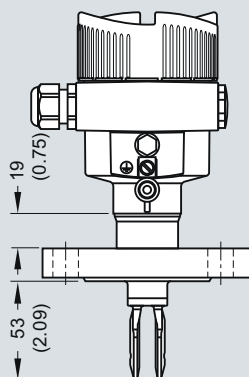
Temperature adapter



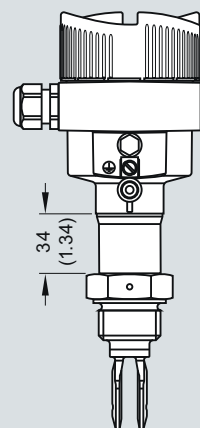
Bolting DN 40



Flange



Gas-tight leadthrough



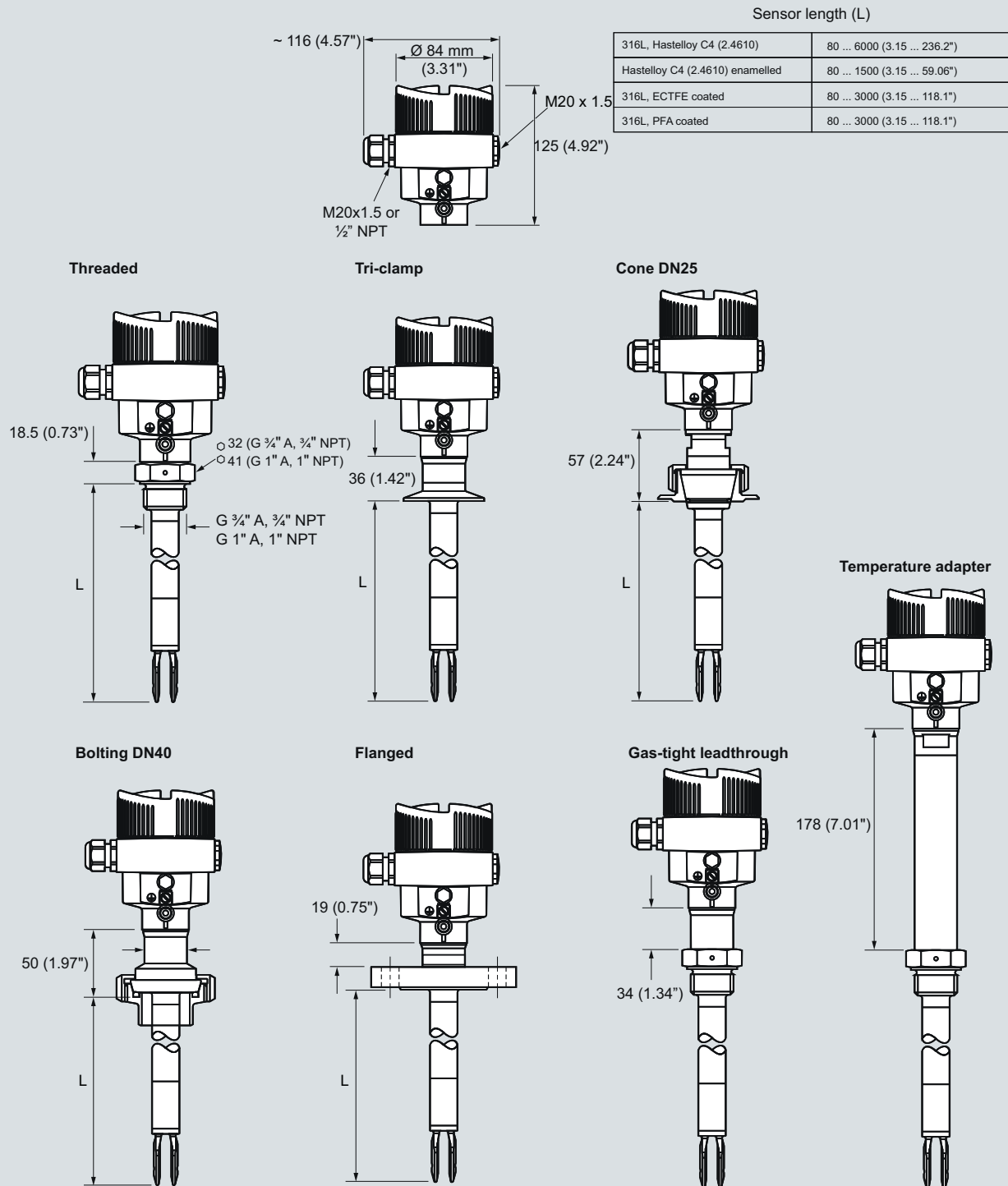
SITRANS LVL200 (Standard), dimensions in mm (inch)

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

SITRANS LVL200 (Extended)



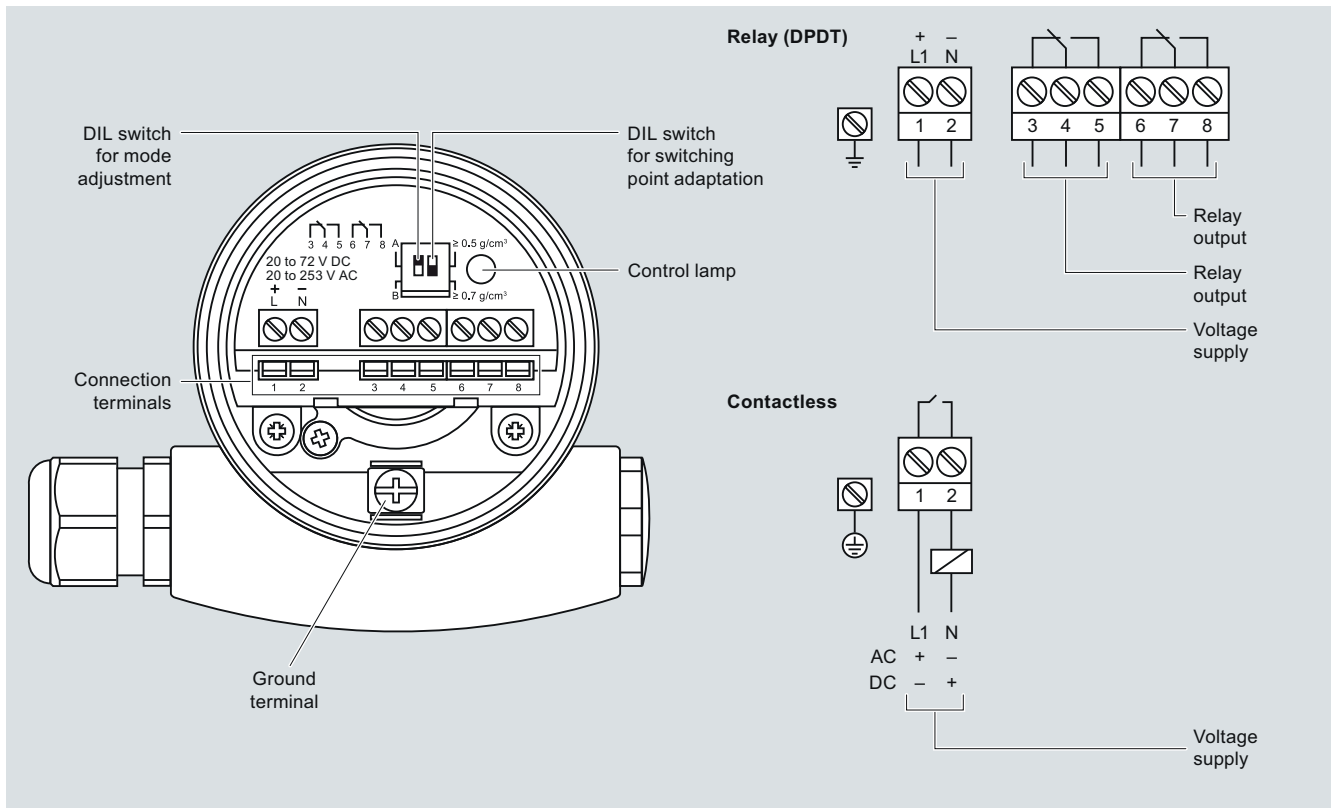
SITRANS LVL200 (Extended), dimensions in mm (inch)

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVL200

Schematics



SITRANS LVL200 connections

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVS100

Overview



SITRANS LVS100 is a vibrating point level switch for bulk solids.

Benefits

- High resistance to mechanical forces
- Strong resistance to external vibrations
- Rotatable enclosure for ease of installation and wiring
- Suitable for point level detection of materials starting at a bulk density of 60 g/l (3.8 lb/ft³)
- Customer desired extensions up to 2000 mm (78.74")

Application

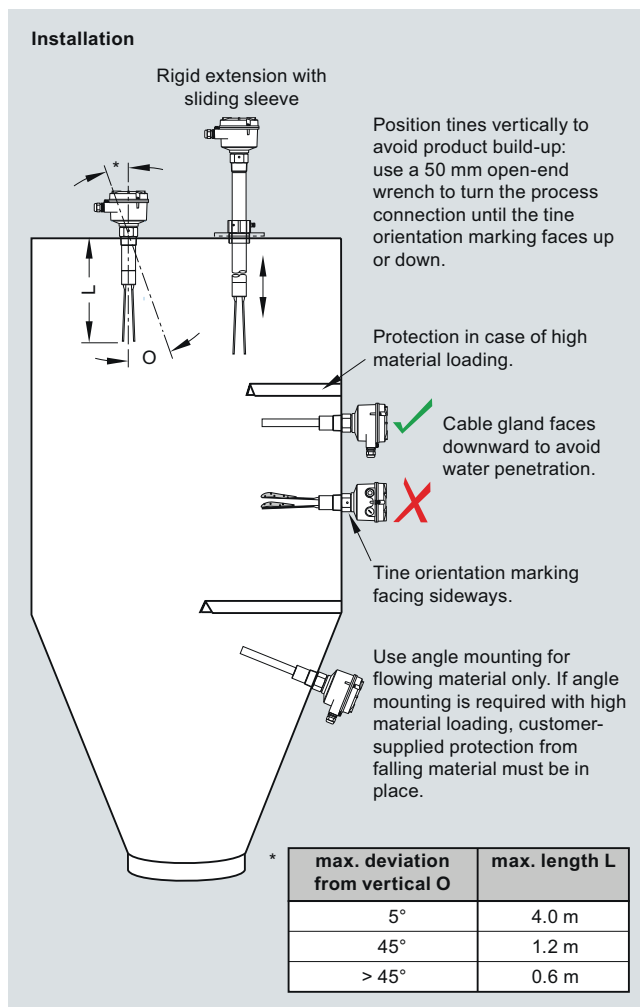
SITRANS LVS100 detects high, low or demand levels of dry bulk solids in bins, silos or hoppers.

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



SITRANS LVS100 installation

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVS100

Technical specifications

Mode of Operation		Power supply	• 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA • 19 ... 50 V DC, +10 %, 1.5 W
Measuring principle	Vibrating point level switch	Certificates and approvals	• CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • C-TICK • ATEX II 1/2 D
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 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		
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 catagory	III		
• Pollution degree	2		
Medium conditions			
• Process temperature	-40 ... +150 °C (-40 ... +302 °F)		
• Max. threaded bushing temperature	+80 °C (+176 °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. 60 g/l (3.8 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")] • 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 lbs)		

Level Measurement

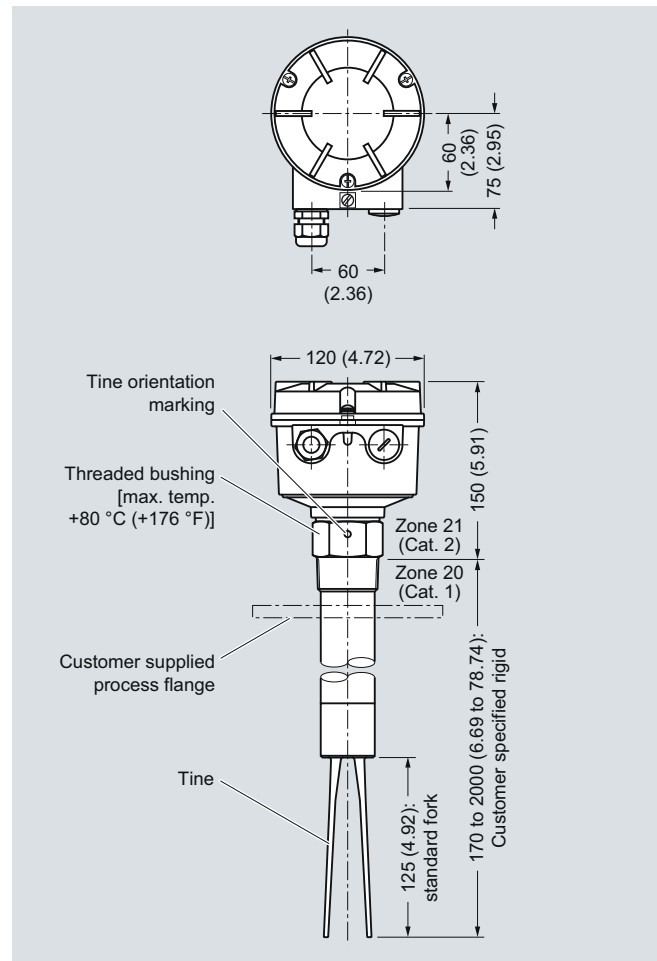
Point level measurement - Vibrating switches

SITRANS LVS100

Selection and Ordering data	Order No.
SITRANS LVS100, standard Vibrating point level switch for high or low level detection of bulk solids Sensitivity > 60 g/l.	7ML5735-
Input Voltage DPDT Relay - 19 ... 230 V AC, 19 ... 50 V DC	1
Process temperature up to +150 °C (+302 °F)	A
Process connection Threaded R 1½" [(BSPT), EN 10226] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve - min. length 500 mm (19.69") 1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]	A B C D
Extension length <u>Stainless steel 316Ti (1.4571)</u> Standard length, 170 mm (6.69") <u>Add order code Y01 and plain text:</u> "Insertion length ... mm" <u>Stainless steel 304 (1.4301)</u> • 300 ... 500 mm (11.81 ... 19.69") • 501 ... 1000 mm (19.72 ... 39.37") • 1001 ... 1500 mm (39.41 ... 59.06") • 1501 ... 2000 mm (59.09 ... 78.74")	11 12 13 14 15
Approvals CSA/FM General Purpose, CE, C-TICK CSA/FM Class II, Div. 1, Group E,F, G, Class III, ATEX II 1/2 D, C-TICK	A B

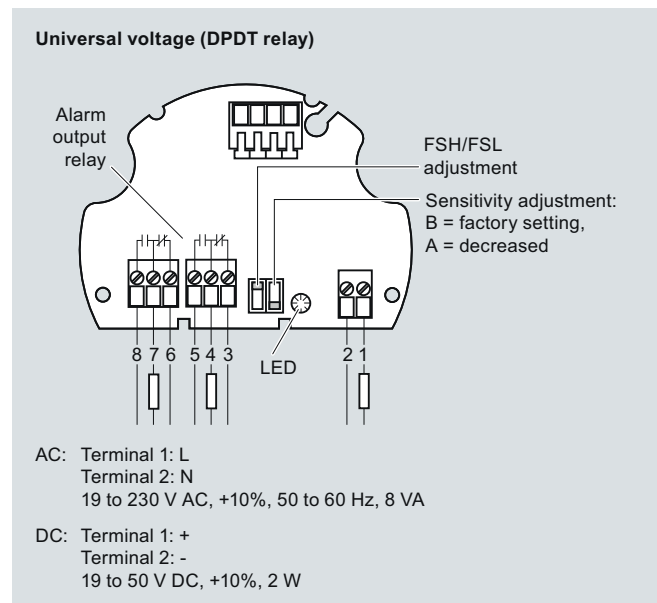
Selection and Ordering data	Order code
Further Designs Please add "-Z" to Order No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 2000 mm (78.74")	Y01
Signal bulb inserted in M20 cable gland	A20
Operating Instructions Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. 7ML1998-5FT63
Spare Parts Replacement Electronics Module LVS100 DPDT Relay (19 to 253 V AC, 19 to 55 V DC) R 1½" [(BSPT), EN 10226] DIN 2999 thread, sliding sleeve 1½" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]	7ML1830-1NS 7ML1830-1NT 7ML1830-1NU

Dimensional drawings



SITRANS LVS100, dimensions in mm (inch)

Schematics



SITRANS LVS100 connections

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVS200

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
- Suitable for low density material: standard version, 20 g/l (1.3 lb/ft³); liquid/solid interface version, 50 g/l (3 lb/ft³), and low density option min. 5 g/l (0.3 lb/ft³)
- Customer desired extensions up to 20000 mm (787")
- Optional detection of solids within liquid
- Durable short fork option with 165 mm (6.5") 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" pipe.

SITRANS LVS200 has an optional 4 to 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)

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 Cutoff 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 to 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

Level Measurement

Point level measurement - Vibrating switches

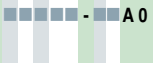
SITRANS LVS200

Medium conditions		Selection and Ordering data	Order No.
- Process temperature - Max. threaded bushing temperature - Max. enclosure surface temperature (Category 2D) - Max. extension surface temperature (Category 1D) - Pressure (vessel) - Minimum material density	- 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	SITRANS LVS200, standard SITRANS LVS200 is a vibrating point level switch for high, low or demand level detection of bulk solids.	7ML5731-  A0
	+80 °C (+176 °F)	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) ¹⁾ 18 ... 50 V DC PNP ¹⁾	1 2 3
	+90 °C (+194 °F)	19 ... 230 V AC/DC without contact, 2-wire loop powered ¹⁾ 7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ²⁾ 8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ³⁾	4 5 6
	+150 °C (+302 °F)	19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT) basic version ^{4) 5)}	7
	Max. 10 bar g (145 psi g) European Pressure Directive 97/23/EC: Category 1 • 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)	Process temperature Without temperature isolator With temperature isolator Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process +180 °C (+356 °F)/ max. temperature electronics +80 °C (+176 °F)] Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process +180 °C (+356 °F)/ max. temperature electronics +80 °C (+176 °F)]	A B C D
Design		Process connection	
Material		Threaded	
Enclosure		R 1½" [(BSPT), EN 10226] 1½" NPT [(Taper), ANSI/ASME B1.20.1] G 2" [(BSPP), EN ISO 228-1], sliding sleeve [min. length 500 mm (19.69")] ⁶⁾	
Process connection		2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")] ⁶⁾ Flanged DN 100 PN 6, EN1092-1 (1.4541/321) DN 100 PN 16, EN1092-1 (1.4541/321)	
Tine material		2" ASME 150 lbs B16.5 (1.4541/321) 3" ASME 150 lbs B16.5 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321) Tri-clamp 2" Stainless steel 304 (1.4301) ⁷⁾	
Degree of protection		Extension length	
Conduit entry		Stainless steel 304 (1.4301) Standard length, 235 mm (9.25") ⁸⁾	
Weight		Add order code Y01 and plain text: "Insertion length ... mm"	
Power supply		• 300 ... 500 mm (11.81 ... 19.69") ⁸⁾ • 501 ... 750 mm (19.72 ... 29.53") ⁸⁾ • 751 ... 1000 mm (29.57 ... 39.37") ⁸⁾ • 1001 ... 1250 mm (39.41 ... 49.21") ⁸⁾ • 1251 ... 1500 mm (49.25 ... 59.06") ⁸⁾ • 1501 ... 1750 mm (59.09 ... 68.90") ⁸⁾ • 1751 ... 2000 mm (68.94 ... 78.74") ⁸⁾ • 2001 ... 2250 mm (78.78 ... 88.58") ⁸⁾ • 2251 ... 2500 mm (88.62 ... 98.43") ⁸⁾ • 2501 ... 2750 mm (98.46 ... 108.27") ⁸⁾ • 2751 ... 3000 mm (108.31 ... 118.11") ⁸⁾ • 3001 ... 3250 mm (118.15 ... 127.95") ⁸⁾ • 3251 ... 3500 mm (127.99 ... 137.80") ⁸⁾ • 3501 ... 3750 mm (137.83 ... 147.64") ⁸⁾ • 3751 ... 4000 mm (147.68 ... 157.48") ⁸⁾	
Certificates and approvals		• 19 ... 230 V AC, +10 %, 50 ... 60 Hz, 8 VA • 19 ... 55 V DC, +10 %, 1.5 W	
		• CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • C-TICK • 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 Ex ia IIC; ATEX II 1D and 1/2 D, available only with power supply option 5	

5

Level Measurement

SITRANS LVS200

Selection and Ordering data		Order No.	Selection and Ordering data		Order code
SITRANS LVS200, standard SITRANS LVS200 is a vibrating point level switch for high, low or demand level detection of bulk solids.		7 ML 5 7 3 1 - 	Future Designs Please add "-Z" to Order No. and specify Order code(s).		
Stainless Steel 316TI (1.4571)			Total insertion length: Enter the total insertion length in plain text description, max. 2000 mm (78.74")		Y01
Standard length, 235 mm (9.25") ⁹⁾		3 1	Enhanced sensitivity > 5 g/l via electronics and increased fork length to 195 mm (7.68")		K05
<u>Add order code Y01 and plain text:</u> "Insertion length ... mm"			Enhanced sensitivity < 5 g/l via electronics, increased fork length to 195 mm (7.68"), and increased aluminum fork width (available only with universal voltage, SPDT, CE/FM and CSA General Purpose approvals)		G01
300 ... 500 mm (11.81 ... 19.69") ⁹⁾		3 2	Signal bulb inserted in M20 cable gland ¹⁾		A20
501 ... 750 mm (19.72 ... 29.53") ⁹⁾		3 3	NAMUR 8/16 mA switch amplifiers		A15
751 ... 1000 mm (29.57 ... 39.37") ⁹⁾		3 4	Operating Instructions Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.		Order No. 7ML1998-5FT62
1001 ... 1250 mm (39.41 ... 49.21") ⁹⁾		3 5	Spare Parts Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]		7ML1830-1KL
1251 ... 1500 mm (49.25 ... 59.06") ⁹⁾		3 6	Sliding sleeve, 2" BSP (ISO 228)		7ML1830-1JM
1501 ... 1750 mm (59.09 ... 68.90") ⁹⁾		3 7	Sliding sleeve, 2" NPT [(Taper), ANSI/ASME B1.20.1]		7ML1830-1JN
1751 ... 2000 mm (68.94 ... 78.74") ⁹⁾		3 8	Available ex stock 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
2001 ... 2250 mm (78.78 ... 88.58") ⁹⁾		4 1	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
2251 ... 2500 mm (88.62 ... 98.43") ⁹⁾		4 2			
2501 ... 2750 mm (98.46 ... 108.27") ⁹⁾		4 3			
2751 ... 3000 mm (108.31 ... 118.11") ⁹⁾		4 4			
3001 ... 3250 mm (118.15 ... 127.95") ⁹⁾		4 5			
3251 ... 3500 mm (127.99 ... 137.80") ⁹⁾		4 6			
3501 ... 3750 mm (137.83 ... 147.64") ⁹⁾		4 7			
3751 ... 4000 mm (147.68 ... 157.48") ⁹⁾		4 8			
Material process connection/extension					
Stainless steel 304 (1.4301) ▶		1			
Stainless steel 316 TI (1.4571)		2			
Approvals					
CSA/FM Dust Ignition Proof, C-TICK ▶		A			
ATEX II 1/2 D, C-TICK ▶		B			
CSA/FM General Purpose, C-TICK		C			
CE, C-TICK		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, C-TICK ¹⁰⁾		E			
ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, C-TICK		F			
1) Available with approval options C and D only					
▶ Available ex stock.					

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVS200

Selection and Ordering data	Order No.
SITRANS LVS200, short fork for liquids/solids interface	7 ML 5 7 3 2 -
Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements	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
8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ²⁾	5
Process temperature	
Without temperature isolator	A
With temperature isolator	B
Separated enclosure - cable length 1.5 m (4.92 ft) [max. temperature process +180 °C (+356 °F)/max. temperature electronics +80 °C (+176 °F)]	C
Separated enclosure - cable length 4.0 m (13.12 ft) [max. temperature process +180 °C (+356 °F)/max. temperature electronics +80 °C (+176 °F)]	D
Process connection	
<u>Threaded</u>	
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")]	C
2" NPT [(Taper), ANSI/ASME B1.20.1], sliding sleeve [min. length 500 mm (19.69")]	D
<u>Flanged</u>	
DN 100 PN 6, EN1092-1 (1.4541/321)	E
DN 100 PN 16, EN1092-1 (1.4541/321)	F
2" ASME 150 lbs B16.5 (1.4541/321)	G
3" ASME 150 lbs B16.5 (1.4541/321)	H
4" ASME 150 lbs B16.5 (1.4541/321)	J
Extension length	
<u>Stainless steel 304 (1.4301)³⁾</u>	
Standard length, 165 mm (6.50") ³⁾	11
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
200 ... 500 mm (7.87 ... 19.69") ³⁾	12
501 ... 750 mm (19.72 ... 29.53") ³⁾	13
751 ... 1000 mm (29.57 ... 39.37") ³⁾	14
1001 ... 1250 mm (39.41 ... 49.21") ³⁾	15
1251 ... 1500 mm (49.25 ... 59.06") ³⁾	16
1501 ... 1750 mm (59.09 ... 68.90") ³⁾	17
1751 ... 2000 mm (68.94 ... 78.74") ³⁾	18
2001 ... 2250 mm (78.78 ... 88.58") ³⁾	21
2251 ... 2500 mm (88.62 ... 98.43") ³⁾	22
2501 ... 2750 mm (98.46 ... 108.27") ³⁾	23
2751 ... 3000 mm (108.31 ... 118.11") ³⁾	24
3001 ... 3250 mm (118.15 ... 127.95") ³⁾	25
3251 ... 3500 mm (127.99 ... 137.80") ³⁾	26
3501 ... 3750 mm (137.83 ... 147.64") ³⁾	27
3751 ... 4000 mm (147.68 ... 157.48") ³⁾	28
<u>Stainless Steel 316Ti (1.4571)</u>	
Standard length, 165 mm (6.50") ⁴⁾	31
<u>Add order code Y01 and plain text: "Insertion length ... mm"</u>	
200 ... 500 mm (7.87 ... 19.69") ⁴⁾	32
501 ... 750 mm (19.72 ... 29.53") ⁴⁾	33
751 ... 1000 mm (29.57 ... 39.37") ⁴⁾	34

Selection and Ordering data	Order No.
SITRANS LVS200, short fork for liquids/solids interface	7 ML 5 7 3 2 -
Vibrating point level switch for solids or solids within liquid interface applications, and high load applications with short insertion requirements	A 0
1001 ... 1250 mm (39.41 ... 49.21") ⁴⁾	35
1251 ... 1500 mm (49.25 ... 59.06") ⁴⁾	36
1501 ... 1750 mm (59.09 ... 68.90") ⁴⁾	37
1751 ... 2000 mm (68.94 ... 78.74") ⁴⁾	38
2001 ... 2250 mm (78.78 ... 88.58") ⁴⁾	41
2251 ... 2500 mm (88.62 ... 98.43") ⁴⁾	42
2501 ... 2750 mm (98.46 ... 108.27") ⁴⁾	43
2751 ... 3000 mm (108.31 ... 118.11") ⁴⁾	44
3001 ... 3250 mm (118.15 ... 127.95") ⁴⁾	45
3251 ... 3500 mm (127.99 ... 137.80") ⁴⁾	46
3501 ... 3750 mm (137.83 ... 147.64") ⁴⁾	47
3751 ... 4000 mm (147.68 ... 157.48") ⁴⁾	48
Material process connection/extension	
Stainless steel 304 (1.4301)	1
Stainless steel 316 Ti (1.4571)	2
Approvals	
CSA/FM Dust Ignition Proof, C-TICK	A
ATEX II 1/2 D, C-TICK	B
CSA/FM General Purpose, C-TICK	C
CE, C-TICK	D
1) Available with approval options B, C, D only	
2) Available with approval option D only	
3) Available with material process connection/extension option 1 only	
4) Available with material process connection/extension option 2 only	

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Order No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48")	Y01
Signal bulb inserted in M20 cable gland ¹⁾	A20
Operating Instructions	Order No.
Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	7ML1998-5FT62
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 [(Taper), ANSI/ASME B1.20.1]	7ML1830-1JN

1) Available with approval options C and D only

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVS200

Selection and Ordering data

SITRANS LVS200, pipe extension

Vibrating point level switch for high or low levels of bulk solids
Extended using 1" pipe extension (customer supplied)

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)¹⁾

18 ... 50 V DC PNP¹⁾

19 ... 230 V AC/DC without contact, 2-wire loop powered¹⁾

7 ... 9 V DC (requires NAMUR switch amplifier)

NAMUR IEC 60947-5-6, 2-wire²⁾ 3)

8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire⁴⁾

Process temperature

Up to +150 °C (+302 °F)

Process connection

Threaded

R 1½" [(BSPT), EN 10226]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

Flanged

DN 100 PN 6, EN1092-1 (1.4541/321)

DN 100 PN 16, EN1092-1 (1.4541/321)

2" ASME 150 lbs B16.5 (1.4541/321)

3" ASME 150 lbs B16.5 (1.4541/321)

4" ASME 150 lbs B16.5 (1.4541/321)

Process connection material

Stainless steel 304 (1.4301)

Stainless steel 316 TI (1.4571)

Extension length

Customer supplied 1" pipe extension

Length: 300 ... 3800 mm (11.81 ... 149.61")

Application type

Dry bulk solids (125 Hz)

Liquids/solids interface (350 Hz)

Approvals

CSA/FM Dust Ignition Proof, C-TICK

ATEX II 1/2 D, C-TICK

CSA/FM General Purpose, C-TICK

CE, C-TICK

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, C-TICK⁵⁾

ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and

1/2D, C-TICK⁵⁾

¹⁾ Available with approval options A to D only

²⁾ Available with application type 1 only

³⁾ Available with approval option E and F only

⁴⁾ Available with approval option D only

⁵⁾ Available with power supply option 5 only

Order No.

7ML 5 7 3 3 -

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Selection and Ordering data

Further Designs

Please add "-Z" to Order No. and specify Order code(s).

Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48")

Enhanced sensitivity > 5 g/l via electronics and increased fork length ... 195 mm (7.68")

Signal bulb inserted in M20 cable gland¹⁾

NAMUR 8/16 mA switch amplifiers

Operating Instructions

Multi-language

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Spare Parts

Replacement Electronics Module (125 Hz)
[19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]

Replacement Electronics Module (350 Hz)
[19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]

¹⁾ Available with approval options C and D only

Order code

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVS200

Selection and Ordering data	Order No.
SITRANS LVS200, cable extended Vibrating point level switch for high or low level detection of bulk solids materials	7ML5734 - A 0
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) ¹⁾ 18 ... 50 V DC PNP ¹⁾ 19 ... 230 V AC/DC without contact, 2-wire loop powered ¹⁾ 7 ... 9 V DC (requires NAMUR switch amplifier) NAMUR IEC 60947-5-6, 2-wire ^{2) 3)} 8/16 mA or 4 ... 20 mA; 12.5 ... 35 V DC, 2-wire ⁴⁾	1 2 3 4 5 6
Process temperature Up to +80 °C (+176 °F)	A
Process connection <u>Threaded</u> R 1½" [(BSPT), EN 10226] 1½" NPT [(Taper), ANSI/ASME B1.20.1] <u>Flanged</u> DN 100 PN 6, EN1092-1 (1.4541/321) DN 100 PN 16, EN1092-1 (1.4541/321) 2" ASME 150 lbs B16.5 (1.4541/321) 3" ASME 150 lbs B16.5 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	A B C D E F G
Extension length 700 ... 1000 mm (19.7 ... 39.4") [max. length 20000 mm (787.4"), not with Power supply option 5 (max. 10000 mm, 393.7")] <u>Add order code Y01 and plain text:</u> <u>"Insertion length ... mm"</u> 1001 ... 2000 mm (39.41 ... 78.74") 2001 ... 3000 mm (78.78 ... 118.11") 3001 ... 4000 mm (118.15 ... 157.48") 4001 ... 5000 mm (157.52 ... 196.85") 5001 ... 6000 mm (196.89 ... 236.22") 6001 ... 7000 mm (236.26 ... 275.59") 7001 ... 8000 mm (275.63 ... 314.96") 8001 ... 9000 mm (315 ... 354.33") 9001 ... 10000 mm (354.37 ... 393.70") 10001 ... 11000 mm (393.74 ... 433.07") 11001 ... 12000 mm (433.11 ... 472.44") 12001 ... 13000 mm (472.48 ... 511.81") 13001 ... 14000 mm (511.85 ... 551.18") 14001 ... 15000 mm (551.22 ... 590.55") 15001 ... 16000 mm (590.59 ... 629.92") 16001 ... 17000 mm (629.96 ... 669.29") 17001 ... 18000 mm (669.33 ... 708.66") 18001 ... 19000 mm (708.70 ... 748.03") 19001 ... 20000 mm (748.07 ... 787.40")	10 11 12 13 14 15 16 17 18 20 21 22 23 24 25 26 27 28 30 31
Application type Dry bulk solids (125 Hz) Liquid/solids interface (350 Hz) ⁵⁾	1 2

Selection and Ordering data	Order 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, C-TICK ATEX II 1/2 D, C-TICK CSA/FM General Purpose, C-TICK CE, C-TICK 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, C-TICK ⁶⁾ ATEX II 1G and 1/2G Eex ia IIC; ATEX II 1D and 1/2D, C-TICK ⁶⁾	A B C D E F
¹⁾ Available with approval options A to D only ²⁾ Available with approval options E and F only ³⁾ Cable length is limited to 10000 mm (393.70") ⁴⁾ Available with approval option D only ⁵⁾ Cable length is limited to 7000 mm (275.59") ⁶⁾ Available with power supply option 5 and application type 1 only	

Selection and Ordering data	Order code
Further Designs Please add "-Z" to Order No. and specify Order code(s). Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48") Enhanced sensitivity > 5 g/l via electronics and increased fork length to 195 mm (7.68") Signal bulb inserted in M20 cable gland ¹⁾ NAMUR 8/16 mA switch amplifiers	 Y01 K05 A20 A15
Operating Instructions Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. 7ML1998-5FT62
Spare Parts Replacement Electronics Module (125 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)] Replacement Electronics Module (350 Hz) [19 ... 230 V AC, 19 ... 55 V DC, one relay output (SPDT)]	7ML1830-1KL 7ML1830-1KM
¹⁾ Available with approval options C and D only	

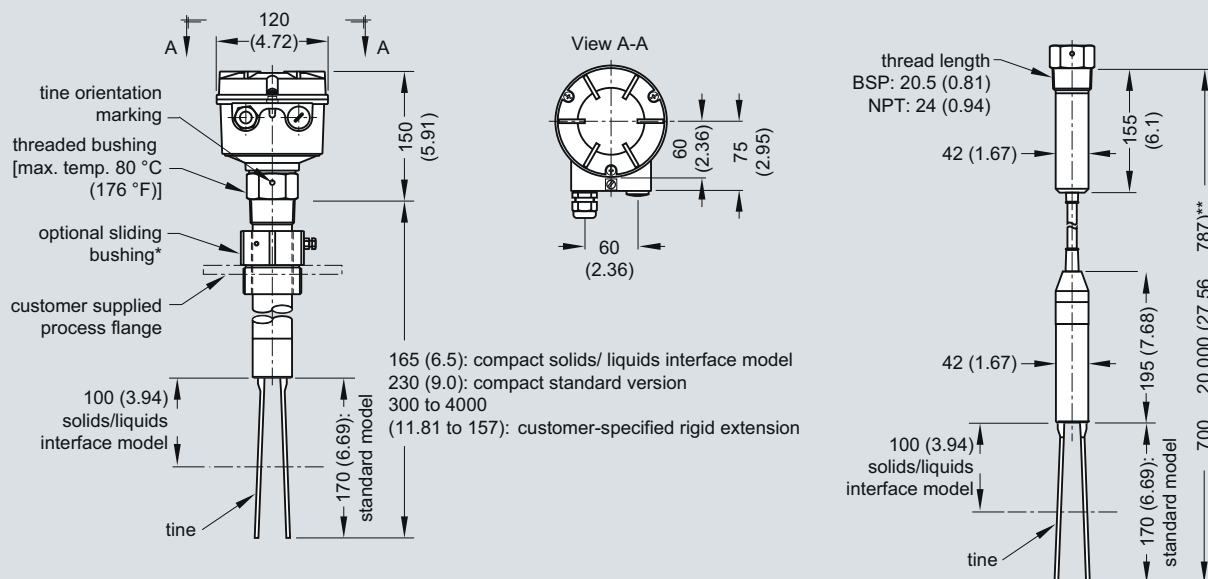
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Level Measurement

Point level measurement - Vibrating switches

SITRANS LVS200

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 7000 mm (275.59")

Cable version with NAMUR electronics length to 10 000 mm (393.7") tightened to 10 Nm.

See drawing 23650563 for pipe extended version details. (Pipe is customer supplied.)

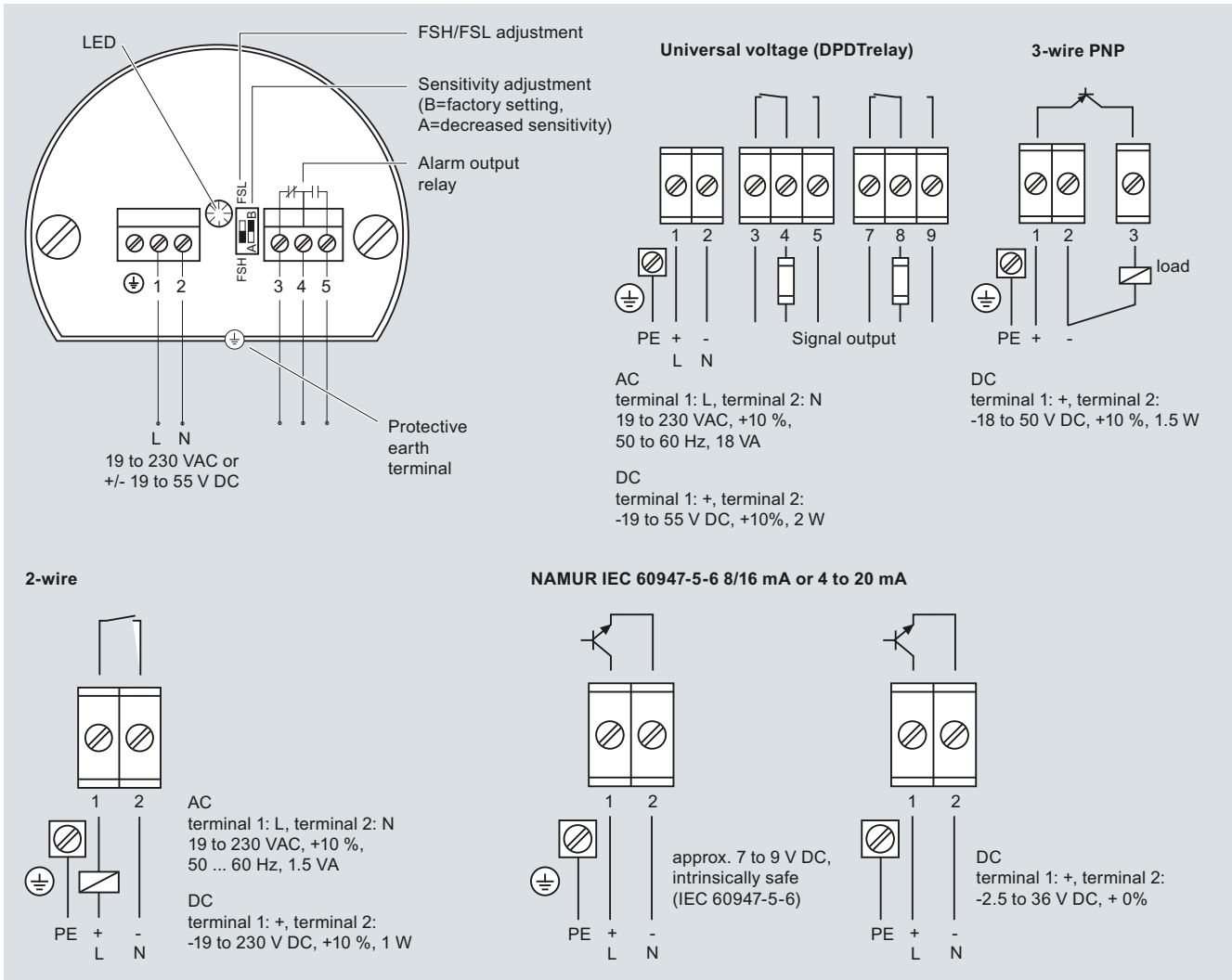
SITRANS LVS200, dimensions in mm (inch)

Level Measurement

Point level measurement - Vibrating switches

SITRANS LVS200

Schematics



SITRANS LVS200 connections

Level Measurement

Point level measurement - Rotating paddle switch

SITRANS LPS200

Overview



SITRANS LPS200 is a rotary paddle switch for point level 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
- Rotatable enclosure
- Optional paddle for use with low density materials
- Simple installation through existing process connection
- High temperature model and optional extension kit available
- Optional fail-safe configuration

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/ft³) with the optional rectangular vane or 100 g/l (6.25 lb/ft³) 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	• Microswitch 5 A at 250 V AC, non inductive • Microswitch SPDT contact 4 A at 30 V DC, non-inductive • Standard (1 rpm model): approx 1.3 seconds • Optional process applications (5 rpm model): approx. 0.26 seconds
• Alarm output	
• Pickup delay	
Sensitivity	Adjustable via reset force of spring or geometry of measuring vane
Rated operating conditions	
Installation conditions	Indoor/outdoor
• Location	
Ambient conditions	
• Ambient temperature	-25 ... +60 °C (-13 ... +140 °F)
• Installation category	III
• Pollution degree	2
Medium conditions	Bulk solids
• Temperature	-25 ... +80 °C (-13 ... +176 °F)
- Standard	
- Optional	-25 ... +350 °C (-13 ... +662 °F)
• Pressure (vessel)	Max. 0.5 bar g (7.25 psi g)
- Standard	
- Optional	Max. 10 bar g (145 psi g)
• Minimum material density	• Can detect down to 100 g/l (6.25 lb/ft³) • Can detect down to 15 g/l (2.19 lb/ft³)
- Standard measuring vane	
- Optional measuring vane	
Design	
Material	Epoxy coated aluminum
• Enclosure	
• 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
Certificates and approvals	
• CSA/FM General Purpose • CE • CSA/FM Dust Ignition Proof • ATEX II 1/2 D • C-TICK	

Level Measurement

Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data	Order No.
SITRANS LPS200, compact Rotary paddle switch for level detection in bulk solids. Compact design for side or top mounted applications.	7ML 5 7 2 5 - - - - - - 0
Process temperature Up to +80 °C (+176 °F) Up to +150 °C (+302 °F) Up to +250 °C (+482 °F) Up to +350 °C (+662 °F) ¹⁾ Up to +80 °C (+176 °F) basic version aluminum ^{2) 3)} Up to +80 °C (+176 °F) basic version stainless steel ^{2) 4)}	1 2 3 4 5 6
Power supply 230 V AC, 1 rev/min. 230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min. 230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min. 115 V AC, 1 rev/min., fail-safe 115 V AC, 5 rev/min. 115 V AC, 5 rev/min., fail-safe 48 V AC, 1 rev/min. 24 V AC, 1 rev/min. 24 V DC, 1 rev/min. 24 V DC, 1 rev/min., fail-safe 24 V DC, 5 rev/min. 24 V DC, 5 rev/min., fail-safe Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min. Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.	A B C D E F G H J K L M N P Q R
Process connection <u>Threaded</u> G 1¼" [(BSPP), EN ISO 228-1] G 1" [(BSPP), EN ISO 228-1] G 1½" [(BSPP), EN ISO 228-1] 1" NPT [(Taper), ANSI/ASME B1.20.1] 1¼" NPT [(Taper), ANSI/ASME B1.20.1] 1½" NPT [(Taper), ANSI/ASME B1.20.1] <u>Flanged</u> DN 32 PN 6, EN1092-1 (1.4541/321) DN 100 PN 6, EN1092-1 (1.4541/321) DN 100 PN 16, EN1092-1 (1.4541/321) 2" ASME 150 lbs B16.5 (1.4541/321) 3" ASME 150 lbs B16.5 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	A B C D E F G H J K L M
Process pressure Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)	1 2 3
Process connection material Aluminum ⁵⁾ Stainless steel 303 (1.4305)	1 2
Extension length 100 mm (3.94") ⁶⁾ 150 mm (5.91") 200 mm (7.87") 250 mm (9.84") 300 mm (11.81")	1 2 3 4 5

Selection and Ordering data	Order No.
SITRANS LPS200, compact Rotary paddle switch for level detection in bulk solids. Compact design for side or top mounted applications.	7ML 5 7 2 5 - - - - - - 0
Measuring vane Boot shaped, 35 x 106 mm (1.38 x 4.17") ⁷⁾ Hinged vane, 65 x 210 mm (2.56 x 8.27") ^{7) 8)} Boot shaped, 28 x 98 mm (1.10 x 3.86") Rectangular 50 x 150 mm (1.97 x 5.91") ⁹⁾ Rectangular 50 x 250 mm (1.97 x 9.84") ⁹⁾ Rectangular 98 x 150 mm (3.86 x 5.91") ⁹⁾ Rectangular 98 x 250 mm (3.86 x 9.84") ⁹⁾	A B C D E F G
Approvals CSA/FM Dust Ignition Proof, C-TICK ATEX II 1/2 D, C-TICK CSA/FM General Purpose, C-TICK CE, C-TICK	A B C D
¹⁾ Available with approval option C and D only, up to max. 0.8 bar ²⁾ Basic version is cost effective and offers fast delivery ³⁾ Available only with power supply option A and with process connection C, and approval D, or power supply E with process connection E, and approval C, and then process pressure 1, process connection material 1, extension length 2, measuring vane A ⁴⁾ Available only with power supply option Q, process connection C with approval B, or process connection E with approval A, and then process pressure 1, process connection material 2, extension length 2 and measuring vane A ⁵⁾ Available with process connections A to F, process pressure option 1, and process temperature option 1 only ⁶⁾ Available with measuring vane options A, C to G, only ⁷⁾ Add 16 mm (0.63") to extension length ⁸⁾ Available with extension length options 2 to 5 only ⁹⁾ Available with process connections G, H, J to M, only	
► Available ex stock.	

Selection and Ordering data	Order code
Further Designs Please add "-Z" to Order No. and specify Order code(s).	
Heating of enclosure ^{1) 2)} Signal bulb inserted in M20 cable gland ¹⁾	A35 A20 K01
SITRANS LPS200 designed for food applications with shaft seal conforming to FDA standards	
Additional Operating Instructions Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. 7ML1998-5FS62
Spare Parts Motor gear /PLC, multi-voltage Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17") Hinged vane, 65 x 210 mm (2.56 x 8.27")	7ML1830-1KG 7ML1830-1KH 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") Extension: 1000, 900, 800, 700, 600 (39.4, 35.4, 31.5, 27.6, 23.6") Extension: 1500, 1400, 1300, 1200, 1100 mm (59.1, 55.1, 51.2, 47.2, 43.3")	7ML5711-0AA 7ML5711-1AA 7ML5711-2AA

Level Measurement

Point level measurement - Rotating paddle switch

SITRANS LPS200

Available ex stock

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 to H, J to N, P only

Level Measurement

Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data

Order No.

SITRANS LPS200, cable extension

Rotary paddle switch for level detection in bulk solids
Cable extension for increased length in top-mounted applications

7 M L 5 7 2 7 -

0

Process temperature

Up to +80 °C (+176 °F)
Up to +150 °C (+302 °F)
Up to +250 °C (+482 °F)
Up to +350 °C (+662 °F)¹⁾
Up to +80 °C (+176 °F) basic version^{2) 5)}

1
2
3
4
5

Power supply

230 V AC, 1 rev/min.
230 V AC, 1 rev/min., fail-safe
230 V AC, 5 rev/min.
230 V AC, 5 rev/min., fail-safe
115 V AC, 1 rev/min.
115 V AC, 1 rev/min., fail-safe
115 V AC, 5 rev/min.
115 V AC, 5 rev/min., fail-safe
48 V AC, 1 rev/min.
24 V AC, 1 rev/min.
24 V DC, 1 rev/min.
24 V DC, 1 rev/min., fail-safe
24 V DC, 5 rev/min.
24 V DC, 5 rev/min., fail-safe
Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min.
Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.

A
B
C
D
E
F
G
H
J
K
L
M
N
P
Q
R

Process connection

Threaded

G 1¼" [(BSPP), EN ISO 228-1]
G 1½" [(BSPP), EN ISO 228-1]
1¼" NPT [(Taper), ANSI/ASME B1.20.1]
1½" NPT [(Taper), ANSI/ASME B1.20.1]

A
B
C
D

Flanged

DN 32 PN 6, EN1092-1 (1.4541/321)
DN 100 PN 6, EN1092-1 (1.4541/321)
DN 100 PN 16, EN1092-1 (1.4541/321)
2" ASME 150 lbs B16.5 (1.4541/321)
3" ASME 150 lbs B16.5 (1.4541/321)
4" ASME 150 lbs B16.5 (1.4541/321)

E
F
G
H
J
K

Process pressure

Up to 0.5 bar (7.25 psi)
Up to 5 bar (72.5 psi)
Up to 10 bar (145 psi)

1
2
3

Process connection material

Aluminum³⁾
Stainless steel 303 (1.4305)

1
2

Cable extension length

Standard cable length, 2000 mm (78.74")

0

Add order code Y01 and plain text:

"Insertion length ... mm"

500 ... 1000 mm (19.69 ... 39.37")
Cable length 1001 ... 2000 mm (39.41 ... 78.74")
Cable length 2001 ... 3000 mm (78.78 ... 118.11")
Cable length 3001 ... 4000 mm (118.15 ... 157.48")
Cable length 4001 ... 5000 mm (157.52 ... 196.85")
Cable length 5001 ... 6000 mm (196.89 ... 236.22")
Cable length 6001 ... 7000 mm (236.26 ... 275.59")
Cable length 7001 ... 10000 mm (275.63 ... 393.70")

1
2
3
4
5
6
7
8

Selection and Ordering data

Order No.

SITRANS LPS200, cable extension

Rotary paddle switch for level detection in bulk solids
Cable extension for increased length in top-mounted applications

7 M L 5 7 2 7 -

0

Measuring vane

Boot shaped, 35 x 106 mm (1.38 x 4.17")⁴⁾
Hinged vane, 65 x 210 mm (2.56 x 8.27")⁴⁾
Boot shaped, 28 x 98 mm (1.10 x 3.86")
Rectangular 50 x 150 mm (1.97 x 5.91")⁵⁾
Rectangular 50 x 250 mm (1.97 x 9.84")⁵⁾
Rectangular 98 x 150 mm (3.86 x 5.91")⁵⁾

A
B
C
D
E
F

Approvals

CSA/FM Dust Ignition Proof, C-TICK
ATEX II 1/2 D, C-TICK
CSA/FM General Purpose, C-TICK
CE, C-TICK

A
B
C
D

- 1) Available with approval option C and D only, up to max. 0.8 bar
- 2) Available only with Power supply Q, (Process connection B with Approvals B or Process connection C with Approvals A), Process pressure 1, Process connection material 2, Cable Extension length 0 and Measuring Vane A
- 3) Available with process connections A to D, process pressure option 1, and process temperature option 1 only
- 4) Add 16 mm (0.63") to extension length
- 5) Available with process connections E to H, J, K, only

Selection and Ordering data

Order code

Further Designs

Please add "-Z" to Order No. and specify Order code(s).

Total insertion length:
Enter the total insertion length in plain text description, max. 10000 mm (393.70")
Reinforced cable (max. 28 kN pulling force)
Heating of enclosure ^{1) 2)}
Signal bulb inserted in M20 cable gland¹⁾

Y01
P01
A35
A20

Additional Operating Instructions

Multi-language
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Order No.
7ML1998-5FS62

Spare Parts

Motor gear /PLC, multi-voltage
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17")
Hinged vane, 65 x 210 mm (2.56 x 8.27")
Rope extension kit, 2 m (6.56 ft)

7ML1830-1KG
7ML1830-1KH
7ML1830-1KJ
7ML1830-1KK

Available ex stock

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

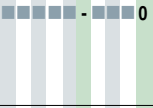
7ML5727-5QC12-0AA0

- 1) Available with approval option D only
- 2) Available with power supply options A to H, J to N, and P, only

Level Measurement

Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data	Order No.
SITRANS LPS200, angled extension Rotary paddle switch with robust design for level detection in bulk solids; ideal for heavy or sticky applications. Angled extension designed to avoid falling material in side mount applications	7ML 5 7 2 8 - 
Process temperature Up to +80 °C (+176 °F) Up to +150 °C (+302 °F) Up to +250 °C (+482 °F)	1 2 3
Power supply 230 V AC, 1 rev/min. 230 V AC, 1 rev/min., fail-safe 230 V AC, 5 rev/min. 230 V AC, 5 rev/min., fail-safe 115 V AC, 1 rev/min. 115 V AC, 1 rev/min., fail-safe 115 V AC, 5 rev/min. 115 V AC, 5 rev/min., fail-safe 48 V AC, 1 rev/min. 24 V AC, 1 rev/min. 24 V DC, 1 rev/min. 24 V DC, 1 rev/min., fail-safe 24 V DC, 5 rev/min. 24 V DC, 5 rev/min., fail-safe Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min. Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.	A B C D E F G H J K L M N P Q R
Process connection <u>Flanged</u> DN 100 PN 6, EN1092-1 (1.4541/321) DN 100 PN 16, EN1092-1 (1.4541/321) 4" ASME 150 lbs B16.5 (1.4541/321)	A B C
Process pressure Up to 0.5 bar (7.25 psi) Up to 5 bar (72.5 psi) Up to 10 bar (145 psi)	1 2 3
Process connection material Stainless steel 303 (1.4305)	1
Extension length 125 mm (4.92") 150 mm (5.91") 200 mm (7.87") 250 mm (9.84") 300 mm (11.81")	1 2 3 4 5
Measuring vane Rectangular vane, 50 x 98 mm (1.97 x 3.86") Rectangular vane, 50 x 150 mm (1.97 x 5.91") Rectangular vane, 50 x 250 mm (1.97 x 9.84") Rectangular vane 98 x 150 mm (3.86 x 5.91") Rectangular vane 98 x 250 mm (3.86 x 9.84") Hinged vane, 65 x 210 mm (2.56 x 8.27")	A B C D E F
Approvals CSA/FM Dust Ignition Proof, C-TICK ATEX II 1/2 D, C-TICK CSA/FM General Purpose, C-TICK CE, C-TICK	A B C D

Selection and Ordering data	Order code
Further Designs Please add "-Z" to Order No. and specify Order code(s).	
Heating of enclosure ^{1) 2)} Signal bulb inserted in M20 cable gland ¹⁾	A35 A20
Additional Operating Instructions Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. 7ML1998-5FS62
Spare Parts Motor gear /PLC, multi-voltage Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17") Hinged vane, 65 x 210 mm (2.56 x 8.27")	7ML1830-1KG 7ML1830-1KH 7ML1830-1KJ

- ¹⁾ Available with approval option D only
²⁾ Available with power supply options A to H, J to N, P only

Level Measurement

Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data

Order No.

SITRANS LPS200, rigid extension

Rotary paddle switch for top mount point level detection in bulk solids

7ML 5 7 3 0 -

Process temperature

Up to +80 °C (+176 °F)

Up to +150 °C (+302 °F)

Up to +250 °C (+482 °F)

Up to +350 °C (+662 °F)¹⁾

1
2
3
4

Power supply

230 V AC, 1 rev/min.

230 V AC, 1 rev/min., fail-safe

230 V AC, 5 rev/min.

A
B
C

230 V AC, 5 rev/min., fail-safe

115 V AC, 1 rev/min.

115 V AC, 1 rev/min., fail-safe

115 V AC, 5 rev/min.

115 V AC, 5 rev/min., fail-safe

48 V AC, 1 rev/min.

24 V AC, 1 rev/min.

D
E
F
G
H
J
K

24 V DC, 1 rev/min.

24 V DC, 1 rev/min., fail-safe

24 V DC, 5 rev/min.

24 V DC, 5 rev/min., fail-safe

L
M
N
P

Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 1 rev/min.

Switch selectable 230 V AC/115 V AC/24 V DC multivoltage, 5 rev/min.

Q
R

Process connection

Threaded

G 1¼" [(BSPP), EN ISO 228-1]

G 1½" [(BSPP), EN ISO 228-1]

1¼" NPT [(Taper), ANSI/ASME B1.20.1]

1½" NPT [(Taper), ANSI/ASME B1.20.1]

A
B
C
D

Flanged

DN 32 PN 6, EN1092-1 (1.4541/321)

DN 100 PN 6, EN1092-1 (1.4541/321)

DN 100 PN 16, EN1092-1 (1.4541/321)

2" ASME 150 lbs B16.5 (1.4541/321)

3" ASME 150 lbs B16.5 (1.4541/321)

4" ASME 150 lbs B16.5 (1.4541/321)

E
F
G
H
J
K

Process pressure

Up to 0.5 bar (7.25 psi)

Up to 5 bar (72.5 psi)

Up to 10 bar (145 psi)

1
2
3

Process connection material

Aluminum^{2) 3) 4)}

Stainless steel 303 (1.4305)⁵⁾

1
2

Extension material (protection tube)

Aluminum^{2) 4) 6) 7)}

Stainless steel 303 (1.4305)⁵⁾

0
1

Extension length

Aluminum

250 ... 500 mm (9.84 ... 19.69")

501 ... 750 mm (19.72 ... 29.53")

751 ... 1000 mm (29.57 ... 39.37")

1001 ... 1250 mm (39.41 ... 42.21")

1251 ... 1500 mm (49.25 ... 59.06")

1501 ... 1750 mm (59.09 ... 68.90")

1751 ... 2000 mm (68.94 ... 78.74")

2001 ... 2250 mm (78.78 ... 88.58")

2251 ... 2500 mm (88.62 ... 98.43")

2501 ... 2750 mm (98.46 ... 108.27")

2751 ... 3000 mm (108.31 ... 118.11")

3001 ... 3250 mm (118.15 ... 127.95")

3251 ... 3500 mm (127.99 ... 137.80")

3501 ... 3750 mm (137.83 ... 147.64")

3751 ... 4000 mm (147.67 ... 157.48")

A
B
C
D
E
F
G
H
J
K
L
M
N
P
Q

Selection and Ordering data

Order No.

SITRANS LPS200, rigid extension

Rotary paddle switch for top mount point level detection in bulk solids

7ML 5 7 3 0 -

Stainless steel 303 (1.4305)

250 ... 500 mm (9.84 ... 19.69")

501 ... 750 mm (19.72 ... 29.53")

751 ... 1000 mm (29.57 ... 39.37")

1001 ... 1500 mm (39.41 ... 59.05")

1501 ... 2000 mm (59.09 ... 78.74")

2001 ... 2500 mm (78.78 ... 98.42")

2501 ... 3000 mm (98.46 ... 118.11")

3001 ... 4000 mm (118.14.78 ... 157.48")

R
S
T
U
V
W
X
Y

Measuring vane

Boot shaped, 35 x 106 mm (1.34 x 4.17")⁸⁾

Hinged vane, 60 x 200 mm (2.36 x 7.87")

Rectangular 50 x 150 mm (1.97 x 5.91")⁹⁾

Rectangular 50 x 250 mm (1.97 x 9.84")⁹⁾

Rectangular 98 x 150 mm (3.86 x 5.91")⁹⁾

Rectangular 98 x 250 mm (3.86 x 9.84")⁹⁾

A
B
C
D
E
F

Approvals

CSA/FM Dust Ignition Proof, C-TICK

ATEX II 1/2 D, C-TICK

CSA/FM General Purpose, C-TICK

CE, C-TICK

1
2
3
4

¹⁾ Available with approval option 3 and 4 only, up to max. 0.8 bar

²⁾ Available with process connections A to D only

³⁾ Available with process pressure option 1 only

⁴⁾ Available with extension length options A to D only

⁵⁾ Available with extension length options R to Y only

⁶⁾ Available with process connection material option 1 only

⁷⁾ Available with process temperature option 1 only

⁸⁾ Add 16 mm (0.63") to extension length

⁹⁾ Available with process connections E to H, J, K, only

Level Measurement

Point level measurement - Rotating paddle switch

SITRANS LPS200

Selection and Ordering data	Order code
Further Designs	
Please add "-Z" to Order No. and specify Order code(s).	
Total insertion length: Enter the total insertion length in plain text description, max. 4000 mm (157.48")	Y01
Heating of enclosure ^{1) 2)}	A35
Signal bulb inserted in M20 cable gland ¹⁾	A20
SITRANS LPS200 designed for food applications with shaft seal conforming to FDA standards ³⁾	K01
<u>Seal at tube end for ingress protection and shaft stability</u>	
Max. temperature +80 °C (+176 °F)	P06
Max. temperature +150 °C (+302 °F)	P07
Max. temperature +250 °C (+482 °F)	P08
Max. temperature +350 °C (+662 °F)	P09
Sliding sleeve (standard, max. pressure 0.8 bar)	P12
Sliding sleeve (pressure tight, for over-pressure application starting from 1 bar max., dependent on pressure option ordered)	P13
Additional Operating Instructions	Order No.
Multi-language This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	7ML1998-5FS62
Spare Parts	
Motor gear/PLC, multi-voltage	7ML1830-1KG
Replacement vane, boot shape, 35 x 106 mm (1.38 x 4.17")	7ML1830-1KH
Hinged vane, 65 x 210 mm (2.56 x 8.27")	7ML1830-1KJ

¹⁾ Available with approval option 4 only

²⁾ Available with power supply options A to H, J to N, P, only

³⁾ Available when ordered with ingress protection seal P06 to P09 only

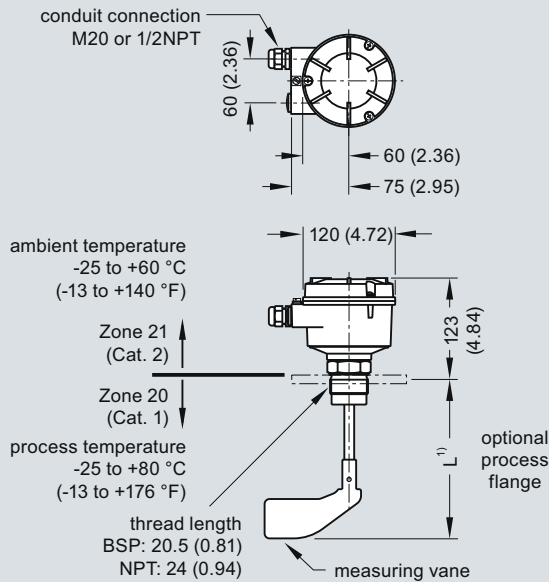
Level Measurement

Point level measurement - Rotating paddle switch

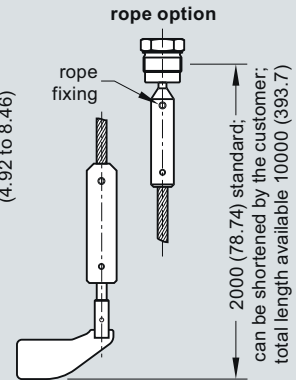
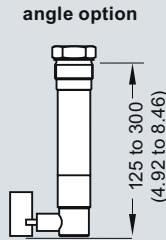
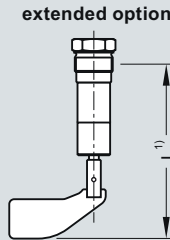
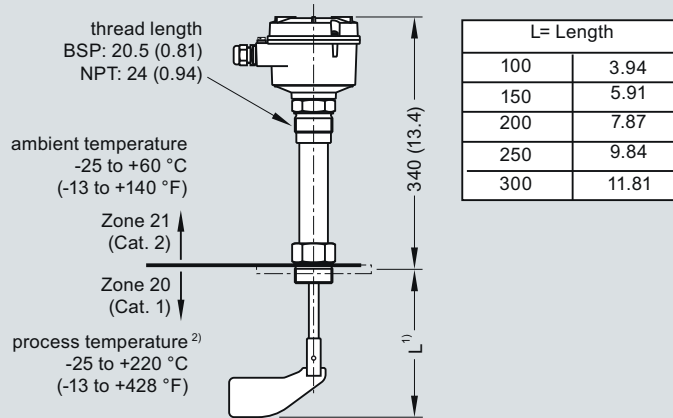
SITRANS LPS200

Dimensional drawings

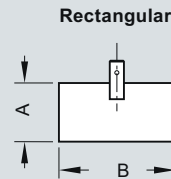
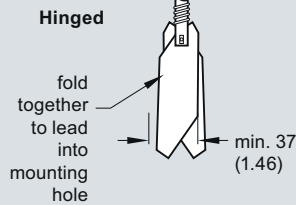
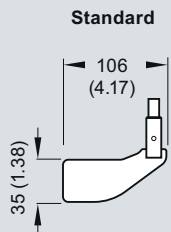
Standard model: compact version



High Temperature Model: compact version



Measuring Vanes



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)

- For 35 x 106 mm boot shaped and 65 x 210 mm hinged measuring vanes, add 16 mm to extension length.
- 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.

Vane	completely covered with material		covered up to 10 cm (3.93") 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/ft ³)	300 g/l (18.7 lb/ft ³)	100 g/l (6.2 lb/ft ³)	150 g/l (9.4 lb/ft ³)
boot shaped 28 x 98 mm	300 g/l (18.7 lb/ft ³)	500 g/l (31.2 lb/ft ³)	150 g/l (9.4 lb/ft ³)	150 g/l (9.4 lb/ft ³)
rectangular 50 x 98 mm	300 g/l (18.7 lb/ft ³)	500 g/l (31.2 lb/ft ³)	150 g/l (9.4 lb/ft ³)	250 g/l (15.6 lb/ft ³)
rectangular 50 x 150 mm	80 g/l (5.0 lb/ft ³)	120 g/l (7.5 lb/ft ³)	40 g/l (2.5 lb/ft ³)	60 g/l (3.7 lb/ft ³)
rectangular 50 x 250 mm	30 g/l (1.9 lb/ft ³)	50 g/l (3.1 lb/ft ³)	15 g/l (0.9 lb/ft ³)	25 g/l (1.6 lb/ft ³)
rectangular 98 x 150 mm	30 g/l (1.9 lb/ft ³)	50 g/l (3.1 lb/ft ³)	15 g/l (0.9 lb/ft ³)	25 g/l (1.6 lb/ft ³)
rectangular 98 x 250 mm	20 g/l (1.2 lb/ft ³)	30 g/l (1.9 lb/ft ³)	15 g/l (0.9 lb/ft ³)	15 g/l (0.9 lb/ft ³)
hinged 65 x 210 mm	70 g/l (4.4 lb/ft ³)	100 g/l (6.2 lb/ft ³)	35 g/l (2.2 lb/ft ³)	50 g/l (3.1 lb/ft ³)
hinged 60 x 200 mm	70 g/l (4.4 lb/ft ³)	100 g/l (6.2 lb/ft ³)	35 g/l (2.2 lb/ft ³)	50 g/l (3.1 lb/ft ³)

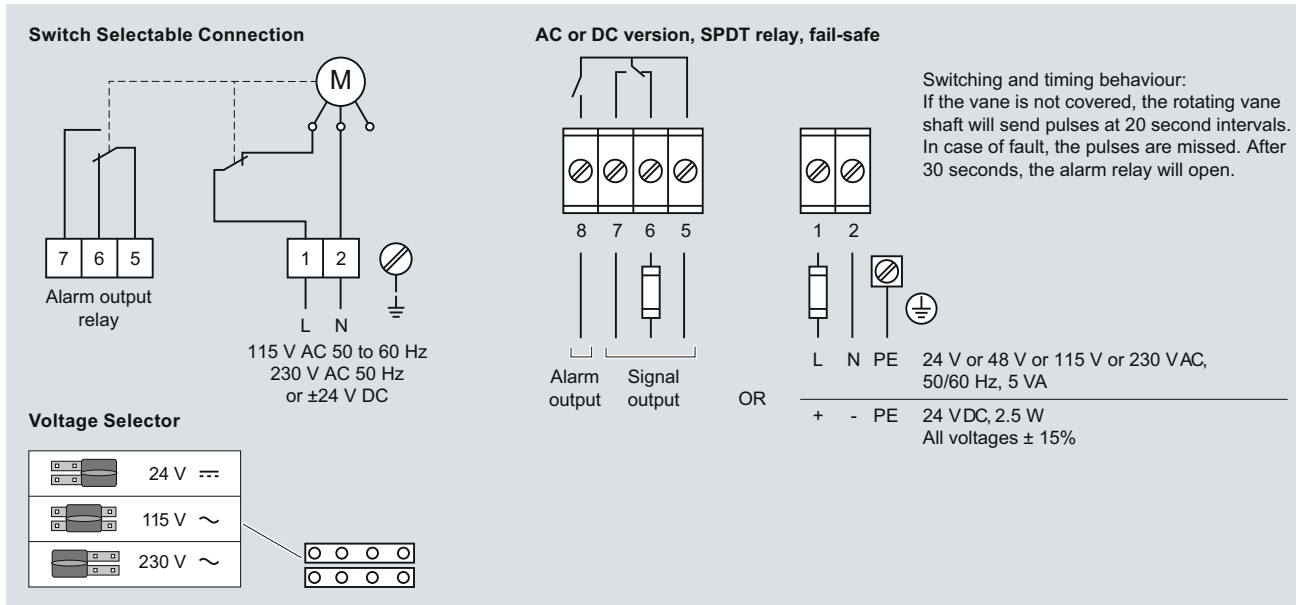
SITRANS LPS200, dimensions in mm (inch)

Level Measurement

Point level measurement - Rotating paddle switch

SITRANS LPS200

Schematics



SITRANS LPS200 connections

Level Measurement

Point level measurement - Tilt switch

Milltronics Tilt switch

Overview



The Milltronics Tilt switch probe is an electro-mechanical tilt switch for point level detection, plugged chute detection, and feed loss detection on conveyor belts.

Benefits

- High or low alarm
- Easy installation and operation
- Low cost
- Adjustable sensitivity
- Customized options

Application

Tilt switches provide point level detection. They offer a cost-effective solution for point level detection, plug chute detection, belt tracking, and feed loss detection on conveyor belts. They also provide simple high and low alarms for both dry bulk solids and liquids.

The Tilt switch consists of a rugged, stainless steel encapsulated probe. The probe is suspended vertically over a bin or belt, and the potted switch inside the probe provides a signal when material tilts it through an angle of more than 17° in any direction. Additional assembly options are available including replaceable wear extensions (for coarse and abrasive materials), flat or cross paddles (for medium bulk density materials), and floats (for liquids or light density bulk materials). The probes are also available for high or low temperature applications.

- Key Applications: point level detection, belt mis-alignment, conveyor feed starvation detection

Technical specifications

Mode of operation	
Measuring principle	Tilting of encapsulated mercury switch
Typical application	• High or low level alarm on bulk solids • High or low level alarm for liquids (when used with float option)
Features	
Number of points	Single point destination
Output	• 2A at 24 V DC
Transducers	Tilt angle sensitive mercury contacts, variable alarm delay to reduce false indicators
Characteristics	
Probe (Tilt switch)	• Resolution: nominal 17° from vertical • Switch: totally encapsulated mercury switch rated at 10 mA at 30 V DC max., non-inductive
Design	
Housing	• Schedule 80 stainless steel pipe with 1/2" NPT mounting for extensions
Material type	• Stainless steel: - Low temperature: -40 ... +90 °C (-40 ... +194 °F) - High temperature: -40 ... +150 °C (-40 ... +302 °F)
Weight	• 2 kg (4.4 lbs)
Approvals	CE, C-TICK
Options	Extensions: stainless steel Wear, Cross Paddle, Flat Paddle, or Float

Level Measurement

Point level measurement - Tilt switch

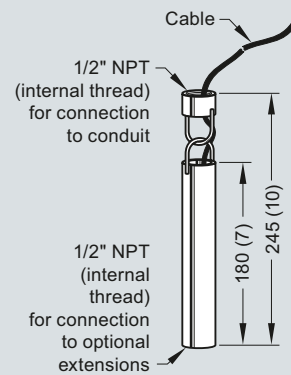
Milltronics Tilt switch

Selection and Ordering data	Order No.
Tilt Switch Probe	C) 7MH7143 -
Tilt switch probes for point level measurement	0
Model	3
Standard, CE approved	A
Sensor Construction	A
Stainless steel	B
Temperature Rating	
Low temperature with 6 m (20 ft.) of cable	1
High temperature with 1.5 m (5 ft.) of cable	3
Probe Extension	5
None	7
Wear extension, stainless steel	8
Cross paddle extension, stainless steel	
Flat paddle extension, stainless steel	
Float, stainless steel	

Selection and Ordering data	Order No.
Further Designs	
Please add '-Z' to Order No. and specify Order code(s).	
Instruction manual	7ML1998-1FL01
TSP Probe, English	
Note: The instruction manual should be ordered as a separate item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and instruction manuals.	
Spare parts	
Float, stainless steel	C) 7MH7723-1DH
Wear extension, stainless steel	C) 7MH7723-1DJ
Cross paddle, stainless steel	C) 7MH7723-1DK
Flat paddle, stainless steel	C) 7MH7723-1DL
C) Subject to export regulations AL:N, ECCN: EAR99	

Dimensional drawings

Tilt Switch



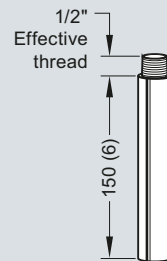
Material
304 stainless steel (1.4301)

Cable

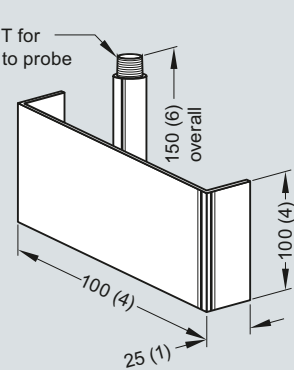
- Low temperature 6 m (20 ft): Type SJO 18-2
- High temperature 1.5 m (5 ft): Shielded PTFE

Optional Extensions (material: 304 Stainless Steel)

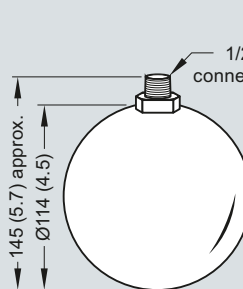
Wear



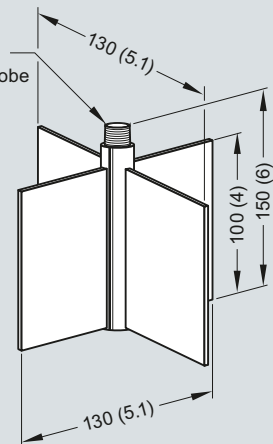
Flat Paddle



Float



Cross Paddle



Tilt switch, dimensions in mm (inch)

Level Measurement

Point level measurement - Ultrasonic switch

Ultrasonic

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 20000 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 patented 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:

$$\text{Distance} = (\text{Velocity of Sound} \times \text{Time}) / 2.$$

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.

Level Measurement

Point level measurement - Ultrasonic switch

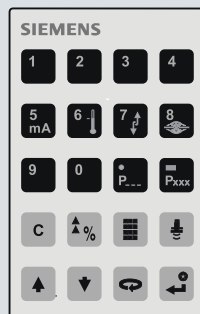
Ultrasonic

Technical specifications

Ultrasonics Transmitter/Controller Selection Guide

Criteria	SITRANS Probe LU	HydroRanger 200	MultiRanger 100/200	SITRANS LUC500	SITRANS LU	OCM III
Range	6 m (20 ft) or 12 m (40 ft)	15 m (50 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	3 m (10 ft)
Typical applications	Chemical storage vessels, filter beds, liquid storage vessels	Wet wells, flumes/weirs, bar screen control	Wet wells, flumes/weirs, bar screen control, hoppers, chemical storage, liquid storage, crusher bins, dry solids storage	Wet well/lift station control, flumes/weirs, open channels	Chemical storage, liquid storage, bulk solids storage (sugar, flour bins, grains, cereals), plastic pellets	Open channel measurement
Output	HART model: 4 ... 20 mA/HART PROFIBUS PA model: PROFIBUS	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)	5 relays, 4 ... 20 mA (option)	4 relays (LU01, LU02) Up to 40 relays (LU10) 4 ... 20 mA isolated	3 relays, 4 ... 20 mA
Communications	HART or PROFIBUS PA Options: • SIMATIC PDM for remote configuration and diagnostics	Built-in Modbus RTU/ASCII via RS-485 Options: • SIMATIC PDM • SmartLink (PROFIBUS DP, Allen-Bradley Remote I/O, DeviceNet)	Built-in Modbus RTU or ASCII via RS-485 Options: • SIMATIC PDM • SmartLink (PROFIBUS DP, Allen-Bradley Remote I/O, DeviceNet)	Telemetry capability with Modbus RTU/ASCII via RS-232/RS-485 Options: • SIMATIC PDM • SmartLink (PROFIBUS DP, Allen-Bradley Remote I/O, DeviceNet) • ECT EnviroRanger Tool software	Dolphin, RS-232/RS-485 (LU01, LU02) Dolphin via infrared (LU10) Options: • SmartLink (PROFIBUS DP, Allen-Bradley Remote I/O, DeviceNet)	Via RS-232 Options: • Flow Reporter software
Power specifications	HART: 4 ... 20 mA, 24 V DC nominal, max. 550 W, 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/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	AC version: 100 ... 230 V AC ±15 %, 50/60 Hz, 30 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	100/115/200/230 V AC, ±15 %, 50/60 Hz, 15 VA and/or 9 ... 30 V DC, 8 W
Approvals	CE, CSA _{US/C} , FM, C-TICK, ATEX, ANZEx, IECEx	CE, CSA _{US/C} , UL Listed, FM, C-TICK	CE, CSA _{US/C} , UL Listed, FM, C-TICK	CE, CSA _{US/C} , UL Listed	CE, CSA _{US/C} , FM, Lloyd's Register	CE, CSA _{US/C} , FM

7ML1830-2AN



SITRANS Probe LU HART*
SITRANS LU

7ML5830-2AJ



SITRANS Probe LU PROFIBUS

7ML1830-2AA



OCM III

7ML1830-2AK



MultiRanger 100/200
HydroRanger 200
HydroRanger Plus
SITRANS LUC500

* **Note:** To order the IS version of this hand programmer, order 7ML5830-2AH.

Level Measurement

Point level measurement - Ultrasonic switch

Ultrasonic

SIEMENS

Ultrasonic Level Application Questionnaire

Customer information

Contact: _____ Prepared By: _____
 Company: _____ Date: _____
 Address: _____ Notes on the Application: _____
 City: _____ Country: _____
 Zip/Postal Code: _____ Phone: () _____
 E-mail: _____ Fax: () _____

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/in

Nozzle Diameter: _____ cm/in

Tank top:

- ☐ Open
☐ Flat
☐ Conical
☐ Parabolic

Tank bottom:

- ☐ Sloped
☐ Flat
☐ Conical
☐ Parabolic

Internal equipment and/or obstructions:

(E.g. 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 to 20 mA☐ Pump Interlocks (#): _____

Outputs required:

☐ 4 to 20 mA☐ Relays (#): _____

Communications:

☐ HART ® /4 to 20 mA ☐ AB Remote I/O☐ PROFIBUS DP ☐ AB DeviceNet☐ PROFIBUS PA ☐ None☐ Modbus RTU/ASCII

Products recommended:

Level Measurement

Point level measurement - Ultrasonic switch

Pointek ULS200

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 or aluminum enclosures, 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.

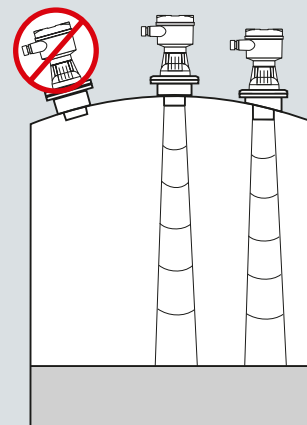
Mounting and Interconnection

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") flange adapter for mating to 3" ASME, DN 65, PN 10 and JIS 10K 3B sized flanges.

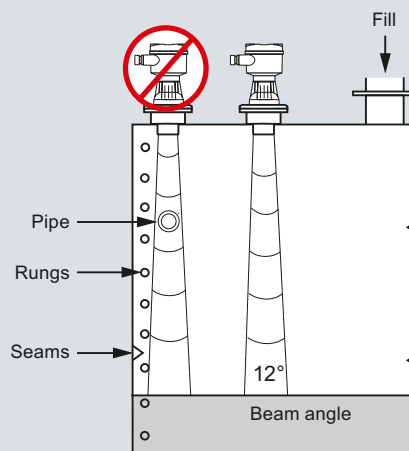
Separate cables and conduit may be required to conform to standard instrumentation wiring or electrical codes.

Configuration

Parabolic Mounting



Flat Mounting and Beam Angle



Pointek ULS200 Mounting

Level Measurement

Point level measurement - Ultrasonic switch

Pointek ULS200

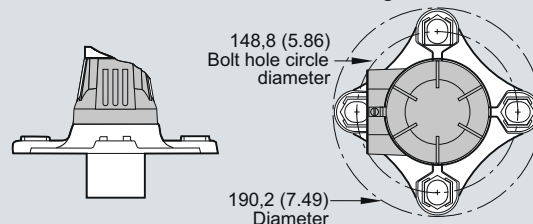
Technical specifications

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, resistive load
DC Version (relay)	2 SPDT Form C contacts rated 5 A at 48 V DC
DC Version (transistor)	2 switches, rated max. 100 mA, 48 V DC
Accuracy	
AC/DC version	
• Resolution	3 mm (0.1")
• 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 or epoxy-coated aluminum with gasket
Weight	Approx. 1.5 kg (3.3 lbs)
Transducer material	PVDF 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") high, for display of distance between sensor face and material, multisegment 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/CA}, FM • CSA/FM Class I, II, III, Div. 1, Gr A, B, C, D, E, F, G T4 • ATEX II 2G EEx md IIC T5 • C-TICK • INMETRO: Br-EEx md IIC T5

Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN10 and JIS 10K 3B flanges



Pointek ULS200 Optional Flange Adapter, dimensions in mm (inch)

Level Measurement

Point level measurement - Ultrasonic switch

Pointek ULS200

Selection and Ordering data	Order 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	C) 7ML1510-
Power supply 24 V DC, relay output 24 V DC, transistor output 100 ... 230 V AC, relay output	1 2 3
Approvals CE, C-TICK, INMETRO, ATEX II 2G EEx md IIC T5 ¹⁾ CE, C-TICK, CSA Class I, II, III, Div. 1 ²⁾ CE, C-TICK, FM Class I, II, III, Div. 1 ²⁾ CE, C-TICK, CSA Class I, II, Div. 2 ³⁾ CE, C-TICK, CSAus/c, FM	C F G J K
Transducer/Process connection ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1] ETFE, R 2" [(BSPT), EN 10226] ETFE, G 2" [(BSPP), EN ISO 228-1] PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1] PVDF copolymer, R 2" [(BSPT), EN 10226] PVDF copolymer, G [(BSPP), EN ISO 228-1] PVDF copolymer, 4" sanitary mounting ⁴⁾	A B C E F G J
Enclosure/cable inlet <u>Polycarbonate</u> • Cable inlet PG 13.5 • Cable inlet ½" NPT <u>Aluminum</u> • Cable inlet PG 13.5 • Cable inlet ½" NPT	1 2 3 4

¹⁾ Available with enclosure/cable inlet option 4 only²⁾ Available with enclosure/cable inlet option 4 only and process connection options A and E only³⁾ Available with enclosure/cable inlet options 2 and 4 only⁴⁾ Available with approval option K only

C) Subject to export regulations AL: N, ECCN: EAR99

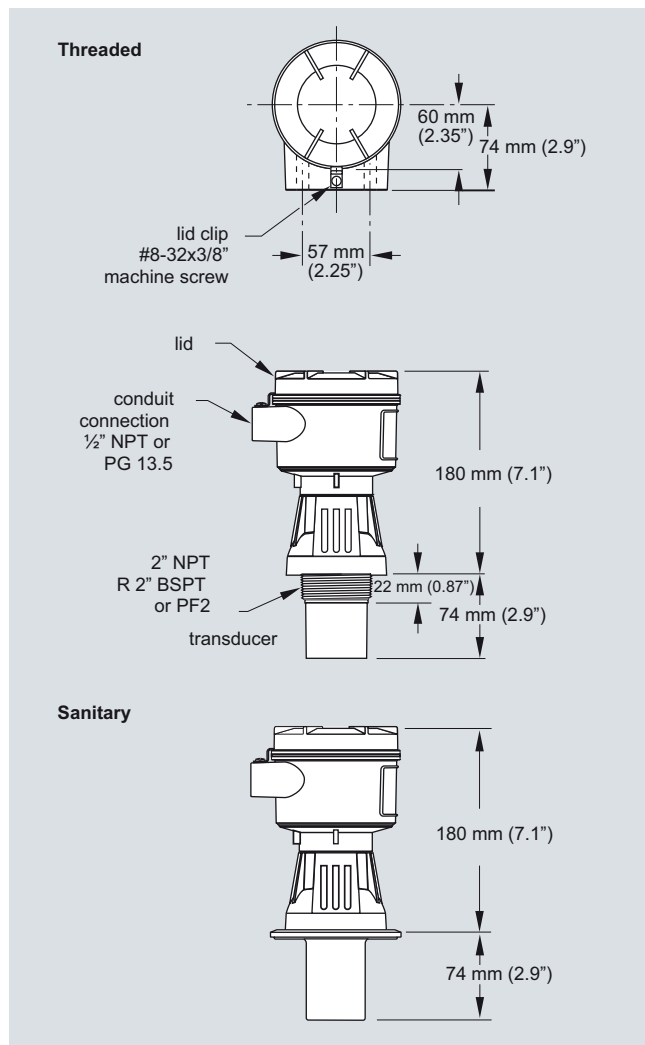
Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s)	
Operating Instructions Additional Multi-language Quick Start manual	C) 7ML1998-1XB63
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Accessories Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosures Universal Box Bracket Mounting Kit 3" ASME, DN 65, PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT 3" ASME, DN 65, PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT 2" BSPT Locknut, plastic 2" NPT Locknut 4" sanitary mounting clamp	7ML1930-1AC 7ML1830-1BK 7ML1830-1BT 7ML1830-1BU 7ML1830-1DQ 7ML1830-1DT 7ML1830-1BR
Spare Parts Polycarbonate Lid Aluminum Lid	7ML1830-1LG 7ML1830-1LH
C) Subject to export regulations AL: N, ECCN: EAR99	

Level Measurement

Point level measurement - Ultrasonic switch

Pointek ULS200

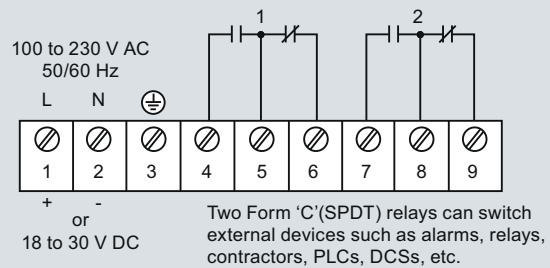
Dimensional drawings



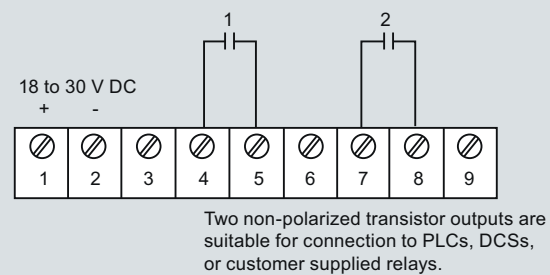
Pointek ULS200, dimensions in mm (inch)

Schematics

Relay Output



Transistor Output: DC version only



Pointek ULS200 connections

Level Measurement

Continuous level measurement - Ultrasonic transmitters

The Probe

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
- Patented Sonic Intelligence® echo processing
- Integral temperature compensation

Application

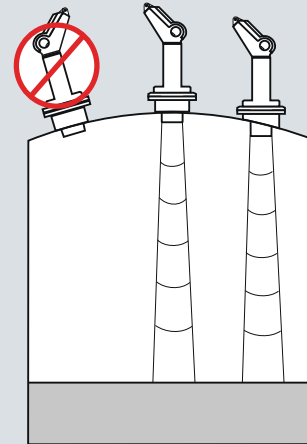
The transducer is available in PVDF copolymer, making the device suitable for use in a wide variety of applications. The Probe is easy to install and maintain, and can be quickly removed for cleaning as required by the food, beverage and pharmaceutical industries.

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.

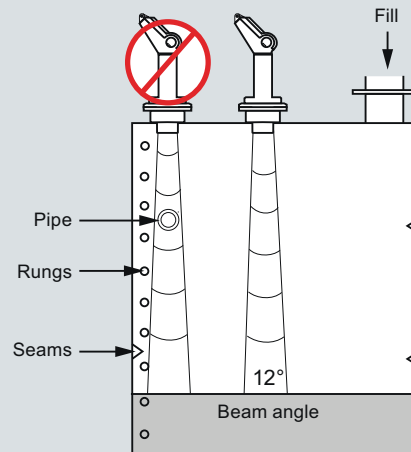
- Key Applications: chemical storage vessels, filter beds, mud pits, liquid storage vessels, food applications

Configuration

Parabolic Mounting



Flat Mounting and Beam Angle



The Probe mounting

Level Measurement

Continuous level measurement - Ultrasonic transmitters

The Probe

Technical specifications

	Two-wire version (standard)	Three-wire version
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)
Output		
mA	4 ... 20 mA	4 ... 20 mA
• Span	Proportional/ inversely proportional	Proportional/ inversely proportional
• Max. load	600 Ω in the loop at 24 V DC	750 Ω at 24 V DC
Relay	No	For level alarm or fault
Power supply		
Supply voltage	12 ... 28 V DC, 0.1 A surge	18 ... 30 V DC, max. 0.2 A
Max. power consumption	0.75 W (25 mA at 24 V DC)	5 W (200 mA at 24 V DC)
Certificates and approvals	CE, C-TICK, CSA _{US/C}	CE, C-TICK, CSA _{US/C} , FM
Accuracy		
Error in measurement	0.25 % of measuring range (in air)	
Resolution	3 mm (0.125")	
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 lbs)	
• With flange adapter	1.7 kg (3.7 lbs)	
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 13.5 or ½" NPT cable glands	

Selection and Ordering data

The Probe

Short-range integrated ultrasonic level transmitter, ideal for liquids and slurries in open or closed vessels

Measuring range

5 m (16.40 ft)

Transducer/Process connection

PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]
PVDF copolymer, R 2" [(BSPT), EN 10226]
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]
PVDF copolymer, 4" Sanitary mounting

Model/Approval

3 Wire, 24 V DC, CE, C-TICK, CSA, FM
2 Wire, 24 V DC, CE, C-TICK, CSA

Order No.

C) **7ML1201-**

00

1

E

F

G

J

E

F

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 20 characters) specify in plain text

Y17

Additional Operating Instructions

3 Wire, 24 V model, Multi-language manual

C) **7ML1998-5GD62**

2 Wire model, Multi-language manual

C) **7ML1998-5GC63**

Accessories

Universal Box Bracket Mounting kit

7ML1830-1BK

Sanitary 4" mounting clamp

7ML1830-1BR

Power Supply, 24 V DC, 200 mA for 2 probes (105 ... 125 V AC input)

C) **7ML1930-1AA**

Power Supply, 24 V DC, 100 mA for 1 probe (105 ... 125 V AC input)

C) **7ML1930-1AB**

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 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

C) Subject to export regulations AL: N, ECCN: EAR99

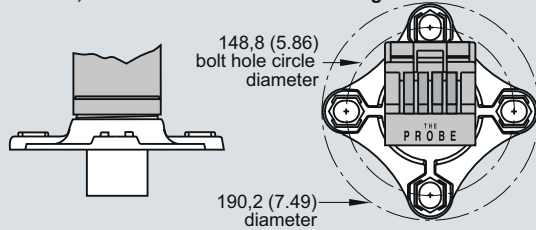
Level Measurement

Continuous level measurement - Ultrasonic transmitters

The Probe

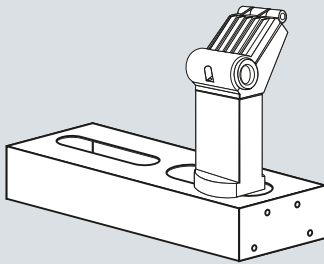
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN10 and JIS 10K 3B flanges



The Probe Optional Flange Adapter, dimensions in mm (inch)

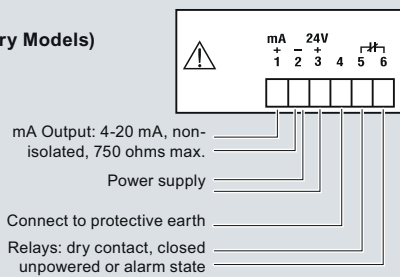
The Probe with FMS 200 Mounting Bracket



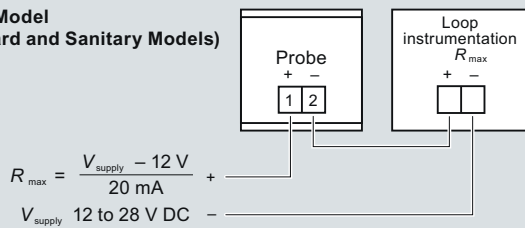
The Probe with Optional Mounting Bracket

Schematics

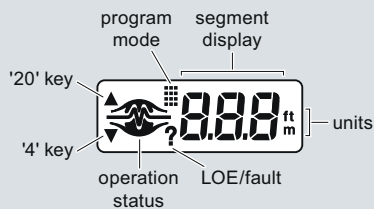
3 Wire Model (Standard and Sanitary Models)



2 Wire Model (Standard and Sanitary Models)



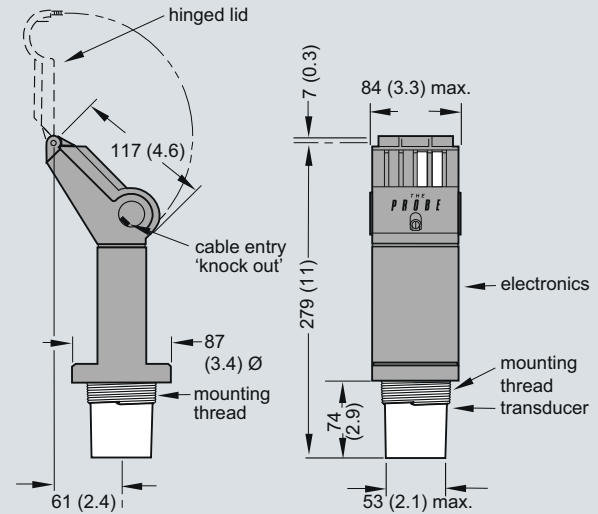
Display



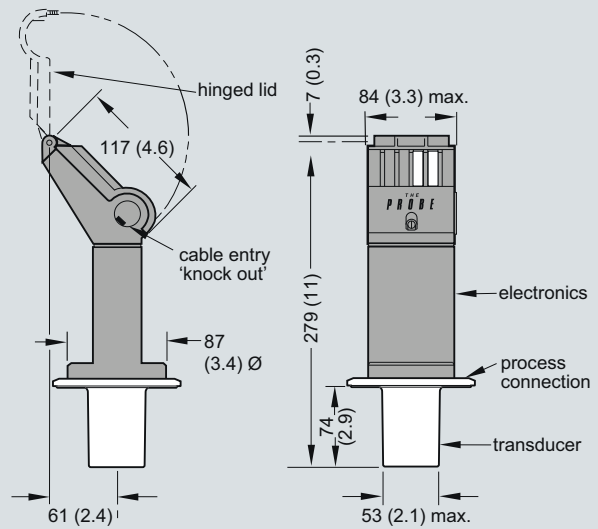
The Probe connections

Dimensional drawings

Standard Model



Sanitary Model



The Probe, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Ultrasonic transmitters

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
- Patented Sonic Intelligence signal processing
- Extremely high signal-to-noise ratio
- 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 and chemical storage vessels.

The range of SITRANS Probe LU is 6 or 12 m (20 or 40 ft). Using Auto False-Echo Suppression for fixed obstruction avoidance, as well as an improved signal-to-noise ratio and improved accuracy of 0.15 % of range or 6 mm (0.25"), the Probe LU provides unmatched reliability.

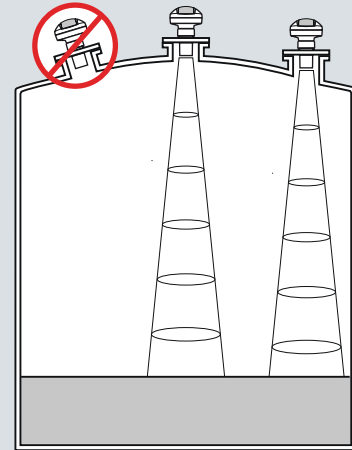
SITRANS Probe LU includes Sonic Intelligence® signal processing from the field-proven Probe and incorporates new echo processing features and the latest micro-processor and communications technology. The Probe LU offers two communications options: HART or PROFIBUS PA (Profile version 3.0, Class B).

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.

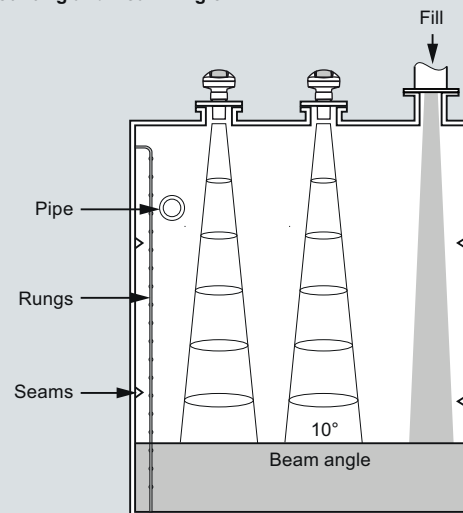
- Key Applications: chemical storage vessels, filter beds, liquid storage vessels

Configuration

Parabolic Mounting



Flat Mounting and Beam Angle



SITRANS Probe LU mounting

Level Measurement

Continuous level measurement - Ultrasonic transmitters

SITRANS Probe LU

Technical specifications

Mode of operation		Process connection	
Measuring principle	Ultrasonic level measurement	Threaded connection	2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] or G 2" [(BSPP), EN ISO 228-1]
Typical application	Level measurement in storage vessels and simple process vessels	Flange connection	3" (80 mm) universal flange
		Other connection	FMS 200 mounting bracket (see page 5/190) or customer supplied mount
Inputs		Display and Controls	
Measuring range		Interface	Local: LCD display with bar graph Remote: Available via HART or PROFIBUS PA
• 6 m (20 ft) model	0.25 ... 6 m (10" ... 20 ft)	Configuration	Using Siemens SIMATIC PDM (PC) or HART handheld communicator or Siemens infrared handheld programmer
• 12 m (40 ft) model	0.25 ... 12 m (10" ... 40 ft)	Memory	Non-volatile EEPROM
Frequency	54 kHz	Power supply	
Outputs		4 ... 20 mA/HART	Nominal 24 V DC with 550 Ω maximum; maximum 30 V DC 4 ... 20 mA
mA/HART®		PROFIBUS PA	12, 13, 15, or 20 mA depending on programming (General Purpose or Intrinsically Safe version) per IEC 61158-2
• Range	4 ... 20 mA	Certificates and Approvals	
• Accuracy	± 0.02 mA	General	CSA _{US/C} , FM, CE, C-TICK
PROFIBUS PA	Profile 3, Class B	Marine (only applies to HART communication option)	• Lloyd's Register of Shipping • ABS Type Approval
Performance		Hazardous	
Resolution	≤ 3 mm (0.12")	• Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4
Accuracy	$\pm$ the greater of 0.15 % of range or 6 mm (0.24")	• Intrinsically Safe (USA/Canada)	CSA/FM (barrier required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
Repeatability	≤ 3 mm (0.12")	• Intrinsically Safe (Australia/New Zealand)	ANZEx Ex ia IIC T4, Tamb = -40 ... +80 °C (-40 ... +176 °F) IP67, IP68
Blanking distance	0.25 m (10")	• Intrinsically Safe (International)	IECEx TSA 04.0020X Ex ia IIC T4
Update time	≤ 5 seconds	• Intrinsically Safe (Brazil)	INMETRO Br-Ex ia IIC T4
• 4/20 mA/HART version	≤ 5 seconds at 4 mA	• Non-incendive (USA)	FM (no barrier required) T5: Class I, Div. 2, Groups A,B,C, D
• PROFIBUS version	≤ 4 seconds at 15 mA current loop	Handheld Programmer	
Temperature compensation	Built-in to compensate over temperature range	Intrinsically Safe Siemens handheld programmer	Infrared receiver
Beam angle	10°	• Approvals for handheld programmer	IS model with ATEX EEx ia IIC T4 CSA/FM Class I, Div. 1, Groups A, B, C, D
Rated operating conditions		Ambient temperature	-20 ... +40 °C (-5 ... +104 °F)
Ambient conditions		Interface	Proprietary infrared pulse signal
• Location	Indoor/outdoor	Power	3 V lithium battery (non-replaceable)
• 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 lbs)		
Cable inlet	2 x M20x1.5 cable gland or 2 x ½" NPT thread		
Material (transducer)	ETFE (Ethylene Tetrafluoroethylene) or PVDF (Polyvinylidene Fluoride)		

Level Measurement

Continuous level measurement - Ultrasonic transmitters

SITRANS Probe LU

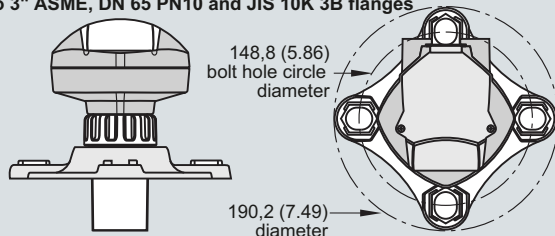
Selection and Ordering data	Order No.
SITRANS Probe LU 2-wire, loop powered ultrasonic transmitter for level, volume and flow monitoring of liquids in open channels, storage vessels and simple process vessels.	C) 7ML5221-
Enclosure/Cable Inlet Plastic (PBT), 2 x M20x1.5 (check Approvals for cable gland details) Plastic (PBT), 2 x ½" NPT (no cable glands supplied)	1 2
Range/Transducer material 6 meter (20 ft), ETFE 6 meter (20 ft), PVDF Copolymer 12 meter (40 ft), ETFE 12 meter (40 ft), PVDF Copolymer	A B C D
Process connection 2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226] G 2" [(BSPP), EN ISO 228-1]	A B C
Communication/Output 4 ... 20 mA, HART® PROFIBUS PA	1 2
Approvals General Purpose, FM, CSA, CE, C-TICK FM, Class I, Div. 2 ¹⁾ Intrinsically Safe, CSA/FM Class I, Div. 1, Groups A, B, C, D (barrier required); Class II, Div. 1, Groups E, F, G; Class III ²⁾ Intrinsically Safe, ATEX II 1G EEx ia IIC T4 ²⁾ Intrinsically safe, ATEX II 1 G EEx ia IIC T4, ANZEx, IECEX, INMETRO, CE, C-TICK ³⁾ Intrinsically safe, CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1 Group E, F, G; Class III T4 ³⁾	1 4 5 6 7 8

- 1) Available with Enclosure/Cable Inlet option 2 only.
2) Available with communication option 2 only.
3) Available with communication option 1 only.
C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions for HART/mA device English French German Note: The Operating Instructions should be ordered as a separate item on the order. Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5HT02 C) 7ML1998-5HT12 C) 7ML1998-5HT32 C) 7ML1998-5QR81
Operating Instructions for PROFIBUS PA device English German Note: The Operating Instructions should be ordered as a separate item on the order. Additional Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5JB02 C) 7ML1998-5JB32 C) 7ML1998-5QV81
Optional equipment Handheld programmer, Intrinsically Safe, EEx ia Handheld programmer, General Purpose approvals Handheld programmer, Infrared, Intrinsically Safe, PROFIBUS PA HART modem/RS-232 (for use with PC and SIMATIC PDM) HART modem/USB (for use with a PC and SIMATIC PDM) 2" NPT locknut, plastic 2" BSPT locknut, plastic 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" NPT 3" ASME, DN 65 PN 10, JIS 10K 3B ETFE Flange adapter for 2" BSPT One General Purpose polymeric cable gland M20x1.5, rated for -20 ... +80 °C (-4 ... +176 °F) 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) One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F) with integrated shield connection (available for PROFIBUS PA) SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	7ML5830-2AH 7ML1830-2AN 7ML5830-2AJ D) 7MF4997-1DA D) 7MF4997-1DB 7ML1830-1DT 7ML1830-1DQ 7ML1830-1BT 7ML1830-1BU 7ML1930-1AM 7ML1930-1AP 7ML1930-1AQ
Spare Parts Plastic lid C) Subject to export regulations AL: N, ECCN: EAR99 D) Subject to export regulations AL: N, ECCN: EAR99H	7ML1830-1KB

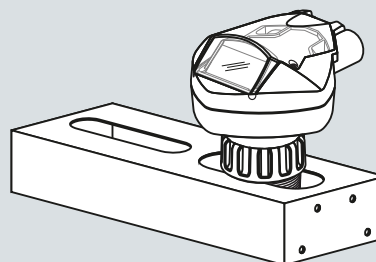
Options

Flange adapter for mating 2" NPT or 2" BSP process connections to 3" ASME, DN 65 PN10 and JIS 10K 3B flanges



SITRANS Probe LU optional flange adapter, dimensions in mm (inch)

SITRANS Probe LU with FMS 200 Mounting Bracket



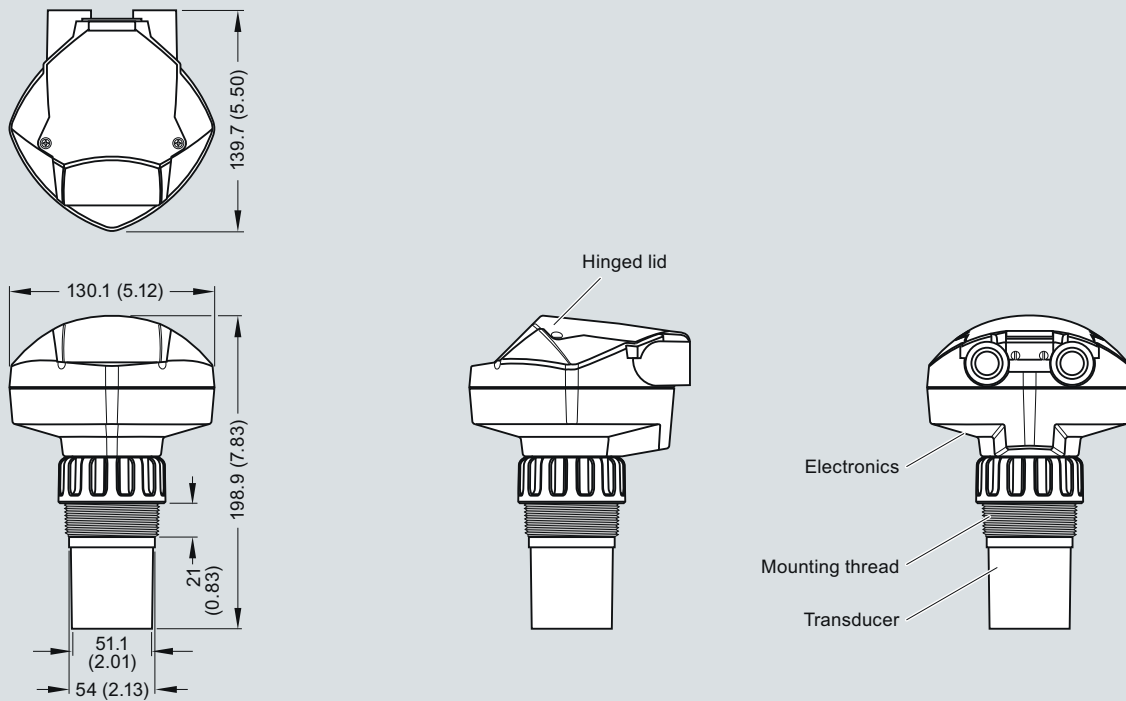
SITRANS Probe LU with optional mounting bracket

Level Measurement

Continuous level measurement - Ultrasonic transmitters

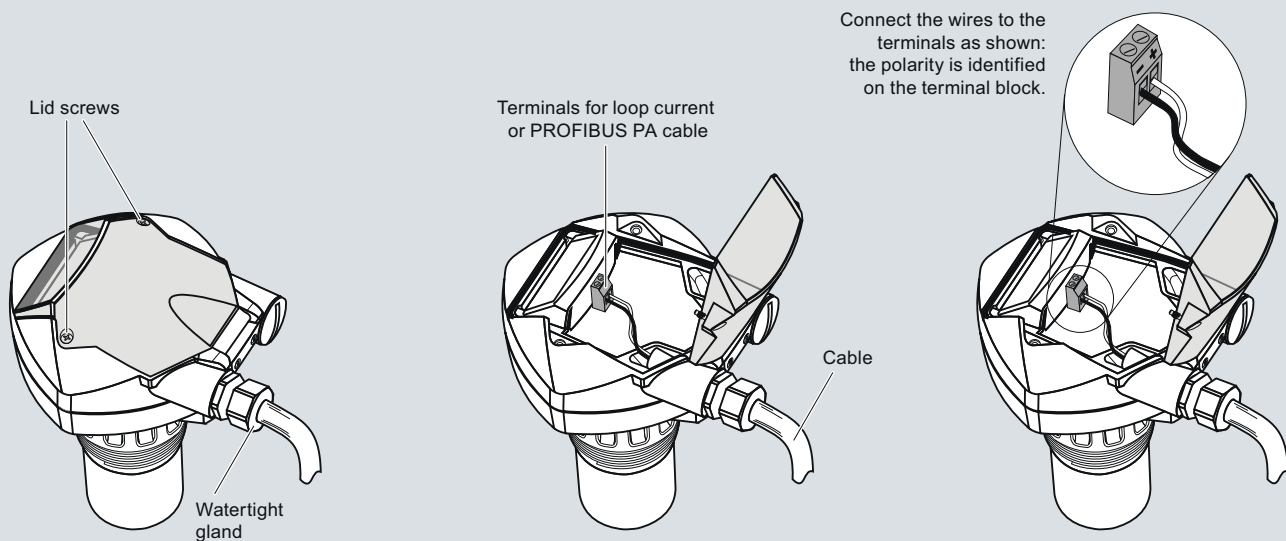
SITRANS Probe LU

Dimensional drawings



SITRANS Probe LU, dimensions in mm (inch)

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

Level Measurement

Continuous measurement - Ultrasonic controllers

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

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, scaleable (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-10/10F, XPS 15/15F, XCT-8, XCT-12 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"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), 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 lbs)
• Panel mount	1.50 kg (3.31 lbs)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	
• Wall mount	IP65/Type 4X/NEMA 4X
• Panel mount	IP54/Type 3/NEMA 3

Level Measurement

Continuous measurement - Ultrasonic controllers

HydroRanger 200

Cable	
• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 300 Vrms, 0.82 mm ² (18 AWG), Belden® 8760 or equivalent is acceptable
• Max. separation between transducer and transceiver	365 m (1200 ft)
Displays and controls	100 x 40 mm (4 x 1.5") multi-block LCD with backlighting
Programming	Programming using handheld programmer or via PC with SIMATIC PDM software
Power supply⁴⁾	
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, C-TICK⁵⁾ • 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 1 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 - DeviceNetTM - Allen-Bradley® Remote I/O

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

HydroRanger 200

Selection and Ordering data	Order 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 model code below.	L) 7ML5034-
Mounting Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount ¹⁾	1 2 3
Power supply 100 ... 230 V AC 12 ... 30 V DC	A B
Number of measurement points Single point model, 6 relays Dual point model, 6 relays Single point model, level only, 1 relay ²⁾ Single point model, level only, 3 relays ²⁾	A B C D
Communication (SmartLinx) Without module SmartLinx® Allen-Bradley® Remote I/O module SmartLinx PROFIBUS DP module SmartLinx DeviceNet™ module See SmartLinx product page 5/310 for more information.	0 1 2 3
Approvals General Purpose CE, FM, CSA _{USC} , UL listed, C-TICK 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)	1 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
 L) Subject to export regulations AL: N, ECCN: 3A991X
 ®Modbus is a registered trademark of Schneider Electric.
 ®Belden is a registered trademark of Belden Wire and Cable Company.
 ®Allen-Bradley is a registered trademark of Rockwell Automation.
 ™DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions English French German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5FC03 C) 7ML1998-5FC11 C) 7ML1998-5FC33
Other Operating Instructions SmartLinx Allen-Bradley Remote I/O, English SmartLinx PROFIBUS DP, English SmartLinx PROFIBUS DP, German SmartLinx PROFIBUS DP, French SmartLinx DeviceNet, English Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	C) 7ML1998-1AP03 C) 7ML1998-1AQ03 C) 7ML1998-1AQ33 C) 7ML1998-1AQ12 C) 7ML1998-1BH02
Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	7ML1830-2AK 7ML1930-1AC
Spare parts Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) Display Board	C) 7ML1830-1MD C) 7ML1830-1ME C) 7ML1830-1MF

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Continuous level measurement - Ultrasonic controllers

HydroRanger 200

Selection and Ordering data	Order No.
Milltronics 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 model code below.	L) 7ML1034 -
Mounting Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount ¹⁾	1 2 3
Power supply 100 ... 230 V AC 12 ... 30 V DC	A B
Communication (SmartLinX) Without module SmartLinX® Allen-Bradley® Remote I/O module SmartLinX PROFIBUS DP module SmartLinX DeviceNet™ module See SmartLinX product page 5/310 for more information.	A B C D
Approvals General Purpose CE, FM, CSA _{US/IC} , UL listed, C-TICK 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)	1 2
Number of measurement points Single point model, 6 relays Dual point model, 6 relays Single point model, level only, 1 relay ²⁾ Single point model, level only, 3 relays ²⁾	1 2 3 4

¹⁾ Available with approval option 1 only

²⁾ This model is level control only; no open channel flow, differential level, or volume conversion functions

L) Subject to export regulations AL: N, ECCN: 3A991X

®Modbus is a registered trademark of Schneider Electric.

®Belden is a registered trademark of Belden Wire and Cable Company.

®Allen-Bradley is a registered trademark of Rockwell Automation.

™DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)

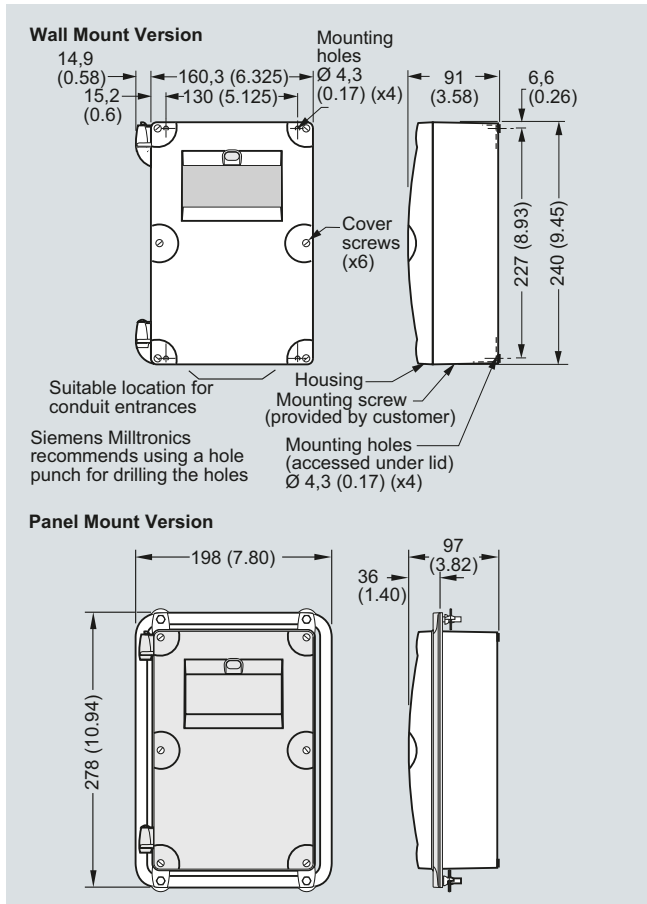
Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions English French German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-1FC06 C) 7ML1998-1FC14 C) 7ML1998-1FC36
Other Operating Instructions SmartLinX Allen-Bradley Remote I/O, English SmartLinX PROFIBUS DP, English SmartLinX PROFIBUS DP, German SmartLinX PROFIBUS DP, French SmartLinX DeviceNet, English Note: The appropriate SmartLinX Operating Instructions should be ordered as a separate line on the order.	C) 7ML1998-1AP03 C) 7ML1998-1AQ03 C) 7ML1998-1AQ33 C) 7ML1998-1AQ12 C) 7ML1998-1BH02
Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	7ML1830-2AM 7ML1930-1AC
Spare parts Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) Display Board	C) 7ML1830-1MD C) 7ML1830-1ME C) 7ML1830-1MF
C) Subject to export regulations AL: N, ECCN: EAR99	

Level Measurement

Continuous level measurement - Ultrasonic controllers

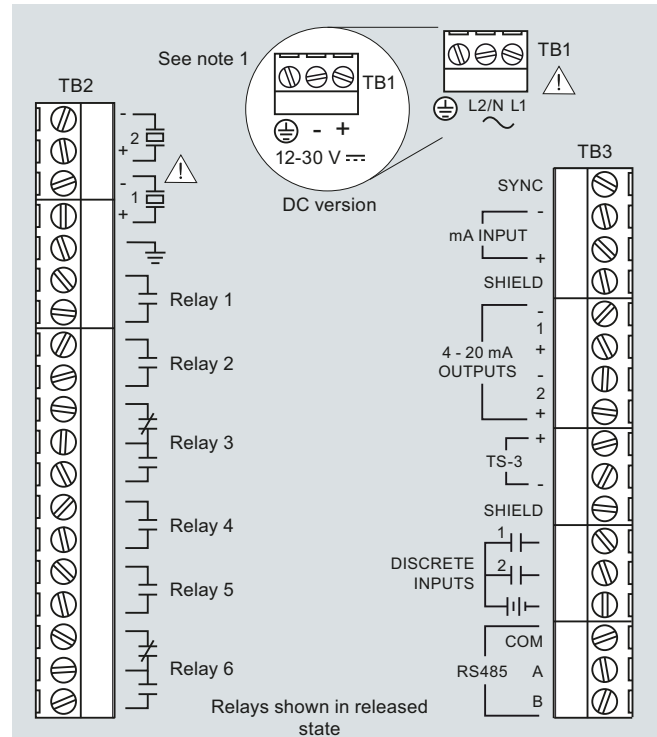
HydroRanger 200

Dimensional drawings



HydroRanger 200, dimensions in mm (inch)

Schematics



Note:

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1200 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

Level Measurement

Continuous level measurement - Ultrasonic controllers

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.

Level Measurement

Continuous level measurement - Ultrasonic controllers

MultiRanger 100/200

Technical specifications

Mode of Operation		Design	
Measuring principle	Ultrasonic level measurement	Weight	
Measuring range	0.3 ... 15 m (1 ... 50 ft)	• Wall mount	1.37 kg (3.02 lbs)
Measuring points	1 or 2	• Panel mount	1.50 kg (3.31 lbs)
Input		Material (enclosure)	Polycarbonate
		Degree of protection (enclosure)	
Analog (MultiRanger 200 only)	0 ... 20 mA or 4 ... 20 mA, from alternate device, scalable	• Wall mount	IP65/Type 4X/NEMA 4X
Discrete	10 ... 50 V DC switching level Logical 0 ≤ 0.5 V DC Logical 1 = 10 ... 50 V DC Max. 3 mA	• Panel mount	IP54/Type 3/NEMA 3
Output		Electrical connection	
		• Transducer and mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG), Belden® 8760 or equivalent is acceptable
Echomax® transducer	44 kHz	• Max. separation between transducer and transceiver	365 m (1200 ft)
Ultrasonic transducer	Compatible transducers: ST-H and Echomax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5	Displays and controls	100 x 40 mm (4 x 1.5") multi-block LCD with backlighting
Relays	Rating 5 A at 250 V AC, non-inductive	Programming	Programming using hand-held programmer, SIMATIC PDM or via PC with Dolphin Plus software
• Version with 1 relay (MultiRanger 100 only)	1 SPST Form A	Power supply	
• Version with 3 relays	2 SPST Form A/1 SPDT Form C	AC version	100 ... 230 V AC ±15 %, 50/60 Hz, 36 VA (17 W)
• Version with 6 relays	4 SPST Form A/2 SPDT Form C	DC version	12 ... 30 V DC (20 W)
mA output	0 ... 20 mA or 4 ... 20 mA	Certificates and approvals	• CE, C-TICK²⁾ • 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
• Max. load	750 Ω, isolated	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™ - Allen-Bradley® Remote I/O
• Resolution	0.1 % of range		
Accuracy			
Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater		
Resolution	0.1 % of measuring range ¹⁾ or 2 mm (0.08"), 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)		

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

Level Measurement

Continuous level measurement - Ultrasonic controllers

MultiRanger 100/200

Selection and Ordering data	Order 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 Versions MultiRanger 100, level measurement only MultiRanger 200, level, volume, flow and differential measurements Mounting, enclosure design Wall mount, standard enclosure Wall mount, 4 entries, 4 M20 cable glands included Panel mount (CE, CSA _{US/C} , FM, UL) Power supply 100 ... 230 V AC 12 ... 30 V DC Number of measurement points Single point version Dual point version Communication (SmartLinX) Without module SmartLinX® Allen-Bradley® Remote I/O module SmartLinX PROFIBUS DP module SmartLinX DeviceNet™ module See SmartLinX product page 5/310 for more information. Output relays 3 relays (2 Form A, 1 Form C), 250 V AC 6 relays (4 Form A, 2 Form C), 250 V AC 1 relay (1 Form A), 250 V AC (available on MultiRanger 100 model only) Approvals General Purpose CE, FM, CSA _{US/C} , UL listed, C-TICK CSA Class I, Div. 2, Groups A, B, C and D; Class II, Div 2, Groups F and G; Class III ¹⁾ ATEX II 3D ²⁾	7ML5033- 1 2 A B C A B 0 1 0 1 2 3 A B C
L) Subject to export regulations AL: N, ECCN: 3A991X ®Modbus is a registered trademark of Schneider Electric. ®Belden is a registered trademark of Belden Wire and Cable Company. ®Allen-Bradley is a registered trademark of Rockwell Automation. ™DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA)	

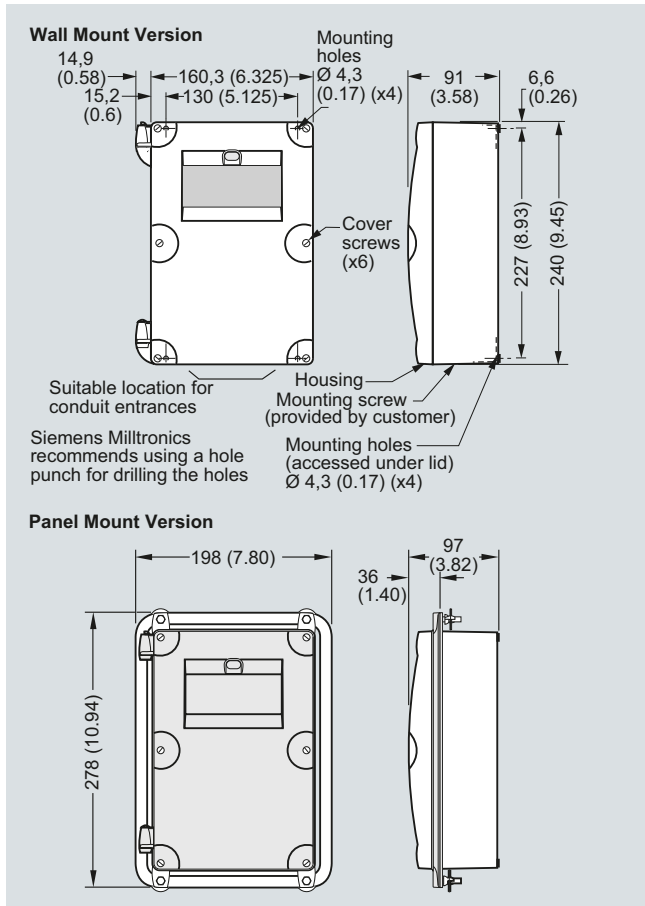
Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Operating Instructions English French Spanish German Quick Start 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 CD containing the complete ATEX Quick Start and Operating Instructions library. Other Operating Instructions SmartLinX Allen-Bradley Remote I/O, English SmartLinX PROFIBUS DP, English SmartLinX PROFIBUS DP, German SmartLinX PROFIBUS DP, French SmartLinX DeviceNet, English Note: The appropriate SmartLinX Operating Instructions should be ordered as a separate line on the order. Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8 Spare parts Power Supply Board (100 ... 230 V AC) Power Supply Board (12 ... 30 V DC) Display Board C) Subject to export regulations AL: N, ECCN: EAR99	Y15 Order No. C) 7ML1998-5FB06 C) 7ML1998-5FB13 C) 7ML1998-5FB23 C) 7ML1998-5FB36 C) 7ML1998-5QD83 C) 7ML1998-1AP03 C) 7ML1998-1AQ03 C) 7ML1998-1AQ33 C) 7ML1998-1AQ12 C) 7ML1998-1BH02 7ML1830-2AK 7ML1930-1AC C) 7ML1830-1MD C) 7ML1830-1ME C) 7ML1830-1MF

Level Measurement

Continuous level measurement - Ultrasonic controllers

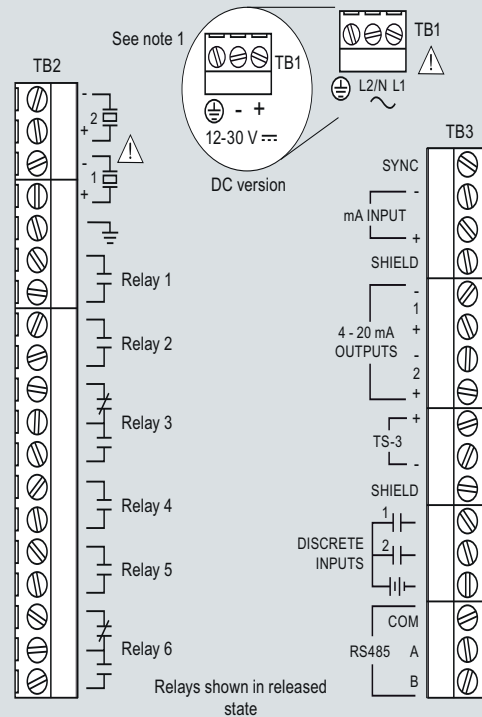
MultiRanger 100/200

Dimensional drawings



MultiRanger, dimensions in mm (inch)

Schematics



Note:

1. Use 2-core copper wire, twisted, with shield, for expansion up to 365 m (1200 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.

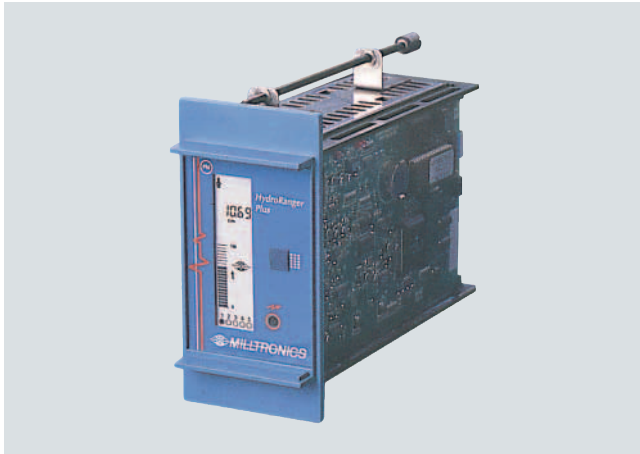
MultiRanger connections

Level Measurement

Continuous level measurement - Ultrasonic controllers

HydroRanger Plus

Overview



HydroRanger Plus is an ultrasonic level controller for control of wet wells and reservoir pump operations, differential control and open channel flow monitoring, using energy-saving algorithms.

Benefits

- Outputs for alarms, chart recorders, controllers and integration of existing systems
- Monitors wet wells, weirs and flumes
- Energy-saving function with built-in real-time clock
- Special control mode to reduce grease rings and other deposits
- Integral temperature compensation
- Pump performance monitoring
- System monitoring and network analysis

Application

The system is effective in wet wells, weirs, and flumes where foam and turbulence are typical operating conditions. It can be customized to meet your specific application needs – from measuring flow rate in a narrow flume to volume in a ferric chloride storage tank.

The system consists of the electronics housed in a wall-mounted enclosure and a hermetically sealed, corrosion-resistant Echomax[®] transducer. These components can be separated by up to 365 m (1200 ft).

Optional submergence shields ensure consistent operation in wet wells where the transducer may be submerged during flooding from rainfall or a power outage. Siemens patented detection software can differentiate between a submerged condition and a high level.

- Key Applications: wet wells, weirs, flumes

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
Output	
Ultrasonic transducer	44 kHz
Relays	5 alarm/control relays, 1 SPDT Form C per relay, rated 5 A at 250 V AC, resistive load
mA output	0/4 ... 20 mA, optically isolated
• Max. load	1 kΩ
• Resolution	0.1 % of 20 mA
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), whichever is greater ¹⁾
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	
Rack mount	DIN 3 HU/14 pitch, 4 rail plug-in unit suitable for standard 84 pitch (19") rack
Panel mount	Suitable for standard panel cutout DIN 43700, 72 x 144 mm, 100 mm center height
Degree of protection (wall mount)	IP65/NEMA 4X/Type 4X
Weight (rack and panel mount)	0.87 kg (1.9 lbs)
Weight (wall mount)	1.5 kg (3.3 lbs)
Material (enclosure)	Polyester/polycarbonate alloy
Electrical connection	
Ultrasonic transducer cable extension	Commercially available copper conductor according to local requirements, rated 250 V/5 A RG 62-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 [®] 8760 or equivalent is acceptable
Power supply	
Ultrasonic transducer	100/115/200/230 V AC, ± 15 %, 50/60 Hz, 15 VA and/or 9 ... 30 V DC, 8 W
	Compatible transducers: ST-H and Echomax series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5
Displays and controls	
Rack and panel mount	75 x 20 mm (3 x 0.8") LCD (selectable backlighting)
Wall mount	100 x 40 mm (4 x 1.5") multifield LCD, backlit
Programming	Removable programmer or optional Dolphin Plus
Memory	EEPROM (non-volatile), no backup battery required
Certificates and approvals	CE ²⁾ , FM, CSA _{US/C} , C-TICK

¹⁾ The measuring range corresponds to the distance from the zero point to the sensor face, plus any range extension.

²⁾ EMC certificate available on request

[®] Belden is a registered trademark of Belden Wire and Cable Company

Level Measurement

Continuous level measurement - Ultrasonic controllers

HydroRanger Plus

Selection and Ordering data	Order No.
HydroRanger Plus, rack and panel mount L)	7ML 1 0 2 5 -
Non-contacting ultrasonic echo ranging technology monitor that comes standard with a backlit display Measuring range: 0.3 m to 15 m (1 ... 50 ft)	0 1
Mounting/device version	
Version for 19" rack (requires terminal block; see accessories)	1
Version for panel	2
Approvals	
CE (EN 61326), CSA _{US/C} , FM, C-TICK	C
Input voltage	
100 V AC, 9 ... 30 V DC	A
115 V AC, 9 ... 30 V DC	B
200 V AC, 9 ... 30 V DC	C
230 V AC, 9 ... 30 V DC	D

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions	Order No.
English	C) 7ML1998-1AC02
French	C) 7ML1998-1AC12
German	C) 7ML1998-1AC32
Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Other Operating Instructions	
SmartLinx Allen-Bradley Remote I/O, English	C) 7ML1998-1AP03
SmartLinx PROFIBUS DP, English	C) 7ML1998-1AQ03
SmartLinx PROFIBUS DP, German	C) 7ML1998-1AQ33
SmartLinx PROFIBUS DP, French	C) 7ML1998-1AQ12
SmartLinx DeviceNet, English	C) 7ML1998-1BH02
Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.	
Accessories	
Handheld programmer	7ML1830-2AC
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure	7ML1930-1AC
Terminal block for rack mount	7ML1830-1JL
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
Spare parts	
Card, Analog HydroRanger Plus Rack/Panel	C) 7ML1830-1LR
Card, daughter	C) 7ML1830-1LS
Card, display, backlit	C) 7ML1830-1LX

Selection and Ordering data	Order No.
HydroRanger Plus, wall mount L)	7ML 1 0 2 8 -
Non-contacting ultrasonic echo ranging technology monitor that comes standard with a backlit display Measuring range: 0.3 m to 15 m (1 ... 50 ft)	A 7 0
Input voltage	
100 V AC, 9 ... 30 V DC	1
115 V AC, 9 ... 30 V DC	2
200 V AC, 9 ... 30 V DC	3
230 V AC, 9 ... 30 V DC	4
Approvals	
CE; FM General Purpose; CSA Class I, Div. 2, C-TICK	C
Mounting/enclosure version	
Standard enclosure (NEMA 4X)	1
Standard enclosure prepared for five M20 cable glands	3
C) Subject to export regulations AL: N, ECCN: EAR99	
L) Subject to export regulations AL: N, ECCN: 3A991X	

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions	Order No.
English	C) 7ML1998-1AC02
French	C) 7ML1998-1AC12
German	C) 7ML1998-1AC32
Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Accessories	
Handheld programmer	7ML1830-2AC
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure	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
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
Spare parts	
Card, mother main	C) 7ML1830-1LV
Card, daughter	C) 7ML1830-1LW
Card, display	C) 7ML1830-1LU
C) Subject to export regulations AL: N, ECCN: EAR99	

Level Measurement

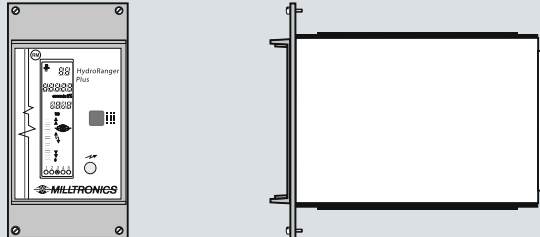
Continuous level measurement - Ultrasonic controllers

HydroRanger Plus

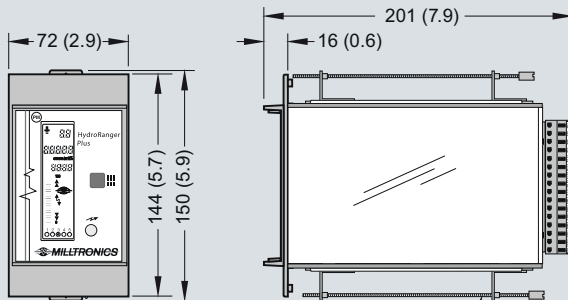
Dimensional drawings

Rack Mount

DIN 3U/14HP, 4 rail plug-in unit suitable for standard 84 HP (19") subrack. (Terminal is customer supplied or available as optional accessory.)

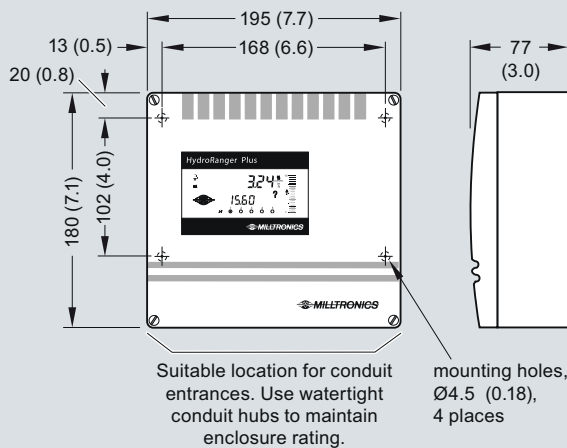


Panel Mount



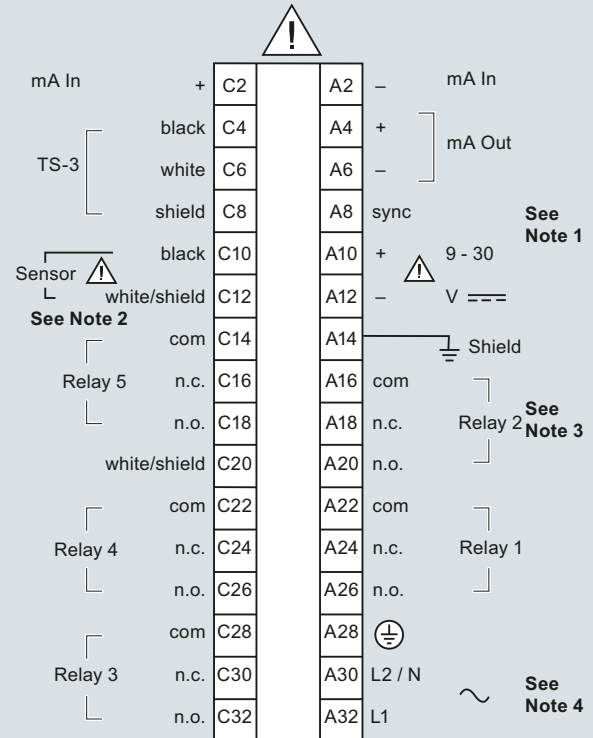
Slip on mounting bracket top and bottom screws to be tightened to no more than 5.9 Nm (1 inch/lb.) torque.

Wall Mount



HydroRanger Plus, dimensions in mm (inch)

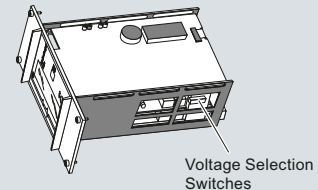
Schematics



Note:

1. Required only if mounted adjacent to other Siemens Milltronics equipment. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5 mm²) wire.
2. Use RG-62 A/U coaxial (or equivalent) for extensions up to 365 m (1200 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. Relay de-energized when in alarm conditions and energized for pump control.
4. Before applying AC power (mains), ensure the correct voltage is selected. Never operate the HydroRanger Plus with the ground (earth) wire disconnected.

Voltage Selection

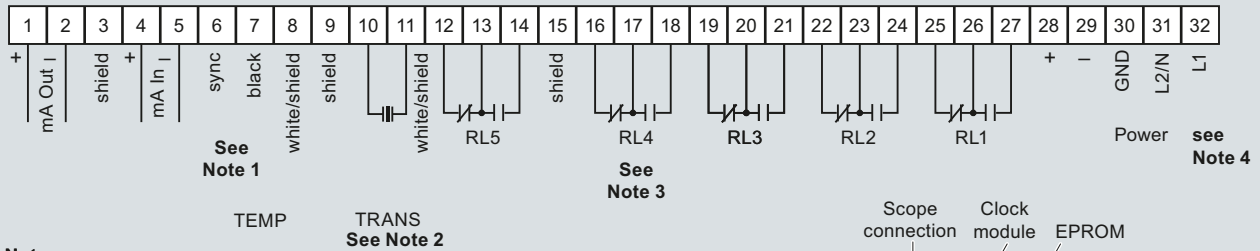


HydroRanger Plus connections, rack and panel mount

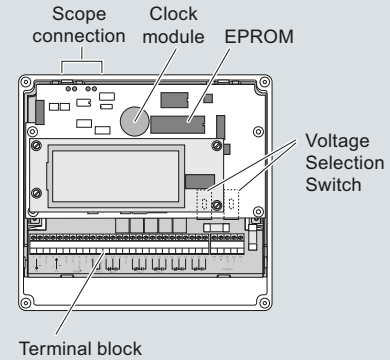
Level Measurement

Continuous level measurement - Ultrasonic controllers

HydroRanger Plus


Note:

1. Required only if mounted adjacent to other Siemens Milltronics equipment. Interconnect all 'SYNC' terminals with a single 18 AWG (0.5 mm²) wire.
2. Use RG-62 A/U coaxial (or equivalent) for extensions up to 365 m (1200 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. Relay de-energized when in alarm conditions and energized for pump control.
4. Before applying AC power (mains), ensure the correct voltage is selected. Never operate the HydroRanger Plus with the ground (earth) wire disconnected.



Level Measurement

Continuous level measurement - Ultrasonic controllers

SITRANS LUC500

Overview



SITRANS LUC500 is a complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms.

Benefits

- Monitoring and control in one device
- Integral telemetry interface (Modbus RTU/ASCII)
- Patented algorithm for calculation of pumped volume within 5 % accuracy
- Logging of pump runtime and number of pump starts
- Expandable with I/Os, RAM for data logging, dual point, SmartLinX communications and RS-485 interface
- Simple system configuration and diagnostics with Siemens Dolphin Plus Windows®-based software
- AC or DC power supply
- SITRANS LUC500 is available for rack mount, panel mount or wall mount

Application

It combines non-contacting ultrasonic technology, patented echo-processing techniques and proven application software to provide accurate level monitoring in liquids up to 15 m (50 ft).

It also effectively monitors flow in flumes, weirs and open channels. Five relays control any combination of pumps, gate valves and alarms. Further advantages include fault signalling and data logging for trend analysis. It can log the time, date and volume of up to 20 occurrences of combined sewer overflows (CSO).

The basic device has 8 digital inputs, 5 digital outputs, 1 analog input, 1 ultrasonic level point, differential/average capability and one RS-232 interface with Modbus® RTU/ASCII protocol.

The device can be expanded by additional I/Os, more RAM, two channels, RS-485 or SmartLinX communications models as your needs grow.

It integrates seamlessly with SCADA or DCS systems or a PLC system to provide remote access to all system parameters (pumped volume, pump runtime, pump status). The integral telemetry interface (Modbus RTU/ASCII) allows remote control in real time.

- Key Applications: wet well/lift station control, weirs/flumes, open channels

Application of accessories

SITRANS LUC500 can be expanded to meet the requirements of a variety of applications.

Auxiliary I/O cards, RAM and data logging, dual-channel function and SmartLinX communications.

- Input/output cards
A single auxiliary I/O card can be installed in the SITRANS LUC500. The following I/O cards are available:
 - 2 analog inputs/2 analog outputs
 - 4 analog inputs
 - 4 analog outputs
 - 8 digital inputs
 - 8 digital inputs/2 analog inputs/2 analog outputs (wall mount only)
- Expanded memory card
The available RAM can be increased using this card. The data logging function is then available.
- Two-channel function
A second measuring point is provided on the SITRANS LUC500 to permit dual-channel measurements. This function is made available by ordering a software access code. Please contact your Siemens representative for details.
- Communications
The SITRANS LUC500 is offered with MODBUS RTU/ASCII as a standard feature. Further industrial communications protocols are available with the addition of an optional SmartLinX card. The following protocols are currently available:
 - PROFIBUS DP
 - Allen Bradley® Remote I/O
 - DeviceNet™

®Modbus is a registered trademark of Schneider Electric.

®Allen-Bradley is a registered trademark of Rockwell Automation.

™DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA) Windows® is a registered trademark of Microsoft Corp.

Level Measurement

Continuous level measurement - Ultrasonic controllers

SITRANS LUC500

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic level measurement
Measuring range	0.3 ... 15 m (1 ... 50 ft)
Measuring points	1 or 2
Output	
Ultrasonic transducer	44 kHz
Relays	5 relays, rated 5 A at 250 V AC, non-inductive • Wall Mount version: 4 SPST Form A relays, 1 SPDT Form C relay • Rack and Panel Mount version: 4 SPST Form A relays, 1 SPST Form B relay
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), whichever is greater ¹⁾
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	
Rack mount	DIN 3 HU/21 pitch, 4-rail plug-in unit suitable for standard 3 HU/84 pitch (19") rack
Panel mount	Suitable for standard panel cutout DIN 43700 72 x 144 mm, 110 mm (4.33") center height
Weight (rack and panel mount)	1.5 kg (3.3 lbs)
Weight (wall mount)	2.5 kg (5.5 lbs)
Communications	
RS-232	Siemens Dolphin protocol, Modbus RTU and ASCII
Option	SmartLinx compatible, RS-485
Power supply	
	100 ... 230 V AC ±15 %, 50/60 Hz, 36 VA (17 W) or 12 ... 30 V DC, 20 W
Ultrasonic transducer	Compatible transducers: ST-H and Echomax [®] series XPS-10/10F, XPS 15/15F, XCT-8, XCT-12 and XRS-5
mA output signal	2-core copper conductor, twisted, shielded, 0.5 ... 0.75 mm ² (22 ... 18 AWG), Belden [®] 8760 or equivalent is acceptable
Displays and controls	
Rack and panel mount	75 x 20 mm (3 x 0.8") LCD (selectable backlighting)
Wall mount	100 x 40 mm (4 x 1.5") multfield LCD, backlit
Programming	
	Using removable handheld programmer (ordered separately) or Dolphin Plus software (option)
Memory	
	1 Mbyte RAM (static) with battery, 1 Mbyte flash EPROM
Certificates and approvals	
	CE, FM, CSA

¹⁾ The measuring range corresponds to the distance from the zero point to the sensor face, plus any range extension (P801)

Level Measurement

Continuous level measurement - Ultrasonic controllers

SITRANS LUC500

Selection and Ordering data	Order No.
SITRANS LUC500 A complete ultrasonic level controller for monitoring and control of water distribution and wastewater collection systems, with energy-saving algorithms.	L) 7ML5001-
Mounting Panel mount version Rack mount version for 19" rack Wall mount, standard enclosure Wall, 4 entry, M20 (valid with approval option 3 only)	1 2 3 5
Input voltage 100 ... 230 V AC 12 ... 30 V DC	A B
Number of measurement points Single point version Dual point version	A B
Data communications SmartLinX ready, no module SmartLinX PROFIBUS DP module SmartLinX Allen-Bradley Remote I/O module SmartLinX DeviceNet module	0 1 2 3
Protocol Modbus RTU/ASCII	1
Auxiliary memory None 1 Mbyte static RAM, including data logging module	0 1
Auxiliary I/O None 2 analog inputs and 2 analog outputs 4 analog inputs 4 analog outputs 8 digital inputs 8 digital inputs, 2 analog inputs and 2 analog outputs (only for wall mount)	A B C D E F
Approvals CSA, CE, UL (not available with mounting option 5) CE L) Subject to export regulations AL: N, ECCN: 3A991X	2 3
Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions English German Note: The Operating Instructions should be ordered as a separate item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. 7ML1998-5GL01 7ML1998-5GL31
Other Operating Instructions SmartLinX Allen-Bradley Remote I/O, English SmartLinX PROFIBUS DP, English SmartLinX PROFIBUS DP, German SmartLinX PROFIBUS DP, French SmartLinX DeviceNet, English Note: The appropriate SmartLinX Operating Instructions should be ordered as a separate line on the order.	C) 7ML1998-1AP03 C) 7ML1998-1AQ03 C) 7ML1998-1AQ33 C) 7ML1998-1AQ13 C) 7ML1998-1BH02

Optional Equipment

Optional Equipment	Order No.
Handheld programmer	7ML1830-2AG
ERS500 Configuration Tool software, CD, cable kit, B) and License	7ML1930-1AE
ERS500 Configuration Tool software, License only	B) 7ML1930-1AF
ERS500 Configuration Tool software, demo CD only	B) 7ML1930-1AG
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) <u>See SmartLinX product page 5/310 for more information.</u>	7ML1930-1FV
Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosures	7ML1930-1AC
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
Auxiliary Cards. Access code required¹⁾	
1 MB static RAM extended memory	L) PBD-51034040
2 analog input / 2 analog output for rack and panel mount version	C) PBD-51034039
2 analog input / 2 analog output for wall mount version	C) PBD-51034044
8 digital input for rack and panel mount version	C) PBD-51034042
8 digital input for wall mount version	C) PBD-51034043
4 analog input for rack and panel mount version	C) PBD-51034045
4 analog input for wall mount version	C) PBD-51034046
4 analog output for rack and panel mount version	C) PBD-51034047
4 analog output for wall mount version	C) PBD-51034048
8 digital inputs, 2 analog inputs, 2 analog outputs, wall mount	C) PBD-51034272
Access code, dual point capability	C) 7ML1830-1KA
Auxiliary Cards²⁾	
1 MB static RAM extended memory	L) 7ML1830-1KR
2 analog input / 2 analog output for rack and panel mount version	C) 7ML1830-1KS
2 analog input / 2 analog output for wall mount version	C) 7ML1830-1KT
8 digital input for rack and panel mount version	C) 7ML1830-1KU
8 digital input for wall mount version	C) 7ML1830-1LA
4 analog input for rack and panel mount version	C) 7ML1830-1LB
4 analog input for wall mount version	C) 7ML1830-1LC
4 analog output for rack and panel mount version	C) 7ML1830-1LD
4 analog output for wall mount version	C) 7ML1830-1LE
8 digital inputs, 2 analog inputs, 2 analog outputs, wall mount	C) 7ML1830-1LF

- 1) Values of parameters P345 and P346 must be obtained from the customer in order to generate the order for the access code.
2) For replacement of auxiliary card or spare auxiliary card. Access code not required. Must be used only as replacement cards.
B) Subject to export regulations AL: N, ECCN: EAR99S
C) Subject to export regulations AL: N, ECCN: EAR99
L) Subject to export regulations AL: N, ECCN: 3A991X

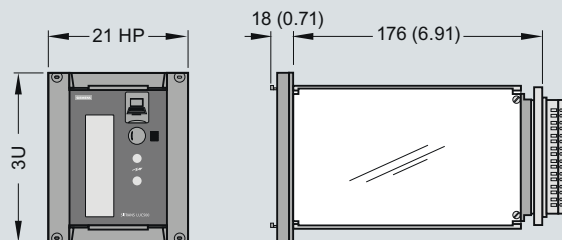
Level Measurement

Continuous level measurement - Ultrasonic controllers

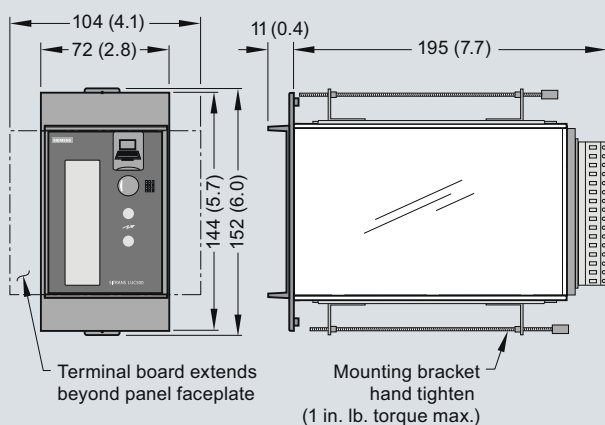
SITRANS LUC500

Dimensional drawings

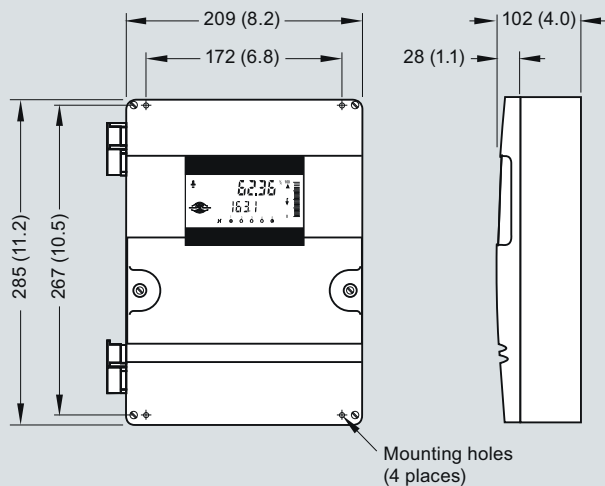
Rack Mount Unit



Panel Mount Unit



Wall Mount Unit



SITRANS LUC500, dimensions in mm (inch)

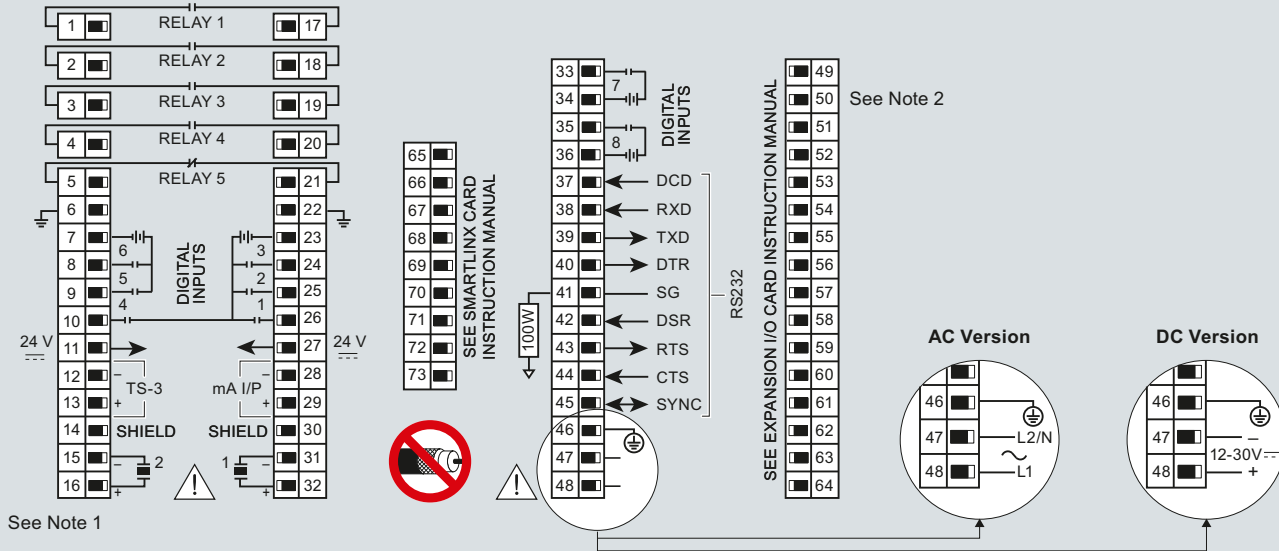
Level Measurement

Continuous level measurement - Ultrasonic controllers

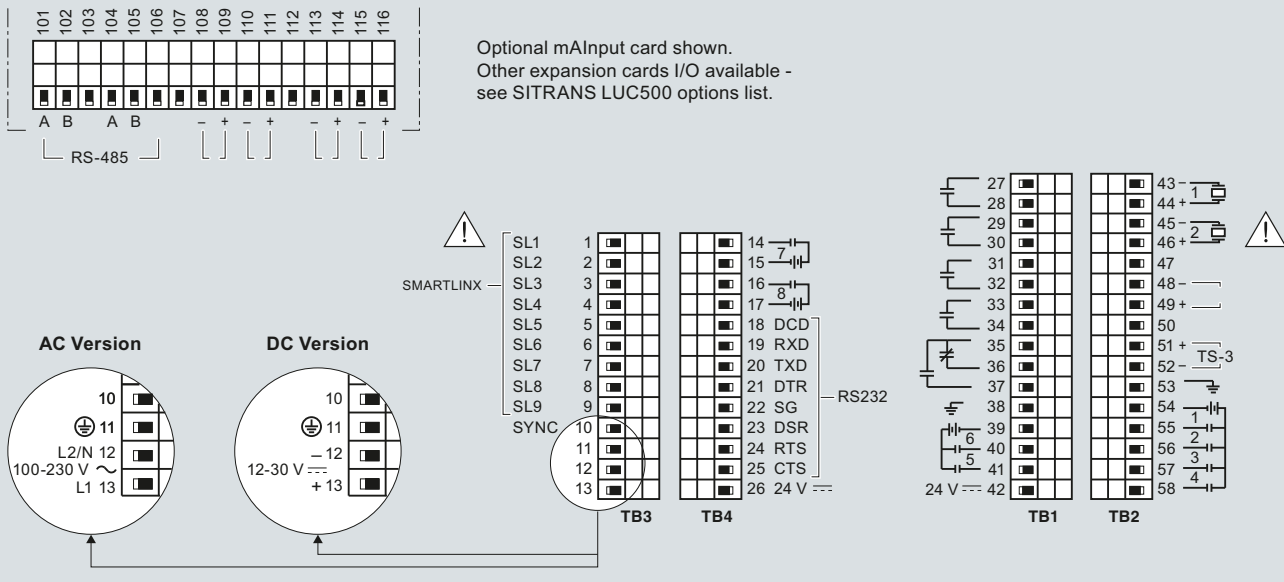
SITRANS LUC500

Schematics

Rack and Panel Mount



Wall Mount



SITRANS LUC500 connections

Level Measurement

Continuous level measurement - Ultrasonic controllers

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 key-pad (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 and SmartLinX 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 (1200 ft) away. The SITRANS LU01 will measure distance, level or volume, and it features patented Sonic Intelligence® echo processing software for superior reliability.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

An on-board communications port automatically configures for RS-232, RS-485 or bi-polar current loop. The SITRANS LU01 will connect to a DCS or PLC using Siemens SmartLinX® interface modules, giving you remote 2-way communication and full parameter access.

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 key-pad (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 and SmartLinX 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 patented Sonic Intelligence® echo processing software for superior reliability. Transducers can be mounted up to 365 m (1200 ft) from the monitor.

Readings are displayed in user-selectable linear engineering units on the backlit LCD.

It features an onboard communications port that automatically configures for RS-232, RS-485 or bi-polar current loop. It will connect to a DCS or PLC using Siemens SmartLinX® interface modules, giving you remote 2-way communication and full parameter access. 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, tripper car

Level Measurement

Continuous level measurement - Ultrasonic controllers

SITRANS LU01 and LU02

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. 1 mA output SITRANS LU02: Max. 2 mA outputs

Accuracy

Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), 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 lbs)
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® 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 LU01/LU02 units can be synchronized together

Power supply

AC model	100/115/200/230 V AC $\pm$ 15 %, 50/60 Hz, 31 VA
DC model	18 ... 30 V DC, 25 W

Displays and controls

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	• SmartLinX: protocol-specific modules as interface for popular industrial fieldbus systems • Dolphin Plus: Siemens Windows®-compatible interface and ComVerter link (infrared)

SITRANS LU01 and LU02

Selection and Ordering data

SITRANS LU01/LU02

Single or dual point ultrasonic long-range level monitoring system for liquids and solids, and ranges up to 60 m (200 ft).

Number of measuring points

LU01 version, 1 point

LU02 version, 2 points

Input voltage

100/115/200/230 V AC, voltage selector switch
18 ... 30 V DC

Feature software

Standard

Application software

Standard

Data communications

No module (SmartLinx ready)
SmartLinx Allen-Bradley® Remote I/O module
SmartLinx PROFIBUS DP module
SmartLinx Modbus® RTU module

Enclosure

Wall mount
Wall mount, drilled, 6 x M20

Approvals

CE, CSA_{US/C}, FM¹⁾
CE²⁾
ATEX II 3D¹⁾

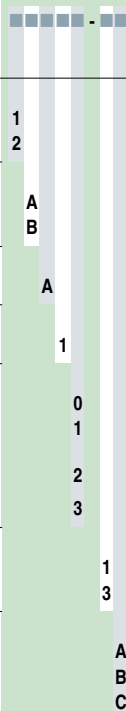
¹⁾ Available with enclosure option 1 only

²⁾ Available with enclosure option 3 only

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

C) 7ML5004-



Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:
Measuring-point number/identification (max. 16 characters) specify in plain text

Y15

Operating Instructions

SITRANS LU01

English

C) 7ML1998-5BE02

French

C) 7ML1998-5BE12

German

C) 7ML1998-5BE32

SITRANS LU02

English

C) 7ML1998-5BD02

French

C) 7ML1998-5BD12

German

C) 7ML1998-5BD32

Note: The Operating Instructions should be ordered as a separate line item.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Other Operating Instructions

SmartLinx Allen-Bradley Remote I/O, English

C) 7ML1998-1AP03

SmartLinx PROFIBUS DP, English

C) 7ML1998-1AQ03

SmartLinx PROFIBUS DP, German

C) 7ML1998-1AQ33

SmartLinx PROFIBUS DP, French

C) 7ML1998-1AQ12

SmartLinx Modbus, English

C) 7ML1998-1BF01

SmartLinx Modbus, German

C) 7ML1998-1BF31

SmartLinx Modem, English

C) 7ML1998-1BG01

Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.

Accessories

Handheld programmer

7ML1830-2AN

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), 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 5/191

7ML1830-2AN

Spare parts

Card, LU01 mother main, AC, comm ready

C) 7ML1830-1KX

Card, LU02 mother main, AC, comm ready

C) 7ML1830-1MA

Card, LU02 daughter, comm ready

C) 7ML1830-1LP

Card, LU01 daughter, comm ready

C) 7ML1830-1LN

Card, display

C) 7ML1830-1LQ

See SmartLinx product page 5/310 for more information.

C) Subject to export regulations AL: N, ECCN: EAR99

®Modbus is a registered trademark of Schneider Electric.

®Allen-Bradley is a registered trademark of Rockwell Automation.

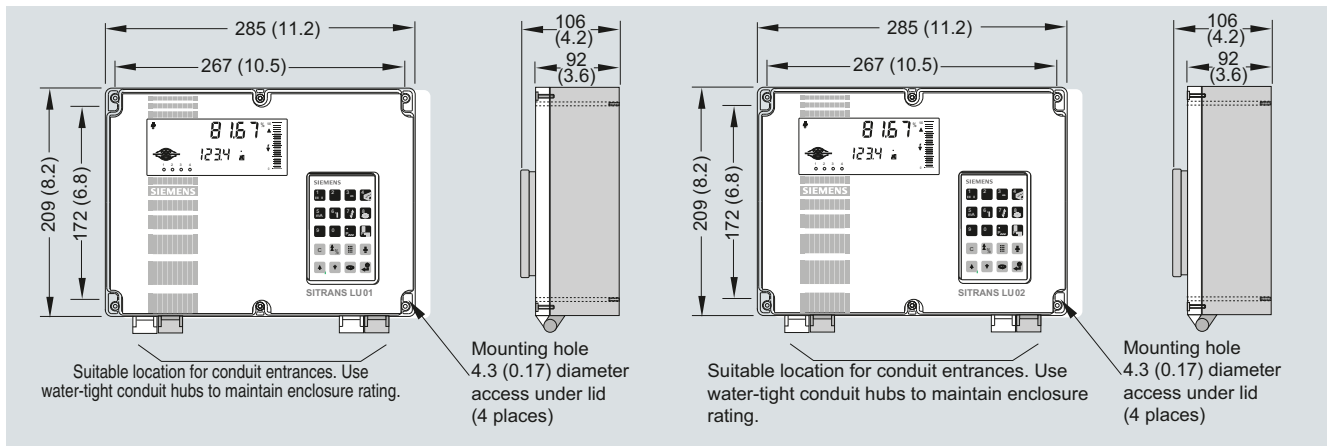
™DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).

Level Measurement

Continuous level measurement - Ultrasonic controllers

SITRANS LU01 and LU02

Dimensional drawings



Dimensional drawings for SITRANS LU01 (left) and SITRANS LU02 (right), dimensions in mm (inch)

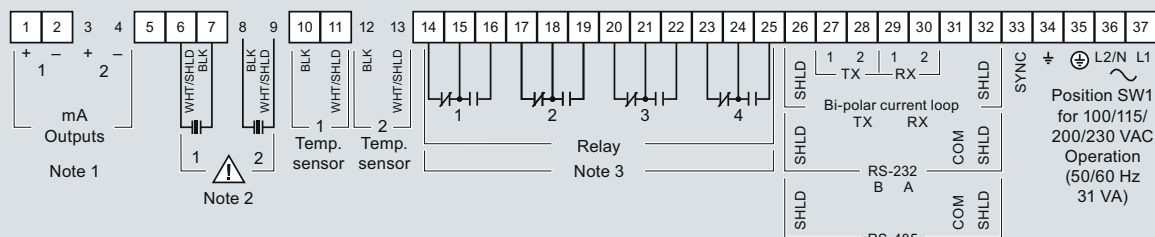
Level Measurement

Continuous level measurement - Ultrasonic controllers

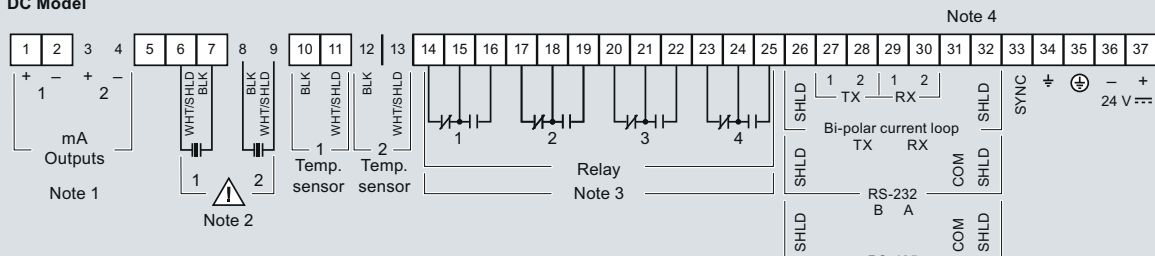
SITRANS LU01 and LU02

Schematics

AC Model



DC Model

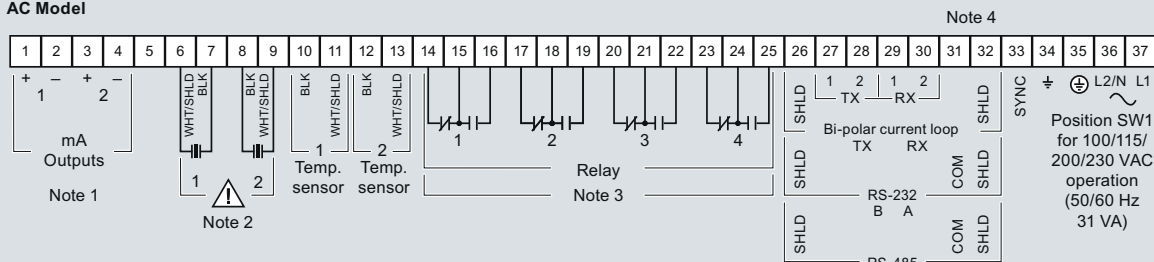


Notes:

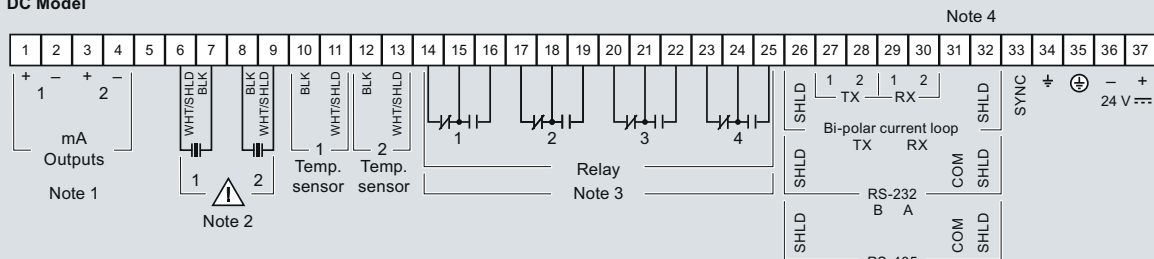
1. Optically isolated, 750 Ω max. load
2. Use RG62-A/U coaxial (or equivalent) for extensions up to 365 m (1200 ft). Run in grounded metal conduit, separate from other wiring.
3. Each relay has 1 set of Form 'C' (SPDT) contacts, relay rated at 5 A 250 V AC, non-inductive, when equal or lower rated limiting 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 (0.5mm²) wire.

SITRANS LU01 connections

AC Model



DC Model



Note:

1. Optically isolated, 750 Ω max. load
2. Use RG62-A/U coaxial (or equivalent) for extensions up to 365 m (1200 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 (0.5mm²) wire.

SITRANS LU02 connections

Level Measurement

Continuous level measurement - Ultrasonic controllers

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 and SmartLinx[®] 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 (1200 ft) from the monitor. The SITRANS LU10 features patented Sonic Intelligence[®] echo processing software for superior reliability. Readings are displayed in user-selectable linear engineering units on the LCD.

SITRANS LU10 will connect to a DCS or PLC using Siemens SmartLinx[®] interface modules, giving you remote 2-way communication and full parameter access. 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 (sugar, flour bins, grains, cereals), plastic pellets, tank farms

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	• SITRANS LU SAM module (option): 20 alarm/control relays • SPDT Form C relays, rated 5 A at 250 V AC, resistive load
mA output	SITRANS LU A0 module (option): 0/4 ... 20 mA, optically isolated
• Max. load • Resolution	750 Ω , isolated 0.1 % of range
Accuracy	
Error in measurement	0.25 % of range or 6 mm (0.24"), whichever is greater
Resolution	0.1 % of measuring range or 2 mm (0.08"), 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 lbs)
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 mm ² (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 $\pm$ 15 %, 50/60 Hz, 31 VA
Displays and controls	
Memory	EEPROM (non-volatile), no backup battery required
Programming	Using removable programmer (ordered separately) or Dolphin Plus (option)
Certificates and approvals	
• CE, C-TICK, FM, CSA_{US/C}, ATEX II 3D • Lloyd's register of Shipping (Categories ENV1, ENV2, ENV3 and ENV5)	

SITRANS LU10

Options

Expansion card	TIB-9, increases the number of TS-3 inputs from 1 ... 10
External temperature sensor	TS-3
Communications	- SmartLinx: protocol-specific modules as interface for popular industrial fieldbus systems - 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) - SITRANS LU SAM, satellite alarm module (max. 2)

[®]Windows is a registered trademark of Microsoft Corporation.

Selection and Ordering data

SITRANS LU10

Ten point ultrasonic long-range level monitoring system for liquids and solids applications, and ranges up to 60 m (200 ft).

Input voltage

100/115, 200/230 V AC, selectable

Feature software

Standard

Application software

Standard

Data communications

No module (SmartLinx ready)
SmartLinx Allen-Bradley[®] Remote I/O module
SmartLinx PROFIBUS DP module
SmartLinx Modbus[®] RTU module

TIB-9 temperature card

None
With TIB-9 card

Enclosure

Wall mount
Wall mount, drilled, 12 x M20

Approvals

CE, CSA^{US}, FM¹⁾
ATEX II 3D¹⁾
CE, C-TICK²⁾

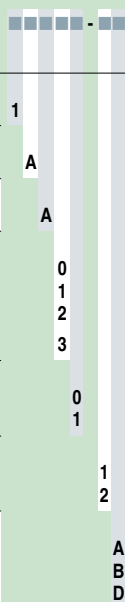
1) Available with Enclosure option 1 only

2) Available with Enclosure option 2 only

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

C) **7ML5007-**



Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Order No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:
Measuring-point number/identification
(max. 16 characters) specify in plain text

Y15

Operating Instructions

English

C) **7ML1998-5AN02**

French

C) **7ML1998-5AN12**

German

C) **7ML1998-5AN32**

Other Operating Instructions

SmartLinx Allen-Bradley Remote I/O, English
SmartLinx PROFIBUS DP, English

C) **7ML1998-1AP03**

C) **7ML1998-1AQ03**

SmartLinx PROFIBUS DP, German

C) **7ML1998-1AQ33**

SmartLinx PROFIBUS DP, French

C) **7ML1998-1AQ12**

SmartLinx Modbus, English

C) **7ML1998-1BF01**

SmartLinx Modbus, German

C) **7ML1998-1BF31**

SmartLinx Modem, English

C) **7ML1998-1BG01**

Note: The appropriate SmartLinx Operating Instructions should be ordered as a separate line on the order.

Accessories

Handheld programmer

7ML1830-2AN

Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"),
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

Spare parts

Card, mother main, AC, comm ready

C) **7ML1830-1ML**

Card, daughter, comm ready

C) **7ML1830-1LY**

Card, display

See SmartLinx product page 5/310 for more information.

7ML1830-1LQ

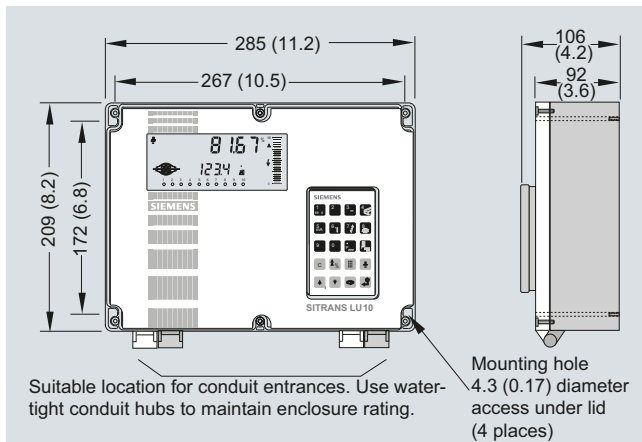
C) Subject to export regulations AL: N, ECCN: EAR99

[®]Modbus is a registered trademark of Schneider Electric.

[®]Allen-Bradley is a registered trademark of Rockwell Automation.

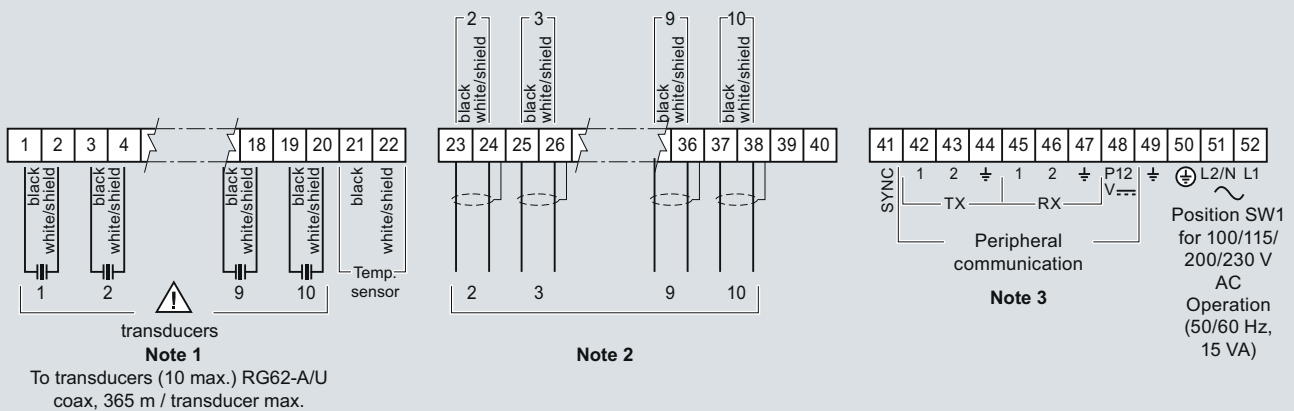
[™]DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).

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 SAM - relay satellite alarm module
 - SITRANS LU AO - analog output module

SITRANS LU10 connections

Level Measurement

Continuous level measurement - Ultrasonic controllers

SITRANS LU SAM

Overview



SITRANS LU SAM Satellite Alarm Module provides up to 20 relay outputs for the measurement points of the SITRANS LU10 level monitor.

Benefits

- The SITRANS LU SAM can be located up to 1500 m (5000 ft) from the SITRANS LU10
- Relay outputs can be assigned to any point on the SITRANS LU10

Application

The operation of the SITRANS LU SAM is programmed via the SITRANS LU10. The only on-board settings are for bank selection and output testing.

Using a SITRANS LU SAM, you can have two relay outputs for all ten measurement points, all 20 for a single measurement point or any combination between the two.

All relays are Form C to allow NO or NC wiring.

Technical specifications

Mode of operation	Satellite alarm module
Input	
Communications	Data from SITRANS LU10
• Transmission rate	4800 bits/s
• Voltage	± 20 mA bipolar current loop
Output	
Relays	20 multi-purpose relays, programmable from SITRANS LU10 SPDT Form C relays, rated 5 A at 250 V AC, resistive load
± 20 mA bipolar current loop	Input and transmission
• Max. load	1 receiving unit
Rated operation conditions	
Ambient conditions	
• Ambient temperature	-20 ... +50 °C (-5 ... +122 °F)
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Design	
Weight	3 kg (6.6 lbs)
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 mm ² (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, 20 VA
Displays and controls	1 LED for display of voltage/communications state, 20 LEDs for display of relay states
Certificates and approvals	CE, FM, CSA _{US/C} , C-TICK

Selection and Ordering data

Order No.

SITRANS LU SAM

C) **7ML5811-1A**

Satellite alarm module provides up to 20 relay outputs for the measurement points of the SITRANS LU10 level monitor.

Approvals: CSA_{US/C}, FM, CE, C-TICK

Operating Instructions

English

C) **7ML1998-5CF02**

German

C) **7ML1998-5CF32**

Note: Instruction manuals should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

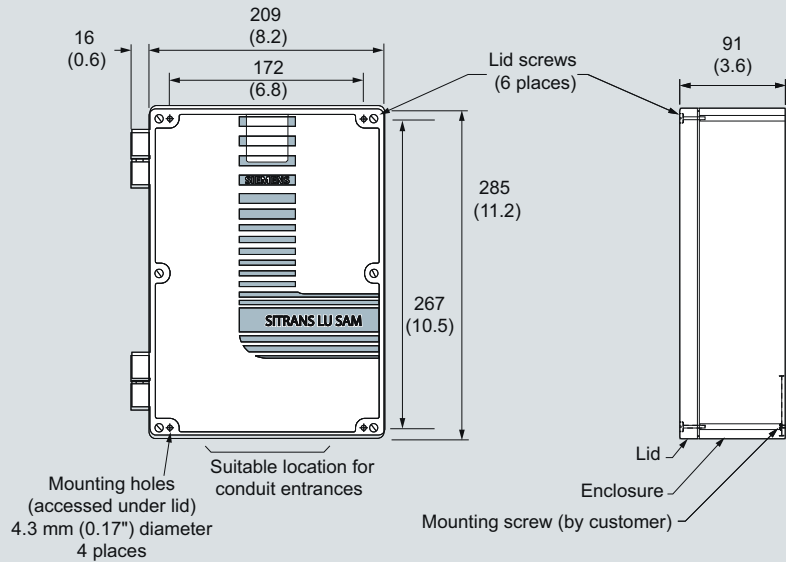
C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Continuous level measurement - Ultrasonic controllers

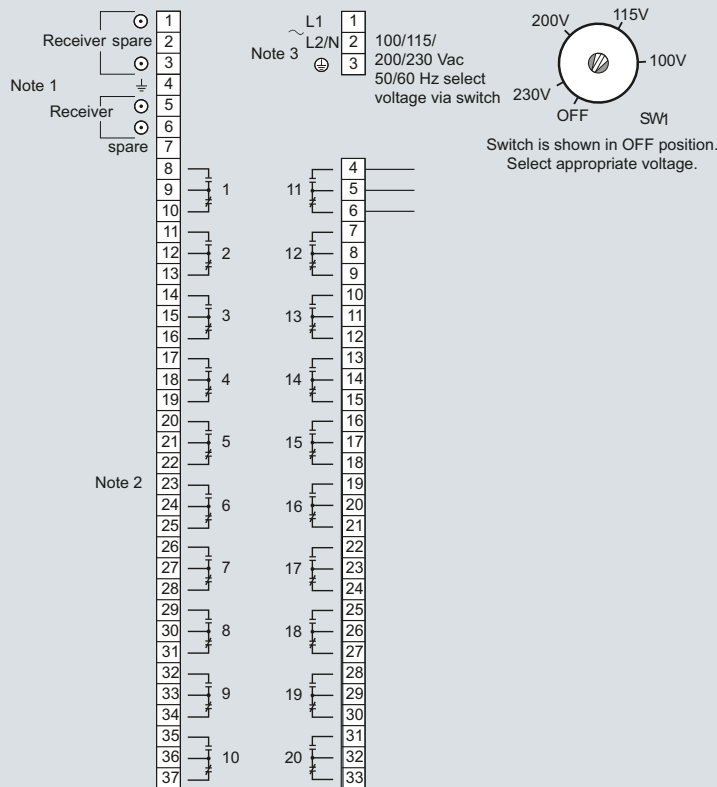
SITRANS LU SAM

Dimensional drawings



SITRANS LU SAM, dimensions

Schematics



- Note:
1. SITRANS LU SAM receiver is polarized.
 2. Refer to associated application device instruction manual for wiring detail.
Check that the communication parameter P740 (SITRANS LU10) is 'ON'.
 3. If SITRANS LU SAM is unpowered, transmitter ceases communication to all downstream peripherals.
 4. Relay contact Form 'C' SPDT, 5A at 250 V AC non-inductive (typical of up to 20 per SITRANS LU SAM).

SITRANS LU SAM connections

Level Measurement

Continuous level measurement - Ultrasonic controllers

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 1500 m (5000 ft) from the SITRANS LU10
- 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	Output module
Input Communications • Transmission rate • Voltage • Polarization • Max. load	Data from SITRANS LU10 4800 bits/s ± 20 mA bipolar current loop Non-polarized 1 receiving unit
Output Analog outputs • Max. load • Resolution	10 analog outputs, programmable from SITRANS LU10 0 or 4 ... 20 mA, isolated Input and transmission 750 Ω 0.1 %
Rated operating conditions Ambient conditions • Ambient temperature for enclosure • Location • Installation category • Pollution degree	-20 ... +50 °C (-5 ... +122 °F) Indoor/outdoor II 4
Design Weight Material (enclosure) Degree of protection • Cable connection • Electrical connection and relay connection	2 kg (4.4 lbs) Polycarbonate Type 4X/NEMA 4X/IP65 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm ² (22 ... 18 AWG) 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} , C-TICK

Selection and Ordering data

Order No.

SITRANS LU AO

Provides remote analog output for the measurement points of the SITRANS LU10 level monitor.
 Approvals: CSA_{US/C}, FM, CE, C-TICK

C) **7ML5810-1A**

Operating Instructions

English
 German

C) **7ML1998-5CE01**
 C) **7ML1998-5CE31**

Note: Instruction manuals should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete Quick Start and instruction manual library.

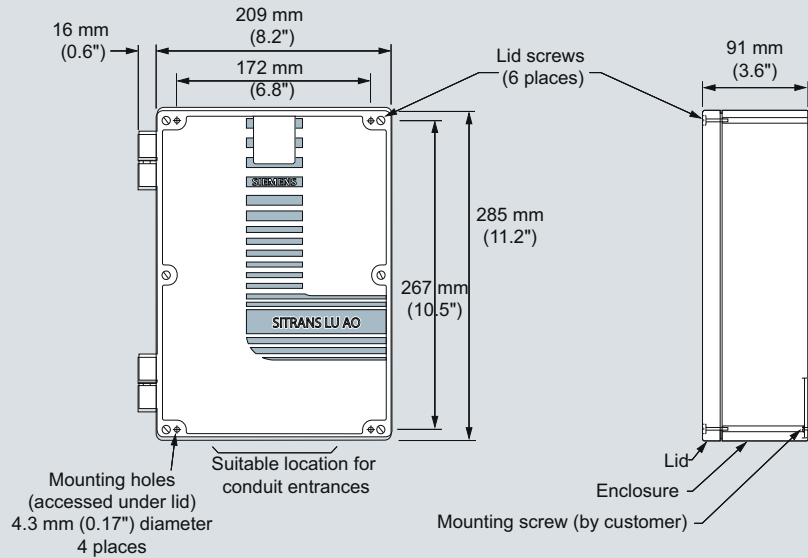
C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Continuous level measurement - Ultrasonic controllers

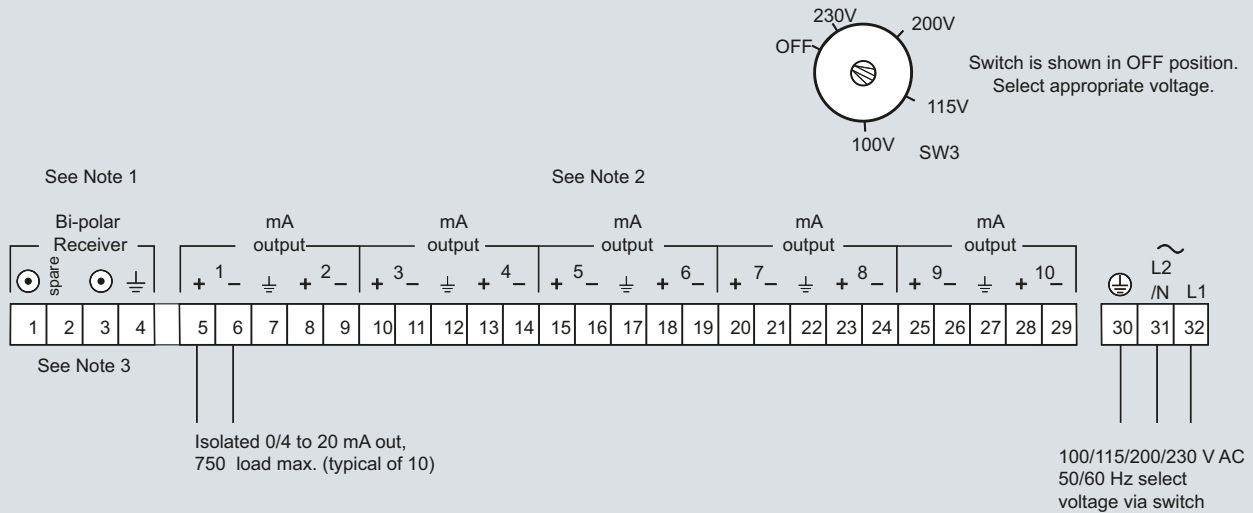
SITRANS LU AO

Dimensional drawings



SITRANS LU AO, dimensions in mm (inch)

Schematics



Note:

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 3000 m (10,000 ft).

SITRANS LU AO connections

Level Measurement

Continuous level measurement - Ultrasonic transducers

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				High Temperature		Solids	
	XRS-5	ST-H	Standard	XPS-10	XPS-15	XPS-30	XPS-40	XCT-8	XCT-12	High Temperature
Max. range ¹⁾	8 m (26 ft)	10 m (33 ft)	10 m (33 ft)	15 m (50 ft)	30 m (100 ft)	40 m (130 ft)	8 m (26 ft)	12 m (40 ft)	30 m (100 ft)	60 m (200 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)	0.9 m (3 ft)	0.6 m (2 ft)	0.6 m (2 ft)	0.9 m (3 ft)	1.8 m (6 ft)
Max. temperature	+65 °C (+149 °F)	+73 °C (+164 °F)	+95 °C (+203 °F)	+95 °C (+203 °F)	+95 °C (+203 °F)	+95 °C (+203 °F)	+145 °C (+293 °F)	+145 °C (+293 °F)	+150 °C (+300 °F)	+150 °C (+300 °F)
Min. temperature	-20 °C (-4 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °F)	-40 °C (-40 °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	Powders, pellets and solids	Hot acids and slurries, food	Hot acids and slurries	Clinker and coal bunkers	Clinker and coal bunkers
Frequency	44 kHz	44 kHz	44 kHz	44 kHz	30 kHz	22 kHz	44 kHz	44 kHz	22 kHz	13 kHz
Beam angle (-3dB)	10°	12°	12°	6°	6°	6°	12°	6°	5°	5°
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	R 1.5" [(BSPT), EN 10226] Universal thread 1.5" NPT	R 1" [(BSPT), EN 10226] 1" NPT	R 1" [(BSPT), EN 10226] 1" NPT	1" NPT	1" 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	- PVDF - Option: Foam facing - Flange with PTFE facing	- PVDF - Option: Foam facing - Flange with PTFE facing - Sanitary version	- PVDF - Option: Flange with PTFE facing	- Aluminum 304 Stainless steel - Polyester - Silicone	- Aluminum 304 Stainless steel - Polyester - Silicone
Compatible with:										
SITRANS LU	•	•	•	•	•	•	•	•	•	•
SITRANS LUC500	•	•	•	•			•	•		
Hydro Ranger 200	•	•	•	•			•	•		
Multi-Ranger 100/200	•	•	•	•			•	•		
OCM III	•									

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.

Level Measurement

Continuous level measurement - Ultrasonic transducers

ST-H

Overview



ST-H transducers use ultrasonic technology to measure level in chemical storage and liquid tanks.

Benefits

- Can be mounted on a 2" (50.8 mm) 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 2" (50.8 mm) 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 lbs)
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 (1200 ft) with RG 62 A/U coaxial cable
Options	
Flange adapter	3" Universal (fits DN 65, PN 10 and 3" ASME)
Submergence coupling	For maintaining high level readings while the transducer is submerged
Certificates and approvals	
CE ³⁾ , CSA Class I, II, III, Div. 1, Gr. A, B, C, D, E, F, G T3 (ETFE only), FM Class I, II, Div. 1, Gr. C, D, E, F, G T4A, ATEX II 2G EEx m IIC T5, C-TICK, INMETRO: Br-Ex m II T5	

- 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.
³⁾ EMC certificate available on request

ST-H

Selection and Ordering data

Echomax® ST-H ultrasonic transducer

Level measurement in chemical storage and liquid tanks. The narrow design of the ST-H allows the transducer to be mounted on a 2" standpipe. Measuring range: min. 0.3 m (1 ft), max. 10 m (33 ft).

Process connection

ETFE, 2" NPT [(Taper), ANSI/ASME B1.20.1]
ETFE, R 2" [(BSPT), EN 10226]
ETFE, G 2" [(BSPP), EN ISO 228-1]
PVDF copolymer, 2" NPT [(Taper), ANSI/ASME B1.20.1]
PVDF copolymer, R 2" [(BSPT), EN 10226]
PVDF copolymer, G 2" [(BSPP), EN ISO 228-1]

Cable length

5 m (16.40 ft)
10 m (32.81 ft)
30 m (98.43 ft)
50 m (164.04 ft)
100 m (328.08 ft)

Approvals

FM Class I, II, Div. 1, C-TICK
ATEX II 2G, CSA, C-TICK, INMETRO ¹⁾
ATEX II 2G, C-TICK, INMETRO ²⁾

Operating Instructions

Quick Start Manual, multi-language
Applications Guidelines, multi-language
Note: The Applications Guidelines should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

¹⁾ Available with Process connection options 0 to 2 only

²⁾ Available with Process connection options 3 to 5 only

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

7ML1100-

A 0

0

1

2

3

4

5

A

B

C

D

E

2

3

4

7ML1998-5QK82

7ML1998-5HV61

Selection and Ordering data

Further designs

Please add "-Z" to Order No. and specify Order code(s).
Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 16 characters) specify in plain text

Accessories

Universal box bracket, mounting kit

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" NPT

3" ASME, DN 65 PN 10, JIS 10K 3B ETFE flange adapter for 2" BSPT

Easy Aimer 2, NPT with ¾" x 1" PVC coupling

Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings

Easy Aimer 304, with stainless steel coupling

Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings

Order code

Y17

Order No.

7ML1830-1BK

7ML1830-1BT

7ML1830-1BU

7ML1830-1AQ

7ML1830-1AX

7ML1830-1AU

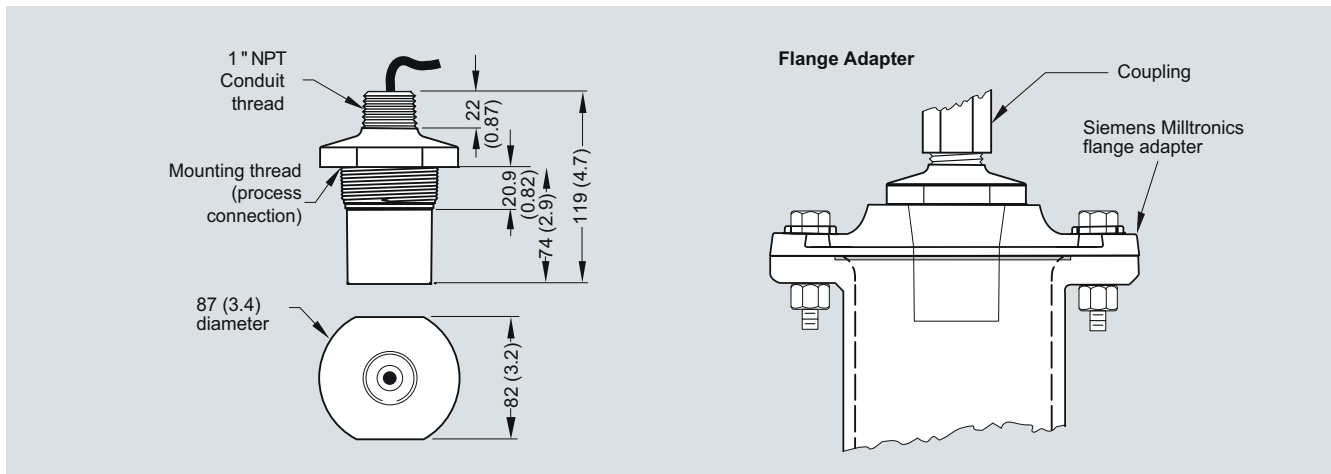
7ML1830-1GN

Level Measurement

Continuous level measurement - Ultrasonic transducers

ST-H

Dimensional drawings

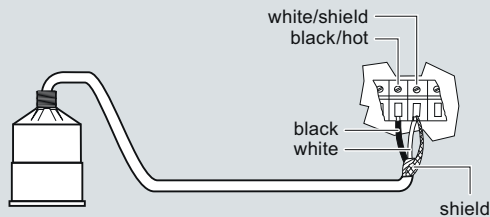


ST-H ultrasonic transducer, dimensions in mm (inch)

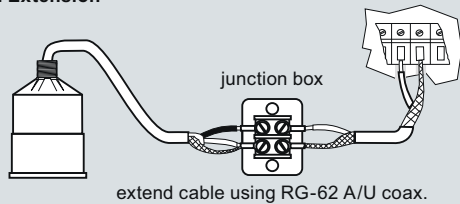
Schematics

5

Direct Connection



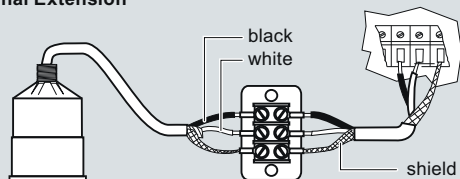
Coaxial Extension



3 Terminal Direct*



3 Terminal Extension*



* For SITRANS LUC500, MultiRanger 100/200, HydroRanger 200

ST-H ultrasonic transducer connections

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XRS-5

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 to 8 m (1 to 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 lbs)
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 (1200 ft) with RG 62 A/U coaxial cable • 365 m (1200 ft) with 2-core twisted pair, foil shield, 0.5 mm² (20 AWG), PVC sheath, only for SITRANS LUC500, 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 (EMC certificate available on request), CSA Class I Div. 2, FM Class I, ATEX II 2G, SAA Ex s Class I	

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XRS-5

Selection and Ordering data	Order No.
Echomax® XRS-5 transducer 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)	C) 7ML1106-0-0
Process connection 1" NPT [(Taper), ANSI/ASME B1.20.1] R 1" [(BSPT), EN 10226]	1 2
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft)	A B C
Facing Standard (CSM rubber) PTFE (flange versions)	A B
Approvals CE, FM Class I, ATEX II 2G, CSA Class I Div. 2, SAA Class I	2
Mounting flange (flush mount) None 3" ASME, 150 lbs, flat faced 4" ASME, 150 lbs, flat faced 6" ASME, 150 lbs, flat faced DN 80, PN 10/16, Type A, flat faced DN 100, PN 10/16, Type A, flat faced DN 150, PN 10/16, Type A, flat faced JIS10K 3B style JIS10K 4B style JIS10K 6B style Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1, or JIS B 2220 standard.	A B C D J K L Q R S
Operating Instructions Quick Start Manual, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5QT81 C) 7ML1998-5HV61

C) Subject to export regulations AL: N, ECCN: EAR99

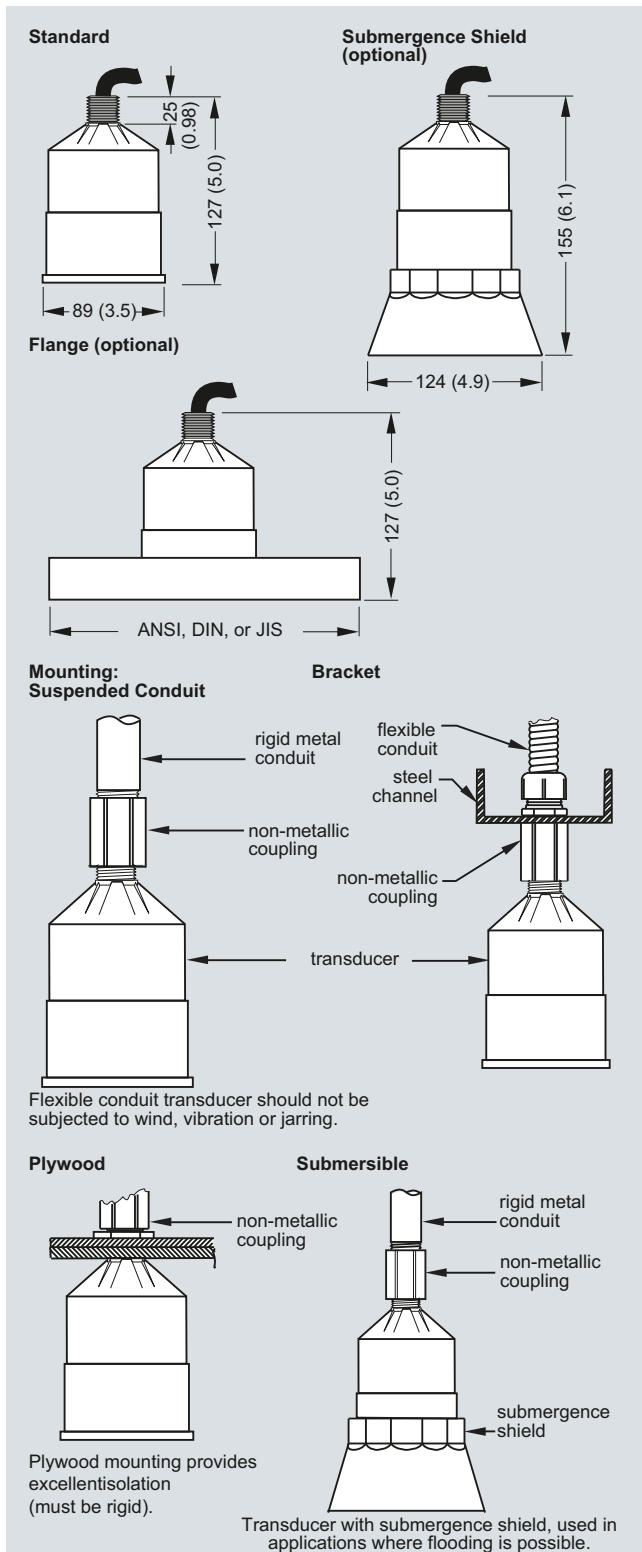
Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm (0.5 x 1.75")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y17
Accessories Submergence shield kit Easy Aimer 2, NPT with ¾" x 1" PVC coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with stainless steel coupling Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings FMS-200 universal box bracket, mounting kit FMS-210 channel bracket, wall mount FMS-220 extended channel bracket, wall mount FMS-310 channel bracket, floor mount FMS-320 extended channel bracket, floor mount FMS-350 bridge channel bracket, floor mount (see Mounting Brackets on page 5/190 for more information) 1" NPT locknut, plastic 1" BSPT locknut, plastic	Order No. 7ML1830-1BH 7ML1830-1AQ 7ML1830-1AX 7ML1830-1AU 7ML1830-1GN 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XRS-5

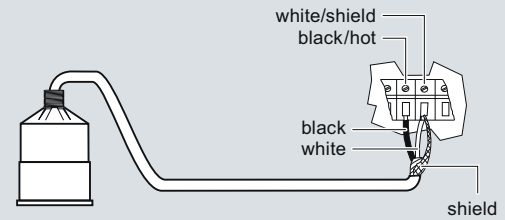
Dimensional drawings



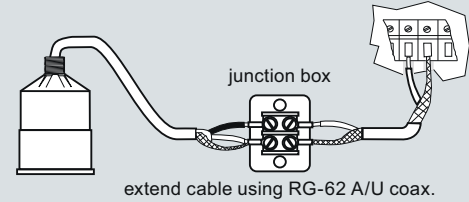
XRS-5 ultrasonic transducer, dimensions in mm (inch)

Schematics

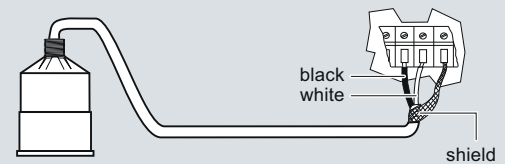
Direct Connection



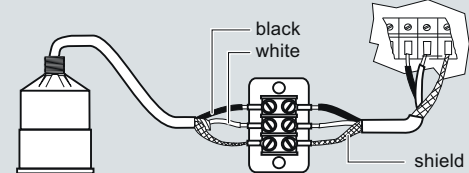
Coaxial Extension



3 Terminal Direct*



3 Terminal Extension*



* For SITRANS LUC500, MultiRanger 100/200, HydroRanger 200

XRS-5 ultrasonic transducer connections

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Overview



Echomax® XPS/XCT 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

The 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 40 m (130 ft) and up to a max. temperature of +95 °C (+203 °F).

The XCT series can be used in applications at higher temperatures to measure level up to a distance of 12 m (40 ft) and at a max. temperature of +145 °C (+293 °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.

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Technical specifications

Input	XPS-10 (standard and F models)	XPS-15 (standard and F models)	XPS-30	XPS-40	XCT-8 (standard and sanitary models)	XCT-12
Measuring range	0.3 ... 10 m (1 ... 33 ft)	Standard: 0.3 ... 15 m (1 ... 50 ft) Flanged: 0.45 ... 15 m (1.5 ... 50 ft)	0.6 ... 30 m (2 ... 100 ft)	0.9 ... 40 m (3 ... 130 ft)	0.6 ... 8 m (2 ... 26 ft)	0.6 ... 12 m (2 ... 40 ft)
Output						
Frequency	44 kHz	44 kHz	30 kHz	22 kHz	44 kHz	44 kHz
Beam angle	12°	6°	6°	6°	12°	6°
Environmental						
Location	Indoors/outdoors					
Ambient temperature		-40 ... +95 °C (-40 ... +203 °F)			Standard: -40 ... +145 °C (-40 ... +293 °F) Sanitary: -40 ... +125 °C (-40 ... +260 °F)	-40 ... +145 °C (-40 ... +293 °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)	0.5 bar g (7.25 psi g)	Standard: 4 bar g (60 psi g): -40 ... +138 °C (-40 ... +280 °F) Standard: 8 bar g (120 psi g): -40 ... +95 °C (-40 ... +203 °F) Flanged: 0.5 bar g (7.25 psi g) Sanitary: XCT-8: 0.5 bar g (7.25 psi g)	
Design						
Weight	0.8 kg (1.8 lbs)	1.3 kg (2.8 lbs) Flanged: 2 kg (4.4 lbs)	4.3 kg (9.5 lbs)	8 kg (18 lbs)	0.8 kg (1.7 lbs)	1.3 kg (2.8 lbs)
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	PVDF	Standard: PVDF Options: DERA KANE® flange; PTFE face with universal PVDF flange	
Color	Standard: blue F: gray	Standard: blue F: gray	blue	blue	white	
Process connection	Standard: 1" NPT or 1" BSPT F: 1" NPT	Standard: 1" NPT or 1" BSPT F: 1" NPT	1.5" universal thread (NPT or BSPT)		1" NPT or R 1" (BSPT), EN 10226	
Degree of protection	IP66/68	IP66/68	IP66/68	IP66/68	IP66/68	IP66/68
Cable	2 wire twisted pair/braided and foil shielded 0.5 mm² (20 AWG) PVC jacket				2 wire twisted pair/braided and foil shielded 0.5 mm² (20 AWG) silicone jacket	
Separation	Max. 365 m (1200 ft)					
Certificates and approvals	Standard: CE ¹⁾ , CSA, FM, ATEX II 2GD F: FM Class I, Div 1, Groups A, B, C and D, Class II Div 1, Groups E, F and G, Class III	Standard: CE ¹⁾ , CSA, FM, ATEX II 2GD F: FM Class I, Div 1, Groups A, B, C and D, Class II Div 1, Groups E, F and G, Class III	CE ¹⁾ , CSA, FM, ATEX II 2G 1D	CE ¹⁾ , CSA, FM, ATEX II 2G 1D	Standard: CE ¹⁾ , CSA, FM, ATEX II 2GD Sanitary: CE, C-TICK, CSA _{US/C}	CE ¹⁾ , CSA, FM, ATEX II 2GD

¹⁾ EMC certificate available on request.

® DERA KANE is a registered trademark of Ashland Inc.

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.
Echomax® XPS-10 ultrasonic transducer	C) 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
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	R
(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 II 2 G, FM Class I Div. 2, SAA Class I	3
CSA Class I Div. 1 ³⁾	4

- 1) Not available with flanged versions
 2) Available with flanged versions only
 3) Valid with mounting thread and facing options 0 to 2 only
 C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm]	Y15
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	
Operating Instructions	Order No.
Quick Start guide, multi-language	C) 7ML1998-5QM82
Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order.	C) 7ML1998-5HV61
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Accessories	
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors	7ML1930-1BJ
Submergence shield kit	7ML1830-1BH
Easy Aimer 2, with ¾" x 1" NPT PVC coupling	7ML1830-1AQ
Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings	7ML1830-1AX
Easy Aimer 304, with stainless steel coupling	7ML1830-1AU
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS 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 5/190 for more information)	7ML1830-1BQ
1" NPT locknut, plastic	7ML1830-1DS
1" BSPT locknut, plastic	7ML1830-1DR
C) Subject to export regulations AL: N, ECCN: EAR99	

5

Echomax XPS and XCT

Selection and Ordering data

Echomax® XPS-10F 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. 10 m

Mounting thread and facing

1" NPT [(Taper), ANSI/ASME B1.20.1]

Cable length

5 m (16.40 ft)
10 m (32.81 ft)
30 m (98.43 ft)
50 m (164.04 ft)
100 m (328.08 ft)

Mounting flange, flush mount

None

3" ASME, 150 lb, flat faced

4" ASME, 150 lb, flat faced

6" ASME, 150 lb, flat faced

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.)

Approvals

FM Class I Div. 1

Order No.

C) 7ML1170 -

0

1

B

C

D

E

F

A

B

C

D

E

1

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:

Measuring-point number/identification (max. 16 characters) specify in plain text

Y15

Operating Instructions

Order No.

Quick Start guide, multi-language

C) 7ML1998-1DU01

Applications Guidelines, multi-language

C) 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 CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

Tag, stainless steel with hole, 12 x 45 mm

(0.47 x 1.77"), one text line for fastening on sensors

7ML1930-1BJ

Submergence shield kit

7ML1830-1BH

Easy Aimer 2, with 3/4" x 1" NPT PVC coupling

7ML1830-1AQ

Easy Aimer 304, with stainless steel coupling

7ML1830-1AU

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 5/190 for more information)

7ML1830-1BQ

1" NPT locknut, plastic

7ML1830-1DS

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order 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	C) 7ML1118-0
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1] with foam facing ¹⁾ 1" NPT [(Taper), ANSI/ASME B1.20.1] with PTFE facing ²⁾ R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226] with foam facing ¹⁾ R 1" [(BSPT), EN 10226] with PTFE facing ²⁾	0 1 2 3 4 5
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K
Mounting flange None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10/16, Type A, flat faced JIS10K 6B 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.)	A D E J K N P
Approvals ATEX II 2G, FM Class I Div. 2, SAA Class I CSA Class I Div. 1 ³⁾	3 4

¹⁾ Not available with flanged versions
²⁾ Available with flanged versions only
³⁾ Available with mounting options 0 to 2 only
 C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5QM82 C) 7ML1998-5HV61
Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (see Mounting Brackets on page 5/190 for more information) 1" NPT locknut, plastic 1" BSPT locknut, plastic Easy Aimer 2, with ¾" x 1" NPT PVC coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304 with stainless steel coupling Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	7ML1930-1BJ 7ML1830-1BJ 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR 7ML1830-1AQ 7ML1830-1AX 7ML1830-1AU 7ML1830-1GN

C) Subject to export regulations AL: N, ECCN: EAR99

Echomax XPS and XCT

Selection and Ordering data	Order 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	C) 7ML 1171 - 0
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1]	1
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C D E F
Mounting flange, flush mount None 6" ASME, 150 lb, flat faced 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.)	A B C
Approvals FM Class I Div. 1	1
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-1DU01 C) 7ML1998-5HV61
Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (see Mounting Brackets on page 5/190 for more information) 1" NPT locknut, plastic Easy Aimer 2, with ¾" x 1" NPT PVC coupling Easy Aimer 304 with stainless steel coupling	7ML1930-1BJ 7ML1830-1BJ 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1AQ 7ML1830-1AU
C) Subject to export regulations AL: N, ECCN: EAR99	

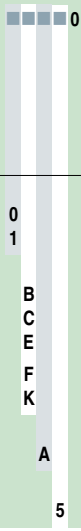
Selection and Ordering data	Order No.
Echomax® XPS-30 ultrasonic transducer High-frequency ultrasonic transducer designed for a wide variety of liquid and solid applications, for use with approved controllers. Includes integral temperature sensor. 1½" universal thread compatible with 1½" NPT and R 1½" [(BSPT), EN 10226] Measuring range: min. 0.6 m (1.97 ft), max. 30 m (98.43 ft)	C) 7ML 1123 - 0
Mounting thread and facing 1½" universal thread 1½" universal thread, foam facing ¹⁾ 1½" universal thread, PTFE facing ²⁾	0 1 2
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K
Mounting flange None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10/16, Type A, flat faced JIS10K 8B 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.)	A D E J K N P
Approvals ATEX II 2G 1D, FM Class I Div 2, SAA	5
1) Not available with flanged versions 2) Available with flanged versions only C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5QM82 C) 7ML1998-5HV61
Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors 1½" BSPT locknut, plastic Easy Aimer 2, 1½" NPT galvanized coupling Easy Aimer 2, 1½" NPT with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	7ML1930-1BJ 7ML1830-1DP 7ML1830-1AN 7ML1830-1AT 7ML1830-1AX 7ML1830-1GN
C) Subject to export regulations AL: N, ECCN: EAR99	

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.
Echomax® XPS-40 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. 0.9 m (2.95 ft), max. 40 m (131.23 ft)	C) 7ML 1 1 2 7 - 
Mounting thread and facing 1½" universal thread 1½" universal thread, foam facing	0 1
Cable length 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	B C E F K
Mounting flange None	A
Approvals ATEX II 2G 1D, FM Class I Div 2, SAA	5

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s).	
Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions Quick Start guide, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5QM82 C) 7ML1998-5HV61
Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors 1½" BSPT locknut, plastic Easy Aimer 2, 1½" NPT galvanized coupling Easy Aimer 2, 1½" NPT with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	7ML1930-1BJ 7ML1830-1DP 7ML1830-1AN 7ML1830-1AT 7ML1830-1AX 7ML1830-1GN

C) Subject to export regulations AL: N, ECCN: EAR99

Echomax XPS and XCT

Selection and Ordering data

Order No.

Echomax® XCT-8 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.
Ambient temperatures up to +145 °C (+293 °F)
Measuring range: min. 0.6 m (2 ft), max. 8 m (26 ft)

C) 7ML1132-0

Mounting thread and facing

1" NPT [(Taper), ANSI/ASME B1.20.1]
1" NPT [(Taper), ANSI/ASME B1.20.1],
PTFE facing¹⁾
R 1" [(BSPT), EN 10226]
R 1" [(BSPT), EN 10226], PTFE facing¹⁾

0
1
2
3

Cable length

1 m (3.28 ft)
5 m (16.40 ft)
10 m (32.81 ft)
30 m (98.43 ft)
50 m (164.04 ft)
100 m (328.08 ft)

A
B
C
E
F
K

Mounting flange

None
3" ASME, 150 lb, flat faced
4" ASME, 150 lb, flat faced
6" ASME, 150 lb, flat faced
DN 80, PN 10/16, Type A, flat faced
DN 100, PN 10/16, Type A, flat faced
DN 150, PN 10/16, Type A, flat faced
JIS10K 3B
JIS10K 4B
JIS10K 6B
(Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 or JIS B 2220 standard.)
3" universal²⁾
4" universal³⁾
6" universal⁴⁾
4" sanitary flange⁵⁾

A
C
D
E
G
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L
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P
R
S
T
U
V

Approvals

ATEX II 2GD, FM Class I, Div. 2, SAA
CSA Class I Div. 1, available with mounting thread and facing option 0
CE, C-TICK, CSA-US/C

4
5
7

- 1) Available with flange versions S to V only
2) Universal fits 3" ASME, DN 80, JIS 10K3B style
3) Universal fits 4" ASME, DN 100, JIS 10K4B style
4) Universal fits 6" ASME, DN 150, JIS 10K6B style
5) Available with Mounting thread and facing options 1 and 3, and approval option 7 only

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:
Measuring-point number/identification (max. 16 characters) specify in plain text

Y15

Operating Instructions

Quick start manual, multi-language

Order No.

C) 7ML1998-5QM82

XCT-8 with Sanitary Flange, multi-language
Note: This manual should be ordered as a separate line item with Mounting Option V.

C) 7ML1998-5HX62

Applications Guidelines, multi-language
Note: The Applications Guidelines should be ordered as a separate line item on the order.

C) 7ML1998-5HV61

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors

7ML1930-1BJ

Submersible hood

7ML1830-1BH

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 5/190 for more information)

7ML1830-1BQ

1" NPT locknut, plastic

7ML1830-1DS

1" BSPT locknut, plastic

7ML1830-1DR

Easy Aimer 304 with stainless steel coupling

7ML1830-1AU

Easy Aimer, aluminum, with M20 adapter and ¾ to 1" and 1½" BSPT couplings

7ML1830-1AX

Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings

7ML1830-1GN

Sanitary, 4" mounting clamp

7ML1830-1BR

Sanitary, isolating gasket

J) 7ML1830-1KC

C) Subject to export regulations AL: N, ECCN: EAR99

J) Subject to export regulations AL: 91999, ECCN: EAR99

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Selection and Ordering data	Order No.
Echomax® XCT-12 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. Ambient temperatures up to +145 °C (+293 °F) Measuring range: min. 0.6 m (2 ft), max. 12 m (40 ft)	C) 7ML 1 1 3 6 -
Mounting thread and facing 1" NPT [(Taper), ANSI/ASME B1.20.1] 1" NPT [(Taper), ANSI/ASME B1.20.1], PTFE facing, available for flange options U only ¹⁾ R 1" [(BSPT), EN 10226] R 1" [(BSPT), EN 10226], PTFE facing, available for flange options U only ¹⁾	0 1 2 3
Cable length 1 m (3.28 ft) 5 m (16.40 ft) 10 m (32.81 ft) 30 m (98.43 ft) 50 m (164.04 ft) 100 m (328.08 ft)	A B C E F K
Mounting flange None 6" ASME, 150 lb, flat faced 8" ASME, 150 lb, flat faced DN 150, PN 10/16, Type A, flat faced DN 200, PN 10/16, Type A, flat faced JIS10K 6B 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.) 6" universal for 6" ASME, DN 150 or JIS 10K6B style	A D E J K N P U
Approvals ATEX II 2GD, FM Class I, Div. 2, SAA CSA Class I, Div. 1, available with mounting thread and facing option 0 only	3 4

¹⁾ Available with universal flanges only

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Acrylic coated, stainless steel tag [13 x 45 mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Operating Instructions Quick start manual, multi-language Applications Guidelines, multi-language Note: The Applications Guidelines should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5QM82 C) 7ML1998-5HV61
Accessories Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77"), one text line for fastening on sensors Submergence shield kit Universal box bracket, mounting kit Channel bracket, wall mount Extended channel bracket, wall mount Channel bracket, floor mount Extended channel bracket, floor mount Bridge channel bracket, floor mount (see Mounting Brackets on page 5/190 for more information) 1" NPT locknut, plastic 1" BSPT locknut, plastic Easy Aimer 304 with stainless steel coupling Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings	7ML1930-1BJ 7ML1830-1BJ 7ML1830-1BK 7ML1830-1BL 7ML1830-1BM 7ML1830-1BN 7ML1830-1BP 7ML1830-1BQ 7ML1830-1DS 7ML1830-1DR 7ML1830-1AU 7ML1830-1AX 7ML1830-1GN
C) Subject to export regulations AL: N, ECCN: EAR99	

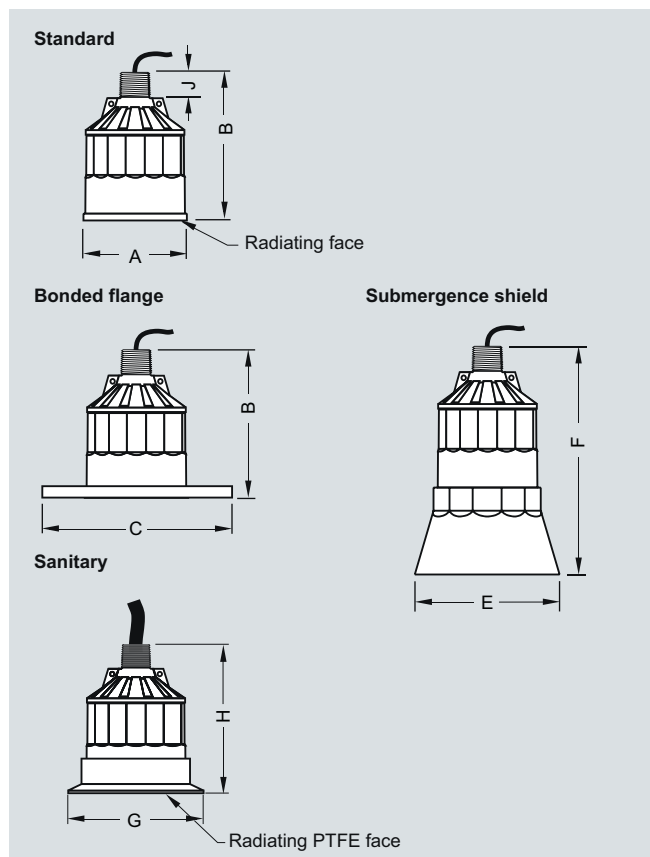
5

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XPS and XCT

Dimensional drawings



XPS and XCT ultrasonic transducer

Version				
Dimension	XPS-10	XPS-15	XPS-30	XPS-40
A	88 mm (3.464")	121 mm (4.764")	175 mm (6.890")	206 mm (8.110")
B	122 mm (4.803")	132 mm (5.197")	198 mm (7.795")	229 mm (9.016")
C	According to ASME, DIN and JIS			n/a
E	124 mm (4.882")	158 mm (6.220")	n/a	n/a
F	152 mm (5.984")	198 mm (7.795")	n/a	n/a
J	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")	28 mm (1.1")

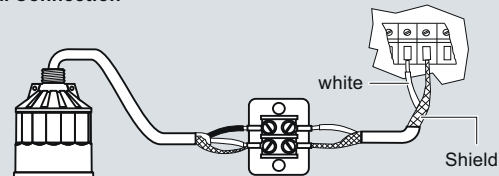
Version		
Dimension	XCT-8	XCT-12
A	88 mm (3.464")	121 mm (4.764")
B	122 mm (4.803")	132 mm (5.197")
C	According to ASME, DIN and JIS	
E	n/a	n/a
F	n/a	n/a
G	Sanitary version: 119 mm (4.68")	n/a
H	Sanitary version: 122 mm (4.8")	n/a
J	28 mm (1.1")	28 mm (1.1")

Schematics

Direct Connection



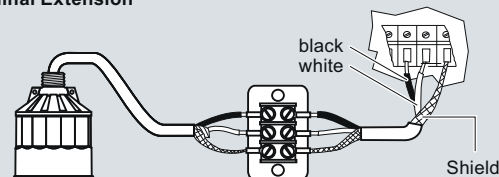
Coaxial Connection



3 Terminal Direct*



3 Terminal Extension*



* For SITRANS LUC500, 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 and XCT ultrasonic transducer connections

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XLT

Overview



Echomax® XLT transducers use ultrasonic technology to measure level in a wide range of bulk solids.

Benefits

- Sealed aluminum face
- Integral temperature sensor
- Self-cleaning and low maintenance
- Connect using only two wires
- Easy to install

Application

XLT transducers operate with Siemens SITRANS LU transceivers in measuring ranges from 0.9 to 60 m (1.8 to 200 ft) and temperatures up to +150 °C (+300 °F). A beam angle of just 5° provides accurate readings in deep, narrow tanks.

With increased signal sensitivity, the XLT transducers from Siemens can operate in difficult applications such as limestone, cement clinker and hot stone. All models have a sealed aluminum face to withstand very harsh environments.

During operation, Echomax transducers emit acoustic pulses in a narrow beam. 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. Temperature variations are automatically compensated by the integral temperature sensor.

- Key Applications: bulk solids including limestone, cement clinker, hot stone and coal bunkers

Technical specifications

Mode of operation	
Measuring principle	Ultrasonic transducer
Input	
Measuring range	
• XLT-30	0.9 ... 30 m (3.0 ... 100 ft)
• XLT-60	1.8 ... 60 m (6.0 ... 200 ft)
Output	
Frequency	
• XLT-30	22 kHz
• XLT-60	13 kHz
Beam angle ¹⁾	5°
Accuracy	
Temperature error	Compensated by transducers internal temperature sensor
Rated operating conditions	
Ambient conditions	
• Ambient temperature	
- XLT-30 and XLT-60	-40 ... +150 °C (-40 ... +300 °F)
Design	
Weight	
• XLT-30	4.3 kg (9.5 lbs)
• XLT-60	6.6 kg (14.5 lbs)
Material (enclosure)	Aluminium, 304 stainless steel, polyester and silicone
Degree of protection	IP68
Color	
• XLT-30 and XLT-60	Red
Mounting	
Cable connection	1" NPT [(Taper), ANSI/ASME B1.20.1]
Cable (max. length)	2-core shielded/twisted, 0.5 mm ² (20 AWG), silicone sheath
Certificates and approvals	365 m (1200 ft) with RG 62 AU coaxial cable
	CE (EMC certificate available on request), CSA _{USC} , FM, ATEX II 2G 1D T5

¹⁾ Definition of beam width: twice the angle at which the off-axis transmission is 3 dB less than the acoustic pressure level of the transmission axis (as measured equidistant from the sensor face).

Level Measurement

Continuous level measurement - Ultrasonic transducers

Echomax XLT

Selection and Ordering data

Order No.

Echomax® XLT-30, XLT-60, 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. 0.9 m, max. 30 m

Process connection:

1" NPT [(Taper), ANSI/ASME B1.20.1]

XLT-30

C) 7ML1141-

XLT-60

C) 7ML1145-

Facing

XLT-30

XLT-60

XLT-30, nylon

XLT-60, nylon

Cable length

1 m (3.28 ft)

5 m (16.40 ft)

10 m (32.81 ft)

20 m (65.62 ft)

30 m (98.43 ft)

50 m (164.04 ft)

70 m (229.66 ft)

80 m (262.47 ft)

90 m (295.28 ft)

100 m (328.08 ft)

Approvals

ATEX II 2G 1D, CSA Class I Div. 1, FM Class I

Div. 2, CE

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:
Measuring-point number/identification (max. 16
characters) specify in plain text

Y15

Operating Instructions

Order No.

Quick start manual, multi-language

C) 7ML1998-5QS81

Applications Guidelines, multi-language

C) 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 CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

Tag, stainless steel with hole, 12 x 45 mm
(0.47 x 1.77"), one text line for fastening on sensors

7ML1930-1BJ

Easy Aimer 2, 1" NPT galvanized

7ML1830-1AP

Easy Aimer 304 with stainless steel coupling

7ML1830-1AU

Easy Aimer 2, aluminum with M20 adapter and 1" and 1½" BSPT aluminum couplings

7ML1830-1AX

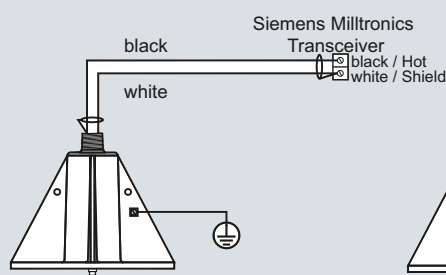
Easy Aimer 304, with M20 adapter and 1" and 1½" BSPT 304 SS couplings

7ML1830-1GN

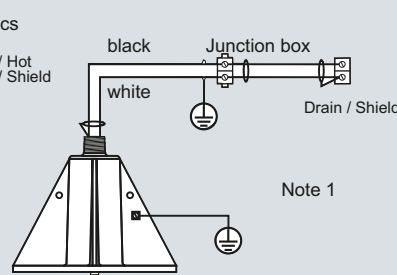
C) Subject to export regulations AL: N, ECCN: EAR99

Schematics

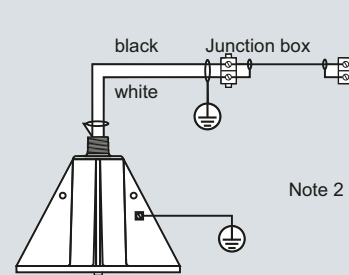
Direct Connection



2 Wire Extension



Coaxial Extension



Note:

1. Extend cable using 18 AWG shield / twisted pair up to 100 m (333 ft).

2. Extend cable using RG-62 A/U coax for optimum signal to noise ratio up to 365 m (1200 ft).

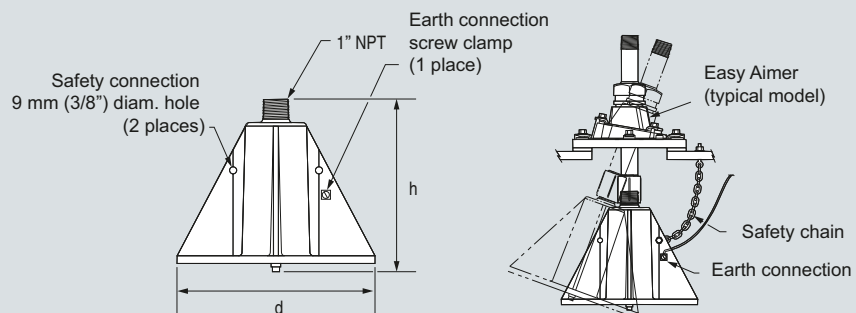
XLT ultrasonic transducer connections

Level Measurement

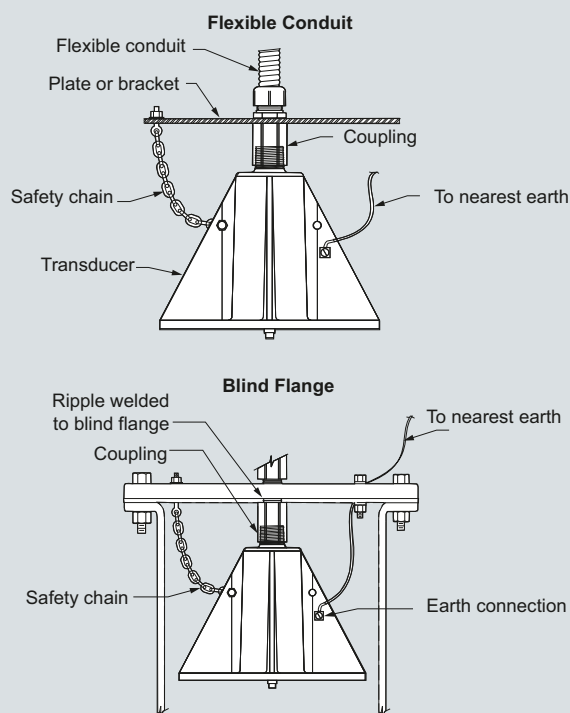
Continuous level measurement - Ultrasonic transducers

Echomax XLT

Dimensional drawings



Mounting - Liquid Applications



XLT ultrasonic transducer, dimensions in mm (inch)

	XLT-30	XLT-60
d	264 mm (10.4")	335 mm (13.2")
h	249 mm (9.8")	324 mm (12.75")

Level Measurement

Continuous level measurement - Accessories for ultrasonic

EA aiming devices

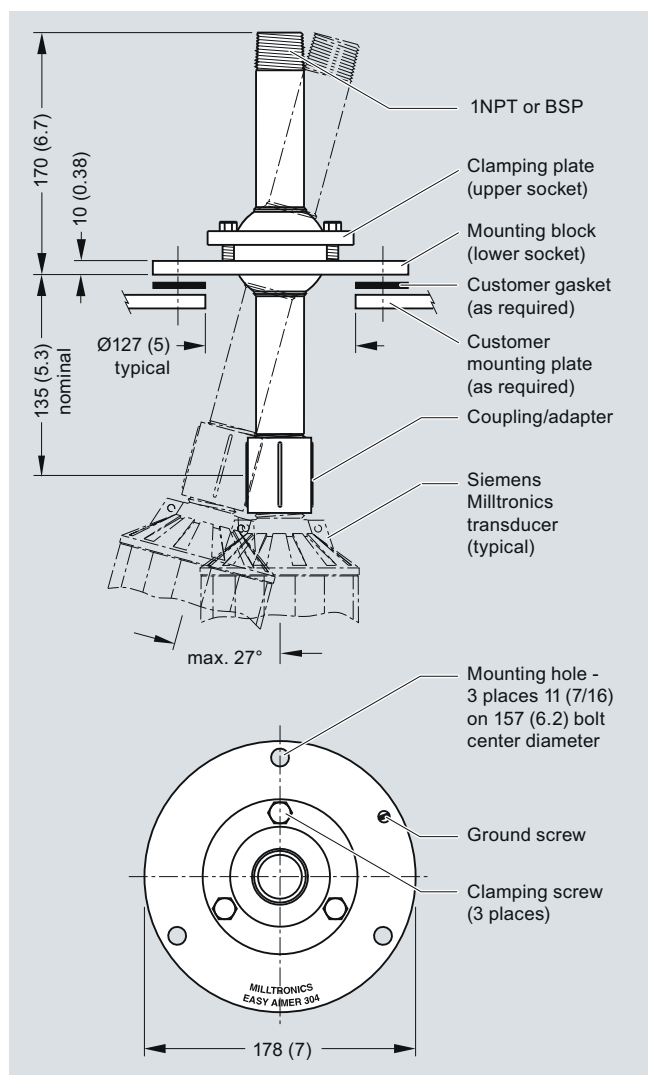
Application

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.

Dimensional drawings



EA 304 aiming device, dimensions in mm (inch)

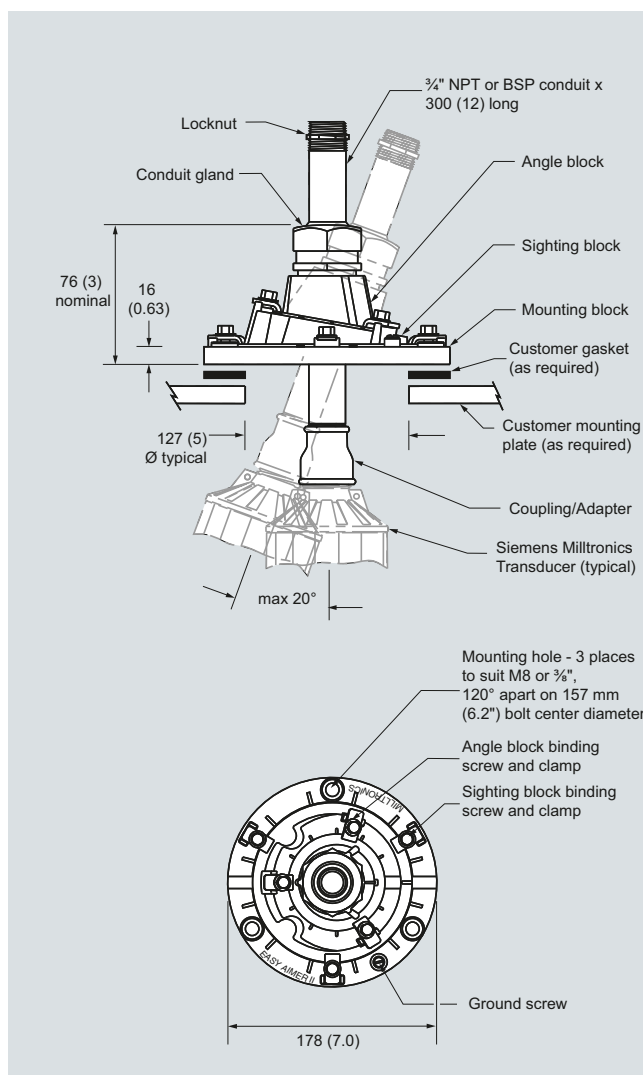
Application

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 2 aiming device, dimensions in mm (inch)

Selection and Ordering data	Order 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 SS 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" coupling ¹⁾	7ML1830-1AT
Easy Aimer 304, NPT with 1" 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 CD containing the complete Quick Start and Operating Instructions library.	7ML1998-5HG62

¹⁾ For use with XPS-30 or XPS-40 transducers only

Level Measurement

Continuous level measurement - Accessories for ultrasonic

FMS mounting brackets

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" or 2" threaded connection.

Distance from sensor to wall or beam: 20 to 31 cm (8 to 12").

The unique box design also acts as a sun shield for transducers with 1" threaded connections.

FMS-210 wall mounting set

Mounting of transducers with 1" threaded connection.

Distance from transducer to wall or beam: 12 to 48 cm (5 to 19").

FMS-220 extended wall mounting set

Mounting of transducers with 1" threaded connection.

Distance from transducer to wall or beam: 32 to 98 cm (13 to 39").

FMS-310 floor mounting set

Mounting of transducers with 1" threaded connection.

Distance from transducer to floor: 20 to 48 cm (8 to 19").

Distance from mounting support: 5 to 57 cm (2 to 22").

FMS-320 extended floor mounting set

Mounting of transducers with 1" threaded connection.

Distance from transducer to floor: 20 to 48 cm (8 to 19").

Distance from mounting support: 41 to 108 cm (16 to 43").

FMS-350 floor mounting set, bridge

Mounting of transducers with 1" threaded connection.

Distance from transducer to floor: 20 to 48 cm (8 to 19"), anywhere along the complete width of the bridge [166 cm (65")].

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.

Selection and Ordering data

Order No.

Mounting brackets for XPS-10/XCT-8 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

C) **7ML1998-5BK61**

FMS-210

C) **7ML1998-5BL61**

FMS-220

C) **7ML1998-5BM61**

FMS-310

C) **7ML1998-5BN61**

FMS-320

C) **7ML1998-5BP61**

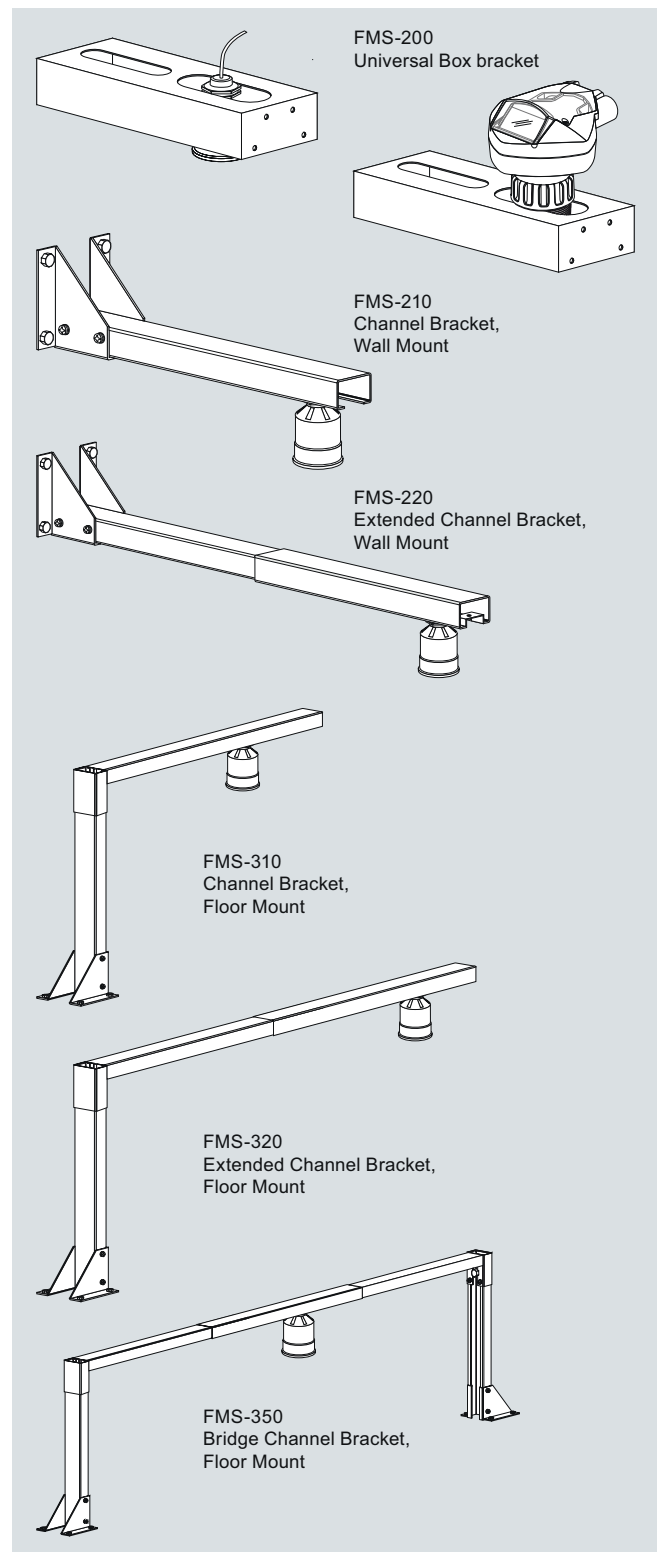
FMS-350

C) **7ML1998-5BQ61**

Note: The Operating Instructions should be ordered as a separate line item on the order.

C) Subject to export regulations AL: N, ECCN: EAR99

Integration



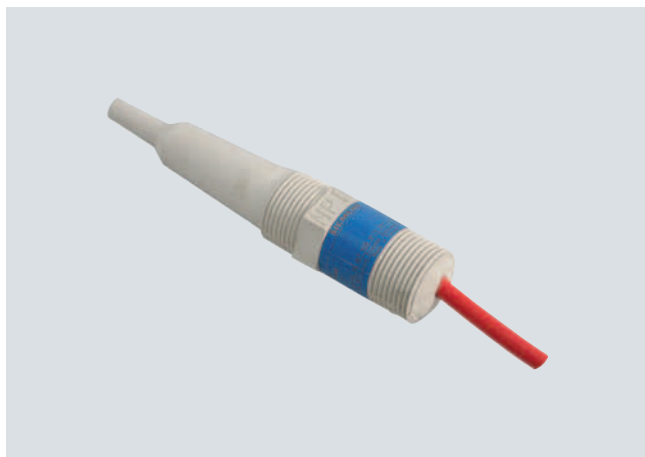
FMS mounting brackets

Level Measurement

Continuous level measurement - Accessories for ultrasonic

TS-3 temperature sensor

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.

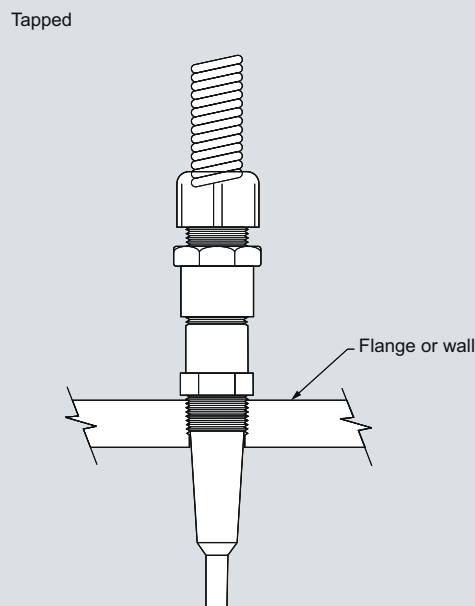
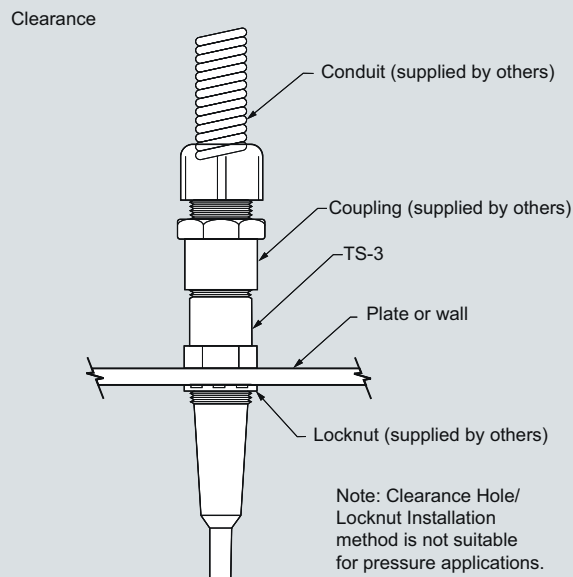
The TS-3 is used in conjunction with ultrasonic transducers that do not have an integral temperature sensor. It is also recommended in cases where the integral temperature sensor of the transducer cannot be used.

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

Level Measurement

Continuous level measurement - Accessories for ultrasonic

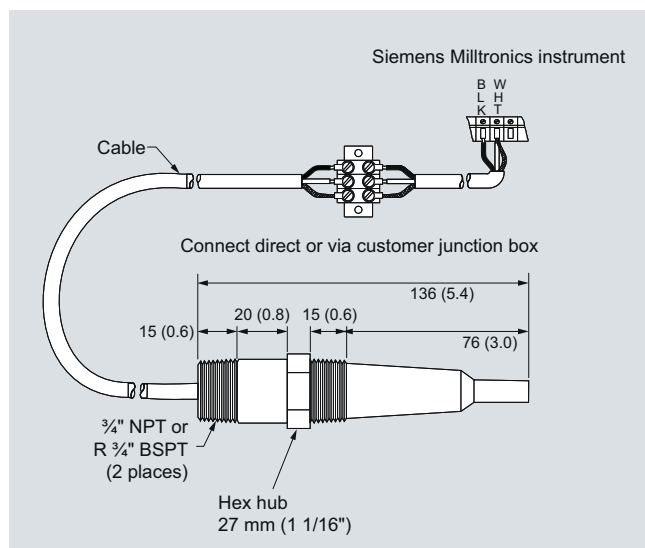
TS-3 temperature sensor

Technical specifications

Mode of operation	
Measuring principle	Temperature sensor
Input	
Measuring range	-40 ... +150 °C (-40 ... + 302 °F)
Output	
Response time	
• Forced circulation (temperature variation: 63 %)	55 seconds
• Flange, forced circulation	90 seconds
• Natural convection	150 seconds
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 mm ² (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	
	SAA, 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

TS-3 temperature sensor

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.

Cable length

1 m (3.28 ft)
5 m (16.40 ft)
10 m (32.81 ft)
30 m (98.43 ft)
50 m (164.04 ft)
70 m (229.66 ft)
90 m (295.28 ft)

Process connection

¾" NPT [(Taper), ANSI/ASME B1.20.1]
R ¾" [(BSPT), EN 10226]

Approvals

CSA, FM
ATEX, SAA

Operating Instructions

English
German

Note: The Operating Instructions should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing ATEX Quick Starts and Operating Instructions.

Optional equipment

¾" NPT locknut, aluminum
Tag, stainless steel with hole, 12 x 45 mm (0.47 x 1.77") for fastening on sensors

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

C) **7ML1813-**

B

1
2
3
4
5
6
7

A
B

3
4

C) **7ML1998-5EM01**

C) **7ML1998-1EM31**

C) **7ML1930-1BE**

7ML1930-1BJ

Level Measurement

Continuous level measurement - Radar transmitters

Radar transmitters

Overview

Radar measurement technology is non-contacting and low maintenance. Because microwaves require no carrier medium, they are virtually unaffected by the process atmosphere (vapour, 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 storage and process vessels including high temperature and pressure, to a range of 20 m (66 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, 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).

SITRANS LR400 is a 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft). It is ideal for low dielectric media.

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.

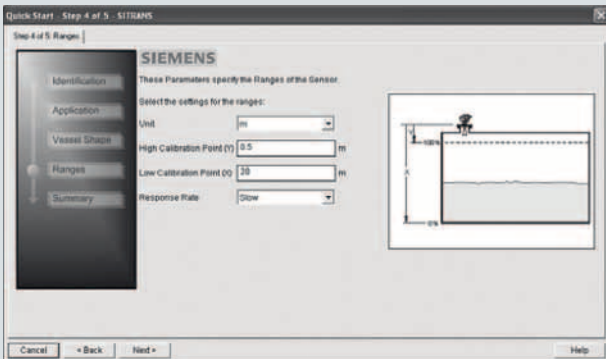
Auto False-Echo Suppression

SITRANS LR instruments offer the unique advantage of patented 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)
Quick to configure – Quick Start Wizard via SIMATIC PDM guides you during setup (available with LR200, LR250, LR260, LR460)



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.

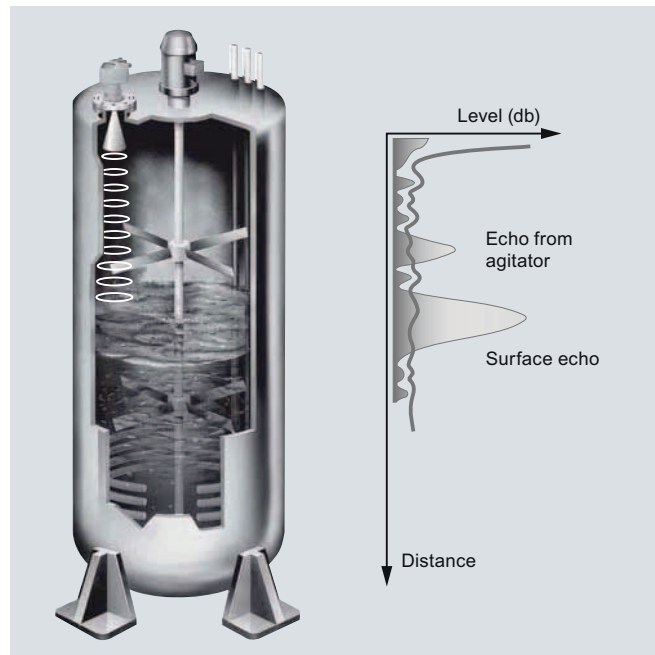
Unlike ultrasonic measurement, radar technology does not require a carrier medium and travels at the speed of light (300 000 000 m/s). Most industrial radar devices operate from 6 to 26 GHz.

Siemens offers pulse radar transmitters (SITRANS Probe LR, SITRANS LR200, SITRANS LR250, SITRANS LR260) and FMCW (Frequency Modulated Continuous Wave) radar transmitters (SITRANS LR400, SITRANS LR460).

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

Level Measurement

Continuous level measurement - Radar transmitters

Radar transmitters

Technical specifications

Radar Selection Guide

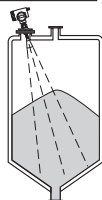
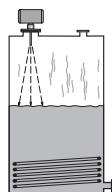
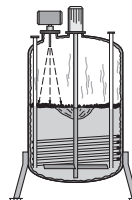
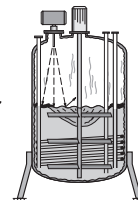
Criteria	SITRANS Probe LR	SITRANS LR200	SITRANS LR250	SITRANS LR260	SITRANS LR400	SITRANS LR460
Typical industries	Chemicals	Chemicals, petrochemicals	Chemicals, petrochemicals	Cement, power generation, food processing, mineral processing, mining	Chemicals, petrochemicals	Cement, power generation, food processing, mineral processing, mining
Typical applications	Liquids, storage vessels	Liquids, storage and process vessels	Liquids, storage and process vessels with agitators, vaporous liquids, high temperatures, low dielectric media	Cement, plastics, grain, flour, coal	Liquids storage vessels, liquid petroleum gas (LPG)	Cement, flyash, grain, coal, flour, plastics
Range	0.3 ... 20 m (1 ... 65 ft)	0.3 ... 20 m (1 ... 65 ft)	50 mm (2") from end of horn ... 20 m (65 ft), horn dependent	30 m (98.4 ft)	0.35 ... 50 m (1.14 ... 164 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	24 ... 25 GHz FMCW
Performance accuracy	0.1 % of range or 10 mm (0.4")	0.1 % of range or 10 mm (0.4")	5 mm (0.02")	25 mm (1") from minimum detectable distance to 300 mm (11.8") Remainder of range = 10 mm (0.39") or 0.1 % of span (whichever is greater)	≤ 5 mm (0.2") from 2 ... 10 m (6.6 ... 32.8 ft) ≤ 15 mm (0.6") from 10 ... 50 m (32.8 ... 164 ft)	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: -40 ... +65 °C (-40 ... +149 °F) Process: -40 ... +250 °C (-40 ... +482 °F), dependent on antenna type	Ambient: max. +65 °C (+149 °F) Process: max. +200 °C (+392 °F)
Output/Communications	4 ... 20 mA/HART® - SIMATIC PDM for remote configuration and diagnostics	4 ... 20 mA/HART - PROFIBUS PA - SIMATIC PDM for remote configuration and diagnostics - AMS	4 ... 20 mA/HART - PROFIBUS PA - Foundation Fieldbus - SIMATIC PDM for remote configuration and diagnostics - AMS - SITRANS DTM/FDT for Pactware, Fieldcare, etc.	4 ... 20 mA/HART - PROFIBUS PA - SIMATIC PDM for remote configuration and diagnostics	4 ... 20 mA/HART - PROFIBUS PA - SIMATIC PDM for remote configuration and diagnostics	4 ... 20 mA/HART - PROFIBUS PA - SIMATIC PDM for remote configuration and diagnostics
Power	4 ... 20 mA, 24 V DC nominal, 30 V DC max. - Minimum voltage depends on total loop resistance	4 ... 20 mA loop, 24 V DC nominal, 30 V DC max. - Minimum voltage depends on total loop resistance	4 ... 20 mA loop, 24 V DC nominal, 30 V DC max. - Minimum voltage depends on total loop resistance	4 ... 20 mA (±0.02 mA accuracy) 24 V DC nominal, 30 V DC max. - Minimum voltage depends on total loop resistance	120 ... 230 V AC, ±15 %, 50/60 Hz 24 V DC, +25/-20 %, 6 W (optional)	100 ... 230 V AC, ±15 %, 50/60 Hz, 6 W 24 V DC, +25/-20 %, 6 W
Approvals	CE, CSA _{US/C} , FM, Lloyd's Register of Shipping, ABS, FCC, Industry Canada, R&TTE, ATEX, PED, C-TICK, INMETRO	CE, CSA _{US/C} , FM, Lloyd's Register of Shipping, ABS, FCC, Industry Canada, R&TTE, ATEX, PED, C-TICK, INMETRO	CSA _{US/C} , CE, FM, FCC, Industry Canada, R&TTE, ATEX, PED, C-TICK, INMETRO	CSA _{US/C} , CE, FM, R&TTE, Industry Canada, FCC, ATEX, C-TICK	CE, CSA _{US/C} , FM, Lloyd's Register of Shipping, ABS, FCC, Industry Canada, R&TTE, ATEX, PED, C-TICK	CSA _{US/C} , CE, FM, R&TTE, Industry Canada, FCC, ATEX, C-TICK, INMETRO

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

(supply sketch where possible)

☐ Sketch attached☐ Storage Solids☐ Storage Liquids☐ Process☐ Reactor**Area safety classification:** (specify code required) _____**Height:** _____ m/ft **Diameter:** _____ m/ft **Filling method:** _____**Top:****Atmosphere:** (indicate all that apply)**Pressure:**☐ Flat☐ Foam☐ Steam

Normal: _____

☐ Parabolic☐ Dust☐ Deposit (build-up)

Maximum (relief): _____

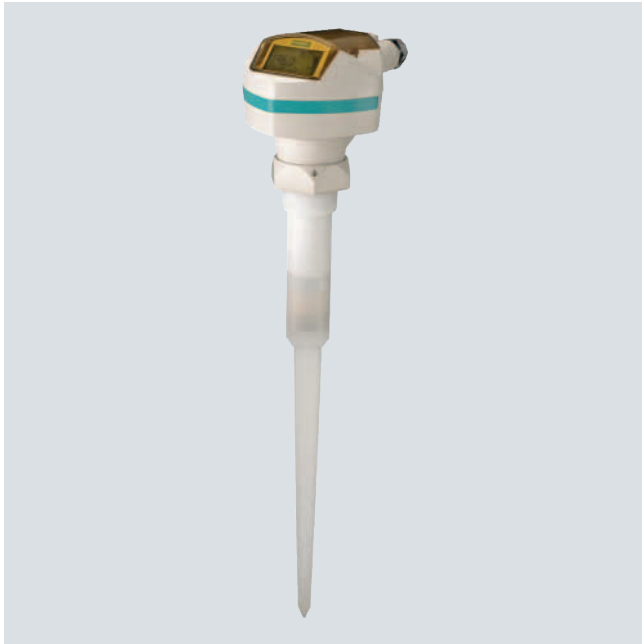
☐ Conical☐ Vapor**Mounting connection** (specify type) _____**Distance to sidewall:** _____ cm/in**Mounting connection maximum temperature:** _____ °C/°F**Max. temperature at electronics:** _____ °C/°F**Critical Information****Nozzle Length:** _____ cm/in**Nozzle Diameter:** _____ cm/in**Stilling well or Still Pipe mounting:** ☐ Yes ☐ No **Stilling well diameter:** _____ cm/in**Material****Material being measured:** _____ ☐ Liquid ☐ Solid ☐ Liquefied gas**Material temperature:** Norm: _____ °C/°F Max: _____ °C/°F**Material surface:** ☐ Flat ☐ Turbulent ☐ Agitated ☐ Vortex **Dielectric constant:** ☐ $\epsilon_r < 3$ ☐ $\epsilon_r > 3$ **Installation****Communications:****Power available:** _____☐ HART® /4 to 20 mA☐ PROFIBUS PA☐ None**Products recommended:** _____

Level Measurement

Continuous level measurement - Radar transmitters

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 startup
- Programming using infrared Intrinsically Safe handheld programmer, SIMATIC PDM or HART® handheld communicator
- Communication using HART®
- Patented 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 vapours, temperature gradients, vacuum or pressure, such as tank farms, chemical storage, digesters and long-range applications. 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.

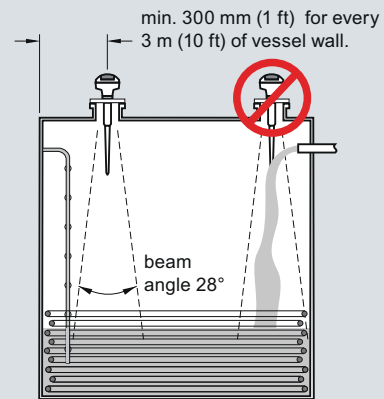
SITRANS Probe LR incorporates Process Intelligence® signal processing. The Probe LR also has a high signal-to-noise ratio leading to improved reliability.

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.

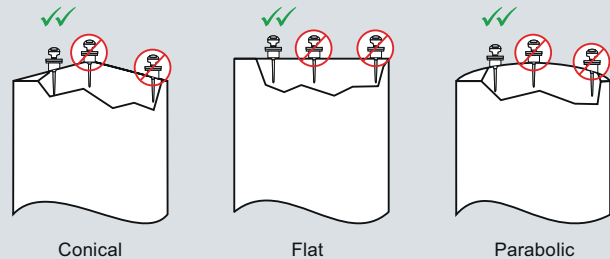
- Key Applications: tank farms, chemical storage, wastewater wet well

Configuration

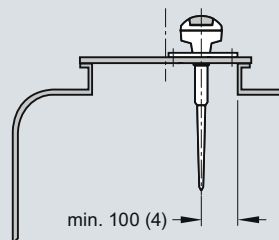
Installation



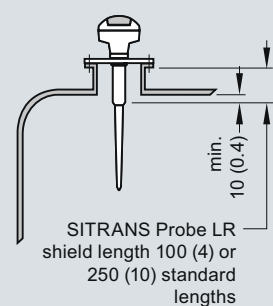
Mounting unit on vessel



Mounting on a manhole cover



Mounting on a nozzle



SITRANS Probe LR installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS Probe LR

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")
Influence of ambient temperature	0.003 %/K
Repeatability	± 5 mm (2")
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	$\epsilon_r > 1.6$ (for $\epsilon_r < 3$, 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 1/2" 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") shield for maximum 100 mm (4") nozzle or optional 250 mm (10") long shield
Process connections	1 1/2" NPT [(Taper), ANSI/ASME B1.20.1] R 1 1/2" [(BSPT), EN 10226] G 1 1/2" [(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, C-TICK
Marine	• Lloyd's Register of Shipping • ABS Type Approval
Radio	FCC, Industry Canada and European (R&TTE), C-TICK

Hazardous

- Europe
- USA

- Canada

- Brazil - INMETRO

Programming

Handheld programmer

PC

Intrinsically safe Siemens handheld programmer (optional)

- Approvals (handheld programmer)

Display (local)

HART® is a registered trademark of the Hart Communications Foundation.

ATEX II 1G EEx ia IIC T4

Intrinsically Safe barrier required
FM Class I, Div. 1, Groups A,B,C,D; Class II, Div. 1, Groups E,F, G; Class III

Intrinsically Safe barrier required
CSA Class I, Div. 1, Groups A,B,C,D; Class II, Div. 1, Group G; Class III

BR-Ex ia IIC T4

HART communicator 375

SIMATIC PDM

Infrared receiver

ATEX II 1G EEx ia IIC T4
CSA and FM Class I, Div. 1, Groups A,B,C,D, T6 at max. ambient

Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS Probe LR

Selection and Ordering data

SITRANS Probe LR

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)

Enclosure

Plastic, (PBT), 2 x 1/2" NPT
Plastic, (PBT), 2 x M20x1.5

Antenna type/Material - (max. 3 bar and +80 °C)

Polypropylene Antenna
1 1/2" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 100 mm shield
R 1 1/2" [(BSPT), EN 10226], c/w integral 100 mm shield
G 1 1/2" [(BSPP), EN ISO 228-1], c/w integral 100 mm shield
1 1/2" NPT [(Taper), ANSI/ASME B1.20.1], c/w integral 250 mm shield
R 1 1/2" [(BSPT), EN 10226], c/w integral 250 mm shield
G 1 1/2" [(BSPP), EN ISO 228-1], c/w integral 250 mm shield

Approvals

General Purpose, CE¹⁾
General Purpose, FM, CSA_{US/IC}²⁾
CSA Class I, Div 1, Groups A, B, C, D, Class II, Div. 1 Group G, Class III, Intrinsically Safe with suitable barrier²⁾
FM, Class I, II and III, Div 1, Groups A, B, C, D, E, F, G, Intrinsically Safe with suitable barrier²⁾
ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier¹⁾

Communication/Output

4 to 20 mA, HART[®]

¹⁾ Includes European Radio approvals (R&TTE), 5.8 GHz, C-TICK

²⁾ Includes FCC Radio approvals, 6.3 GHz for North America only

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

C) **7ML5430-**

0

1

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1

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Order No. and specify Order code(s).

Acrylic coated, stainless steel tag [13 x 45 mm

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:
Measuring-point number/identification (max. 16 characters) specify in plain text

Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

Operating Instructions

English

French

Spanish

German

Note: The Operating Instructions should be ordered as a separate item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Additional Operating Instructions

Multi-language Quick Start manual

Optional equipment

Handheld programmer, Intrinsically Safe, ATEX II 1G, EEx ia

HART[®] modem/RS-232
(for use with a PC and SIMATIC PDM)

HART modem/USB
(for use with a PC and SIMATIC PDM)

One metallic cable gland M20x1.5,
rated -40 ... +80 °C (-40 ... +176 °F)¹⁾

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

Spare parts

Plastic lid

¹⁾ Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

C) Subject to export regulations AL: N, ECCN: EAR99

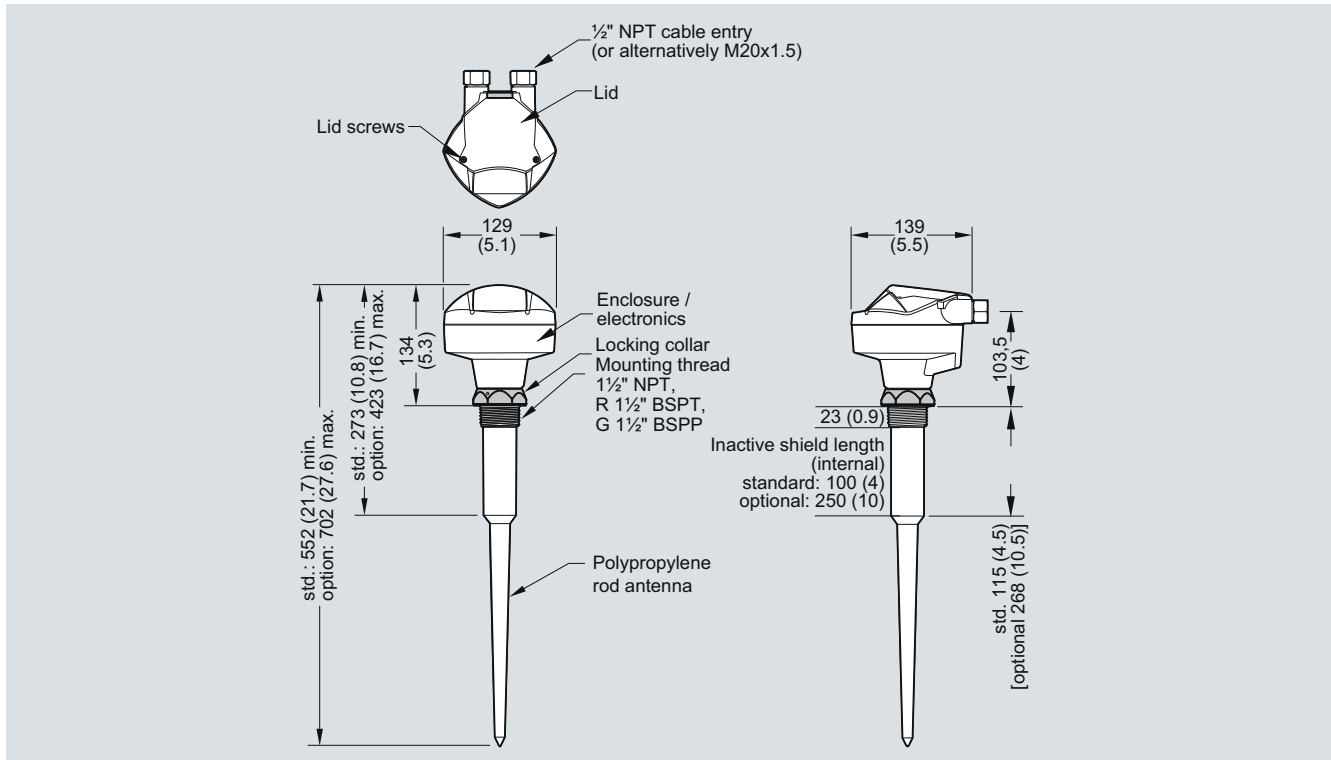
D) Subject to export regulations AL: N, ECCN: EAR99H

Level Measurement

Continuous level measurement - Radar transmitters

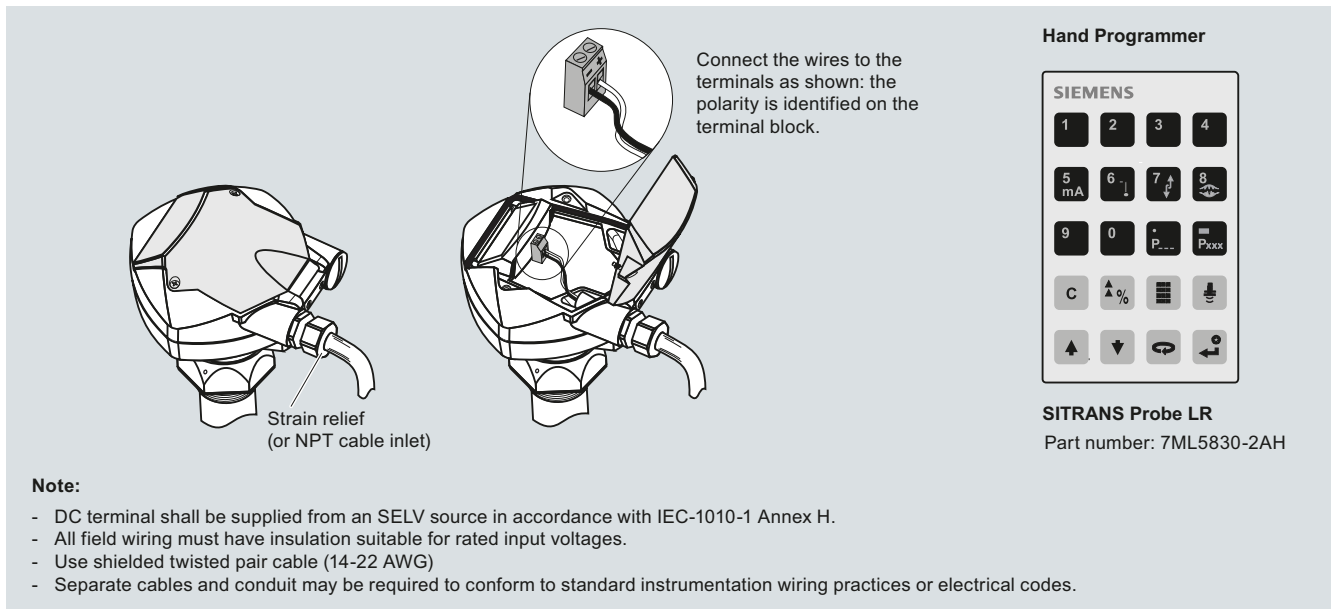
SITRANS Probe LR

Dimensional drawings



SITRANS Probe LR, dimensions in mm (inch)

Schematics



SITRANS Probe LR connections

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Overview



SITRANS LR200 is a 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).

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 patented Process Intelligence signal-processing technology for superior reliability.

- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, high temperatures, asphalt, digesters

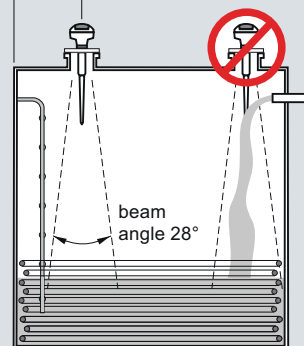
Configuration

Installation

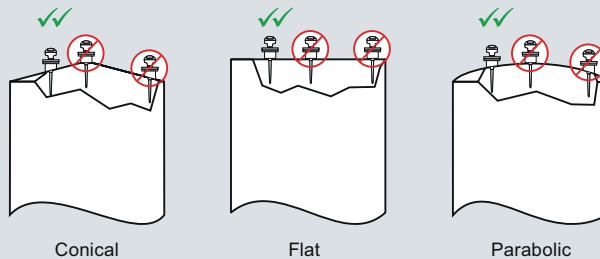
min. 300 mm (1 ft) for every 3 m (10 ft) of vessel wall.

Note:

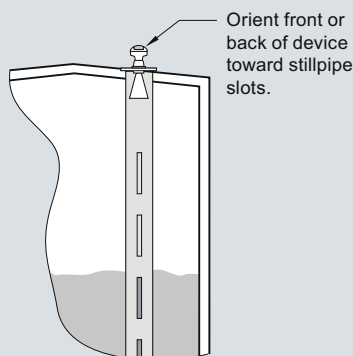
- Beam angle is the width of the cone where the energy density is half of the peak energy density.
- The peak energy density is directly in front of and in line with the rod antenna.
- There is a signal transmitted outside of the beam angle; therefore false targets may be detected.



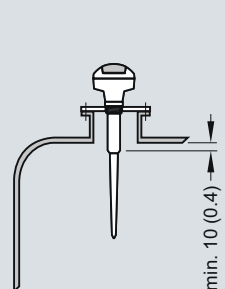
Mounting unit on vessel



Mounting unit on stilling well



Mounting on a nozzle



SITRANS LR200 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Technical specifications

Mode of operation		Process connections	
Measuring principle	Radar level measurement	• 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)
Frequency	5.8 GHz (North America 6.3 GHz)	• Flange connection	Refer to SITRANS LR200 Antennas for more connections
Measuring range	0.3 ... 20 m (1.0 ... 65 ft)	Power supply	
Output		4 ... 20 mA/HART	
Analog output	4 ... 20 mA	• General Purpose, Non-incendive, Intrinsically Safe	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
Accuracy	± 0.02 mA	• Flame proof, Increased safety, Explosion proof	Nominal 24 V DC (max. 30 V DC) with max. 250 Ω
Span	Proportional or inversely proportional	PROFIBUS PA	10.5 mA per IEC 61158-2
Communications	HART® Optional: PROFIBUS PA (Profile 3.0, Class B)	Certificates and approvals	
Fail-safe	Programmable as high, low or hold (Loss of Echo)	General	CSA US/C, CE, FM, C-TICK
Performance (according to reference conditions IEC60770-1)		Marine	Lloyd's Register of Shipping ABS Type Approval
From end of antenna to 600 mm:	40 mm (1.57")	Radio	FCC, Industry Canada and European (R&TTE), C-TICK
Remainder of range:	10 mm (0.4") or 0.1 % of span (whichever is greater)	Hazardous	
Rated operating conditions		• Flame proof (Europe)	ATEX II 1/2 G EEx dmia IIC T4
Installation conditions		• Increased safety (Europe)	ATEX II 1/2 G EEx emia IIC T4
• Location	Indoor/outdoor	• Explosion proof (USA/Canada)	CSA/FM (barrier not required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
Ambient conditions (enclosure)		• Non-incendive (USA)	FM (barrier not required) T5, Class I, Div. 2, Groups A, B, C, D
• Ambient temperature	-40 ... +80 °C (-40 to +176 °F)	• Intrinsically Safe (Europe)	ATEX II 1G EEx ia IIC T4
• Installation category	I	• Intrinsically Safe (USA/Canada)	CSA/FM (barrier required) T4, Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III
• Pollution degree	4	• Intrinsically Safe (Australia)	ANZEX Ex ia IIC T4 [T _a = -40 ... +80 °C (-40 ... +176 °F)] IP67
Medium conditions		• Intrinsically Safe (International)	IECEx TSA 04.0020X T4
Dielectric constant ε _r	ε _r > 1.6 (for ε _r < 3, use waveguide antenna or stillpipe)	Brazil - INMETRO	BR-Ex ia IIC T4
Vessel temperature and pressure	Varies with connection type; see Pressure/Temperature curves for more information	Programming	
Design		Intrinsically Safe Siemens handheld programmer	Infrared receiver
Enclosure		• 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
• Material	Aluminium, polyester powder coated	Handheld communicator	HART communicator 375
• Cable inlet	2 x M20x1.5 or 2 x ½" NPT with adapter	PC	SIMATIC PDM AMS
Degree of protection	Type 4X/NEMA 4X, Type 6/ NEMA 6, IP67, IP68	Display (local)	Multi-segment alphanumeric liquid crystal with bar graph (representing level) available in four languages
Weight	< 2 kg (4.4 lbs) (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") shield for maximum 100 mm (4") nozzle, or optional 250 mm (10") long shield		
• Optional rods, horn and waveguides	Refer to SITRANS LR200 Antennas for optional rods, horns and waveguides		

HART® is a registered trademark of the Hart Communications Foundation.

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Selection and Ordering data

Order No.

SITRANS LR200, Uni-Construction polypropylene rod antenna version

C) 7ML 5 4 2 2 - 0

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).

Max. 3 bar g (43.5 psi g) pressure and +80 °C (+176 °F)

Enclosure/Cable inlet

Aluminum, Epoxy painted
2 x 1/2" NPT, Siemens LUI interface
2 x M20x1.5, Siemens LUI interface

2

3

Polypropylene antenna type - (Max. 3 Bar pressure and +80 °C)

1 1/2" NPT [(Taper), ANSI/ASME B1.20.1],
c/w integral 100 mm shield
R 1 1/2" [(BSPT), EN 10226],
c/w integral 100 mm shield
G 1 1/2" [(BSPP), EN ISO 228-1],
c/w integral 100 mm shield

A

B

C

D

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F

1 1/2" NPT [(Taper), ANSI/ASME B1.20.1],
c/w integral 250 mm shield
R 1 1/2" [(BSPT), EN 10226],
c/w integral 250 mm shield
G 1 1/2" [(BSPP), EN ISO 228-1],
c/w integral 250 mm shield

Approvals

General Purpose, CE¹⁾
General Purpose, CSA_{USC}, FM, for North America only²⁾
CSA Class I and II, Div. I, Groups A, B, C, D, G, 6.3 GHz, for North America only, Intrinsically Safe with suitable barrier²⁾

A

B

C

FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier²⁾

D

ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier¹⁾

E

FM, Class I, Div. 2, Groups A, B, C, D, for North America only (no barrier required)^{2) 3)}

F

ATEX II 1/2 G EEx emia IIC T4 (no barrier required)^{1) 4) 5)}

G

ATEX II 1/2 G EEx dmia IIC T4 (no barrier required)^{1) 5)}

H

CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G (no barrier required)^{2) 3) 5)}

J

Communication/Output

PROFIBUS PA
4 ... 20 mA, HART®, startup at <3.6 mA

2

3

¹⁾ Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK

²⁾ Includes Radio approval FCC, 6.3 GHz

³⁾ Available with enclosure option 2 only

⁴⁾ Available with enclosure option 3 only

⁵⁾ Available with communication option 1 and 3 only

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]:
Measuring-point number/identification (max. 16 characters); specify in plain text

Y15

Test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and to ISO 9000

C11

Namur NE43 compliant, device preset to failsafe <3.6 mA⁵⁾

N07

Operating Instructions for HART/mA device

Order No.

English

C) 7ML1998-5JP02

German

C) 7ML1998-5JP32

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 CD containing the complete ATEX Quick Start and Operating Instructions library.

C) 7ML1998-5XC82

Operating Instructions for PROFIBUS PA device

English

C) 7ML1998-5JR01

German

C) 7ML1998-5JR31

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 CD containing the complete ATEX Quick Start and Operating Instructions library.

C) 7ML1998-5XD81

Accessories

Handheld programmer, Intrinsically safe, EEx ia

C) 7ML1930-1BK

HART modem/RS-232 (for use with a PC and SIMATIC PDM)

D) 7MF4997-1DA

HART modem/USB (for use with a PC and SIMATIC PDM)

D) 7MF4997-1DB

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART¹⁾

7ML1930-1AP

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA⁶⁾

7ML1930-1AQ

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

¹⁾ Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Selection and Ordering data	Order No.
SITRANS LR200, Flange Adapter, Sanitary Version	C) 7ML5424 -
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).	
Antenna material (uses antenna adapter)	
PTFE, one piece rod antenna	0
UHMW-PE, one piece rod antenna	1
Process connection	
Sanitary fitting clamp	A
Configuration/Connection size	
2" connection, rod antenna only	A
3" connection, rod antenna only	B
4" connection, rod antenna only	C
Antenna extension	
No extension	0
Mounting Clamp	
No mounting clamp	0
Mounting clamp included, not available with Pressure rating option 0	1
Enclosure/Cable inlet	
Aluminum, Epoxy painted	
2 x 1/2" NPT, Siemens LUI interface	C) 2
2 x M20x1.5, Siemens LUI interface	C) 3
Communication/Output	
PROFIBUS PA	B
4 ... 20 mA, HART®, startup at <3.6 mA	C
Approvals	
General Purpose, CE ¹⁾	A
General Purpose, CSA _{USC} , FM, for North America only ²⁾	C) B
CSA Class I and II, Div. I, Groups A, B, C, D, G, for C) North America only,	C
Intrinsically Safe with suitable barrier ²⁾	
FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, C) for North America only,	D
Intrinsically Safe with suitable barrier ²⁾	
ATEX II 1G EEx ia IIC T4,	E
Intrinsically Safe with suitable barrier ¹⁾	
FM, Class I, Div. 2, Groups A, B, C, D, FCC	C) F
6.3 GHz, for North America only (no barrier required) ³⁾	
ATEX II 1/2 G EEx emia IIC T4 (no barrier required) ^{1) 4) 5)}	G
ATEX II 1/2 G EEx dmia IIC T4 (no barrier required) ^{1) 5)}	H
CSA/FM Class I, II and III, Div. 1, Groups A, B, C, C) D, E, F, G (no barrier required) ^{2) 3) 5)}	J
Pressure rating	
Rating per Pressure/Temperature curves in Manual	0
0.5 bar g (7.25 psi g) maximum	1

1) Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK

2) Includes Radio approval FCC, 6.3 GHz

3) Available with enclosure option 2 only

4) Available with enclosure option 3 only

5) Available with communication option A and C only

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text	Y15
Test certificate: 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 ⁵⁾	N07
Operating Instructions for HART/mA device	Order No.
English	C) 7ML1998-5JP02
German	C) 7ML1998-5JP32
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 CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5XC81
Operating Instructions for PROFIBUS PA device	
English	C) 7ML1998-5JR02
German	C) 7ML1998-5JR32
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 CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5XD81
Accessories	
Handheld programmer, Intrinsically safe, EEx ia	C) 7ML1930-1BK
HART modem/RS-232 (for use with a PC and SIMATIC PDM)	D) 7MF4997-1DA
HART modem/USB (for use with a PC and SIMATIC PDM)	D) 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 ⁶⁾	7ML1930-1AQ
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
Sanitary fitting clamps	
2", 304 stainless steel	7ML1830-1HD
3", 304 stainless steel	7ML1830-1HE
4", 304 stainless steel	7ML1830-1HF

1) Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

5

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Selection and Ordering data	Order No.
SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version	C) 7 M L 5 4 2 3 -
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).	
Antenna material (uses antenna adapter) PTFE, uses antenna adapter and additional process connection below	1
Process connection (refer to Pressure/Temperature curves in Operating Instructions) Flanges (316L stainless steel) DN 50 PN 16, Type A, flat faced DN 80 PN 16, Type A, flat faced DN 100 PN 16, Type A, flat faced DN 150 PN 16, Type A, flat faced 2" ASME 150 lb, flat faced 3" ASME 150 lb, flat faced 4" ASME 150 lb, flat faced 6" ASME 150 lb, flat faced DN 50 PN 40, flat faced DN 80 PN 40, flat faced DN 100 PN 40, flat faced DN 150 PN 40, flat faced 2" ASME 300 lb, flat faced, available with Pressure rating option 1 only 3" ASME 300 lb, flat faced 4" ASME 300 lb, flat faced 6" ASME 300 lb, flat faced JIS DN 50 10K JIS DN 80 10K JIS DN 100 10K JIS DN 150 10K (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] 2" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" [(BSPT), EN 10226] R 2" [(BSPT), EN 10226] G 1½" [(BSPP), EN ISO 228-1] G 2" [(BSPP), EN ISO 228-1]	AA BA CA DA FB GB HB JB AC BC CC DC FD GD HD JD AE BE CE DE LA MA LC MC LE ME
Antenna extensions or Inactive shield length No antenna extension 50 mm (2") extension, PTFE 100 mm (4") extension, PTFE 100 mm (4") extension, 316L stainless steel shield ¹⁾ 150 mm (6") extension, 316L stainless steel shield ¹⁾ 200 mm (8") extension, 316L stainless steel shield ¹⁾ 250 mm (10") extension, 316L stainless steel shield ¹⁾ Custom inactive shield length 101 mm ... 1000 mm (in 1 mm increments) <u>Add order code Y01 and plain text:</u> <u>"Inactive shield length mm"¹⁾</u>	0 1 2 3 4 5 6 7
Process seal/gasket Integral Gasket, for flat faced flange process connections only, not for Antenna extension options 3 to 6 FKM O-ring, not available for combination of flat faced flanges with Antenna extension options 0, 1 or 2	0 1
Enclosure/Cable inlet Aluminum, Epoxy painted 2 x ½" NPT, Siemens LUI interface 2 x M20x1.5, Siemens LUI interface	 C) 2 C) 3
Communication/Output PROFIBUS PA 4 ... 20 mA, HART®, startup at <3.6 mA	 B C

Selection and Ordering data	Order No.
SITRANS LR200, Flange Adapter/PTFE Rod Antenna Version	C) 7 M L 5 4 2 3 -
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).	
Approvals General Purpose, CE ²⁾ General Purpose, CSA _{USC} FM, for North America only ³⁾ CSA Class I and II, Div. I, Groups A, B, C, D, G, for North America only, Intrinsically Safe with suitable barrier ³⁾ FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier ³⁾ ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier ²⁾ FM, Class I, Div. 2, Groups A, B, C, D, FCC 6.3 GHz, for North America only (no barrier required) ^{3) 4)} ATEX II 1/2 G EEx emia IIC T4 (no barrier required) ^{2) 5) 6)} ATEX II 1/2 G EEx dmia IIC T4 (no barrier required) ^{2) 6)} CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G (no barrier required) ^{2) 4) 6)}	A B C D E F G H J
Pressure rating Rating per Pressure/Temperature curves in Manual 0.5 bar g (7.25 psi g) maximum	0 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) Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK 3) Includes Radio approval FCC, 6.3 GHz 4) Available with enclosure option 2 only 5) Available with enclosure option 3 only 6) Available with communication option A and C only C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s).	
Inactive custom shield lengths: Enter the total length of the inactive shield in plain text description (in 1 mm increments).	Y01
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text	Y15
Test certificate: 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 ⁵⁾	N07
Operating Instructions for HART/ma device	Order No.
English	C) 7ML1998-5JP02
German	C) 7ML1998-5JP32
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 CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5XC81

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Operating Instructions for PROFIBUS PA device

English C) **7ML1998-5JR02**
 German C) **7ML1998-5JR32**

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual C) **7ML1998-5XD81**
 This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

Handheld programmer, Intrinsically safe, EEx ia C) **7ML1930-1BK**

HART modem/RS-232 (for use with a PC and SIMATIC PDM) D) **7MF4997-1DA**

HART modem/USB (for use with a PC and SIMATIC PDM) D) **7MF4997-1DB**

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART¹⁾ **7ML1930-1AP**

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA⁶⁾ **7ML1930-1AQ**

Antenna, rod, PTFE **7ML1830-1HC**

Antenna extension, 50 mm (2") PTFE **7ML1830-1CG**

Antenna extension, 100 mm (4") PTFE **7ML1830-1CH**

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

¹⁾ Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

Selection and Ordering data

Order No.

SITRANS LR200, Flange Adapter/Horn Antenna Version C) **7ML 5 4 2 5 -**

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).

Antenna Material (uses antenna adapter)

316L stainless steel with PTFE cone emitter
 316L stainless steel with PTFE cone emitter and purge connection with 1/8" NPT inlet¹⁾
 Sliding waveguide system with 1000 mm (40") waveguide^{1) 2)}

Process connection (refer to Pressure/Temperature curves on specification sheets)

Flanges (316L stainless steel)

DN 50 PN 16, Type A, flat faced¹⁾

DN 80 PN 16, Type A, flat faced

DN 100 PN 16, Type A, flat faced

DN 150 PN 16, Type A, flat faced

DN 200 PN 16, Type A, flat faced

DN 80 PN 10/16 DIN EN1092-1 form B1

DN 100 PN 10/16 DIN EN1092-1 form B1

DN 150 PN 10/16 DIN EN1092-1 form B1

DN 200 PN 16 DIN EN1092-1 form B1

2" ASME 150 lb, flat faced¹⁾

3" ASME 150 lb, flat faced

4" ASME 150 lb, flat faced

6" ASME 150 lb, flat faced

8" ASME 150 lb, flat faced

DN 50 PN 40, flat faced¹⁾

DN 80 PN 40, flat faced

DN 100 PN 40, flat faced

DN 80 PN 25/40 DIN EN1092-1 form B1

DN 100 PN 25/40 DIN EN1092-1 form B1

DN 150 PN 25/40 DIN EN1092-1 form B1

2" ASME 300 lb, flat faced¹⁾

3" ASME 300 lb, flat faced

4" ASME 300 lb, flat faced

JIS DN 50 10K¹⁾

JIS DN 80 10K

JIS DN 100 10K

JIS DN 150 10K

JIS DN 200 10K

(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

4 ... 20 mA, HART®, startup at <3.6 mA

Process seal/gasket

FKM (-40 ... +200 °C)

Nitrile (-40 ... +60 °C), sliding waveguide systems only

FFKM (-35 ... +200 °C)

Enclosure/Cable inlet

Aluminum, Epoxy painted

2 x 1/2" NPT, Siemens LUI interface

2 x M20x1.5, Siemens LUI interface

Horn size/Waveguide options

80 mm (3") horn³⁾

100 mm (4") horn³⁾

150 (6") mm horn

200 (8") mm horn

100 mm (4") horn with 100 mm (4") waveguide extension³⁾

100 mm (4") horn with 150 mm (6") waveguide extension³⁾

100 mm (4") horn with 200 mm (8") waveguide extension³⁾

100 mm (4") horn with 250 mm (10") waveguide extension³⁾

7ML 5 4 2 5 -

AA

BA

CA

DA

EA

0

1

2

AA

BA

CA

DA

EA

BF

CF

DF

EF

FB

GB

HB

JB

KB

AC

BC

CC

CG

DG

EG

FD

GD

HD

AE

BE

CE

DE

EE

1

2

0

1

2

2

2

3

B

C

D

E

F

G

H

J

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Selection and Ordering data

Order No.

SITRANS LR200, Flange Adapter/Horn Antenna C) Version

7ML 5 4 2 5 -

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).

150 mm (6") horn with 100 mm (4") waveguide extension
150 mm (6") horn with 150 mm (6") waveguide extension
150 mm (6") horn with 200 mm (8") waveguide extension

150 mm (6") horn with 250 mm (10") waveguide extension
200 mm (8") horn with 100 mm (4") waveguide extension
200 mm (8") horn with 150 mm (6") waveguide extension

200 mm (8") horn with 200 mm (8") waveguide extension
200 mm (8") horn with 250 mm (10") waveguide extension

Waveguide only - Waveguide length 500 mm ... 3000 mm (in 1 mm increments)
(Add order code Y01 and plain text: "waveguide length ... mm")

Approvals

General Purpose, CE⁴⁾

General Purpose, CSA_{USC}, FM, for North America only⁵⁾

CSA Class I and II, Div. I, Groups A, B, C, D, G, for North America only, Intrinsically Safe with suitable barrier⁵⁾

FM, Class I and II, Div. I, Groups A, B, C, D, E, F, G, for North America only, Intrinsically Safe with suitable barrier⁵⁾

ATEX II 1G EEx ia IIC T4, Intrinsically Safe with suitable barrier⁴⁾

FM, Class I, Div. 2, Groups A, B, C, D, for North America only (no barrier required)^{5) 6)}

ATEX II 1/2 G EEx emia IIC T4 (no barrier required)^{4) 7) 8)}

ATEX II 1/2 G EEx dmia IIC T4 (no barrier required)^{4) 8)}

CSA/FM Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G (no barrier required)^{5) 6) 8)}

Pressure rating

Rating per Pressure/Temperature curves in Manual 0.5 bar g (7.25 psi g) maximum

1) Available with pressure rating option 1 only

2) Maximum Process Temperature +60 °C (+140 °F)

3) For stillpipe applications only

4) Includes European Radio approval (R&TTE), 5.8 GHz, C-TICK

5) Includes Radio approval FCC, 6.3 GHz

6) Available with enclosure option 2 only

7) Available with enclosure option 3 only

8) Available with communication option 0 and 2 only

C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

Selection and Ordering data

Order code

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Inactive custom shield lengths: Enter the total length of the inactive shield in plain text description (in 1 mm increments).

Y01

Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text

Y15

Test certificate: 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 mA¹⁾

N07

Operating Instructions for HART/mA device

Order No.

English

C) 7ML1998-5JP02

German

C) 7ML1998-5JP32

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual

C) 7ML1998-5XC81

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Operating Instructions for PROFIBUS PA device

English

C) 7ML1998-5JR02

German

C) 7ML1998-5JR32

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual

C) 7ML1998-5XD81

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

Handheld programmer, Intrinsically safe, EEx ia

C) 7ML1930-1BK

HART modem/RS-232 (for use with a PC and SIMATIC PDM)

D) 7MF4997-1DA

HART modem/USB (for use with a PC and SIMATIC PDM)

D) 7MF4997-1DB

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART²⁾

7ML1930-1AP

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA³⁾

7ML1930-1AQ

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

1) Includes Radio approval FCC, 6.3 GHz

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

C) Subject to export regulations AL: N, ECCN: EAR99

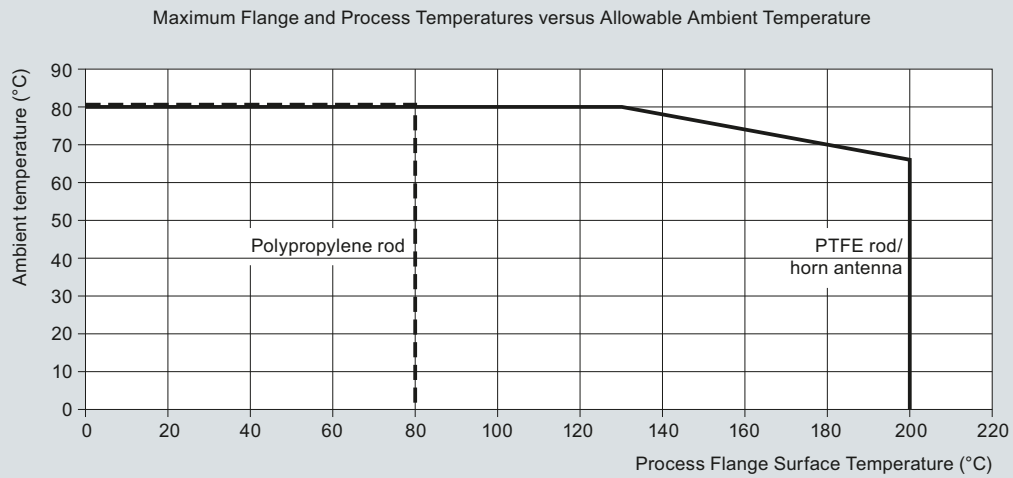
D) Subject to export regulations AL: N, ECCN: EAR99H

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Characteristic curves



SITRANS LR200 Ambient/Process Flange Surface Temperature Curve

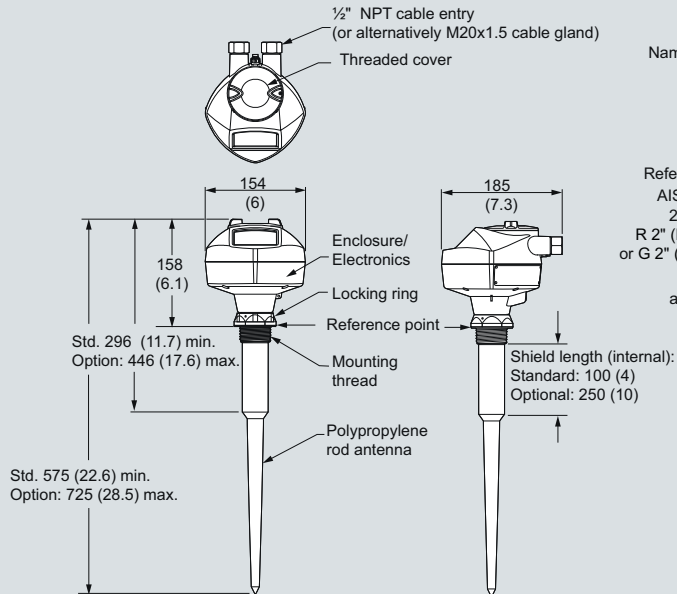
Level Measurement

Continuous level measurement - Radar transmitters

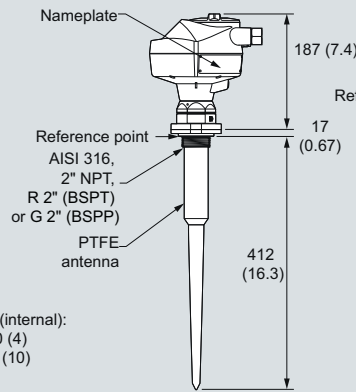
SITRANS LR200

Dimensional drawings

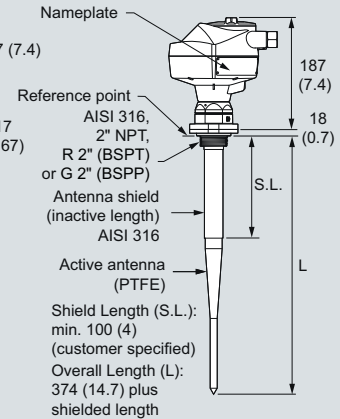
SITRANS LR200 with Polypropylene Shielded Rod Antenna



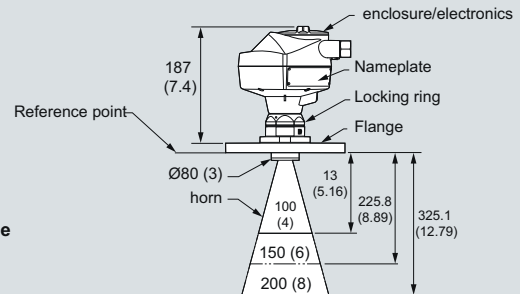
PTFE Rod Antenna, Threaded



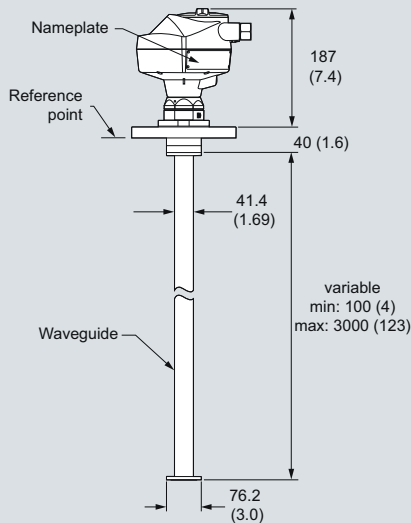
**Threaded Connection
PTFE Rod, external shield**



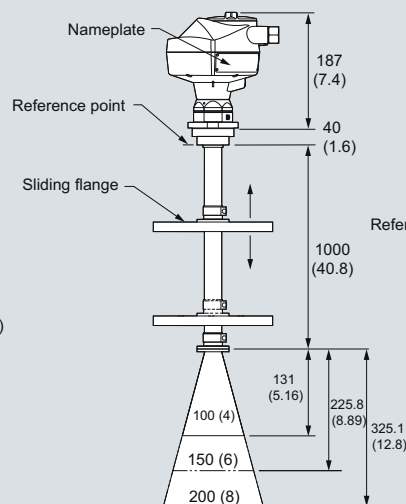
Horn Antenna with Flat Faced Flange



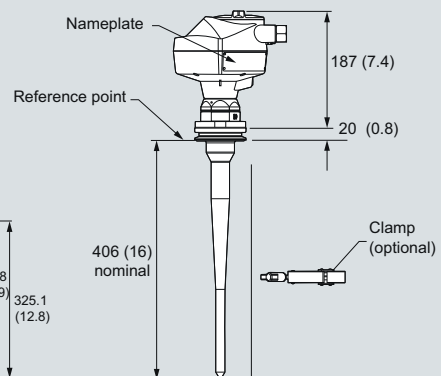
**Waveguide Antenna with
Flat Faced Flange**



Sliding Waveguide



Sanitary Rod Antenna



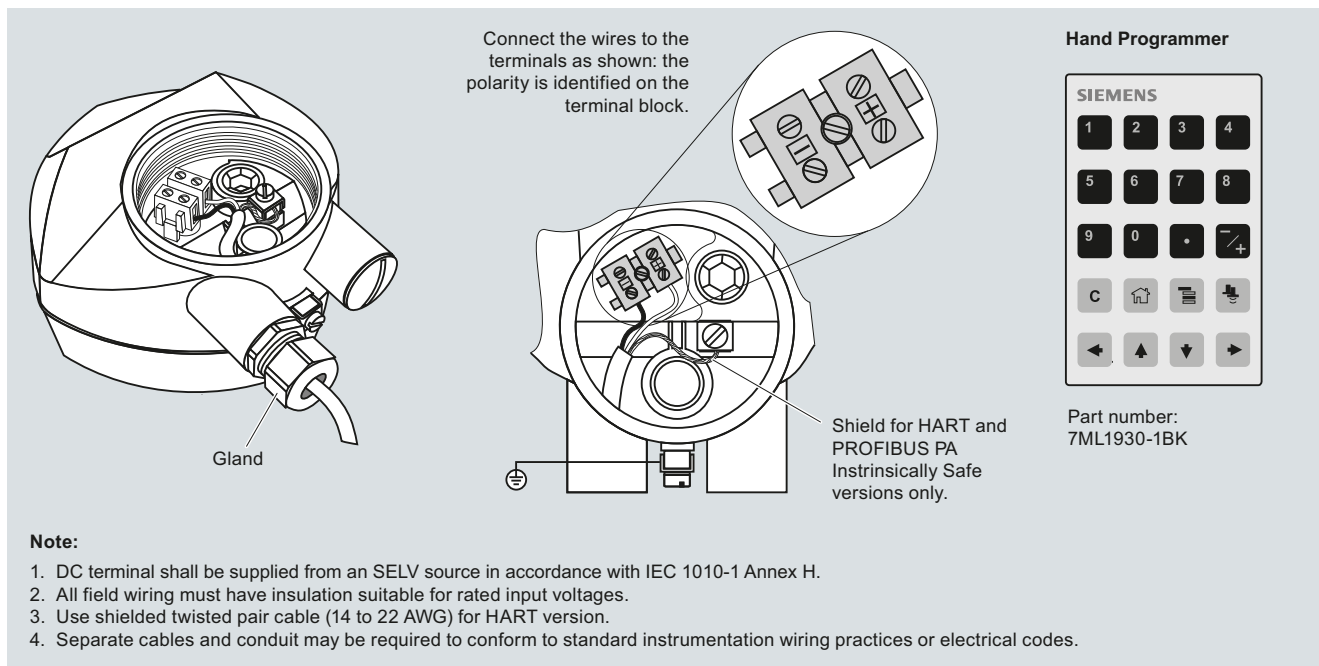
SITRANS LR200, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Schematics



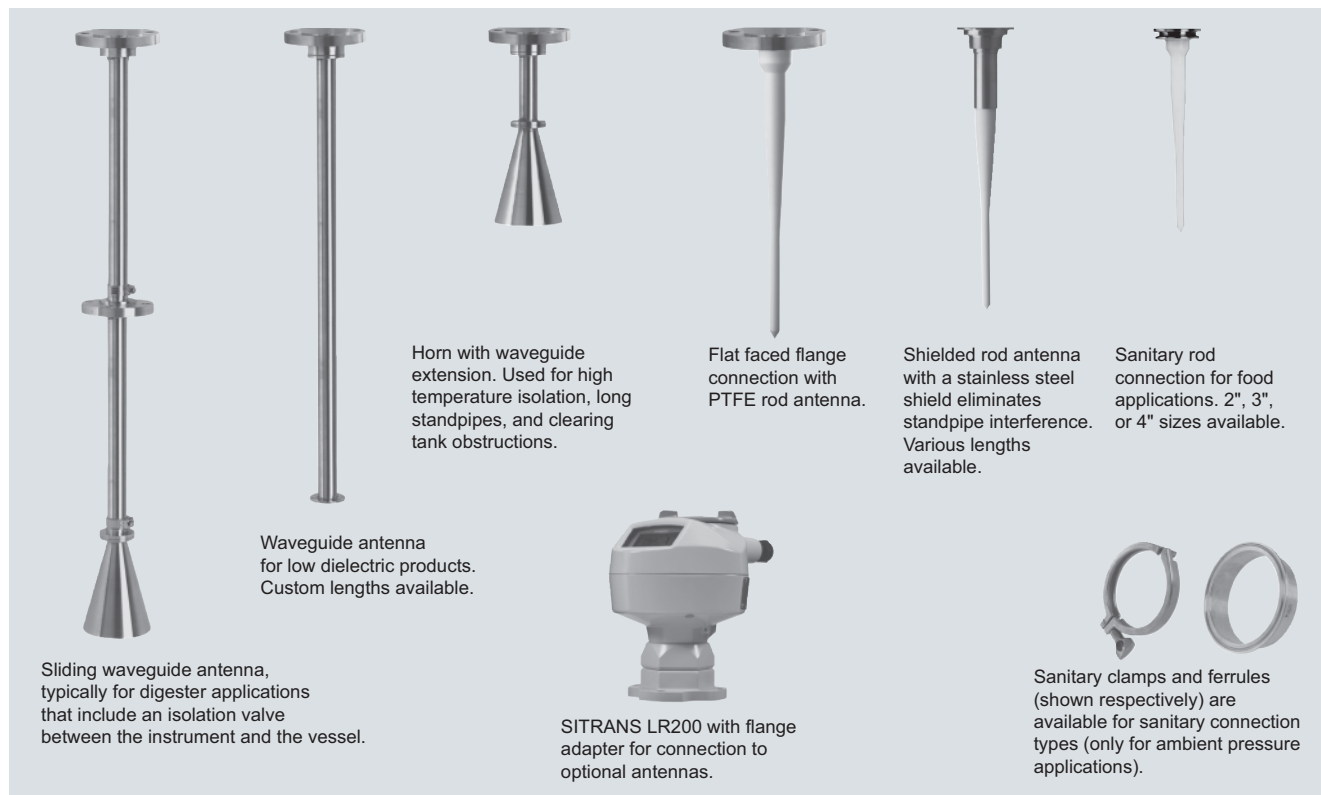
SITRANS LR200 connections

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200 Antennas

Integration



Antenna configurations for SITRANS LR200

Technical specifications

Antenna Types	Flat Faced Flange with Rod	Shielded Rod	Sanitary Rod (1 piece construction)	Horn (4", 6", 8" sizes available)	Waveguide
Connection type	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6")	Threaded 2" NPT, R 2" (BSPT), G 2" (BSPP) or flat faced flange nominal pipe sizes 80, 100 mm (3, 4")	Sanitary fitting clamp 50, 80, 100 mm (2, 3, 4") sizes	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6")	Flat faced flange nominal pipe sizes 50, 80, 100, 150 mm (2, 3, 4, 6")
Wetted parts	PTFE	PTFE, 316L stainless steel, FKM o-ring	UHME-PE or PTFE	316L stainless steel PTFE, FKM o-ring	316L stainless steel PTFE, FKM o-ring
Extensions	50 or 100 mm (2 or 4") PTFE or UHMW-PE	100, 150, 200 or 250 mm (4, 6, 8 or 10") standard shield length	N/A	use waveguide for extensions to 6 m (20 ft) long	two sections (max.) can be connected together Max. overall length: 3 m (9.8 ft)
Dielectric constant	> 3	> 3	> 3	> 3	> 1.6
Insertion length (max.)	41 cm (16.3")	variable	41 cm (16.3")	variable with extension	variable
Purging option (liquid or gas)	No	No	No	Yes	Yes
Sliding waveguide option for digesters¹⁾	Yes	No	No	Yes	N/A
Weight²⁾	6.5 kg (14.3 lbs)	5.0 kg (11 lbs)	5.0 kg (11 lbs)	7.5 kg (16.5 lbs)	8.0 kg (17.6 lbs) 1 m (39") length

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

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200 Specials

SITRANS LR200 Specials

Order No.

SITRANS LR200 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, no process connection.⁷⁾ C) **A5E01483323**

SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option E, with HART[®] communication, no process connection.⁷⁾ C) **A5E01483368**

SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, M20 cable inlet, approval option C, with HART[®] communication, no process connection.⁷⁾ C) **A5E01483389**

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.⁷⁾ C) **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.⁷⁾ C) **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.⁷⁾ C) **A5E01483456**

SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option A, with HART[®] communication, no process connection.⁷⁾ C) **A5E01483468**

SITRANS LR200 aluminum enclosure with board stack, LUI display, 6.3 GHz, NPT cable inlet, approval option C, with HART[®] communication, no process connection.⁷⁾ C) **A5E01483480**

SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with HART[®] communication, no process connection.⁷⁾ C) **A5E01483493**

SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, NPT cable inlet, approval option E, with HART[®] communication, no process connection.⁷⁾ C) **A5E01483536**

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.⁷⁾ C) **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.⁷⁾ C) **A5E01483559**

SITRANS LR200 Specials

Order No.

SITRANS LR200 aluminum enclosure with board stack, LUI display, 5.8 GHz, M20 cable inlet, approval option A, with HART[®] communication start-up at <3.6mA, no process connection.⁷⁾ C) **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 <3.6mA, no process connection.⁷⁾ C) **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 <3.6mA, no process connection.⁷⁾ C) **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 <3.6mA, no process connection.⁷⁾ C) **A5E02956422**

SITRANS LR200 Horn Antenna Kits with mounting screws (no emitter supplied)



80 mm (3") horn antenna kit

PBD-25500K02A

100 mm (4") horn antenna kit

PBD-25500K03A

150 mm (6") horn antenna kit

PBD-25500K05A

200 mm (8") horn antenna kit

PBD-25500K07A

SITRANS LR200 Extension Kits for Horn Antenna with mounting screws

100 mm (4") extension kit for horn antenna

PBD-25501K0100A

150 mm (6") extension kit for horn antenna

PBD-25501K0150A

200 mm (8") extension kit for horn antenna

PBD-25501K0200A

250 mm (10") extension kit for horn antenna

PBD-25501K0250A

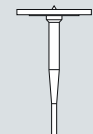
500 mm (20") extension kit for horn antenna

PBD-25501K0500A

1000 mm (40") extension kit for horn antenna

PBD-25501K1000A

SITRANS LR200 Flanged Rod Antenna Kit with 316L SS flat faced flanges



Flanged PTFE rod antenna kit, 2" ASME, 150 lb. See drawing 51003 on <http://www.siemens.com/radar>^{1) 6)}

PBD-51003K020AAAA

Flanged PTFE rod antenna kit, DN 50 PN16. See drawing 51003 on <http://www.siemens.com/radar>^{1) 6)}

PBD-51003K050AJAA

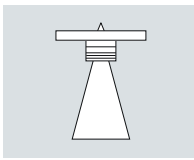
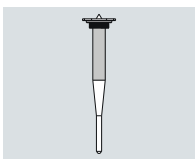
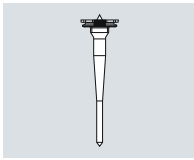
Flanged PTFE rod antenna kit, JIS 10K DN 50. See drawing 51003 on <http://www.siemens.com/radar>^{1) 6)}

PBD-51003K050AOAA

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200 Specials

Order No.		Order No.	
SITRANS LR200 PTFE Rod Antenna Kit with 316L SS 1½" pipe thread process connection PTFE rod antenna kit, 1½" NPT 316L SS Process Connection, FKM O-ring; See drawing 51004 on http://www.siemens.com/radar ⁶⁾ PTFE rod antenna kit, R 1½" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring; See drawing 51004 on http://www.siemens.com/radar ⁶⁾ PTFE rod antenna kit, 1½" G 316L SS Process Connection, FKM O-ring; See drawing 51004 on http://www.siemens.com/radar ⁶⁾		SITRANS LR200 Horn Antenna Kit with 316L SS flat faced flange, with PTFE emitter (without waveguide) Horn antenna kit, 2" ASME 316L SS flange 3" horn, PTFE emitter ^{2) 6)} Horn antenna kit, 2" ASME 316L SS flange 4" horn, PTFE emitter ^{2) 6)} Horn antenna kit, 2" ASME 316L SS flange 6" horn, PTFE emitter ^{2) 6)} Horn antenna kit, 2" ASME 316L SS flange 8" horn, PTFE emitter ^{2) 6)} Horn antenna kit, DN 50 PN 16 316L SS flange 80 mm horn, PTFE emitter ^{2) 6)} Horn antenna kit, DN 50 PN 16 316L SS flange 100 mm horn, PTFE emitter ^{2) 6)} Horn antenna kit, DN 50 PN 16 316L SS flange 150 mm horn, PTFE emitter ^{2) 6)} Horn antenna kit, DN 50 PN 16 316L SS flange 200 mm horn, PTFE emitter ^{2) 6)}	
SITRANS LR200 PTFE Rod Antenna Kit with 316L SS 2" pipe thread process connection PTFE rod antenna kit, 2" NPT 316L SS Process Connection, FKM O-ring; See drawing 51005 on http://www.siemens.com/radar ⁶⁾ PTFE rod antenna kit, R 2" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring; See drawing 51005 on http://www.siemens.com/radar ⁶⁾ PTFE rod antenna kit, 2" G 316L SS Process Connection, FKM O-ring; See drawing 51005 on http://www.siemens.com/radar ⁶⁾		SITRANS LR200 Sanitary Rod Antenna with Sanitary Fitting Clamp Flange mounting and bushing. See drawing 51010 on http://www.siemens.com/radar (Sanitary Fitting Clamps not included) PTFE sanitary rod antenna kit, 2" mounting connection. ⁶⁾ PTFE sanitary rod antenna kit, 3" mounting connection. ⁶⁾ PTFE sanitary rod antenna kit, 4" mounting connection. ⁶⁾ UHMW-PE sanitary rod antenna kit, 2" mounting connection. ⁶⁾ UHMW-PE sanitary rod antenna kit, 3" mounting connection. ⁶⁾ UHMW-PE sanitary rod antenna kit, 4" mounting connection. ⁶⁾	
SITRANS LR200 PTFE Rod Antenna Kit (100 mm shield) with 316L SS 2" pipe thread process connection PTFE rod antenna shielded kit, 2" NPT 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield. See drawing 51002 on http://www.siemens.com/radar ^{3) 6)} PTFE rod antenna shielded kit, R 2" (BSPT), EN 10226 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield. See drawing 51002 on http://www.siemens.com/radar ^{3) 6)} PTFE rod antenna shielded kit, 2" G 316L SS Process Connection, FKM O-ring, 100 mm 316L SS shield. See drawing 51002 on http://www.siemens.com/radar ^{3) 6)}		SITRANS LR200 PTFE Flanged Rod Antenna Kit with 316L SS shield and 316L SS flat faced flange PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 100 mm 316L SS shield. ^{1) 6)} PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 100 mm 316L SS shield. ^{1) 6)} PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 150 mm 316L SS shield. ^{1) 6)}	

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200 Specials

	Order No.
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 150 mm 316L SS shield. ^{1) 6)}	PBD-51014K0150EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 200 mm 316L SS shield. ^{1) 6)}	PBD-51014K0200AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 200 mm 316L SS shield. ^{1) 6)}	PBD-51014K0200EJA
PTFE shielded rod antenna kit, flanged, 3" ASME 150 lb 316L SS flange, 250 mm 316L SS shield. ^{1) 6)}	PBD-51014K0250AAA
PTFE shielded rod antenna kit, flanged, DN 80 PN 16 316L SS flange, 250 mm 316L SS shield. ^{1) 6)}	PBD-51014K0250EJA
PTFE paste	
Kit, PTFE paste, Tube, 250 mL. ⁷⁾	C) 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

C) Subject to export regulations AL: N, ECCN: EAR99

Please contact nacc.smpi@siemens.com for special requests.

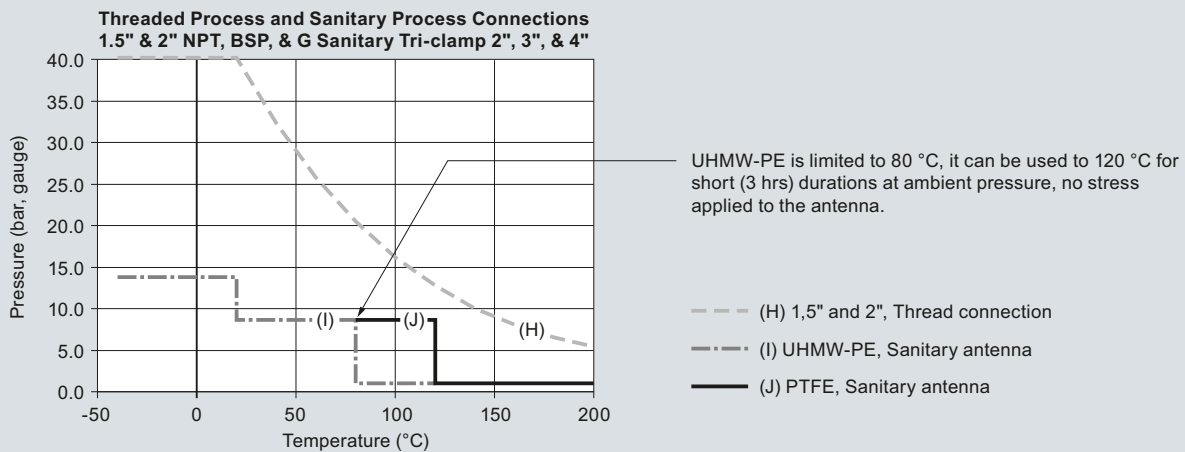
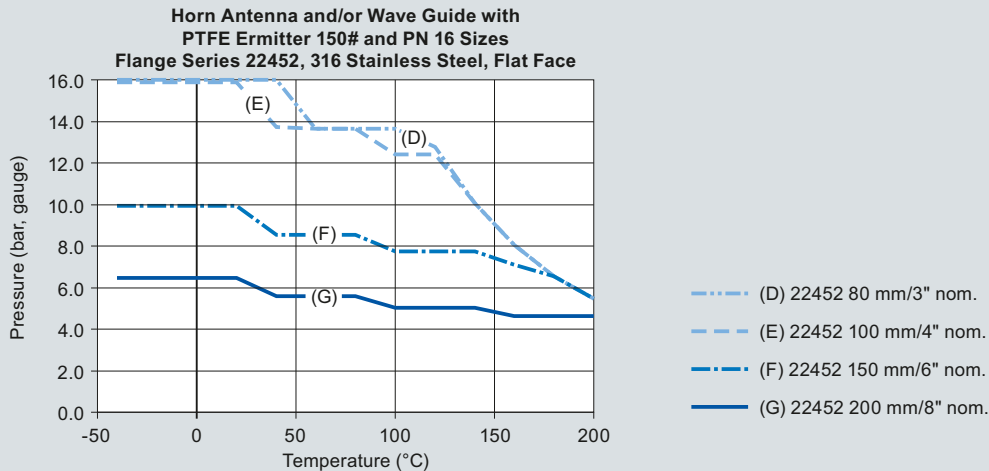
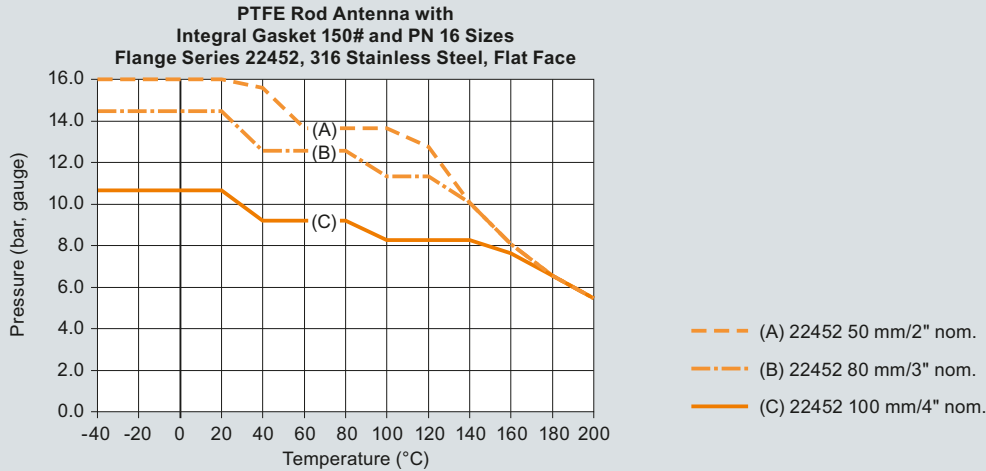
- 1) Available in flange sizes including ASME, DIN and JIS: please contact nacc.smpi@siemens.com.
- 2) Available with no pressure rating
- 3) Available in other shield lengths: please contact nacc.smpi@siemens.com.
- 4) Available with no pressure rating and with General Purpose Approvals only
- 5) Please contact nacc.smpi@siemens.com for pricing and part number. Submit completed Application Questionnaire found on page 5/195
- 6) Available with Pressure rating; serial number of original unit required with completed Application Questionnaire found on page 5/195
- 7) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR200

Characteristic curves



SITRANS LR200 Process Pressure/Temperature derating curves

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250

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 horn 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") from the end of the horn
- 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

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 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 on low dielectric media, and in small vessels, as well as tall and narrow vessels.

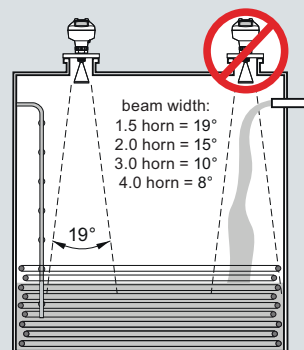
- Key Applications: liquid bulk storage tanks, process vessels with agitators, vaporous liquids, high temperatures, low dielectric media

Configuration

Installation

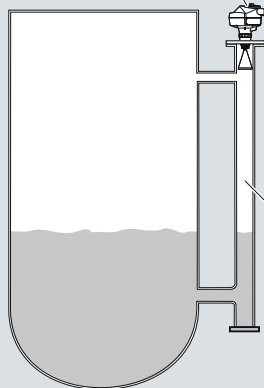
Note:

- 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.



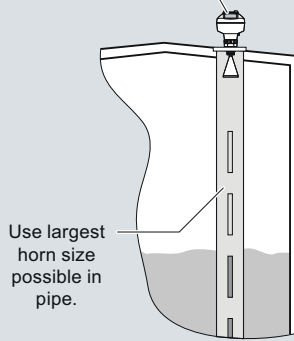
Mounting unit on bypass

Orient front or back of device toward vent.

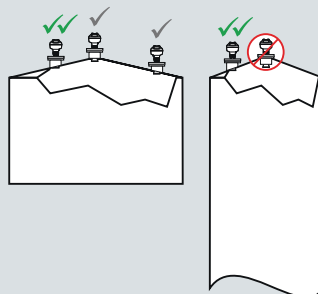


Mounting unit on stilling well

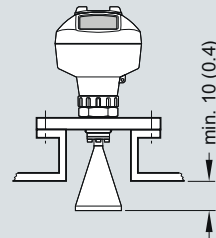
Orient front or back of device toward stillpipe slots.



Mounting unit on vessel



Mounting on a nozzle



SITRANS LR250 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250

Technical specifications

Mode of operation		• Dimensions (nominal horn sizes)	Standard 1.5" (40 mm), 2" (48 mm), 3" (75 mm), 4" (95 mm) horn and optional 100 mm (4") horn extension
Measuring principle	Radar level measurement	Process connections	
Frequency	K-band (25.0 GHz)	• Process connection	11½" or 2" NPT [(Taper), ANSI/ASME B1.20.1] R 1½" or 2" [(BSPT), EN 10226] G 1½" or 2" [(BSPP), EN ISO 228-1]
Minimum measuring range	50 mm (2") from end of horn	• Flange connection	2", 3", 4" (ANSI 150, 300 lbs), 50, 80, 100 mm (PN 16, 40, JIS 10K)
Maximum measuring range	20 m (65 ft), horn dependent	Power supply 4 ... 20 mA/HART	Nominal 24 V DC (max. 30 V DC) with max. 550 Ω
Output		PROFIBUS PA	• 15 mA • per IEC 61158-2
HART®:	Version 5.1	FOUNDATION Fieldbus	• 20.0 mA • per IEC 61158-2
• Analog output • Accuracy • Fail-safe	4 ... 20 mA ±0.02 mA • Programmable as high low or hold (loss of echo) • NE 43 programmable Profile 3.1	Certificates and approvals	
PROFIBUS PA:	2 Analog Input (AI)	General	CSA _{US/C} , CE, FM, NE 21, C-TICK
FOUNDATION Fieldbus™	H1	Radio	FCC, Industry Canada and Europe ETSI EN 302-372, C-TICK
• Functionality • Version • Function blocks	Basic or LAS ITK 5.2.0 2 Analog Input (AI)	Hazardous	
Performance (according to reference conditions IEC60770-1)		• Intrinsically Safe (Europe) • Non-sparking/Energy Limited (Europe) • Intrinsically Safe (Canada/USA)	ATEX II 1G Ex ia IIC T4 ATEX II 1D Ex tD A20 IP67 T90°C ATEX II 3G Ex nA/nL IIC T4 Gc
Maximum measured error	5 mm (0.2")	• Non-incendive (Canada/USA) • Intrinsically Safe (International) • Flame Proof (International/Europe)	CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III T4 CSA/FM Class I, Div. 2, Groups A, B, C, D T5 IECEx Ex ia IIC T4, Ex tD A20 IP67 T90°C IECEx/ATEX II 1/2 GD, 1D, 2D, Ex dmbia IIC T4 Ga/Gb, Ex tD A20 IP67 T90°C IECEx/ATEX II 1/2 GD, 1D, 2D, Ex embia IIC T4 Ga/Gb, Ex tD A20 IP67 T90°C
Influence of ambient temperature	<0.003 %/K	• Increased Safety (International/Europe) • 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 • Lloyd's Register of Shipping • ABS Type Approval • Bureau Veritas
Rated operating conditions		Marine	
Installation conditions	Indoor/outdoor	Programming	
• Location		Intrinsically Safe Siemens handheld programmer	Infrared receiver
Ambient conditions (enclosure)		• 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 Ta = +50 °C IECEx SIR 09.0073
• Ambient temperature • Installation category • Pollution degree	-40 ... +80 °C (-40 ... +176 °F) I 4	Handheld communicator PC	HART communicator 375/475 • SIMATIC PDM • Emerson AMS • SITRANS DTM (for connection into FDT, such as PACTware or Fieldcare)
Medium conditions		Display (local)	Graphic local user interface including quick start wizard and echo profile displays
Dielectric constant ε _r	ε _r > 1.6, horn 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	Aluminium, 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 lbs) 3.75 mm (1½") 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)]		

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Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250

Selection and Ordering data	Order No.
SITRANS LR250	C) 7ML 5 4 3 1 -
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). Ideal for small vessels and low dielectric media.	0 -
Process Connection and Antenna Material	
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FKM seal	0
316L (1.4435 or 1.4404) stainless steel, PTFE emitter, FFKM seal	1
Hastelloy C-22/2.4602, PTFE emitter, FKM seal ¹⁾	2
Hastelloy C-22/2.4602, PTFE emitter, FFKM seal ¹⁾	3
Process Connection Type	
1½" NPT [(Taper), ANSI/ASME B1.20.1] ²⁾	AA
R 1½" [(BSPT), EN 10226] ²⁾	AB
G 1½" [(BSPP), EN ISO 228-1] (parallel thread) ²⁾	AC
2" NPT [(Taper), ANSI/ASME B1.20.1]	AD
R 2" [(BSPT), EN 10226]	AE
G 2" [(BSPP), EN ISO 228-1] (parallel thread)	AF
2" ASME, 150 lb, FF, ASME B16.5 ³⁾	BA
3" ASME, 150 lb, FF, ASME B16.5 ³⁾	BB
4" ASME, 150 lb, FF, ASME B16.5 ³⁾	BC
2" ASME, 300 lb, FF, ASME B16.5 ³⁾	CA
3" ASME, 300 lb, FF, ASME B16.5 ³⁾	CB
4" ASME, 300 lb, FF, ASME B16.5 ³⁾	CC
DN 50 PN 16, Type A, EN 1092-1 ³⁾	DA
DN 80 PN 16, Type A, EN 1092-1 ³⁾	DB
DN 100 PN 16, Type A, EN 1092-1 ³⁾	DC
DN 50 PN 40, Type A, EN 1092-1 ³⁾	EA
DN 80 PN 40, Type A, EN 1092-1 ³⁾	EB
DN 100 PN 40, Type A, EN 1092-1 ³⁾	EC
JIS 50A 10K, FF, JIS B2220 ³⁾	FA
JIS 80A 10K, FF, JIS B2220 ³⁾	FB
JIS 100A 10K, FF, JIS B2220 ³⁾	FC
DN 50 PN 10/16 DIN EN1092-1 form B1	GA
DN 80 PN 10/16 DIN EN1092-1 form B1	GB
DN 100 PN 10/16 DIN EN1092-1 form B1	GC
DN 150 PN 10/16 DIN EN1092-1 form B1	GD
DN 50 PN 25/40 DIN EN1092-1 form B1	HA
DN 80 PN 25/40 DIN EN1092-1 form B1	HB
DN 100 PN 25/40 DIN EN1092-1 form B1	HC
DN 150 PN 25/40 DIN EN1092-1 form B1	HD
Communication/Output	
PROFIBUS PA	1
4 ... 20 mA, HART®, startup at < 3.6 mA	2
FOUNDATION Fieldbus™	3
Enclosure/Cable inlet	
Aluminum, Epoxy painted	0
2 x ½" NPT	1
2 x M20x1.5	
Antenna	
1½" horn ⁴⁾	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 ⁴⁾	E
2" horn with 100 mm extension	F
3" horn with 100 mm extension	G
4" horn with 100 mm extension	H
(Note: Please use largest horn size possible.)	

Selection and Ordering data	Order No.
SITRANS LR250	C) 7ML 5 4 3 1 -
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). Ideal for small vessels and low dielectric media.	0 -
Approvals	
General Purpose, CE, CSA, FM, FCC, R&TTE, C-TICK	A
Intrinsically Safe, CSA/FM Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G, FCC	B
Intrinsically Safe, IECEx/ATEX II 1 GD Ex ia IIC T4, Ex tD A20 IP67 T90°C, R&TTE, C-TICK, INMETRO	C
Non-incendive, CSA/FM Class I, Div. 2, Groups A, B, C, D, FCC	D
Non-sparking, Energy Limited, ATEX II 3G Ex nA/nL IIC T4, CE, R&TTE, C-TICK	E
Increased Safety, IECEx/ATEX II 1/2 GD Ex embia IIC T4, Ex tD A20 IP67 T90°C, CE, R&TTE, C-TICK ⁵⁾	F
Flame Proof, IECEx/ATEX II 1/2 GD Ex dmbia IIC T4, Ex tD A20 IP67 T90°C, CE, R&TTE, C-TICK ⁵⁾	G
Explosion Proof CSA/FM Class I, II, III, Div. 1, Gr. A, B, C, D, E, F, G, FCC ⁵⁾	H
Pressure rating	
Rating per Pressure/Temperature curves in manual	0
0.5 bar g (7.25 psi g) maximum	1
1) Not available with process connection options AA to AF	
2) For 1½" horn antennas only, max. range 10 m (32.8 ft), dk > 3	
3) Siemens Milltronics type flange, see instruction manual for details	
4) For 1½" threaded connection only, max. range 10 m (32.8 ft), dk > 3	
5) Applicable to Communication option 0 or 2 only	
C) Subject to export regulations AL: N, ECCN: EAR99	
Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Plug M12 with mating Connector ^{1) 2) 3)}	A50
Plug 7/8" with mating Connector ⁷⁾⁸⁾⁴⁾	A55
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 27 characters); specify in plain text	Y15
Test certificate: 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 ⁵⁾	N07
Operating Instructions for HART/4mA device	Order No.
English	C) 7ML1998-5JE03
German	C) 7ML1998-5JE33
Note: The Operating Instructions should be ordered as a separate line item on the order.	
Multi-language Quick Start manual	C) 7ML1998-5QX82
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	

5

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250

Operating Instructions for PROFIBUS PA device

English C) **7ML1998-5JF03**

German C) **7ML1998-5JF33**

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual C) **7ML1998-5XE82**

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Operating Instructions for FOUNDATION Fieldbus device

English C) **7ML1998-5KL01**

German C) **7ML1998-5KL31**

Note: The Operating Instructions should be ordered as a separate line item on the order.

Multi-language Quick Start manual C) **7ML1998-5XN81**

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

Handheld programmer, Intrinsically safe, EEx ia C) **7ML1930-1BK**

HART modem/RS-232 (for use with a PC and SIMATIC PDM) D) **7MF4997-1DA**

HART modem/USB (for use with a PC and SIMATIC PDM) D) **7MF4997-1DB**

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), HART⁵⁾ **7ML1930-1AP**

One metallic cable gland M20x1.5, rated -40 ... +80 °C (-40 ... +176 °F), PROFIBUS PA⁶⁾ **7ML1930-1AQ**

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

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 Approvals option A, B, or C only

⁴⁾ Available with Enclosure option 0 only

⁵⁾ Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

Level Measurement

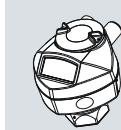
Continuous level measurement - Radar transmitters

SITRANS LR250 Specials

SITRANS LR250 Specials

Order No.

SITRANS LR250 Enclosures



LR250 enclosure with board stack, NPT cable inlet, approval option A, with HART communication, no process connection

C) **A5E01156819**

LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART communication, no process connection

C) **A5E01156820**

LR250 enclosure with board stack, NPT cable inlet, approval option B, with HART communication, no process connection

C) **A5E01156823**

LR250 enclosure with board stack, M20 cable inlet, approval option B, with HART communication, no process connection

C) **A5E01156824**

LR250 enclosure with board stack, NPT cable inlet, approval option C, with HART communication, no process connection

C) **A5E01156827**

LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART communication, no process connection

C) **A5E01156832**

LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication, no process connection

C) **A5E01156834**

LR250 enclosure with board stack, NPT cable inlet, approval option D, with HART communication, no process connection

C) **A5E01156835**

LR250 enclosure with board stack, NPT cable inlet, approval option A, with PROFIBUS PA communication, no process connection

C) **A5E01156836**

LR250 enclosure with board stack, M20 cable inlet, approval option A, with PROFIBUS PA communication, no process connection

C) **A5E01156838**

LR250 enclosure with board stack, NPT cable inlet, approval option B, with PROFIBUS PA communication, no process connection

C) **A5E01156839**

LR250 enclosure with board stack, M20 cable inlet, approval option B, with PROFIBUS PA communication, no process connection

C) **A5E01156841**

LR250 enclosure with board stack, NPT cable inlet, approval option C, with PROFIBUS PA communication, no process connection

C) **A5E01156843**

LR250 enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection

C) **A5E01156844**

LR250 enclosure with board stack, M20 cable inlet, approval option C, with PROFIBUS PA communication, no process connection

C) **A5E01156846**

LR250 enclosure with board stack, M20 cable inlet, approval option D, with PROFIBUS PA communication, no process connection

C) **A5E01156848**

LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART® communication, no process connection

C) **A5E02448270**

SITRANS LR250 Specials

Order No.

LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART® communication, no process connection

C) **A5E02448274**

LR250 enclosure with board stack, NPT cable inlet, approval option H, with HART® communication, no process connection

C) **A5E02448278**

LR250 enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection

C) **A5E02653792**

LR250 enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus communication, no process connection

C) **A5E02653793**

LR250 enclosure with board stack, NPT cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection

C) **A5E02654606**

LR250 enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus communication, no process connection

C) **A5E02654608**

LR250 enclosure with board stack, M20 cable inlet, approval option A, with HART® communication start-up at <3.6mA, no process connection

C) **A5E02956317**

LR250 enclosure with board stack, M20 cable inlet, approval option C, with HART® communication start-up at <3.6mA, no process connection

C) **A5E02956319**

LR250 enclosure with board stack, M20 cable inlet, approval option E, with HART® communication start-up at <3.6mA, no process connection

C) **A5E02956320**

LR250 enclosure with board stack, M20 cable inlet, approval option F, with HART® communication start-up at <3.6mA, no process connection

C) **A5E02956322**

LR250 enclosure with board stack, M20 cable inlet, approval option G, with HART® communication start-up at <3.6mA, no process connection

C) **A5E02956323**

LR250 enclosure with board stack, NPT cable inlet, approval option A, with FOUNDATION Fieldbus™ communication, no process connection

C) **A5E02653792**

LR250 enclosure with board stack, M20 cable inlet, approval option A, with FOUNDATION Fieldbus™ communication, no process connection

C) **A5E02653793**

LR250 enclosure with board stack, NPT cable inlet, approval option C, with FOUNDATION Fieldbus™ communication, no process connection

C) **A5E02654606**

LR250 enclosure with board stack, M20 cable inlet, approval option C, with FOUNDATION Fieldbus™ communication, no process connection

C) **A5E02654608**

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Specials

Order No.

SITRANS LR250 horn antenna and extension kits



38 mm (1.5") horn antenna kit, 1.5" Process Connections only	C)	A5E01151539
100 mm (4") horn antenna extension kit, 1.5" Process Connections only		A5E01151553
50 mm (2") stainless steel 316L horn antenna kit	C)	A5E01151569
75 mm (3") stainless steel 316L horn antenna kit	C)	A5E01151571
100 mm (4") stainless steel 316L horn antenna kit	C)	A5E01151573
100 mm (4") horn antenna extension kit, 50 mm (2"), 75 mm (3") and 100 mm (4") process connec- tion	C)	A5E01151577
50 mm (2") horn antenna kit, Hastelloy C-22	J)	A5E01151584
75 mm (3") horn antenna kit, Hastelloy C-22	J)	A5E01151585
100 mm (4") horn antenna kit, Hastelloy C-22	J)	A5E01151587
5 Dupont 1Gr Polyback, PTFE grease kit	C)	A5E01151626
LR250 lid with O-ring		A5E02465410

C) Subject to export regulations AL: N, ECCN: EAR99

J) Subject to export regulations AL: 91999, ECCN: EAR99

Please contact nacc.smpi@siemens.com for special requests

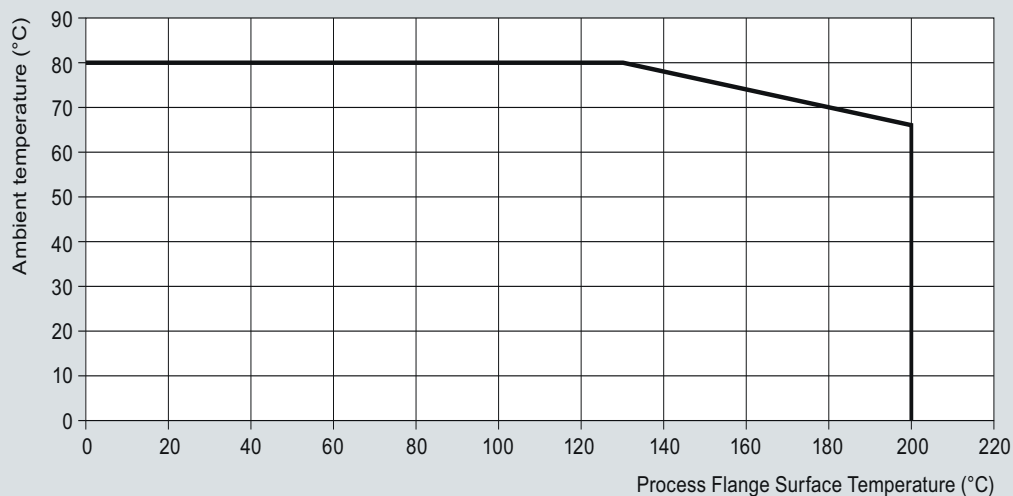
Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Specials

Characteristic curves

Maximum Flange and Process Temperatures versus Allowable Ambient Temperature



SITRANS LR250 Ambient/Process Flange Surface Temperature Curve

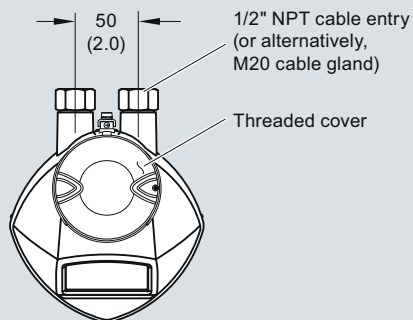
Level Measurement

Continuous level measurement - Radar transmitters

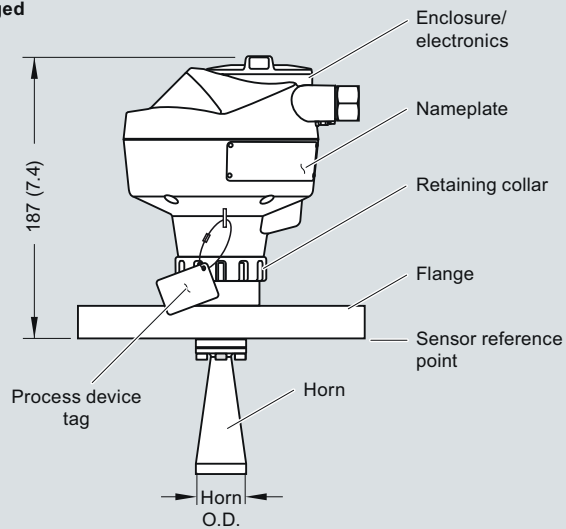
SITRANS LR250 Specials

Dimensional drawings

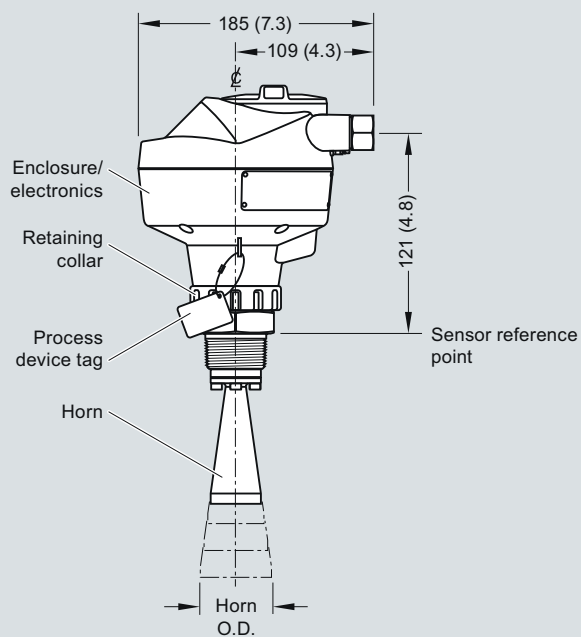
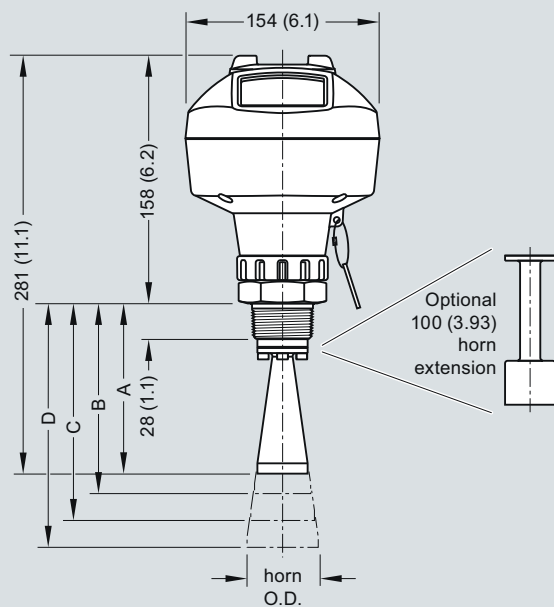
SITRANS LR250



Flanged



Threaded



Nominal Horn Size	Horn O.D.	Horn Height	Beam Angle	Measurement Range
40 (1.5)	39.8 (1.57)	A	19 degrees	10 m (32.8 ft)
50 (2)	47.8 (1.88)	B	15 degrees	20 m (65.6 ft)
80 (3)	74.8 (2.94)	C	10 degrees	20 m (65.6 ft)
100 (4)	94.8 (3.73)	D	8 degrees	20 m (65.6 ft)

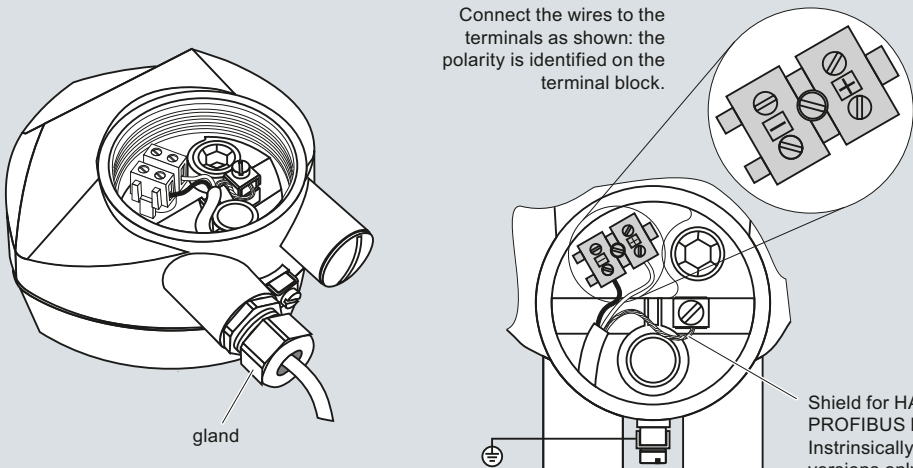
SITRANS LR250, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR250 Specials

Schematics



Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

gland

Shield for HART and PROFIBUS PA
Intrinsically Safe versions only.

Hand Programmer

SIEMENS			
1	2	3	4
5	6	7	8
9	0	.	↗
C	⏮	⏪	⏩
⏮	⏪	⏩	⏭

SITRANS LR250 HART
Part number:
7ML1930-1BK

Note:

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 to 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

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR260

Overview



SITRANS LR260 is a 2-wire 25 GHz pulse radar level transmitter for continuous monitoring of solids 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.

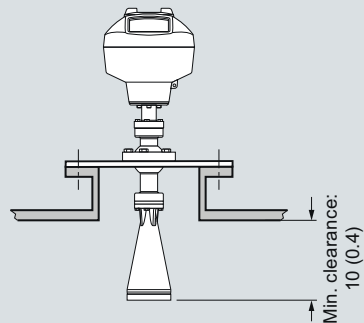
SITRANS LR260's unique design allows safe and simple programming using the Intrinsically Safe handheld programmer without having to open the instrument's lid.

SITRANS LR260 measures virtually any solids material to a range of 30 m (98.4 ft).

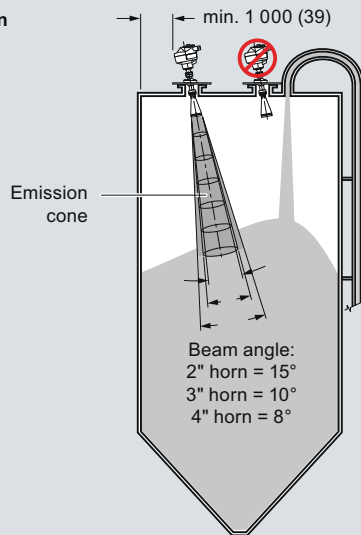
- Key Applications: cement powder, plastic powder/pellets, grain, flour, coal, solids bulk storage vessels, and other applications.

Configuration

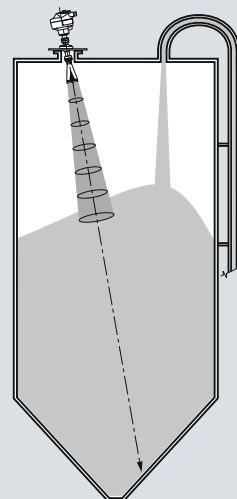
Mounting on a nozzle



Installation



Positioning with Easy Aimer



SITRANS LR260 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR260

Technical specifications

Mode of operation	
Measuring principle	Pulse radar level measurement
Frequency	K-band (25.0 GHz)
Minimum detectable distance	50 mm (2") from end of horn
Maximum measuring range ¹⁾	• 2" horn: 10 m (32.8 ft) • 3" horn: 20 m (65.6 ft) • 4" horn: 30 m (98.4 ft)
Output-HART	
Power	• 4 ... 20 mA (± 0.02 mA accuracy) • Nominal 24 V DC (max. 30 V DC)
Fail signal	3.6 mA ... 23 mA; or last value
Load	230 ... 600 W, 230 ... 500 W when connecting a coupling module
Max. line length	Multi-wire: ≤ 1500 m (4921 ft) Protocol HART, Version 5.1
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") from minimum detectable distance to 300 mm (11.8") • Remainder of range = 10 mm (0.39") 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	$\epsilon_r > 1.6$, 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	Aluminium, 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	
• Material	304 stainless steel
• Dimensions (nominal horn sizes)	2" horn: 1.93" (49.0 mm) diameter 3" horn: 2.93" (74.5 mm) diameter 4" horn: 3.84" (97.5 mm) diameter
Process connections	
• Universal flanges ²⁾	2"/50 mm, 3"/80 mm, 4"/100 mm, 6"/150 mm

Certificates and approvals

General	CSA _{US/C} , CE, FM
Radio	Europe (R&TTE), FCC, Industry Canada, C-TICK
Hazardous	CSA/FM Class II, Div. 1, Groups E, F, G, Class III ATEX II 1D, 1/2D, 2D Ex tD A20 IP67, IP68 T100 °C

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., Gr. A-G, T6 Ta=50C
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

®HART is a registered trademark of the Hart Communications Foundation.

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR260

Selection and Ordering data	Order 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).	C) 7ML5427-0
Order handheld programmer separately!	
Process connection Universal flat faced flange fits ANSI/DIN/JIS flanges, Easy Aimer with integral (Easy Aimer ball)	
2"/50 mm	A
3"/80 mm	B
4"/100 mm	C
6"/150 mm	D
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) 3)}	D
2" Horn antenna with 1000 mm extension ^{1) 2) 3)}	E
3" Horn antenna, fits 80 mm or 3" nozzles ⁴⁾	F
3" Horn antenna with 100 mm extension ⁴⁾	G
3" Horn antenna with 200 mm extension ⁴⁾	H
3" Horn antenna with 500 mm extension ^{2) 3) 4)}	J
3" Horn antenna with 1000 mm extension ^{2) 3) 4)}	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) 3)}	P
4" Horn antenna with 1000 mm extension ^{2) 3)}	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 1/2" 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, C-TICK	A
CSA/FM Class II, Div. I, Groups E, F, G, Class III, Industry Canada, FCC, C-TICK	B
ATEX II 1D, 1/2D, 2D T100 °C, CE, R&TTE, C-TICK	C
Pressure rating	
3 bar g (43.5 psi g) pressure maximum and +80 °C (+176 °F)	0
0.5 bar g (7.25 psi g) maximum	1

- 1) Maximum measurement range 10 m (32.8 ft)
 2) Available with Purge connection option 0 only
 3) Available with pressure option 1 only
 4) Maximum measurement range 20 m (65.6 ft)
 C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text	Y15
Test certificate: 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 for HART/mA device	Order No.
English	C) 7ML1998-5KE01
German	C) 7ML1998-5KE11
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 CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5KE31
Operating Instructions for PROFIBUS PA device	
English	C) 7ML1998-5KF01
German	C) 7ML1998-5KF31
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 CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5XJ81
Accessories	
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
Handheld programmer, Infrared, Intrinsically Safe	C) 7ML1930-1BK
Dust cap, PTFE, for 2"/50 mm horn	7ML1930-1DE
Dust cap, PTFE, for 3"/75 mm horn	7ML1930-1BL
Dust cap, PTFE, for 4"/100 mm horn	7ML1930-1BM
HART modem/RS-232 (for use with a PC and SIMATIC PDM)	D) 7MF4997-1DA
HART modem/USB (for use with a PC and SIMATIC PDM)	D) 7MF4997-1DB
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	

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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C) Subject to export regulations AL: N, ECCN: EAR99

D) Subject to export regulations AL: N, ECCN: EAR99H

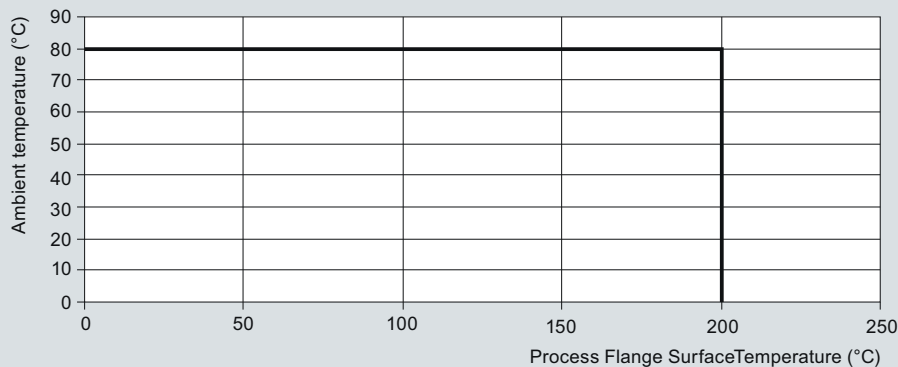
Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR260

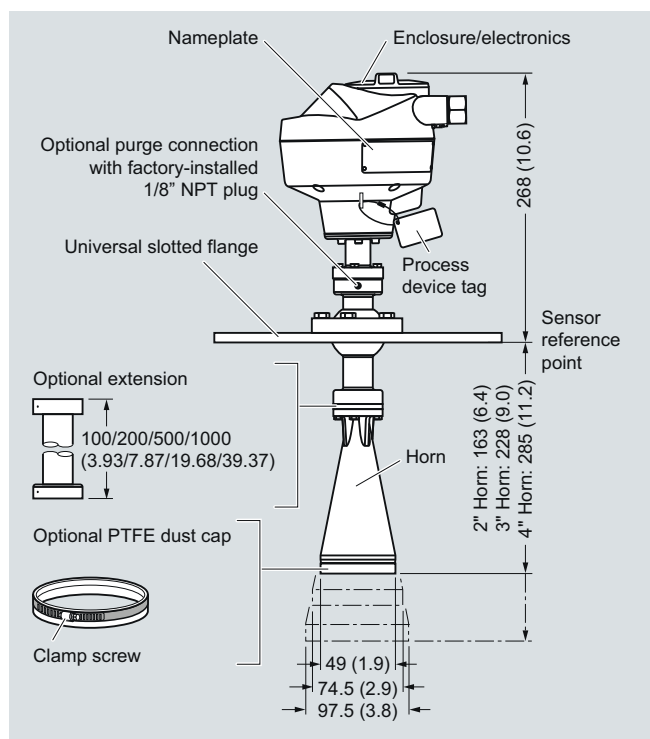
Characteristic curves

Maximum Flange and Process Temperatures versus Allowable Ambient Temperature



SITRANS LR260 Ambient/Process Flange Surface Temperature Curve

Dimensional drawings



SITRANS LR260, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR260

Schematics

Connect the wires to the terminals as shown: the polarity is identified on the terminal block.

Shield for HART and PROFIBUS PA Intrinsically Safe versions only.

Hand Programmer

SIEMENS

1	2	3	4
5	6	7	8
9	0	.	↗
C	⏮	⏪	⏩
←	↑	↓	→

Part number:
7ML1930-1BK

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 to 22 AWG) for HART version.
4. Separate cables and conduit may be required to conform to standard instrumentation wiring practices or electrical codes.

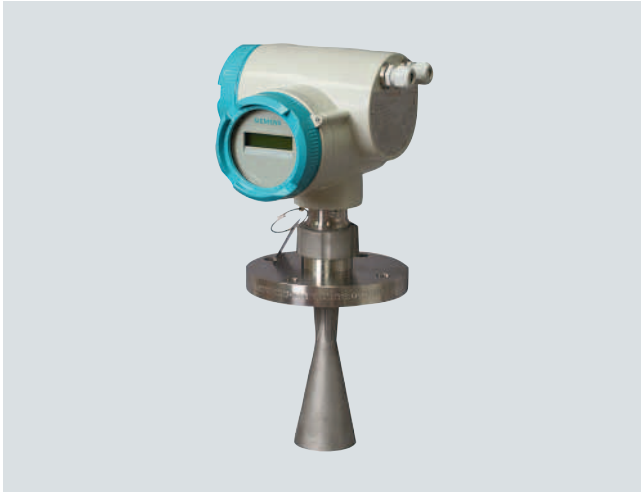
SITRANS LR260 connections

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR400

Overview



The SITRANS LR400 is a 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media.

Benefits

- Easy installation and commissioning, low maintenance
- Self-calibration with internal reference
- Built-in diagnostics
- Auto False-Echo Suppression and advanced echo processing
- 24 GHz and high signal-to-noise ratio
- Communication using HART® or PROFIBUS PA
- Programming using infrared Intrinsically Safe handheld programmer or with SIMATIC PDM or HART handheld device

Application

It provides excellent results on low dielectric media.

SITRANS LR400 is available for standard applications and for applications that require explosion proof protection.

SITRANS LR400 features robust enclosure, flange and horn components. It is virtually unaffected by atmospheric or temperature conditions within the vessel.

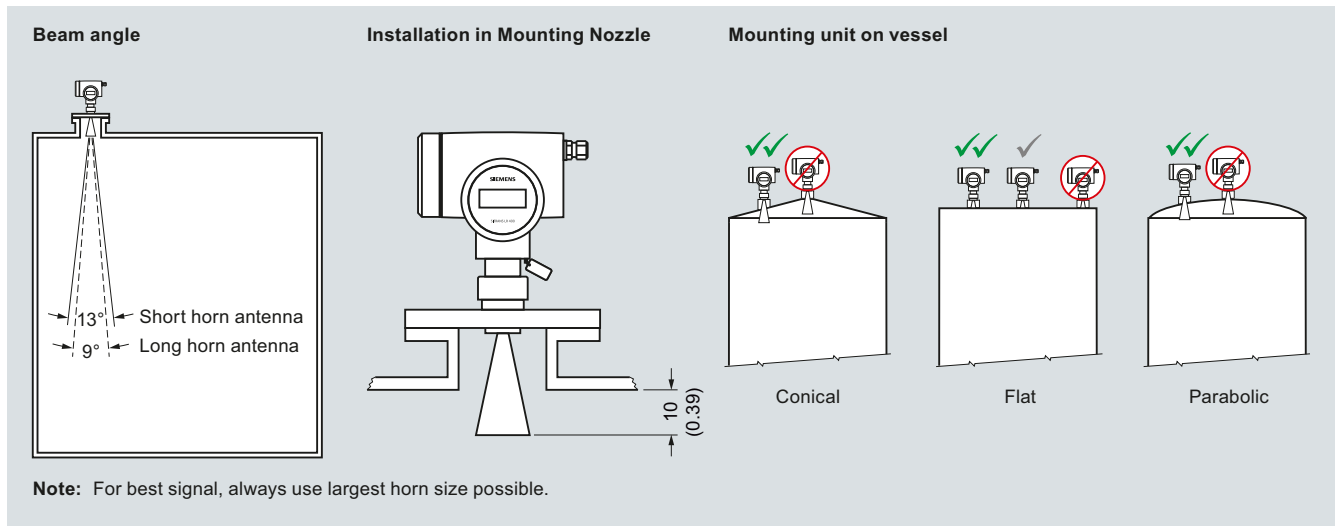
Safe on-site local programming is simple using the Intrinsically Safe handheld programmer. SIMATIC PDM can be used for easy remote programming.

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 liquid or slurry applications, high temperature or high pressure, low dielectric media, such as LPG (liquid, petroleum, gas)

5

Configuration



SITRANS LR400 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR400

Technical specifications

Mode of operation

Measuring principle	FMCW radar level measurement
Frequency	24 ... 25 GHz FMCW
Measuring range	0.35 ... 50 m (1.15 ... 164 ft)

Output

Analog output (HART®)	
• Signal range	Optically isolated 4 ... 20 mA
• Load	Max. 600 Ω (330 Ω for [ia] versions, Area classification options G, L, P, S)
• Relay	NC or NO function, max. DC 50 V, max. 200 mA, rating 5 W
Communication	HART, optional PROFIBUS PA
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.0

Performance (Reference conditions)

Dead band	0 ... 350 mm from bottom edge of flange
Error in measurement at +25 °C (+77 °F)	≤ 5 mm from 2 ... 10 m ≤ 15 mm from 10 ... 50 m
• Repeatability	≤ 1 mm
• Fail-safe	mA signal programmable as high, low or hold (LOE)

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	$\epsilon_r > 1.4$
Process temperature range	
• Standard	-40 ... +200 °C (-40 ... +392 °F) -20 ... +200 °C (-4 ... +392 °F) for SITRANS LR400 with ATEX rating
• With optional temperature extension	-40 ... +250 °C (-40 ... +482 °F)
Vessel Pressure	Up to 40 bar g (process connection dependent)

Design

Weight	Approx. 12.2 kg (26.8 lbs) with 3" 150 psi 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	
• Flat faced flanges	316L stainless steel, 80, 100, 150 mm, bolt holes matching EN 1092-1 and JIS B 2220
• Raised face flanges	316L stainless steel, 3", 4", 6", bolt holes matching ASME B 16.5

Programming

Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
• Approvals for handheld programmer	IS model with ATEX 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

Safety	CSA-US/C, CE, FM, C-TICK
Shipping	• Lloyd's Register of Shipping • ABS
Radio	Europe (R&TTE, CETECOM), Industry Canada, FCC, C-TICK
Hazardous areas	ATEX II 1/2 G EEx dem [ia] IIC T6 ATEX II 1/2 G EEx dem IIC T6 CSA/FM Class I, Div. 1, Groups B, C, D; Class II, Div. 1, Groups E, F, G; Class III T6, INMETRO

Optional equipment

Purging (self-cleaning) system PTFE dust cover

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR400

Selection and Ordering data	Order No.
SITRANS LR400 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media. Order handheld programmer separately!	L) 7ML5421-
Process temperature range -40 °C ... +200 °C (-40 ... +392 °F), standard -40 °C ... +250 °C (-40 ... +482 °F), high temperature extension	0 1
Process connection Universal flange 3"/80 mm ¹⁾ Universal flange 4"/100 mm ¹⁾ Universal flange 6"/150 mm ¹⁾ DN 80, PN 16, Type A, flat faced DN 80, PN 40, Type B1, raised face DN 100, PN 16, Type A, flat faced DN 100, PN 40, Type B1, raised face DN 150, PN 16, Type A, flat faced 3" ASME, 150 lb, raised face 3" ASME, 300 lb, raised face 4" ASME, 150 lb, raised face 4" ASME, 300 lb, raised face 6" ASME, 150 lb, raised face JIS, DN 80 10K JIS, DN 100 10K JIS, DN 150 10K (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1, or JIS B 2220 standard.)	A B D S C T G U E F J K N Q R V
Antenna Horn antenna, long 93 mm (3.66") diam. for 100 mm (4") nozzles Horn antenna, short 74 mm (2.91") diam. for 80 mm (3") nozzles	D K
Antenna purging system None Purging system Note: Available with process connections A, B or D, only, and available for Area Classifications A or B only	0 1
Process seal/gasket PTFE for -40 ... +250 °C (-40 ... +482 °F) flange temperatures FKM for -20 ... +200 °C (-4 ... +392 °F) flange temperatures ²⁾	1 3
Output/communication 4 ... 20 mA, HART [®] PROFIBUS PA	0 1
Power supply/cable inlet 100 ... 230 V AC • 2 x M20x1.5 • 2 x 1/2" NPT 24 V DC • 2 x M20x1.5 • 2 x 1/2" NPT	B C E F
Area classification General Purpose, CSAus/c, Industry Canada, FCC, CE and R&TTE ATEX II 2G EEx d IIC T6; CE, R&TTE ATEX II 2G EEx dem IIC T6; CE, R&TTE ATEX II 2G EEx dem [ia] IIC T6; CE, R&TTE ³⁾ ATEX II 1/2 GD EEx d IIC T6; CE, R&TTE ²⁾ ATEX II 1/2 GD EEx dem IIC T6; CE, R&TTE ²⁾ ATEX II 1/2 GD EEx dem [ia] IIC T6; CE, R&TTE ^{2) 3)}	B E F G J K L

Selection and Ordering data	Order No.
SITRANS LR400 4-wire, 24 GHz FMCW radar level transmitter for continuous monitoring of liquids and slurries in storage and process vessels including high temperature and high pressure, to a range of 50 m (164 ft); ideal for low dielectric media. Order handheld programmer separately!	L) 7ML5421-
FM Class I, Div. 1, Groups B, C, D; Class II/III, Div. 1, Groups E, F, G; FCC ²⁾ CSA Class I, Div. 1, Groups B, C, D; Class II/III, Div. 1, Groups E, F, G; FCC ²⁾	D) T U
Local operation Local Display Only. Handheld programmer not included (Order programmer separately.)	2
1) Available with antenna purging system option 1 only, universal, 0.5 bar g (7.25 psi g) maximum 2) Available with process temperature range option 0 only 3) Available only with power supply option E or F D) Subject to export regulations AL: N, ECCN: EAR99H L) Subject to export regulations AL: N, ECCN: 3A991X	

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s).	
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters); specify in plain text	Y15
Test certificate: 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 English German French Spanish 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 CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5FH06 C) 7ML1998-5FH36 C) 7ML1998-5FH16 C) 7ML1998-5FH22 C) 7ML1998-5QN83

5

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR400

Accessories

	Order No.
Handheld programmer Intrinsically Safe, EEx ia	7ML5830-2AJ
Long horn dust cover, PTFE	7ML1930-1AH
Short horn dust cover, PTFE	7ML1930-1AJ
HART® modem/RS-232 (for use with a PC and SIMATIC PDM)	D) 7MF4997-1DA
HART® modem/USB (for use with a PC and SIMATIC PDM)	D) 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 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	

¹⁾ Product shipped with plastic cable gland, rated to -20 °C. If -40 °C rating required, then metallic cable gland is recommended.

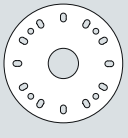
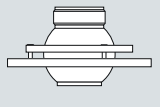
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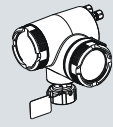
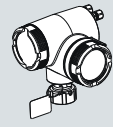
D) Subject to export regulations AL: N, ECCN: EAR99H

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR400 Specials

SITRANS LR400 Specials	Order No.	
3"/80 mm Universal Flange, without horn or hub. ¹⁾	PBD-51035813	
4"/100 mm Universal Flange, without horn or hub. ¹⁾	PBD-51035814	
6"/150 mm Universal Flange, without horn or hub. ¹⁾	PBD-51035815	
8"/200 mm Universal Flange, without horn or hub. ¹⁾	PBD-51035816	
Purging kit with Easy Aimer ball, no flange, no horn. ¹⁾	PBD-51036110	
Purging kit with Easy Aimer ball with 4"/100 mm flange, no horn. ¹⁾	PBD-51035810	
Purging kit with Easy Aimer ball with 6"/150 mm flange, no horn. ¹⁾	PBD-51035811	
Purging Kit with Easy Aimer ball with 8"/200 mm flange, no horn. ¹⁾	PBD-51035812	
Short horn antenna, no emitter supplied	PBD-22475K1A	
Long horn antenna, no emitter supplied	PBD-22475K2A	
Short horn antenna, purged, no emitter supplied	PBD-22475K3A	
Long horn antenna, purged, no emitter supplied	PBD-22475K4A	
Replacement display module, SITRANS LR400 Liquids and Solids versions	PBD-51035410	
4" extension kit for horn antenna with General Purpose approvals	PBD-51035474	
8" extension kit for horn antenna with General Purpose approvals	PBD-51035473	
8" extension kit for horn antenna for hazardous units	PBD-51036180	

SITRANS LR400 Specials	Order No.	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, HART® communication, and GP, CE, and CETECOM approvals.	C) PBD-51036479	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and GP, CE, and CETECOM approvals.	PBD-51036480	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, HART® communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	C) PBD-51035867	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	C) PBD-51035871	
SITRANS LR400 Aluminum enclosure with AC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&TTE approvals.	C) PBD-51035873	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, HART® communication and GP, CE and CETECOM approvals.	C) PBD-51036481	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and GP, CE and CETECOM approvals.	PBD-51036482	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, HART® communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	C) PBD-51036483	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and GP, CE, CSA, Industry Canada, FCC and R&TTE.	C) PBD-51036484	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, HART® communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&TTE approvals.	C) PBD-51036485	
SITRANS LR400 Aluminum enclosure with DC power, M20 cable inlet, PROFIBUS PA communication and ATEX II 1/2 GD EEx d IIC T6, CE and R&TTE approvals.	C) PBD-51036486	

¹⁾ Available with no pressure rating and with General Purpose approvals only

Please contact nacc.smpi@siemens.com for special requests.

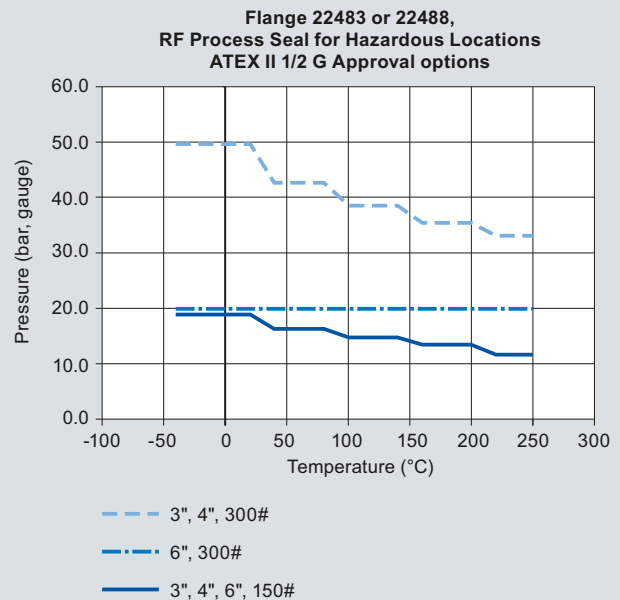
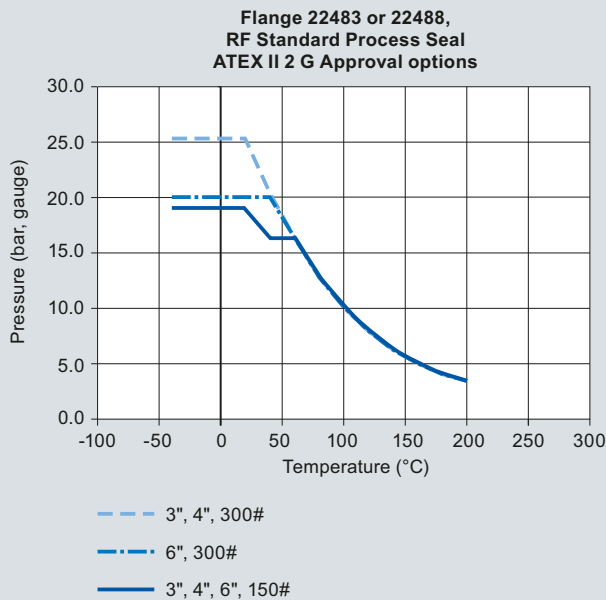
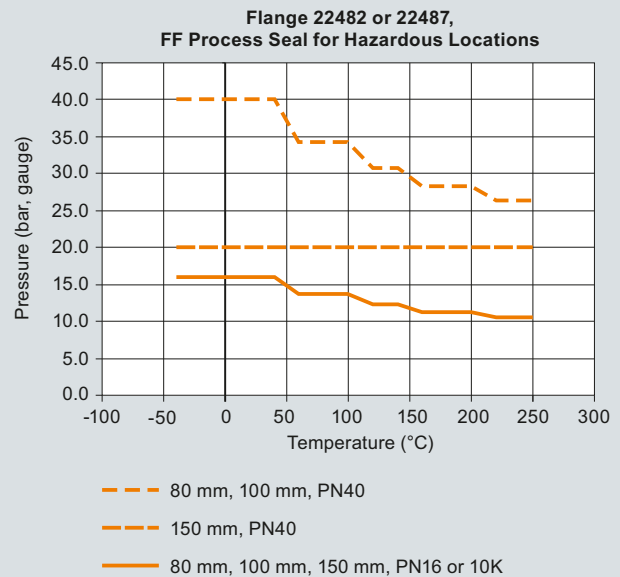
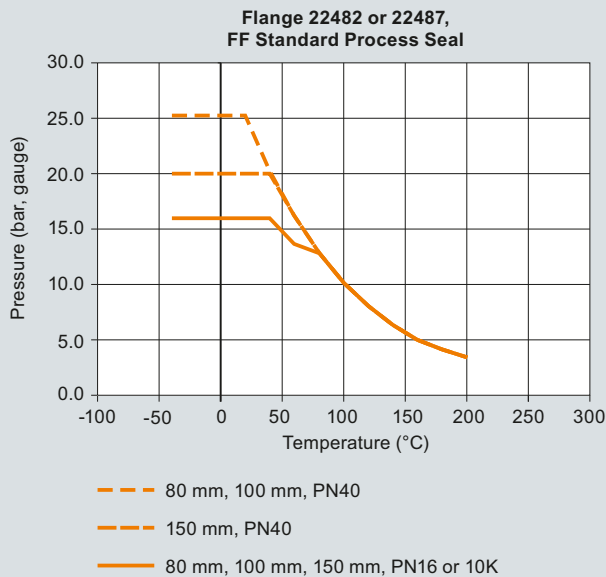
C) Subject to export regulations AL: N, ECCN: 3A991X

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR400

Characteristic curves



SITRANS LR400 Process Pressure/Temperature derating curves

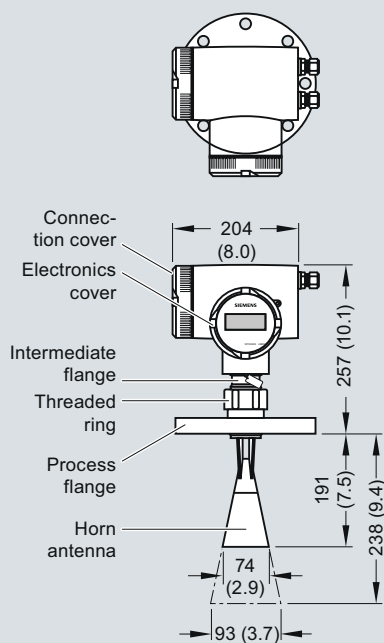
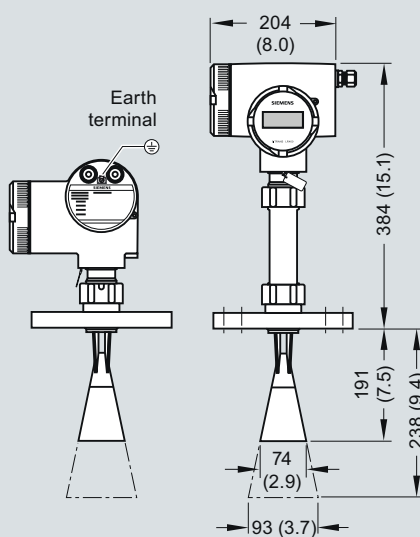
Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR400

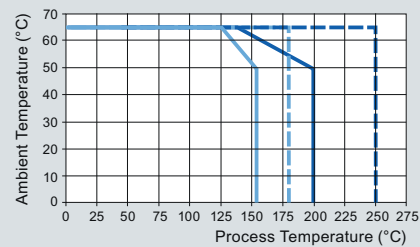
Dimensional drawings

SITRANS LR400 (7ML5421)

SITRANS LR400
(with temperature extension)

SITRANS LR400

Maximum Flange and Process Temperature Versus Allowable Ambient Temperature



— Standard
 - - - Optional temperature extension

SITRANS LR400, dimensions in mm (inch)

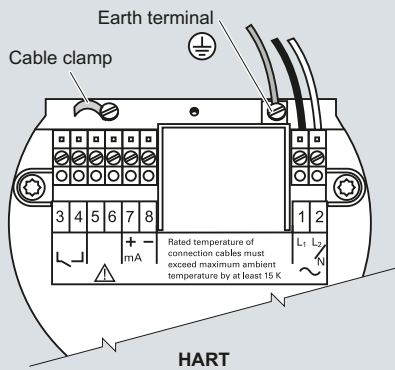
Level Measurement

Continuous level measurement - Radar transmitters

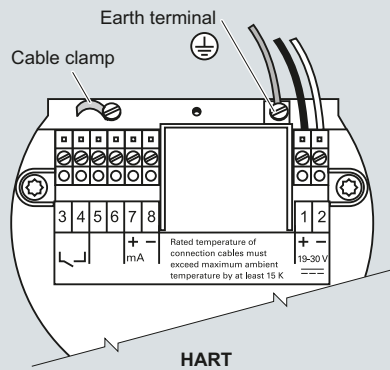
SITRANS LR400

Schematics

AC version



DC version

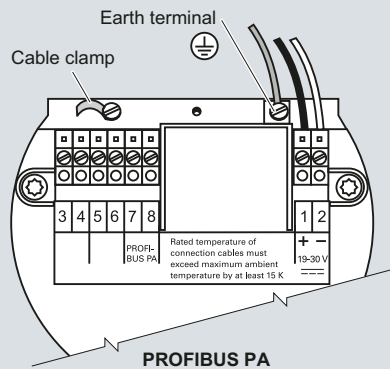
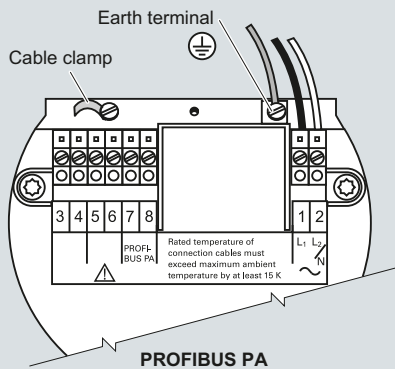


Hand Programmer



SITRANS LR400

Part number:
7ML5830-2AJ


Note:

- Recommended torque on terminal clamping screws, 0.5 to 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 LR400 connections

Level Measurement

Continuous level measurement - Radar transmitters

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.

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.

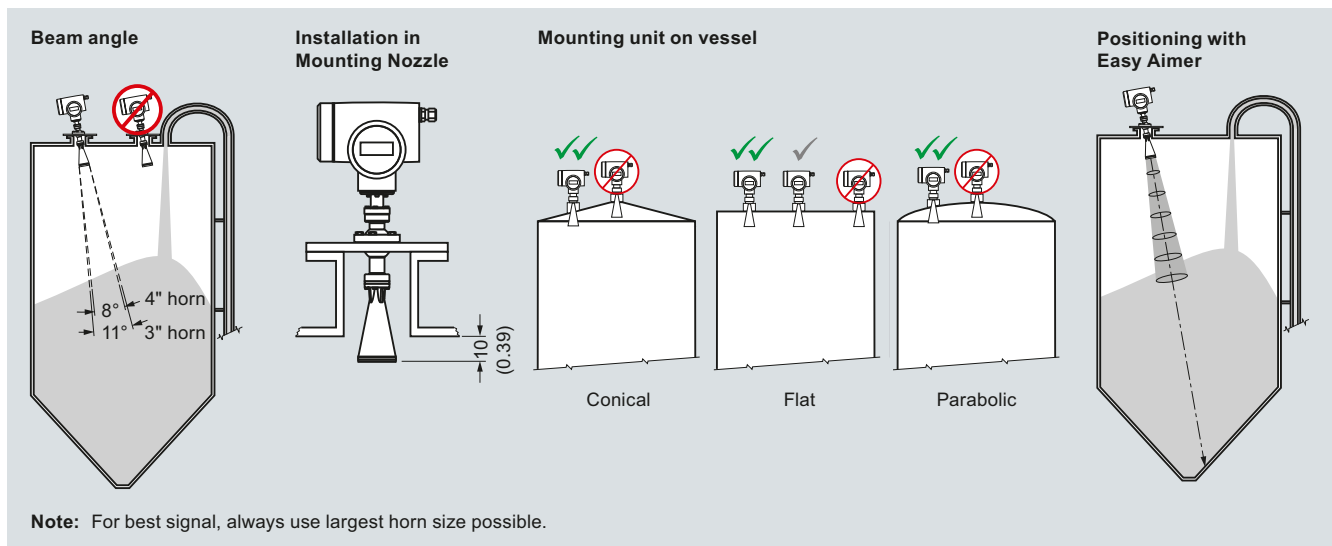
The characteristics of 24 GHz and high signal-to-noise ratio contribute to exceptional signal reflection, regardless of the dielectric value of the medium.

Key applications: long-range dusty applications, cement powder, fly-ash, coal, flour, grain, plastics

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

Configuration



SITRANS LR460 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR460

Technical specifications

Mode of operation		Programming	
Measuring principle	FMCW radar level measurement	Intrinsically Safe Siemens handheld programmer (ordered separately)	Infrared receiver
Frequency	24.2 ... 25.2 GHz FMCW	• 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)
Measuring range	0.35 ... 100 m (1.15 ... 328.08 ft)	Handheld communicator	HART Communicator 375
Output		PC	SIMATIC PDM
Analog output (HART)		Display (local)	Alphanumeric LCD for readout and entry
• Signal range	Optically isolated	Power supply	
• Load	Max. 600 Ω	100 ... 230 V AC ±15 % (50/60 Hz), 6 W (12 VA)	
• Fail-safe	mA signal programmable as high, low or hold (LOE)	or	
Communication	HART, optional PROFIBUS PA	24 V DC +25/-20 %, 6 W (optional)	
Digital output	Relay, NC or NO function, max. 50 V DC, max. 200 mA, rating 5 W	Certificates and approvals	
PROFIBUS PA protocol	Layer 1 and 2, Class A, Profile 3.01	General	
Performance (Reference conditions according to IEC 60770-1)		Radio	
Non-linearity	Greater of 25 mm (1") or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range	Hazardous Areas	
Non-repeatability	≤ 10 mm (0.4")	Optional equipment	
Rated operating conditions		Dust cap	
Amb. temperature for enclosure	-40 ... +65 °C (-40 ... +149 °F)	Air purge connection	
Location	Indoor/outdoor	PTFE	
Installation category	II	1/8" NPT	
Pollution degree	4		
Medium conditions			
Dielectric constant	$\epsilon_r > 1.4$		
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 lbs) with 3" 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 1/2" NPT		
Process connections			
• Universal flanges, 316L stainless steel, flat faced, with integral Easy Aimer	3"/80 mm, 4"/100 mm, 6"/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		

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR460

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") or 0.25 % of span (including hysteresis and non-repeatability), over the full ambient temperature range
Non-repeatability	≤ 10 mm (0.4")

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	$\epsilon_r > 1.4$
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 lbs) with 3" 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 1/2" NPT
Process connections	
• Universal flanges, 304 stainless steel, flat faced, with integral Easy Aimer	3"/80 mm, 4"/100 mm, 6"/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, C-TICK
Radio	European Radio (R&TTE), Industry Canada, FCC, C-TICK
Hazardous Areas	CSA/FM Class II, Div. 1, Groups E, F and G, Class III ATEX II 1D, 1/2 D, 2D T85 °C

Optional equipment

Dust cap	PTFE
Air purge connection	1/8" NPT

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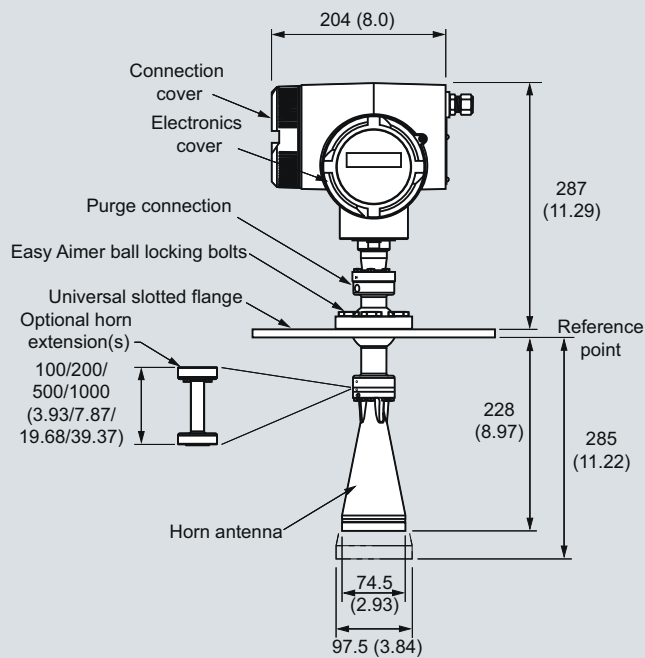
Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR460

Dimensional drawings

SITRANS LR460 (7ML5426)



SITRANS LR460, dimensions in mm (inch)

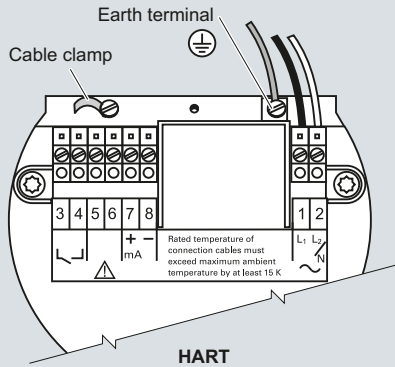
Level Measurement

Continuous level measurement - Radar transmitters

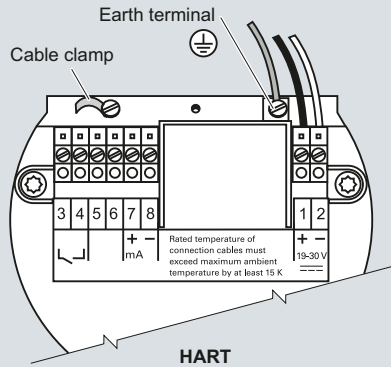
SITRANS LR460

Schematics

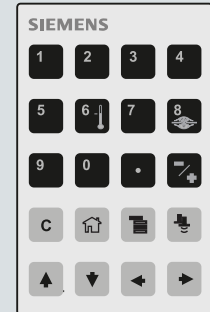
AC version



DC version

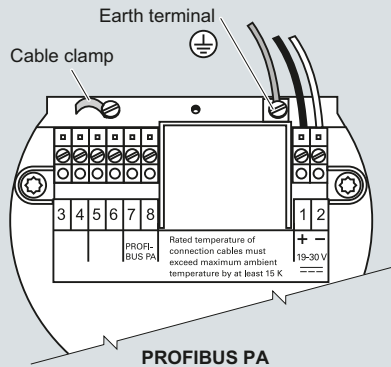
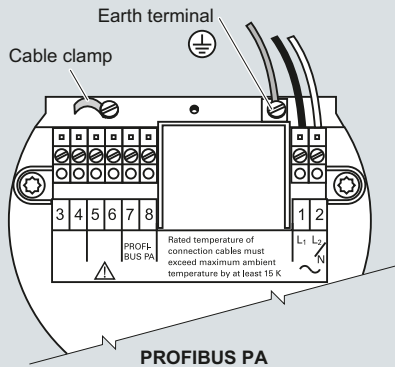


Hand Programmer



SITRANS LR460

Part number:
7ML5830-2AJ



Note:

- Recommended torque on terminal clamping screws, 0.5 to 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

Level Measurement

Continuous level measurement - Radar transmitters

SITRANS LR260/LR460 Specials

SITRANS LR260/LR460 Specials	Order 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⁾ F)	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

SITRANS LR260/LR460 Specials	Order No.
Enclosure with electronics	
LR260 enclosure with board stack, HART communication, M20 cable inlet, approval option A, no process connection C)	A5E02203605
LR260 enclosure with board stack, PROFIBUS PA communication, M20 cable inlet, approval option A, no process connection C)	A5E02213423
LR260 enclosure with board stack, HART communication, NPT cable inlet, approval option A, no process connection C)	A5E02165924
LR260 enclosure with board stack, PROFIBUS PA communication, NPT cable inlet, approval option A, no process connection C)	A5E02213428
Enclosure with electronics (LR460)	
LR460 enclosure with board stack, HART communication, AC power, M20 cable inlet, approval option A, no process connection L)	A5E02182085
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, M20 cable inlet, approval option A, no process connection C)	A5E02212422
LR460 enclosure with board stack, HART communication, AC power, NPT cable inlet, approval option A, no process connection L)	A5E02212423
LR460 enclosure with board stack, PROFIBUS PA communication, AC power, NPT cable inlet, approval option A, no process connection L)	A5E02212424
LR460 enclosure with board stack, HART communication, DC power, M20 cable inlet, approval option A, no process connection L)	A5E02212425
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, M20 cable inlet, approval option A, no process connection L)	A5E02212426
LR460 enclosure with board stack, HART communication, DC power, NPT cable inlet, approval option A, no process connection L)	A5E02212428
LR460 enclosure with board stack, PROFIBUS PA communication, DC power, NPT cable inlet, approval option A, no process connection L)	A5E02212429

¹⁾ Available with no pressure rating, 0.5 bar g maximum.

Please contact nacc.smpi@siemens.com for special requests.

C) Subject to export regulations AL: N, ECCN: EAR99

F) Subject to export regulations AL: 91999, ECCN: N

L) Subject to export regulations AL: N, ECCN: 3A991X

Continuous level measurement - Guided wave radar transmitter

Overview**Introduction**

Guided Wave Radar transmitters combine TDR (time domain reflectometry), ETS (equivalent time sampling) and modern low power circuitry.

Time Domain Reflectometry (TDR)

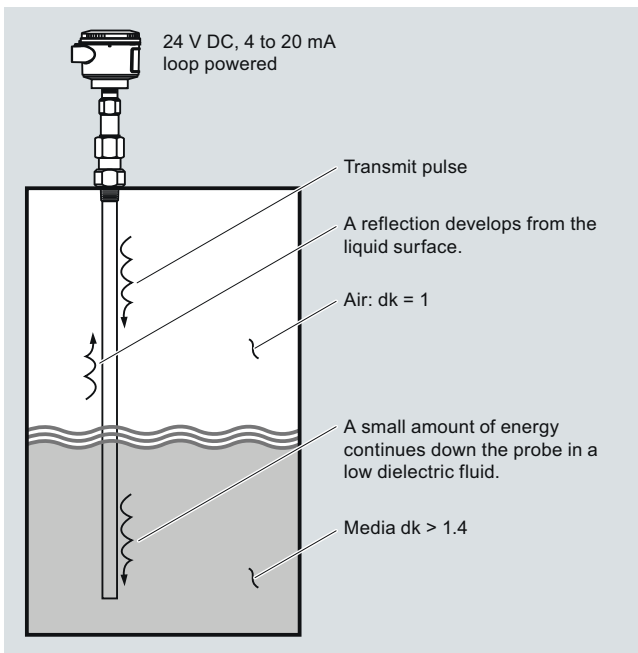
TDR uses pulses of electromagnetic (EM) energy to measure distances or levels. When a pulse reaches a dielectric discontinuity (created by media surface), part of the energy is reflected. The greater the dielectric difference, the greater the amplitude (strength) of the reflection.

In the SITRANS LG200 transmitter, a waveguide with a characteristic impedance in air 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.

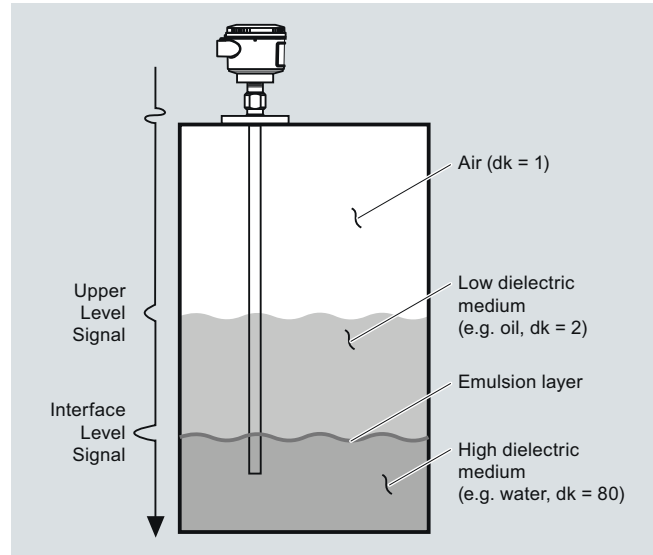
Equivalent Time Sampling (ETS)

ETS (Equivalent Time Sampling) is used to measure the high speed, low power EM energy. ETS is critical in the application of TDR to vessel level measurement technology. The high speed EM energy (1000 ft/ μ s) is difficult to measure over short distances and at the resolution required in the process industry. ETS captures the EM signals in real time (nanoseconds) and re-constructs them in equivalent time (milliseconds), which is much easier to measure with today's technology.

ETS is accomplished by scanning the waveguide to collect thousands of samples. Approximately 8 scans are taken per second; each scan gathers more than 30,000 samples.

**Interface Detection**

The SITRANS LG200, when used with the Model 7ML1301-6 coaxial probe, is a transmitter capable of measuring both an upper level and an interface level. The upper liquid must have a dielectric constant between 1.4 and 5 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.



Level Measurement

Continuous level measurement - Guided wave radar transmitter

SIEMENS

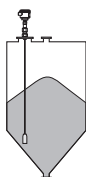
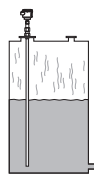
Guided Wave Radar (Level) Application Questionnaire

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/in
 Nozzle Diameter: _____ cm/in
 Process connection type: _____
 Process connection size: _____
 Distance to sidewall: _____ cm/in

Pressure:

Normal: _____
 Maximum (relief): _____

Material

Material being measured: _____

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 to 5 cSt (like water) ☐ 50 to 100 cSt (like honey)
☐ 5 to 20 cSt (like machine oil) ☐ 100 to 500 cSt (like syrup/molasses)
☐ 20 to 50 cSt (like cooking oil) ☐ >500 cSt (like tar)

☐ Liquid ☐ Solid ☐ Slurry

Particle size:

- ☐ Fine dust/powder, <0.5 cm (0.2")
☐ Grains (rice, corn), <2 cm (0.8")
☐ Small stones/gravel, <2 cm (0.8")
☐ Small rocks/chunks, >2 cm (0.8")
☐ Large particles, <9 cm (3.5")

Foam type:

- ☐ None ☐ Wet
☐ Dry ☐ Wet/dense

Installation (indicate all that apply)

Power available: _____ Communications: _____ Outputs required: ☐ 4 to 20 mA
☐ HART® /4 to 20 mA ☐ Other (please specify) _____

Products recommended:

SIEMENS**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 dimensions:**

Height: _____ m/ft
 Diameter: _____ m/ft
 Nozzle Length: _____ cm/in
 Nozzle Diameter: _____ cm/in
 Process connection type: _____
 Process connection size: _____
 Distance to sidewall: _____ cm/in

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)

Pressure:

Normal: _____
 Maximum (relief): _____

Interface Data

Upper material: _____ Lower material: _____ Emulsion layer: ☐ Yes
 Upper material thickness: _____ cm/in Lower material thickness: _____ cm/in ☐ No (preferred)
 Upper material dielectric: _____ Lower material dielectric: _____ Emulsion thickness: _____ cm/in

Material

Material being measured: _____

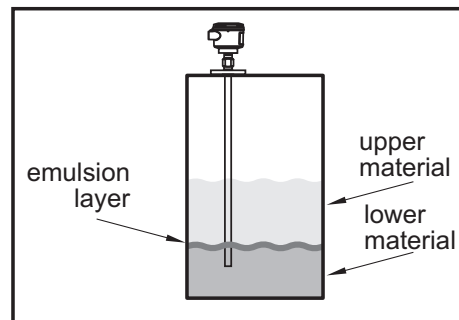
☐ Liquid ☐ Slurry

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 to 5 cSt (like water) ☐ 50 to 100 cSt (like honey)
☐ 5 to 20 cSt (like machine oil) ☐ 100 to 500 cSt (like syrup/molasses)
☐ 20 to 50 cSt (like cooking oil) ☐ >500 cSt (like tar)

**Installation**

Power available: _____

Outputs required: ☐ 4 to 20 mACommunications: ☐ HART®/4 to 20 mA☐ Other (please specify) _____**Products recommended:**

Overview



SITRANS LG200 is a guided wave radar transmitter for short and medium range level, level/interface, and volume measurement of liquids and solids. It is unaffected by changes in process conditions, high temperatures and pressures, and steam.

Benefits

- Coaxial, rigid, and flexible single or twin rods for many applications
- Measures accurately on materials with dielectric (dK) as low as 1.4 [including LNG at -196 °C (-320.8 °F)]
- Guided wave radar measurement for up to 2.5 mm (0.12") accuracy
- Measures level and interface on challenging applications including foam
- 3 button programming for quick setup
- Reliable level measurement on harsh applications with pressure up to 430 bar g (6250 psi g) and temperatures as high as +427 °C (+800 °F).
- Suitable for use in SIL-1 and SIL-2 Loops (Full FMEDA report available)

Application

SITRANS LG200 provides accurate measurement in level, volume, and interface applications. For short and extended applications, LG200 offers coaxial, single or twin rod probes, and single or twin cable probes up to 22.5 m (75 ft).

SITRANS LG200 measures accurately in liquid or slurry applications of corrosive vapors, foam, saturated steam, high viscosity, quick fill/empty rates, low levels and varying dielectrics and product densities.

Ideal for retrofitting torque tube applications, SITRANS LG200 chamber replacement probe can be mounted in existing chambers or cages for optimal measurement.

- Key applications: hydrocarbon processing, interface/level measurement, low dielectric liquids, high temperature/pressure applications, powdered solids with high angle of repose. Applications on ammonia are also possible with the HT/HP coaxial probe design which incorporates a glass seal that is not susceptible to the vapors seen in this application.

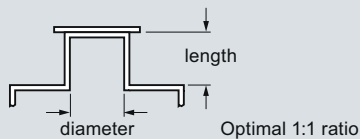
Level Measurement

Continuous level measurement - Guided wave radar transmitter

SITRANS LG200

Configuration

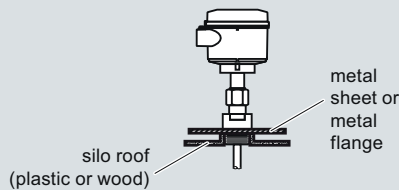
Mounting on a nozzle



Installation in non-metallic silos ¹⁾

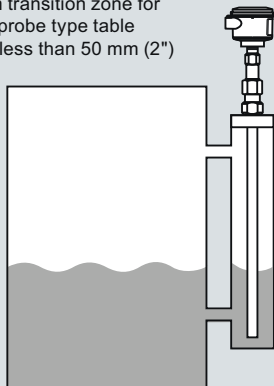
For installation in vessels of a non-metallic construction or possibly open vessels, a suitable launch plate is required to optimize the impedance of the transmitted signal as it travels along the probe. Optimal performance cannot be guaranteed if a suitable transition is not available at the process connection.

When using single rod versions (flexible or solid) and a threaded process connection, a metal sheet or flange will greatly improve conditions as this provides a suitable launch plate. A flanged process connection is generally accepted to be provision of this launch plate.



Bypass pipe

1. Minimum pipe diameter 50 mm (2")
2. Minimum 25 mm (1") from bottom of the bypass pipe
3. Take note of bottom transition zone for chosen probe, see probe type table
4. For pipe diameters less than 50 mm (2") consult factory

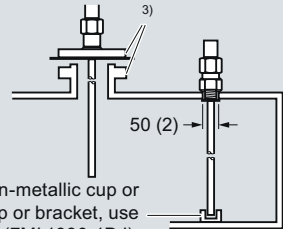


- 1) See Electromagnetic compatibility
- 2) min. 1" - 150 lbs, DN 25 PN 16
- 3) min. 2" - 150 lbs, DN 25 PN 16

Single Rod mounting

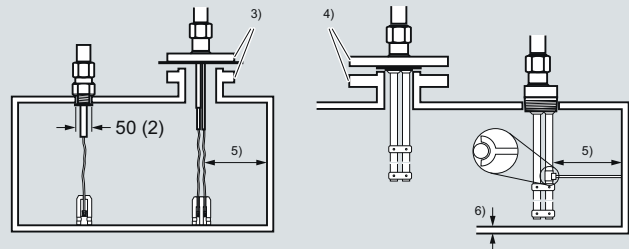
1. Do not mount in nozzles <50 mm (2") in diameter.
2. Mount in applications where ratio of diameter to length is 1:1 or greater. Any ratio less than 1:1 (i.e. 2" x 6" nozzle = 1:3) may require a blanking distance and/or dielectric adjustment.
3. Do not use pipe reducers.
4. Keep conductive objects away from probe to ensure proper performance.

Probe can be stabilized at the bottom with a non-metallic cup or bracket. When mounting into a metallic cup or bracket, use optional TFE bottom spacer (7ML1930-1DJ).



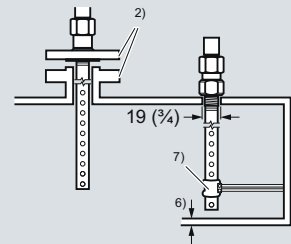
Twin Rod mounting 7ML1302-x

1. Active rod must be mounted at least 25 mm (1") away from any obstructions.
2. Minimum stillwell or nozzle diameter for probe is 76 mm (3"), inactive part needs to be flush with inside tank wall.



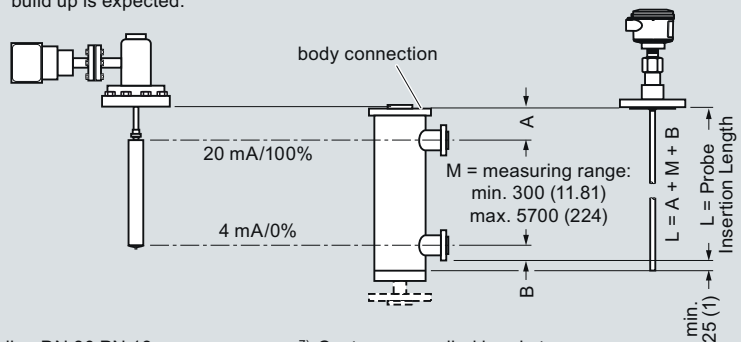
Coaxial 7ML1301-x/Coaxial-Interface 7ML1301-6

1. Minimum 25 mm (1") from tank bottom
2. Minimum 2" process connection for enlarged coaxial probe
3. Distance to obstructions not important due to enclosed design



Displacer/Torque Tube Replacement

1. With Coaxial Probe 7ML1301-4 there is no top transition zone allowing measurement to the process connection.
2. Minimum pipe size: coaxial probes 2"/DN50, twin rod 3"/DN80, single rod 2"/DN50
3. 22 mm (0.875") Coaxial probes should be used where limited build up is expected.



- 7) Customer supplied brackets
Recommended:
1 bracket per 3 m length

SITRANS LG200 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Guided wave radar transmitter

SITRANS LG200

Technical specifications

Mode of operation		Design	
Measuring principle	Guided wave radar measurement	Weight of transmitter with solid lid	1.28 kg (2.83 lbs)
Measuring range	0.15 ... 22.5 m (0.5 ... 75 ft)	Weight of transmitter with glass window lid	1.60 kg (3.52 lbs)
Output		Materials	
mA analog output with HART digital signal	Optically isolated 4 ... 20 mA, 620 Ω max.	• Enclosure	Aluminum, epoxy-coated
Output range		• Degree of protection	Type 4/NEMA 4, IP65
• Analog	3.8 ... 20.5 mA usable	• Cable inlet	2x M20x1.5 or 2 x ½" NPT
• Start-up current	4.0 mA	Process connections	
Diagnostic alarm	Adjustable 3.6 mA, 22 mA, HOLD	• Threaded	G ¾" [(BSPP), EN ISO 228-1], 1", 1½", 2" NPT [(Taper), ANSI/ASME B1.20.1] and G 2" [(BSPP), EN ISO 228-1]
Digital communication	HART Version 5.x and multidrop compatible		
Performance		• Flanged	3/4" ... 4", ASME, DIN flanges
	Reference Conditions 1.82 m (72") Coaxial Probe with water at +20 °C (70 °F) and CFD Threshold	• Hygienic	3/4" ... 4", Triclover
Non-linearity		Programming	
• Coaxial/twin rod probes	< 0.1 % of probe length or 2.5 mm (0.1"), whichever is greater [(top 60 cm (24") of twin rod probes 30 mm (1.2"))]	Local	Three button, menu-driven data entry with security passwords
• Single rod probes	< 0.3 % or 0.3" (8 mm), whichever is greater	Remote	SIMATIC PDM via HART
• Interface models	Upper layer: ± 25.4 mm (1") Interface layer: ± 25.4 mm (1") (distinct interface surface required)	Power	
Resolution and repeatability	≤ 2.5 mm (0.1")	11 ... 36 V DC	
Accuracy		Certificates and approvals	
• Coaxial/twin rod probes	< 0.1 % of probe length or 0.1" (2.5 mm), whichever is greater [Top 60 cm (24") of twin rod probes 30 mm (1.2")]	General Purpose	CSA/FM, CE, C-TICK
• Single rod probes	± 0.5 % of probe length or 0.5" (13 mm), whichever is greater	Intrinsically Safe	FM Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65 CSA Class I, Div. 1, Groups A, B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65 ATEX II 1G EEx ia IIC T4
• Interface models	± 1" (25 mm) (distinct Interface required)	Explosion Proof/Flame Proof	FM Class I, Div 1, Groups B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65 CSA Class I, Div. 1, Groups B, C, D, Class II, Div. 1, Groups E, F, G T4, Class III, Type 4, IP65 ATEX II 1/2 G EEx d [ia] IIC T6 ATEX II 1/2 D IP65 T85 °C
Electromagnetic compatibility	Meets CE requirements (EN 61326-1/2006) (Single and Twin Rod probes must be used in metallic vessel or stilling well to maintain CE compliance.)	Non-Incendive	FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G T4, Class III, Type 4, IP65 CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups E, F, G T4, Class III, Type 4, IP65
• Response time	< 1 second	Non-Sparking	ATEX II 3G EEx nA (nL) IIC T4 to T6 ATEX II 3G EEx nA II T4 to T6
• Warm up time	< 5 seconds	Others	• Functional Safety to SIL-1 in accordance with IEC 61508 Safe Failure Fraction (SFF) of 85.5 % (Third party FMEDA Analysis - hardware only) • Functional Safety to SIL-2 in accordance with IEC 61508 Safe Failure Fraction (SFF) of 91 % (Third party FMEDA Analysis - hardware only) • Lloyds Steam Vessel Approval conforming to EN12952-11 & EN12953-9 • GOST R
• Temperature effects	+ 0.02 % of actual probe length/°C for probes ≥ 2.5 m (8 ft)		
Rated operating conditions ¹⁾			
Ambient temperature for enclosure	-40 ... +80 °C (-40 ... +176 °F)		
LCD readable temperature range	-20 ... +70 °C (-5 ... +160 °F)		
Location	Indoor/outdoor		
Installation category	II		
Pollution degree	2		
Humidity	0-99 % (non condensing)		
Medium conditions ¹⁾			
Dielectric constant	dK ≥ 1.4		
Process temperature range ²⁾	-196 ... +427 °C (-321 ... +800 °F)		
Vessel pressure ³⁾	Full vacuum to 431 bar g (6250 psi g), probe dependent		

1)

If installation is in areas classified as hazardous, please observe relevant certificates

2)

Temperature rating is pressure dependent

3)

Pressure rating is temperature dependent

	Coaxial Probe (7ML1301-1)	Coaxial HT/HP Probe (7ML1301-2)	Coaxial HP Probe (7ML1301-3)	Coaxial Overfill/Flooded Cage Probe (7ML1301-4)
Model reference number	7xA-x	7xD-x	7xP-x	7xR-x
Recommended applications	General purpose: clean, low viscosity liquids < +150 °C (+300 °F)	Clean, high temperature/high pressure liquids > +200 °C (+400 °F), ammonia, chlorine, LNG ¹⁾ , LPG ¹⁾	Clean, high pressure liquids < +200 °C (+400 °F), ammonia, chlorine, LNG, LPG	General applications, overfill, temperatures to +200 °C (+400 °F), clean, low viscosity liquids, displacer/torque-tube replacement
Not recommended for:	Coating and buildup, foam	Coating and buildup, foam, steam	Coating and buildup, foam, steam	Coating and buildup, foam
Materials/wetted parts	316 L SS, TFE spacers, O-ring ²⁾	316L SS, Alumina spacers ³⁾ , (option PEEK ⁴⁾ or TFE ⁵⁾ , Borosilicate	316L SS, TFE spacers, Borosilicate	316L SS, TFE spacers, O-ring ²⁾
Process seal	O-ring ²⁾	Borosilicate (no O-ring)	Borosilicate (no O-ring)	O-ring ²⁾
Rod/tube diameter				
Standard	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube
Enlarged	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	ø 15 mm (0.63") rod ø 45 mm (1.75") tube
Process connection thread				
Standard	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]
Enlarged	2" NPT [(Taper), ANSI/ASME B1.20.1]	2" NPT [(Taper), ANSI/ASME B1.20.1]	2" NPT [(Taper), ANSI/ASME B1.20.1]	2" NPT [(Taper), ANSI/ASME B1.20.1]
Flange ASME (EN/DIN)				
Standard	1 ... 4" (DN 25 ... 100)	1 ... 4" (DN 25 ... 100)	1 ... 4" (DN 25 ... 100)	1 ... 4" (DN 25 ... 100)
Enlarged	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)
Length	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")
Transition Zone⁶⁾				
Top	25 mm (1") at dk = 1.4 150 mm (6") at dk = 80	none	25 mm (1") at dk = 1.4 150 mm (6") at dk = 80	none
Bottom	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80
Process temperature maximum	+150 °C at 27 bar g (+300 °F at 400 psi g)	+427 °C at 133 bar g (+800 °F at 2000 psi g) ⁷⁾	+200 °C at 379 bar g (+400 °F at 5500 psi g)	+200 °C at 18 bar g (+400 °F at 270 psi g)
Process temperature minimum	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-196 °C at 430 bar g (-321 °F at 6250 psi g)	-196 °C at 430 bar g (-321 °F at 6250 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)
Process pressure				
• Process pressure maximum	70 bar g at +20 °C (1000 psi g at +70 °F)	431 bar g at +20 °C (6250 psi g at +70 °F)	431 bar g at +20 °C (6250 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)
• Process pressure minimum/vacuum service	Yes, not hermetic ⁸⁾	Yes, hermetic (<10 ⁻⁸ cc/sec at 1 atmosphere)	Yes, hermetic (<10 ⁻⁸ cc/sec at 1 atmosphere)	Yes, not hermetic
Dielectric range (dk)	1.4 ... 100	1.4 ... 100 ¹⁾	1.4 ... 100	1.4 ... 100
Maximum viscosity (cP)				
Standard	500	500	500	500
Enlarged	1500	1500	1500	1500
Coating/buildup	No	No	No	No
Foam	No	No	No	No
Corrosives	Yes	Yes	Yes	Yes
Sanitary	No	No	No	No
Overfill	No	Yes	No	Yes

1) Dependent on spacer option

2) See O-ring Selection Guide for guidance

3) For dk ≥ 2, maximum temperature +427 °C (+800 °F)

4) For dk ≥ 1.4, maximum temperature +343 °C (+650 °F), PEEK spacers standard on enlarged coaxial design

5) For dk 1.4, maximum temperature +288 °C (+550 °F)

6) Transition zone is dielectric dependent: dk = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone

7) +345 °C (+650 °F) with PEEK spacers

8) Not hermetic: sealing by means of O-ring. Hermetic: sealing by means of borosilicate glass window

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®Hastelloy is a registered trademark of Haynes International.

®Monel is a registered trademark of Special Metals Corporation.

Level Measurement

Continuous level measurement - Guided wave radar transmitter

SITRANS LG200

	Coaxial Steam Probe (7ML1301-5)	Coaxial Interface Probe (7ML1301-6)	Single Rigid Rod Probe (7ML1303-1)	Single Rigid Rod HT/HP Probe (7ML1303-2)	Single Rigid Rod Probe, PFA rod insu- lation (7ML1303-1J)
Model reference number	7xS-x	7xT-x	7xF-x	7xJ-x	7xF-4
Recommended applications	Hot water (steam) >+200 °C (+400 °F) (external chamber is required for use in boil- ers)	Liquid/liquid-interface, temperatures to +200 °C (+400 °F); clean, low-viscosity liquids	Coating and buildup, foam	Coating and buildup, foam	Excessive coating and buildup, foam
Not recommended for	General purpose, coat- ing and buildup, foam	Coating and buildup, foam	Low dielectric media (dK < 10) ¹⁾	Low dielectric media (dK < 10) ¹⁾	Low dielectric media (dK < 10) ¹⁾
Materials/wetted parts	316L SS, PEEK spacer- ers, Aegis PF128 O-ring ²⁾	316L SS, TFE spacers, O-ring ²⁾	316L SS, TFE, O-ring ²⁾	316L SS, TFE, O-ring ²⁾	316L SS, PFA, TFE, O-ring ²⁾
Process seal	Aegis PF128 O-ring ²⁾ , PEEK only	O-ring ²⁾	O-ring ²⁾	Aegis PF128 O-ring only ²⁾	O-ring ²⁾
Rod/Tube diameter					
Standard	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 8 mm (0.3125") rod ø 22 mm (0.875") tube	ø 12 mm (0.5") rod	ø 12 mm (0.5") rod	ø 12 mm (0.5") rod ø 16 mm (0.625") insulation
Enlarged	N/A	ø 15 mm (0.63") rod ø 45 mm (1.75") tube	N/A	N/A	N/A
Process connection thread					
Standard	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	¾" NPT [(Taper), ANSI/ASME B1.20.1], G 1" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]
Enlarged	N/A	2" NPT [(Taper), ANSI/ASME B1.20.1]	N/A	N/A	N/A
Flange ASME (EN/DIN)					
Standard	1 ... 4" (DN 25 ... 100)	1 ... 4" (DN 25 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)
Enlarged	N/A	2 ... 4" (DN 50 ... 100)	N/A	N/A	N/A
Length	60 ... 455 cm (24 ... 180")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")
Transition Zone³⁾					
Top	25 mm (1") at dk ≥ 10	none	Application, installa- tion, and dielectric dependent	Application, installa- tion, and dielectric dependent	Application, installa- tion, and dielectric dependent
Bottom	25 mm (1") at dk ≥ 10	150 mm (6") at dk = 1.4 25 mm (1") at dk = 80	25 mm (1") at dk >10	25 mm (1") at dk >10	25 mm (1") at dk >10
Process temperature maximum	+343 °C at 165 bar g (+650 °F at 2400 psi g) (saturated steam)	+200 °C at 18 bar g (+400 °F at 270 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)	+316 °C at 165 bar g (+605 °F at 2400 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)
Process temperature minimum	-40 °C at 207 bar g (-40 °F at 3000 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 50 bar g (-40 °F at 750 psi g)
Process pressure maximum	165 bar g at +343 °C (2400 psi g at +650 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)	207 bar g at +20 °C (3000 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)
Process pressure min. vacuum service	Yes, not hermetic	Yes, not hermetic	Not suitable	Not suitable	Not suitable
Dielectric range	10 ... 100	Upper liquid layer 1.4 ... 5, Interface liq- uid layer 15 ... 100	1.9 ... 100 ¹⁾	1.9 ... 100 ¹⁾	1.9 ... 100 ¹⁾
Maximum viscosity					
Standard	500 cP	500 cP	10000 cP (consult factory if severe agitation/turbulence)		
Enlarged	N/A	1500 cP			
Coating/buildup	No	No	Yes, maximum error 10 % of coated length; % error related to dielectric of media, thickness of coating and coated probe length above media		
Foam	No	No	Yes	Yes	Yes
Corrosives	Yes	Yes	Yes	Yes	Yes
Sanitary	No	No	No	No	No
Overfill	Yes	Yes	No	No	No

¹⁾ With dK of 1.9 to 10, the device must be mounted between 50 and 150 mm (2 and 6") of metal tank wall or in chamber/bridle

²⁾ See O-ring Selection Guide for guidance

³⁾ Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone

	Single Rigid Rod Probe, Sanitary (7ML1303-1D)	Single Rigid Rod Probe, PFA faced flange(7ML1303-1E)	Single Flexible Rod Probe (7ML1304-1)	Single Flexible Rod Probe for Bulk Solids (7ML1304-2)
Model reference number	7xF-E	7xF-F	7x1-x	7x2-x
Recommended applications	Applications demanding sanitary specifications	Extreme corrosives, coating/buildup, foam	Coating and buildup, foam; lengths > 6 m (20 ft) head-room	Granular bulk solids applications (powders, grain, dust) 3000 lb pull down force
Not recommended for	Low dielectric media (dK < 10) ¹⁾	Low dielectric media (dK < 10) ¹⁾	Low dielectric media (dK < 4)	Solids with dK < 4
Materials/wetted parts	316L SS, TFE, 15 µ-inch (<0.4 µm) R _a	All PFA - wetted surfaces	316L SS, TFE, O-ring ²⁾	316L SS, TFE, O-ring ²⁾
Optional	AL6XN SS	N/A	N/A	N/A
Process seal	316L SS, TFE, O-ring ²⁾	PFA, no O-ring	O-ring ²⁾	Sealant
Rod/Tube diameter	ø 12 mm (0.5") rod	ø 12 mm (0.5") rod ø 16 mm (0.625") insulation	ø 5 mm (0.188") cable	ø 6 mm (0.25") cable
Process connection thread	N/A	N/A	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]
Flange ASME (DIN)	19 ... 100 mm (¾ ... 4") Triclover-style 16 amp fitting	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)
Length	60 ... 610 cm (24 ... 240")	60 ... 610 cm (24 ... 240")	1 ... 22.5 meters (3 ... 75 ft)	1 ... 22.5 meters (3 ... 75 ft)
Transition Zone³⁾				
Top	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent	Application, installation, and dielectric dependent
Bottom	25 mm (1") at dK > 10	25 mm (1") at dK > 10	305 mm (12")	305 mm (12")
Process temperature maximum	+150 °C at 5.1 bar g (+300 °F at 75 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)	+150 °C at 27 bar g (+300 °F at 400 psi g)	+66 °C at 3.4 bar g (+150 °F at 50 psi g)
Process temperature minimum	0 °C at 5.1 bar g (+32 °F at 75 psi g)	-40 °C at 13.7 bar g (-40 °F at 200 psi g)	-40 °C at 70 bar g (-40 °F at 1000 psi g)	-40 °C at 3.4 bar g (-40 °F at 50 psi g)
Process pressure:				
• Process pressure maximum	5.1 bar g at +150 °C (75 psi g at +300 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)	70 bar g at +20 °C (1000 psi g at +70 °F)	3.4 bar g +66 °C (50 psi g at +150 °F)
• Process pressure minimum/vacuum service	Not suitable for vacuum applications			
Dielectric range	1.9 ... 100 ¹⁾	1.9 ... 100 ¹⁾	4 ... 100 ¹⁾	4 ... 100
Maximum viscosity (cP)	10000 (consult factory if severe agitation/turbulence)			N/A
Coating/buildup	Yes, maximum error 10 % of coated length; % error related to dielectric of media, thickness of coating and coated probe length above media			
Foam	Yes	Yes	Yes	Yes
Corrosives	No	Yes	No	No
Sanitary	Yes	No	No	No
Overfill	No	No	No	No

¹⁾ With dK of 1.9 to 10, the device must be mounted between 50 and 150 mm (2 and 6") of metal tank wall or in chamber/bridle

²⁾ See O-ring Selection Guide for guidance

³⁾ Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone

Level Measurement

Continuous level measurement - Guided wave radar transmitter

SITRANS LG200

Model reference number	Twin Rod Probe (7ML1302-1) 7xB-x	Flexible Twin Rod Probe (7ML1302-3) 7x7-x	Flexible Twin Rod Bulk Solids Probe (7ML1302-2) 7x5-x
Recommended applications	General purpose, foam, minor film coating	Low dielectric media (1.9 ... 10) with lengths > 6 m (20 ft)	Granular light bulk solids applications (powders, grains, dust), 3000 lbs pull-down force
Not recommended for	Media bridging between rods or building up on spacers	Dielectric > 10: media bridging on flexible elements	Media bridging on flexible elements
Materials/wetted parts	316L SS, TFE spacers, O-ring ¹⁾	316L SS, FEP webbing, O-ring ¹⁾	316L SS, FEP webbing, O-ring ¹⁾
Process seal	O-ring ¹⁾	O-ring ¹⁾	Sealant
Rod/Tube diameter	Two, ø 12 mm (0.5") rod; 22 mm (0.875") C _L to C _L	Two, ø 6 mm (0.25") cables; 22 mm (0.875") C _L to C _L	Two, ø 6 mm (0.25") cables; 22 mm (0.875") C _L to C _L
Process connection thread	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]	2" NPT [(Taper), ANSI/ASME B1.20.1], G 2" [(BSPP), EN ISO 228-1]
Flange ASME (EN/DIN)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)	2 ... 4" (DN 50 ... 100)
Length	60 ... 610 cm (24 ... 240")	1 ... 22.5 m (3 ... 75 ft)	1 ... 22.5 m (3 ... 75 ft)
Transition Zone²⁾			
Top	150 mm (6") at dK > 1.9 Blocking distance: none	150 mm (6") at dK > 1.9 Blocking distance: 12 ... 50 cm (4.8 ... 20")	150 mm (6") at dK > 1.9 Blocking distance: 12 ... 50 cm (4.8 ... 20")
Bottom	150 mm (6") at dK = 1.9 25 mm (1") at dK = 80	305 mm (12")	305 mm (12")
Process temperature max. ³⁾	+200 °C at 19 bar g (+400 °F at 275 psi g)		+66 °C at 3.4 bar g (+ 150 °F at 50 psi g)
Process temperature min.	-40 °C at 70 bar g (-40 °F at 1000 psi g)		-40 °C at 3.4 bar g (-40 °F at 50 psi g)
Process pressure max.	70 bar g at +20 °C (1000 psi g at +70 °F)		3.4 bar g at +66 °C (50 psi g at + 150 °F)
Process pressure min./vacuum service	Yes, not hermetic		Not suitable
Dielectric range	1.9 ... 100	1.9 ... 100	1.9 ... 100
Maximum viscosity (cP)	1500	1500	Not suitable
Coating/buildup	Yes, maximum error 3 % of coated length with conductive media Bridging not recommended. ⁴⁾		
Foam	Yes	Yes	Yes
Corrosives	Yes	No	Yes
Sanitary	No	No	No
Overfill	No	No	No

¹⁾ See O-ring Selection Guide for guidance

²⁾ Transition zone is dielectric dependent: dK = dielectric permittivity. Unit will function but accuracy will decrease in Transition Zone

³⁾ Refer to Ambient Temperature vs Process Temperature graphs or instruction manual

⁴⁾ Bridging is defined as continuous accumulation of material between the probe elements

O-ring and Seal Selection Guide

Material	Recommended for Use in:	Not Recommended for Use In:
Viton GFLT	General purpose, steam, ethylene	Ketones (MEK, acetone), skydrol fluids, amines, anhydrous ammonia, low molecular weight esters and ethers, hot hydrofluoric or chlorosulfuric acids, sour HCs
EPDM	Acetone, MEK, skydrol fluids	Petroleum oils, di-ester base lubricants, propane, steam, anhydrous ammonia
Kalrez (4079)	Inorganic and organic acids (including HF and nitric) aldehydes, ethylene, glycols, organic oils, silicone oils, vinegar, sour HCs	Black liquor, hot water/steam, hot aliphatic amines, ethylene oxide, propylene oxide, molten sodium, molten potassium, anhydrous ammonia
Aegis PF128	Inorganic and organic acids (including HF and nitric) aldehydes, ethylene, glycols, organic oils, silicone oils, vinegar, sour HCs, steam, amines, ethylene oxide, propylene oxide	Black liquor, Freon 43, Freon 75, Galden, KEL-F liquid, molten sodium, molten potassium, anhydrous ammonia
Borosilicate (HT/HP probes only)	General high temperature/high pressure applications, hydrocarbons, full vacuum (hermetic), anhydrous ammonia	Steam, hot alkaline solutions, HF acid, media with pH>12, condensate

SITRANS LG200

Selection and Ordering data

SITRANS LG200 Transmitter

A guided wave radar transmitter for short and medium range level, level/interface, and volume measurement of liquids and solids, including high temperature and pressure applications, and steam.

Note:

In addition to the transmitter, please select a probe configuration to complete the SITRANS LG200 (ordered separately).

For orders of 10 or more, please consult factory.

Power

24 V DC, 2-wire

Signal Output

4 ... 20 mA HART

Options

SIL-1 Approved (FMEDA analysis) SFF = 85.5 %

SIL-2 Approved (FMEDA analysis) SFF = 91 %

Enclosure/lid

Aluminum

Aluminum with glass window

Cable inlet

2 x 1/2" NPT, IP65

2 x M20x1.5, IP65

Approvals (Please select for your region)

North America

General Purpose and Intrinsically Safe (CSA/FM Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G T4, Class III); Non-incendive (CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups E, F, G; FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G)

Explosion Proof (CSA/FM Class I, Div. 1, Groups B, C, and D; Class II, Div. 1, Groups E, F, G, T4; Class III); Non-incendive (CSA Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups E, F, G; FM Class I, Div. 2, Groups A, B, C, D, Class II, Div. 2, Groups F, G)

Europe

General Purpose and Intrinsically Safe (ATEX II 1G EEx ia IIC T4)

Explosion Proof (ATEX II 1/2 GD EEx d [ia] IIC T6)

Non-sparking [ATEX II 3G EEx nA II/EEEx nA (nL) IIC T4 to T6]

C) Subject to export regulations AL: N, ECCN: EAR99

Order No.

C) 7ML1300-

1 - A0

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Selection and Ordering data

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000 [Available only when ordered in conjunction with a probe (7ML130x-x). Testing requires transmitter with probe.]

Operating Instructions

English

French

German

Multi-language Quick Start manual

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

C) Subject to export regulations AL: N, ECCN: EAR99

Order code

C11

Order No.

C) 7ML1998-5KA01

C) 7ML1998-5KA11

C) 7ML1998-5KA31

C) 7ML1998-5XG81

Level Measurement

Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order No.
SITRANS LG200 Coaxial Probes	R) 7 M L 1 3 0 1 -
SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 ... 100).	0
Note: In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately). For orders of 10 or more, please consult factory.	
Model	
Coaxial ^{1) 2)}	1
Coaxial, High Temperature/High Pressure ^{2) 3)}	2
Coaxial, High Pressure ^{2) 3)}	3
Coaxial, Overfill/Flooded Cage ^{1) 2)}	4
Coaxial Steam ^{4) 5)}	5
Coaxial, Interface ^{1) 2)}	6
Material of Construction	
316/316L (1.4401/1.4404) stainless steel probe and process connection	A
316/316L (1.4401/1.4404) SS probe ASME B31.1 specifications ⁶⁾	D
Enlarged Coaxial, 316/316L (1.4401/1.4404) stainless steel probe and process connection with PEEK Spacers ⁷⁾	E
316/316L (1.4401/1.4404) stainless steel probe and process connection with PEEK HT spacers dk ≥ 1.4 ⁸⁾	H
316/316L (1.4401/1.4404) stainless steel probe and process connection with Teflon [®] spacers dk ≥ 2 ^{8) 9)}	J
Probe Insertion Length	
Add order code Y01 and plain text: "Insertion length ... mm"	
Model option 1, 4 and Material of Construction option A, E: 60 ... 100 cm (23.6 ... 39.4")	A 1
Model option 1, 4 and Material of Construction option A, E: 101 ... 200 cm (39.8 ... 78.7")	A 2
Model option 1, 4 and Material of Construction option A, E: 201 ... 300 cm (79.1 ... 118.1")	A 3
Model option 1, 4 and Material of Construction option A, E: 301 ... 400 cm (118.5 ... 157.5")	A 4
Model option 1, 4 and Material of Construction option A, E: 401 ... 500 cm (157.9 ... 196.9")	A 5
Model option 1, 4 and Material of Construction option A, E: 501 ... 610 cm (197.2 ... 240.2")	A 6
Add order code Y01 and plain text: "Insertion length ... cm"	
Model options 3, 6 with Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4")	B 1
Model options 3, 6 with Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7")	B 2
Model options 3, 6 with Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1")	B 3
Model options 3, 6 with Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5")	B 4
Model options 3, 6 with Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9")	B 5
Model options 3, 6 with Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2")	B 6
Add order code Y01 and plain text: "Insertion length ... cm"	
Model options 3, 6 with Material of Construction option E: 60 ... 100 cm (23.6 ... 39.4")	C 1
Model options 3, 6 with Material of Construction option E: 101 ... 200 cm (39.8 ... 78.7")	C 2
Model options 3, 6 with Material of Construction option E: 201 ... 300 cm (79.1 ... 118.1")	C 3
Model options 3, 6 with Material of Construction option E: 301 ... 400 cm (118.5 ... 157.5")	C 4

Selection and Ordering data	Order No.
SITRANS LG200 Coaxial Probes	R) 7 M L 1 3 0 1 -
SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 ... 100).	0
Model options 3, 6 with Material of Construction option E: 401 ... 500 cm (157.9 ... 196.9")	C 5
Model options 3, 6 with Material of Construction option E: 501 ... 610 cm (197.2 ... 240.2")	C 6
Add order code Y01 and plain text: "Insertion length ... cm"	
Model option 2 with Material of Construction options A, E, H, J: 60 ... 100 cm (23.6 ... 39.4")	E 1
Model option 2 with Material of Construction options A, E, H, J: 101 ... 200 cm (39.8 ... 78.7")	E 2
Model option 2 with Material of Construction options A, E, H, J: 201 ... 300 cm (79.1 ... 118.1")	E 3
Model option 2 with Material of Construction options A, E, H, J: 301 ... 400 cm (118.5 ... 157.5")	E 4
Model option 2 with Material of Construction options A, E, H, J: 401 ... 500 cm (157.9 ... 196.9")	E 5
Model option 2 with Material of Construction options A, E, H, J: 501 ... 610 cm (197.2 ... 240.2")	E 6
Add order code Y01 and plain text: "Insertion length ... cm"	
Model option 5 with Material of Construction options A, D: 60 ... 100 cm (23.6 ... 39.4")	F 1
Model option 5 with Material of Construction options A, D: 101 ... 200 cm (39.8 ... 78.7")	F 2
Model option 5 with Material of Construction options A, D: 201 ... 300 cm (79.1 ... 118.1")	F 3
Model option 5 with Material of Construction options A, D: 301 ... 400 cm (118.5 ... 157.5")	F 4
Model option 5 with Material of Construction options A, D: 401 ... 455 cm (157.9 ... 180")	F 5
O-rings	
Viton	1 1
EPDM (Ethylene Propylene Rubber)	1 2
Kalrez 4079	1 3
HSN (Nitrile)	1 4
Buna-N	1 5
Neoprene	1 6
Chemraz	1 7
Polyurethane	1 8
Aegis PF128	2 1
Kalrez 2035	2 2
None (Borosilicate glass seal, not for steam applications) ¹⁰⁾	2 3
Process Connection (Size/Type)	
Threaded	
¾" NPT [(Taper), ANSI/ASME B1.20.1]	AA
G 1" [(BSPP), EN ISO 228-1]	AB
G 2" [(BSPP), EN ISO 228-1] ¹¹⁾	AC
2" NPT [(Taper), ANSI/ASME B1.20.1] ¹¹⁾	AD
ASME flanges	
1" 150 lb ASME raised face flange	BA
1" 300 lb ASME raised face flange	BB
1" 600 lb ASME raised face flange	BC
1" 900/1500 lb ASME raised face flange ¹⁰⁾	BD
1" 2500 lb ASME raised face flange ¹⁰⁾	BE
1" 900/1500 lb ASME ring joint flange ¹⁰⁾	BF
1" 2500 lb ASME ring joint flange ¹⁰⁾	BG
1½" 150 lb ASME raised face flange	CA
1½" 300 lb ASME raised face flange	CB
1½" 600 lb ASME raised face flange	CC
1½" 900/1500 lb ASME raised face flange ¹⁰⁾	CD
1½" 2500 lb ASME raised face flange ¹⁰⁾	CE

SITRANS LG200

Selection and Ordering data

Order No.

SITRANS LG200 Coaxial Probes

R) 7 M L 1 3 0 1 -

SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 ... 100).

1½" 600 lb ASME ring joint flange
1½" 900/1500 lb ASME ring joint flange¹⁰⁾
1½" 2500 lb ASME ring joint flange¹⁰⁾
2" 150 lb ASME raised face flange
2" 300 lb ASME raised face flange
2" 600 lb ASME raised face flange

2" 900/1500 lb ASME raised face flange¹⁰⁾
2" 2500 lb ASME raised face flange¹⁰⁾
2" 600 lb ASME ring joint flange

2" 900/1500 lb ASME ring joint flange¹⁰⁾
2" 2500 lb ASME ring joint flange¹⁰⁾

3" 150 lb ASME raised face flange

3" 300 lb ASME raised face flange

3" 600 lb ASME raised face flange

3" 900 lb ASME raised face flange¹⁰⁾

3" 1500 lb ASME raised face flange¹⁰⁾

3" 2500 lb ASME raised face flange¹⁰⁾

3" 600 lb ASME ring joint flange

3" 900 lb ASME ring joint flange¹⁰⁾

3" 1500 lb ASME ring joint flange¹⁰⁾

3" 2500 lb ASME ring joint flange¹⁰⁾

4" 150 lb ASME raised face flange

4" 300 lb ASME raised face flange

4" 600 lb ASME raised face flange

4" 900 lb ASME raised face flange¹⁰⁾

4" 1500 lb ASME raised face flange¹⁰⁾

4" 2500 lb ASME raised face flange¹⁰⁾

4" 600 lb ASME ring type joint flange

4" 900 lb ASME ring type joint flange¹⁰⁾

4" 1500 lb ASME ring type joint flange¹⁰⁾

4" 2500 lb ASME ring type joint flange¹⁰⁾

EN flanges

DN 25 PN 16 EN 1092-1 Type A flat faced flange

DN 25 PN 25/40 EN 1092-1

Type A flat faced flange

DN 25 PN 64/100 EN 1092-1

Type B1 raised faced flange

DN 25 PN 160 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 25 PN 250 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 25 PN 320 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 25 PN 400 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 40 PN 16 EN 1092-1 Type A flat faced flange

DN 40 PN 25/40 EN 1092-1

Type A flat faced flange

DN 40 PN 64/100 EN 1092-1

Type B1 raised faced flange

DN 40 PN 160 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 40 PN 250 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 40 PN 320 EN 1092-1 Type B1 raised faced flange¹⁰⁾

DN 40 PN 400 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 50 PN 16 EN 1092-1 Type A flat faced flange

DN 50 PN 25/40 EN 1092-1

Type A flat faced flange

Selection and Ordering data

Order No.

SITRANS LG200 Coaxial Probes

R) 7 M L 1 3 0 1 -

SITRANS LG200 coaxial probes are used in most standard applications. Coaxial probes yield robust signal strength even in extremely low dielectric applications (dK 1.4 ... 100).

DN 50 PN 64 EN 1092-1

Type B1 raised faced flange

DN 50 PN 100 EN 1092-1

Type B1 raised faced flange

DN 50 PN 160 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 50 PN 250 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 50 PN 320 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 50 PN 400 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 80 PN 16 EN 1092-1 Type A flat faced flange

DN 80 PN 25/40 EN 1092-1

Type A flat faced flange

DN 80 PN 64 EN 1092-1

Type B1 raised faced flange

DN 80 PN 100 EN 1092-1

Type B1 raised faced flange

DN 80 PN 160 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 80 PN 250 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 80 PN 320 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 80 PN 400 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 100 PN 16 EN 1092-1 Type A flat faced flange

DN 100 PN 25/40 EN 1092-1

Type A flat faced flange

DN 100 PN 64 EN 1092-1

Type B1 raised faced flange

DN 100 PN 100 EN 1092-1

Type B1 raised faced flange

DN 100 PN 160 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 100 PN 250 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 100 PN 320 EN 1092-1

Type B1 raised faced flange¹⁰⁾

DN 100 PN 400 EN 1092-1

Type B1 raised faced flange¹⁰⁾

Fisher torque tube flange, carbon steel (249B)

Fisher torque tube flange, 316 stainless steel (249C)

Masoneilan torque tube flange, carbon steel

Masoneilan torque tube flange, 316 stainless steel

1) Not available with O-ring option 21 (type Aegis PF128)

2) Consult factory for these options in Hastelloy C or Monel

3) Available with O-ring option 23 only (none)

4) Coaxial steam probe must be used with O-ring option 21 only (type Aegis PF128)

5) Available with Material of Construction option A and D only [316/316L

(1.4401/1.4404) stainless steel]

6) Available with Model option 5 only (coaxial steam probe)

7) 2" or DN 50 minimum Process Connection and available with PEEK Spacers for temperature maximum +345 °C (+650 °F)

8) Used with Model option 2 only (coaxial High Temperature/High Pressure probe)

9) Process temperature maximum +345 °C (+650 °F)

10) Available with model options 2, 3, and 5 only (High Temperature/High Pressure, High Pressure, and Steam probes only)

11) Available with Material of Construction option E only (enlarged coaxial probe)

R) Subject to export regulations AL: N, ECCN: EAR99I

Level Measurement

Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 610 cm (240.2")	Y01
Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text	Y15
Inspection Certificate Type 3.1 per EN 10204	C12
Manufacturer's test report (Hydrostatic Test)	C18
NACE MR-0175 materials traceability	D07
Operating Instructions	
English	C) 7ML1998-5KA01
French	C) 7ML1998-5KA11
German	C) 7ML1998-5KA31
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5XG81
Accessories	
Coaxial probe shortening kit with TFE end spacer [for process temperatures < +200 °C (+400 °F)]	C) A5E02455728
Coaxial probe TFE end spacer [for process temperatures < +200 °C (+400 °F)]	C) A5E02479158
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	

Level Measurement

Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

SITRANS LG200 Twin Rod Probes

SITRANS LG200 twin rod probes are used in applications where coating and buildup are possible. Used in application with dielectric constant ≥ 1.9 .

Note:

In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).

For orders of 10 or more, please consult factory.

Model

- 1 Twin rigid rod
- 2 Flexible twin rod bulk solids probe¹⁾
- 3 Flexible twin rod probe

Material of Construction

316/316L (1.4401/1.4404) stainless steel probe and process connection

Process Connection (size/type)

- 2" NPT [(Taper), ANSI/ASME B1.20.1]
- G 2" [(BSPP), EN ISO 228-1]
- 2" 150 lb ASME raised face flange²⁾
- 2" 300 lb ASME raised face flange²⁾
- 3" 150 lb ASME raised face flange
- 2" 600 lb ASME raised face flange²⁾
- 3" 300 lb ASME raised face flange
- 4" 150 lb ASME raised face flange
- 3" 600 lb ASME raised face flange
- 4" 300 lb ASME raised face flange
- DN 50 PN 16 EN 1092-1 Type A flat faced flange
- 4" 600 lb ASME raised face flange
- DN 50 PN 25/40 EN 1092-1 Type A flat faced flange
- DN 80 PN 16 EN 1092-1 Type A flat faced flange
- DN 80 PN 25/40 EN 1092-1 Type A flat faced flange
- DN 100 PN 16 EN 1092-1 Type A flat faced flange
- DN 100 PN 25/40 EN 1092-1 Type A flat faced flange
- Fisher Torque Tube flange, 316SS (249C)
- Masoneilan Torque Tube flange, 316SS
- Carbon Steel
- Fisher Torque Tube flange, Carbon Steel (249B)
- Masoneilan Torque Tube flange, Carbon Steel

O-ring

- 1 Viton
- 1 EPDM (Ethylene Propylene Rubber)
- 1 Kalrez 4079
- 1 HSN (Nitrile)
- 1 Buna-N
- 1 Neoprene
- 1 Chemraz
- 1 Polyurethane
- 2 Aegis PF128
- 2 Kalrez 2035

Probe Insertion Length

Add order code Y01 and plain text: "Insertion length ... cm"

- Model option 1 and Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4")
- Model option 1 and Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7")
- Model option 1 and Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1")

Order No.

7 M L 1 3 0 2 -

0

Selection and Ordering data

SITRANS LG200 Twin Rod Probes

SITRANS LG200 twin rod probes are used in applications where coating and buildup are possible. Used in application with dielectric constant ≥ 1.9 .

- Model option 1 and Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5")
- Model option 1 and Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9")
- Model option 1 and Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2")

Standard lengths³⁾

- Model option 2,3 and Material of Construction option A: 1 m (39.4")³⁾
- Model option 2,3 and Material of Construction option A: 2 m (78.7")³⁾
- Model option 2,3 and Material of Construction option A: 3 m (118.1")³⁾
- Model option 2,3 and Material of Construction option A: 4 m (157.5")³⁾
- Model option 2,3 and Material of Construction option A: 5 m (196.9")³⁾
- Model option 2,3 and Material of Construction option A: 6 m (236.2")³⁾
- Model option 2,3 and Material of Construction option A: 7 m (275.6")³⁾
- Model option 2,3 and Material of Construction option A: 8 m (315.0")³⁾
- Model option 2,3 and Material of Construction option A: 9 m (354.3")³⁾
- Model option 2,3 and Material of Construction option A: 10 m (393.7")³⁾
- Model option 2,3 and Material of Construction option A: 11 m (433.1")³⁾
- Model option 2,3 and Material of Construction option A: 12 m (472.4")³⁾
- Model option 2,3 and Material of Construction option A: 13 m (511.8")³⁾
- Model option 2,3 and Material of Construction option A: 14 m (551.2")³⁾
- Model option 2,3 and Material of Construction option A: 15 m (590.6")³⁾
- Model option 2,3 and Material of Construction option A: 16 m (629.9")³⁾
- Model option 2,3 and Material of Construction option A: 17 m (669.3")³⁾
- Model option 2,3 and Material of Construction option A: 18 m (708.7")³⁾
- Model option 2,3 and Material of Construction option A: 19 m (748.0")³⁾
- Model option 2,3 and Material of Construction option A: 20 m (787.4")³⁾
- Model option 2,3 and Material of Construction option A: 21 m (826.8")³⁾
- Model option 2,3 and Material of Construction option A: 22.5 m (885.8")³⁾

- 1) Available with O-ring option 11 only
- 2) Available with model option 1 (Twin rigid rod) only
- 3) No Y01 needed in order code

R) Subject to export regulations AL: N, ECCN: EAR99I

Order No.

7 M L 1 3 0 2 -

0

AD

AE

AF

EA

EB

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ED

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EH

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EK

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EN

EP

EQ

ER

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ET

EU

EV

EW

EX

Level Measurement

Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

Order code

Further designs

Please add **"-Z"** to Order No. and specify Order code(s).

Enter the total insertion length in plain text description, max. 610 cm (240.2")

Y01

Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text

Y15

Inspection Certificate Type 3.1 per EN 10204

C12

Manufacturer's test report (Hydrostatic Test)

C18

NACE MR-0175 materials traceability

D07

Operating Instructions

Order No.

English

C) **7ML1998-5KA01**

French

C) **7ML1998-5KA11**

German

C) **7ML1998-5KA31**

Multi-language Quick Start manual

C) **7ML1998-5XG81**

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data	Order No.
SITRANS LG200 Single Rod Rigid Probes R) 7ML1303-	
SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥ 10 , or $\text{dk} > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle.	
Note: In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately). For orders of 10 or more, please consult factory.	
Model	
Single rod rigid probe ¹⁾	1
High Temperature/High Pressure Single rod ^{2) 3)}	2
Material of Construction	
316/316L (1.4401/1.4404) stainless steel probe and process connection	A
316/316L (1.4401/1.4404) stainless steel sanitary probe and process connection ^{1) 4)}	D
PFA faced-flange and rod insulation, all PFA wetted parts (316 SS rod) ^{1) 5)}	E
316 AL6XN stainless steel sanitary probe and process connection ^{1) 6)}	F
PFA rod insulation (316 SS rod and process connection)	J
Process Connection (size/type)	
1 or 1½" Tri-Clover 16 amp sanitary fitting ⁷⁾	A 1
2" NPT [(Taper), ANSI/ASME B1.20.1] ⁸⁾	A 2
G 2" [(BSPP), EN ISO 228-1] ⁸⁾	A 3
2" 150 lb ASME raised face flange ⁸⁾	A 4
2" 300 lb ASME raised face flange ⁸⁾	A 5
2" Tri-Clover 16 amp sanitary fitting ⁷⁾	A 6
¾" Tri-Clover 16 amp sanitary fitting ^{7) 9)}	A 7
2½" Tri-Clover 16 amp sanitary fitting ⁷⁾	B 0
3" 150 lb ASME raised face flange ⁸⁾	B 1
3" 300 lb ASME raised face flange ⁸⁾	B 2
3" Tri-Clover 16 amp sanitary fitting ⁷⁾	B 3
4" 150 lb ASME raised face flange ⁸⁾	C 1
4" 300 lb ASME raised face flange ⁸⁾	C 2
4" Tri-Clover 16 amp sanitary fitting ⁷⁾	C 3
DN 50, PN 16, EN 1092-1 Type A flat faced flange ⁸⁾	D 1
DN 50, PN 25/40, EN 1092-1 Type A flat faced flange ⁸⁾	D 2
DN 80, PN 16, EN 1092-1 Type A flat faced flange ⁸⁾	D 3
DN 80, PN 25/40, EN 1092-1 Type A flat faced flange ⁸⁾	D 4
DN 100, PN 16, EN 1092-1 Type A flat faced flange ⁸⁾	D 5
DN 100, PN 25/40, EN 1092-1 Type A flat faced flange ⁸⁾	D 6
AL6XN¹⁰⁾	
¾" Tri-Clover 16 amp sanitary fitting ^{9) 10)}	E 0
1½" Tri-Clover 16 amp sanitary fitting ¹⁰⁾	E 1
2" Tri-Clover 16 amp sanitary fitting ¹⁰⁾	E 2
2½" Tri-Clover 16 amp sanitary fitting ¹⁰⁾	E 3
3" Tri-Clover 16 amp sanitary fitting ¹⁰⁾	F 1
4" Tri-Clover 16 amp sanitary fitting ¹⁰⁾	G 1
PFA Coated 316 stainless steel flange ¹¹⁾	
2" 150 lb ASME raised face flange ¹¹⁾	H 1
2" 300 lb ASME raised face flange ¹¹⁾	H 2
3" 150 lb ASME raised face flange ¹¹⁾	J 1
3" 300 lb ASME raised face flange ¹¹⁾	J 2
4" 150 lb ASME raised face flange ¹¹⁾	K 1
4" 300 lb ASME raised face flange ¹¹⁾	K 2
DN 50, PN 16, EN 1092-1 Type A flat faced flange ¹¹⁾	L 1

Selection and Ordering data	Order No.
SITRANS LG200 Single Rod Rigid Probes R) 7ML1303-	
SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥ 10 , or $\text{dk} > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle.	
DN 50, PN 25/40, EN 1092-1 Type A flat faced flange ¹¹⁾	L 2
DN 80, PN 16, EN 1092-1 Type A flat faced flange ¹¹⁾	L 3
DN 80, PN 25/40, EN 1092-1 Type A flat faced flange ¹¹⁾	L 4
DN 100, PN 16, EN 1092-1 Type A flat faced flange ¹¹⁾	L 5
DN 100, PN 25/40, EN 1092-1 Type A flat faced flange ¹¹⁾	L 6
Higher Pressure rated flanges	
ANSI/ASME	
2" 600 lb ASME raised face flange ⁸⁾	M 0
2" 900/1500 lb ASME raised face flange ¹²⁾	M 1
2" 2500 lb ASME raised face flange ¹²⁾	M 2
3" 600 lb ASME raised face flange ⁸⁾	N 0
3" 900 lb ASME raised face flange ¹²⁾	N 3
3" 1500 lb ASME raised face flange ¹²⁾	N 4
3" 2500 lb ASME raised face flange ¹²⁾	N 5
4" 600 lb ASME raised face flange ⁸⁾	P 0
4" 900 lb ASME raised face flange ¹²⁾	P 3
4" 1500 lb ASME raised face flange ¹²⁾	P 4
4" 2500 lb ASME raised face flange ¹²⁾	P 5
2" 600 lb ASME ring type joint flange ⁸⁾	Q 0
2" 900/1500 lb ASME ring type joint flange ¹²⁾	Q 1
2" 2500 lb ASME ring type joint flange ¹²⁾	Q 2
3" 600 lb ASME ring type joint flange ⁸⁾	R 0
3" 900 lb ASME ring type joint flange ¹²⁾	R 3
3" 1500 lb ASME ring type joint flange ¹²⁾	R 4
3" 2500 lb ASME ring type joint flange ¹²⁾	R 5
4" 600 lb ASME ring type joint flange ⁸⁾	S 0
4" 900 lb ASME ring type joint flange ¹²⁾	S 3
4" 1500 lb ASME ring type joint flange ¹²⁾	S 4
4" 2500 lb ASME ring type joint flange ¹²⁾	S 5
EN flanges	
DN 50, PN 64, EN 1092-1 Type A flat faced flange ⁸⁾	T 0
DN 50, PN 100, EN 1092-1 Type A flat faced flange ⁸⁾	T 1
DN 50, PN 160, EN 1092-1 Type A flat faced flange ¹²⁾	T 2
DN 50, PN 250, EN 1092-1 Type A flat faced flange ¹²⁾	T 3
DN 80, PN 64, EN 1092-1 Type A flat faced flange ⁸⁾	U 0
DN 80, PN 100, EN 1092-1 Type A flat faced flange ⁸⁾	U 1
DN 80, PN 160, EN 1092-1 Type A flat faced flange ¹²⁾	U 2
DN 80, PN 250, EN 1092-1 Type A flat faced flange ¹²⁾	U 3
DN 100, PN 64, EN 1092-1 Type A flat faced flange ⁸⁾	V 0
DN 100, PN 100, EN 1092-1 Type A flat faced flange ⁸⁾	V 1
DN 100, PN 160, EN 1092-1 Type A flat faced flange ¹²⁾	V 2
DN 100, PN 250, EN 1092-1 Type A flat faced flange ¹²⁾	V 3

Level Measurement

Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

Order No.

SITRANS LG200 Single Rod Rigid Probes

R) 7 ML 1 3 0 3 -

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥ 10 , or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle.

O-ring

Viton 1 1
 EPDM (Ethylene Propylene Rubber) 1 2
 Kalrez 4079 1 3
 HSN (Nitrile) 1 4
 Buna-N 1 5
 Neoprene 1 6
 Chemraz 1 7
 Polyurethane 1 8
 Aegis PF128 2 1
 Kalrez 2035 2 2
 None 2 3

Probe Insertion Length

Add order code Y01 and plain text:
 "Insertion length ... cm"

Model option 1, 2 and Material of Construction option A: 60 ... 100 cm (23.6 ... 39.4")

Model option 1, 2 and Material of Construction option A: 101 ... 200 cm (39.8 ... 78.7")

Model option 1, 2 and Material of Construction option A: 201 ... 300 cm (79.1 ... 118.1")

Model option 1, 2 and Material of Construction option A: 301 ... 400 cm (118.5 ... 157.5")

Model option 1, 2 and Material of Construction option A: 401 ... 500 cm (157.9 ... 196.9")

Model option 1, 2 and Material of Construction option A: 501 ... 610 cm (197.2 ... 240.2")

Add order code Y01 and plain text:
 "Insertion length ... cm"

Model option 1 and Material of Construction option D: 60 ... 100 cm (23.6 ... 39.4")

Model option 1 and Material of Construction option D: 101 ... 200 cm (39.8 ... 78.7")

Model option 1 and Material of Construction option D: 201 ... 300 cm (79.1 ... 118.1")

Model option 1 and Material of Construction option D: 301 ... 400 cm (118.5 ... 157.5")

Model option 1 and Material of Construction option D: 401 ... 500 cm (157.9 ... 196.9")

Model option 1 and Material of Construction option D: 501 ... 610 cm (197.2 ... 240.2")

Add order code Y01 and plain text:
 "Insertion length ... cm"

Model option 1 and Material of Construction option F: 60 ... 100 cm (23.6 ... 39.4")

Model option 1 and Material of Construction option F: 101 ... 200 cm (39.8 ... 78.7")

Model option 1 and Material of Construction option F: 201 ... 300 cm (79.1 ... 118.1")

Model option 1 and Material of Construction option F: 301 ... 400 cm (118.5 ... 157.5")

Model option 1 and Material of Construction option F: 401 ... 500 cm (157.9 ... 196.9")

Model option 1 and Material of Construction option F: 501 ... 610 cm (197.2 ... 240.2")

Add order code Y01 and plain text:
 "Insertion length ... cm"

Model option 1 and Material of Construction option E: 60 ... 100 cm (23.6 ... 39.4")

Model option 1 and Material of Construction option E: 101 ... 200 cm (39.8 ... 78.7")

Model option 1 and Material of Construction option E: 201 ... 300 cm (79.1 ... 118.1")

Selection and Ordering data

Order No.

SITRANS LG200 Single Rod Rigid Probes

R) 7 ML 1 3 0 3 -

SITRANS LG200 single rod rigid probes are used in applications where coating and buildup are likely. Used in applications with dielectric constant ≥ 10 , or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle.

Model option 1 and Material of Construction option E: 301 ... 400 cm (118.5 ... 157.5")

DD

Model option 1 and Material of Construction option E: 401 ... 500 cm (157.9 ... 196.9")

DE

Model option 1 and Material of Construction option E: 501 ... 610 cm (197.2 ... 240.2")

DF

Add order code Y01 and plain text:
 "Insertion length ... cm"

Model option 1 and Material of Construction option J: 60 ... 100 cm (23.6 ... 39.4")

EA

Model option 1 and Material of Construction option J: 101 ... 200 cm (39.8 ... 78.7")

EB

Model option 1 and Material of Construction option J: 201 ... 300 cm (79.1 ... 118.1")

EC

Model option 1 and Material of Construction option J: 301 ... 400 cm (118.5 ... 157.5")

ED

Model option 1 and Material of Construction option J: 401 ... 500 cm (157.9 ... 196.9")

EE

Model option 1 and Material of Construction option J: 501 ... 610 cm (197.2 ... 240.2")

EF

Add order code Y01 and plain text:
 "Insertion length ... cm"

(¾" Process Connection only)

Model option 1 and Material of Construction option D and F: 60 ... 100 cm (23.6 ... 39.4")¹³⁾

FA

Model option 1 and Material of Construction option D and F: 101 ... 180 cm (39.8 ... 72")¹³⁾

FB

- 1) Model option 1 with Material of Construction options D, E, F, available with O-ring option 23 only
- 2) Available with O-ring option 21 only
- 3) Available with Material of Construction option A only
- 4) Available with Process Connection options A1, A6, A7, B0, B3, C3 only
- 5) Available with Process Connection options H1, H2, J1, J2, K1, K2, L1, L2, L3, L4, L5, L6 only.
- 6) Available with Process Connection options E0, E1, E2, E3, F1, G1 only
- 7) Available with Material of Construction option D only
- 8) Available with Material of Construction options A and J only
- 9) Available with Probe Insertion Length options FA and FB only
- 10) Available with Material of Construction option F only
- 11) Available with Material of Construction option E only
- 12) Available with Model option 2 only
- 13) Available with Process Connection options A7 and E0 only (¾")

R) Subject to export regulations AL: N, ECCN: EAR99I

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order No. and specify Order code(s).	
Enter the total insertion length in plain text description, max. 610 cm (240.2")	Y01
Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text	Y15
Inspection Certificate Type 3.1 per EN 10204	C12
Manufacturer's test report (Hydrostatic Test)	C18
NACE MR-0175 materials traceability	D07
Operating Instructions	
English	C) 7ML1998-5KA01
French	C) 7ML1998-5KA11
German	C) 7ML1998-5KA31
Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5XG81
Accessories	
TFE bottom spacer/endplate	R) 7ML1930-1DJ
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	
R) Subject to export regulations AL: N, ECCN: EAR99	

Level Measurement

Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data

SITRANS LG200 Single Rod Flexible Probes

SITRANS LG200 single rod flexible probes are used in applications where coating and buildup are possible. Used in applications with dielectric constant ≥ 10 or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle. For solids version only, $dk > 4$.

Note:

In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately).

For orders of 10 or more, please consult factory.

Model

Single rod flexible probe
Single rod bulk solids flexible probe¹⁾

Material of Construction

316/316L (1.4401/1.4404) stainless steel probe and process connection

Process Connection (size/type)

316/316L (1.4401/1.4404)

2" NPT [(Taper), ANSI/ASME B1.20.1]

G 2" [(BSPP), EN ISO 228-1]

2" 150 lb ASME raised face flange

2" 300 lb ASME raised face flange

3" 150 lb ASME raised face flange

3" 300 lb ASME raised face flange

4" 150 lb ASME raised face flange

4" 300 lb ASME raised face flange

DN 50 PN 16 EN 1092-1 Type A flat faced flange

DN 50 PN 25/40 EN 1092-1 Type A flat faced flange

DN 80 PN 16 EN 1092-1 Type A flat faced flange

DN 80 PN 25/40 EN 1092-1 Type A flat faced flange

DN 100 PN 16 EN 1092-1 Type A flat faced flange

DN 100 PN 25/40 EN 1092-1 Type A flat faced flange

O-ring

Viton

EPDM (Ethylene Propylene Rubber)

Kalrez 4079

HSN (Nitrile)

Buna-N

Neoprene

Chemraz

Polyurethane

Aegis PF128

Kalrez 2035

Order No.

R) 7ML1304 -

0

1

2

A

A 0

A 1

A 2

A 3

B 1

B 2

C 1

C 2

D 1

D 2

E 1

E 2

F 1

F 2

1

2

3

4

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Selection and Ordering data

SITRANS LG200 Single Rod Flexible Probes

SITRANS LG200 single rod flexible probes are used in applications where coating and buildup are possible. Used in applications with dielectric constant ≥ 10 or $dk > 1.9$ when installed within 2 ... 6" of a metal tank wall or in cage or bridle. For solids version only, $dk > 4$.

Flexible Rod Length (To be shortened by customer as required)

1 meter (39.4")

2 meters (78.7")

3 meters (118.1")

4 meters (157.5")

5 meters (196.9")

6 meters (236.2")

7 meters (275.6")

8 meters (315.0")

9 meters (354.3")

10 meters (393.7")

11 meters (433.1")

12 meters (472.4")

13 meters (511.8")

14 meters (551.2")

15 meters (590.6")

16 meters (629.9")

17 meters (669.3")

18 meters (708.7")

19 meters (748.0")

20 meters (787.4")

21 meters (826.8")

22.5 meters (885.8")

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Order No.

R) 7ML1304 -

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A

A 0

A 1

A 2

A 3

B 1

B 2

C 1

C 2

D 1

D 2

E 1

E 2

F 1

F 2

1

2

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¹⁾ Available with O-ring option 1 1 only (others on request)

R) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data

Further designs

Please add "-Z" to Order No. and specify Order code(s).

Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text

Operating Instructions

English

French

German

Multi-language Quick Start manual
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Selection and Ordering data		Order No.	Selection and Ordering data		Order code
SITRANS LG200 Chamber Replacement Probe R)		7 ML 1 3 0 5 -	Further designs		
Replaces existing aging torque tube transmitters. Proprietary flanges can be used with existing chambers and cages.			Please add "-Z" to Order No. and specify Order code(s).		
Note: In addition to the probe, please select a transmitter configuration to complete the SITRANS LG200 (ordered separately). For this option, please consult factory			Stainless steel tag. Measuring-point number/identification (max. 16 characters); specify in plain text		Y15
			Inspection Certificate Type 3.1 per EN 10204		C12
			NACE MR-0175 materials traceability		D07
Model Chamber Replacement Probe ¹⁾		1	Operating Instructions		Order No.
Chamber/Process Connection Material of Construction 316/316L stainless steel (B31.1 construction) Carbon Steel (106 Grade B) ²⁾ Carbon Steel (B31.1 construction)		A B C	English		C) 7ML1998-5KA01
			French		C) 7ML1998-5KA11
			German		C) 7ML1998-5KA31
			Multi-language Quick Start manual This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.		C) 7ML1998-5XG81
Process Connection (size/type) 1½" NPT [(Taper), ANSI/ASME B1.20.1] thread 1½", 150 lb ASME raised face flange 1½", 300 lb ASME raised face flange 1½", 600 lb ASME raised face flange 1½" Socket weld 2" NPT [(Taper), ANSI/ASME B1.20.1] thread 2", 150 lb ASME raised face flange 2", 300 lb ASME raised face flange 2", 600 lb ASME raised face flange 2" Socket weld Other flange sizes available. Please consult factory.		A 0 A 1 A 2 A 3 B 1 B 2 C 1 C 2 D 1 D 2	Accessories		
			SITRANS RD100 Remote display - see Chapter 8		
			SITRANS RD200 Remote display - see Chapter 8		
			SITRANS RD500 Remote display - see Chapter 8		
			C) Subject to export regulations AL: N, ECCN: EAR99		
Level Range 14" (0.356 meters) Other level ranges available. Please consult factory.		1			
Process Connection Configuration Top In, Bottom Out Top In, Bottom Out, with Sight Glass Connections Other configurations available. Please consult factory.		1 2			
Temperature Range +316 °C (+600 °F) (Dielectric constant ≥ 10) +260 °C (+500 °F) (Dielectric constant ≥ 1.4)		A B			
Chamber Type Fisher 249B Fisher 259B Fisher 249		A B C			

¹⁾ Probe is always 316/316L (1.4401/1.4404) Stainless Steel construction regardless of chamber and process connection materials.

²⁾ Available Process Connection Configuration option 1 only

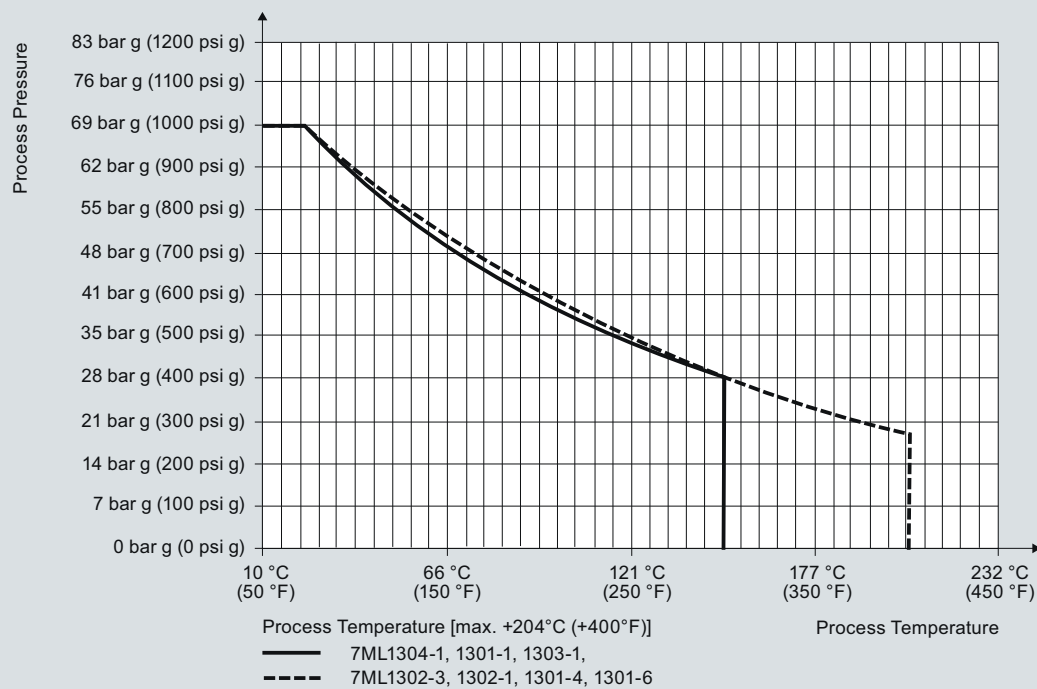
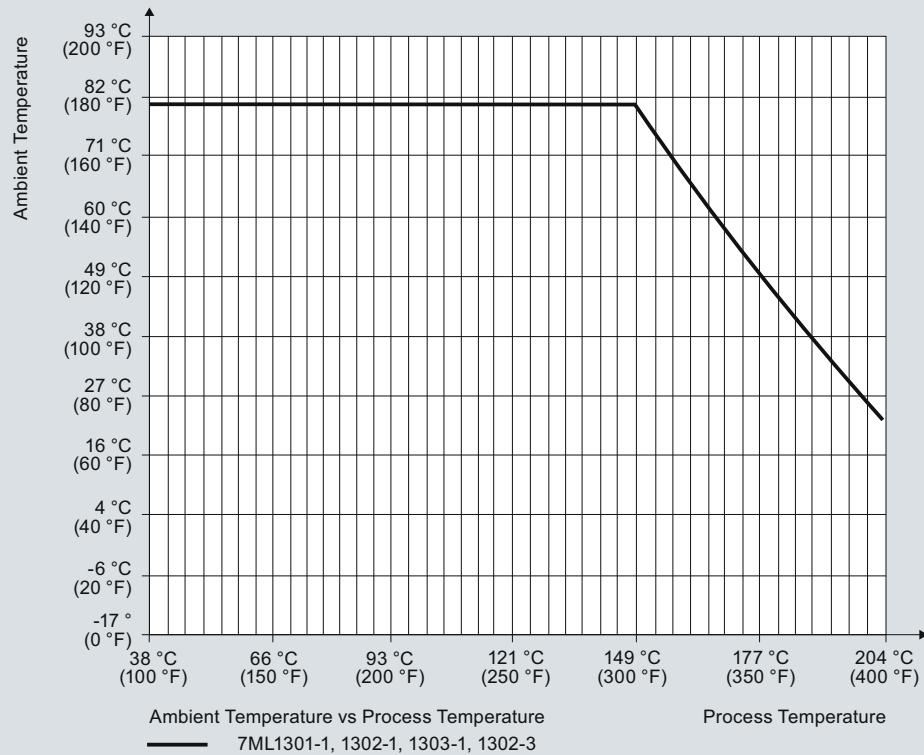
R) Subject to export regulations AL: N, ECCN: EAR99I

Level Measurement

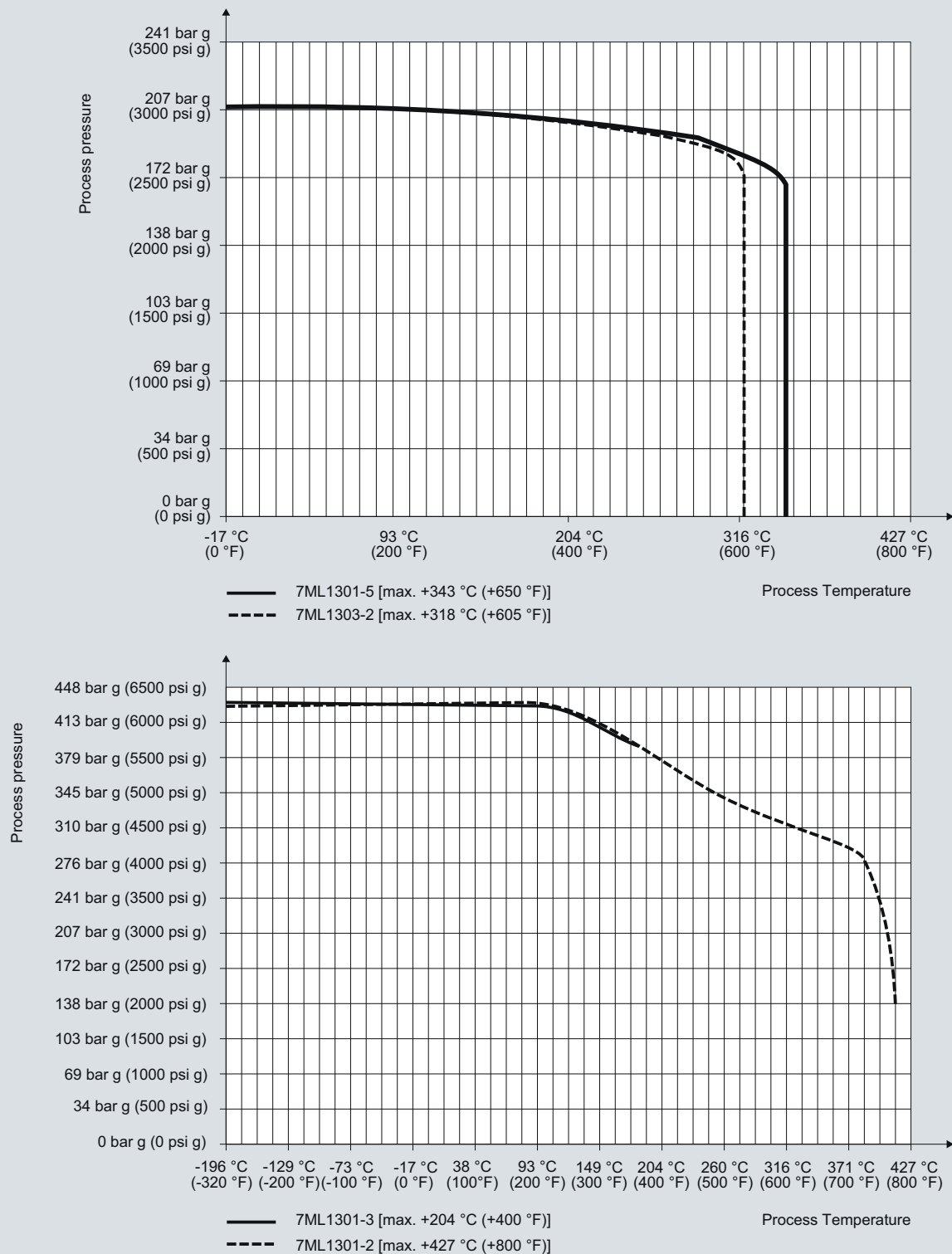
Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Characteristic curves



SITRANS LG200 Process Pressure/Temperature derating curves



SITRANS LG200 Process Pressure/Temperature derating curves

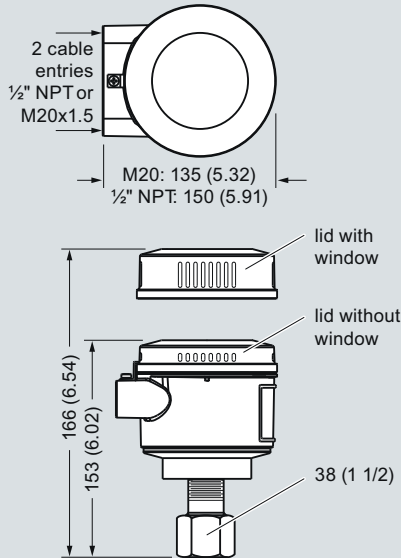
Level Measurement

Continuous level measurement - Guided wave radar transmitters

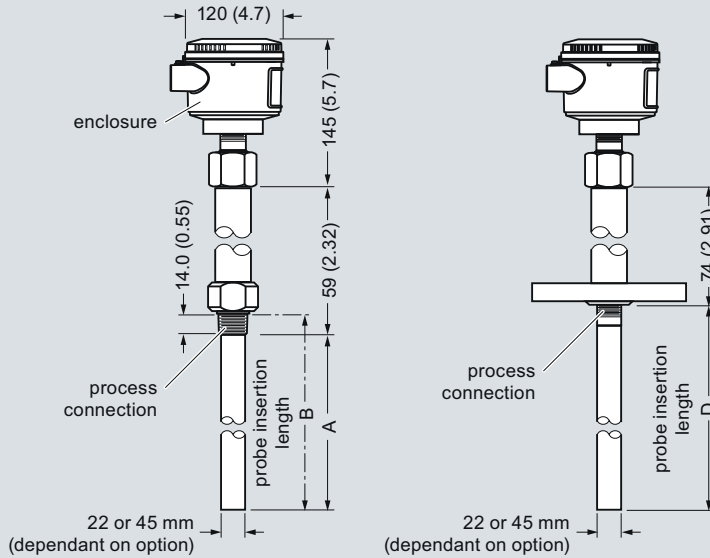
SITRANS LG200

Dimensional drawings

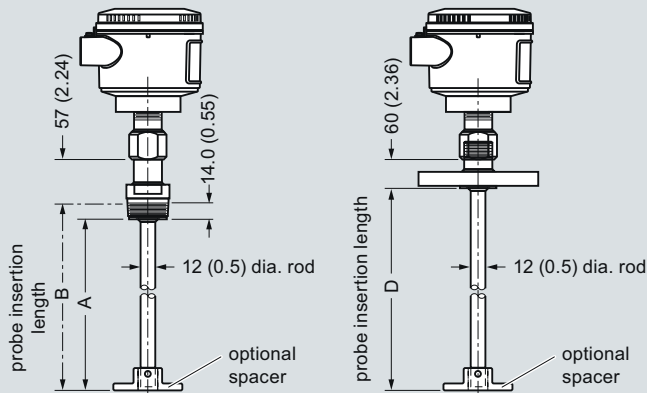
SITRANS LG200 Enclosure 7ML1300



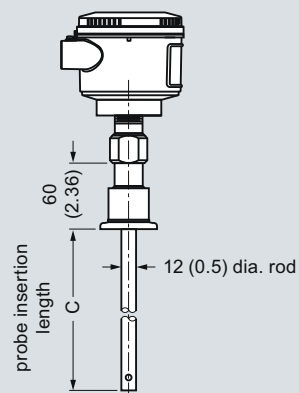
7ML1301-1 (7xA-x) Probe, Threaded and Flanged Connection



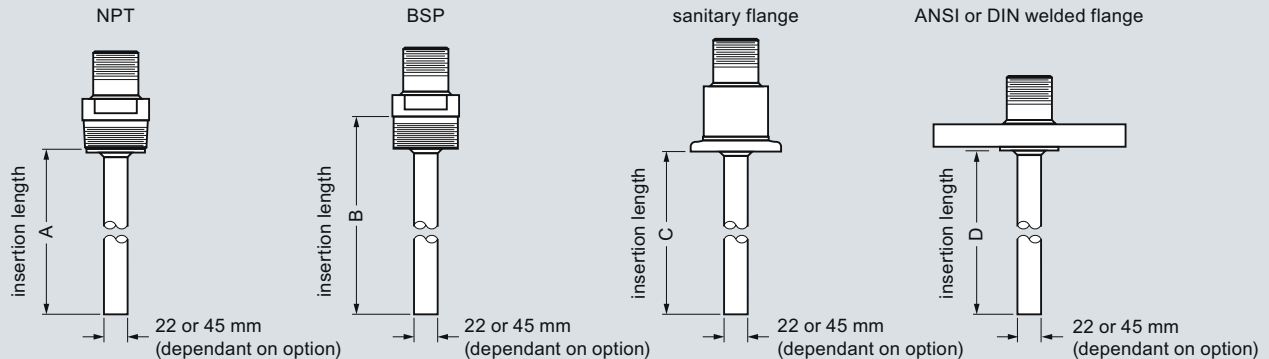
7ML1303-1 (7xF-x) Probe, Threaded and Flanged Connection



7ML1303-1D (7xF-E) Probe, Sanitary Connection



Probe Connections and Insertion Lengths (Note BSP connections differ from NPT)



SITRANS LG200 (threaded process connection dimensions shown are NPT connections unless stated otherwise), dimensions in mm (inch)

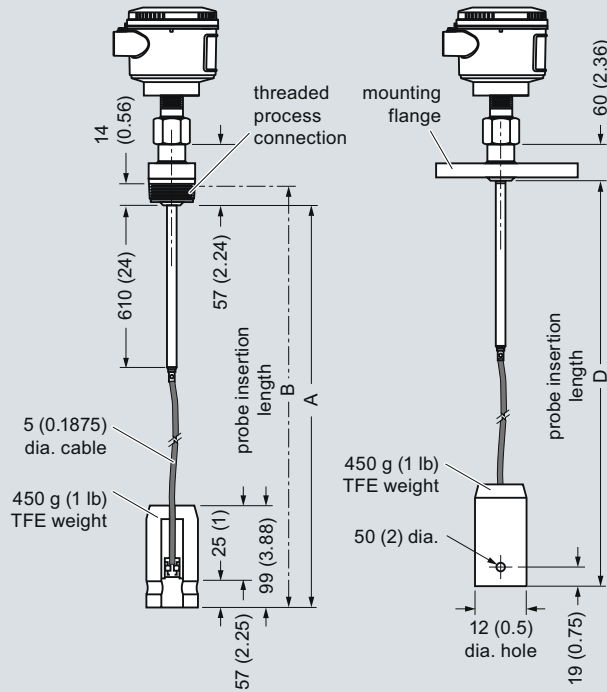
Level Measurement

Continuous level measurement - Guided wave radar transmitters

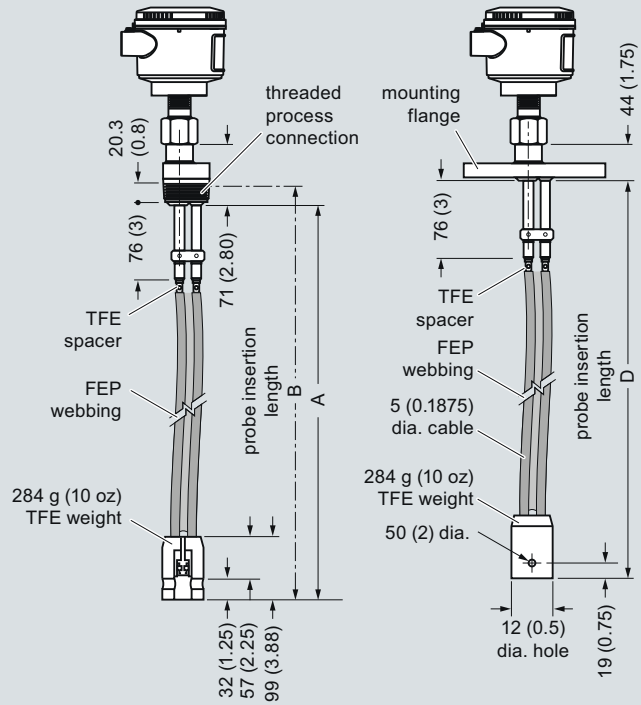
SITRANS LG200

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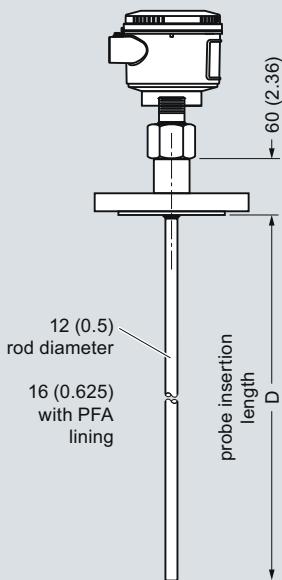
SITRANS LG200
7ML1304-1 (7x1-x) Flexible Probe,
Threaded or Flanged Connection



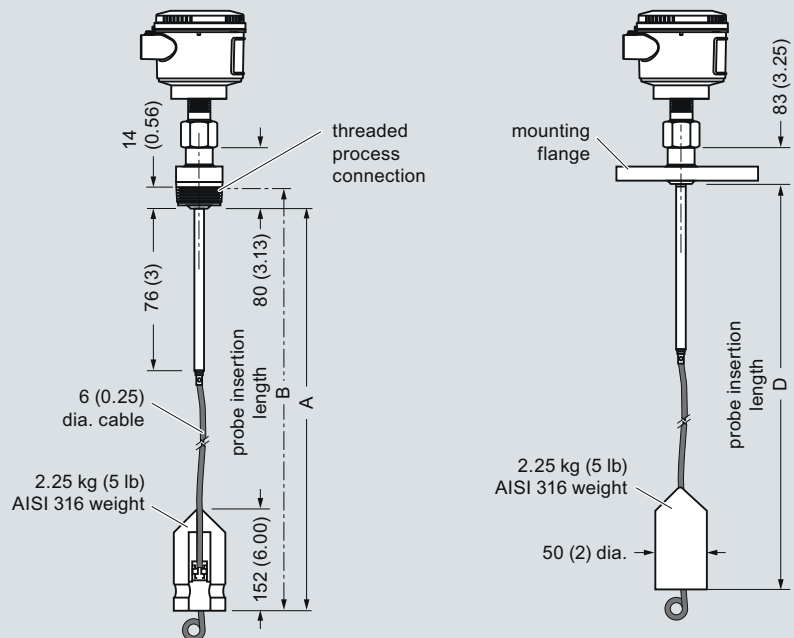
7ML1302-3 (7x7-x) Twin Rod Flexible Probe,
Threaded or Flanged Connection



7ML1303-1E (7xF - F) Probe,
Flat-Faced Flanged Connection



7ML1304-2 (7x2-x) Bulk Solids Flexible Probe,
Threaded or Flanged Connection



SITRANS LG200 (threaded process connection dimensions shown are NPT connections unless stated otherwise), dimensions in mm (inch)

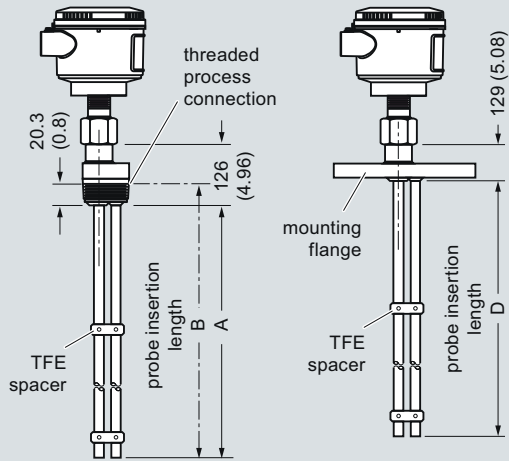
Level Measurement

Continuous level measurement - Guided wave radar transmitters

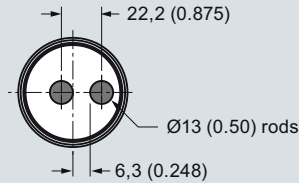
SITRANS LG200

SITRANS LG200

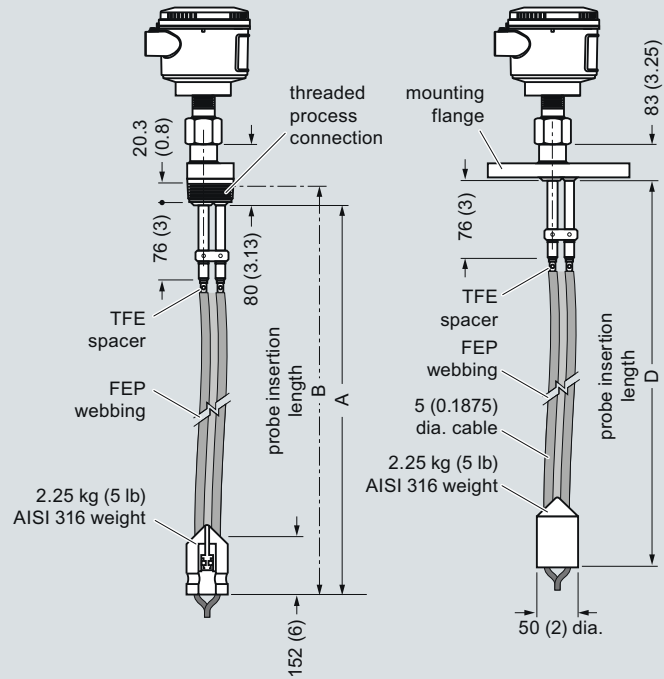
7ML1302-1 (7xB-x) Twin Rod Probe, Threaded and Flanged Connection



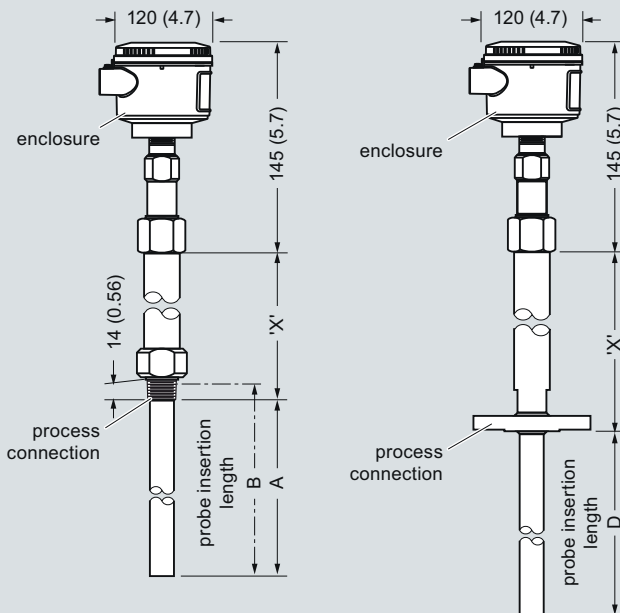
Twin rod end view



7ML1302-2 (7x5-x) Twin Rod Bulk Solids Flexible Probe Threaded or Flanged Connection

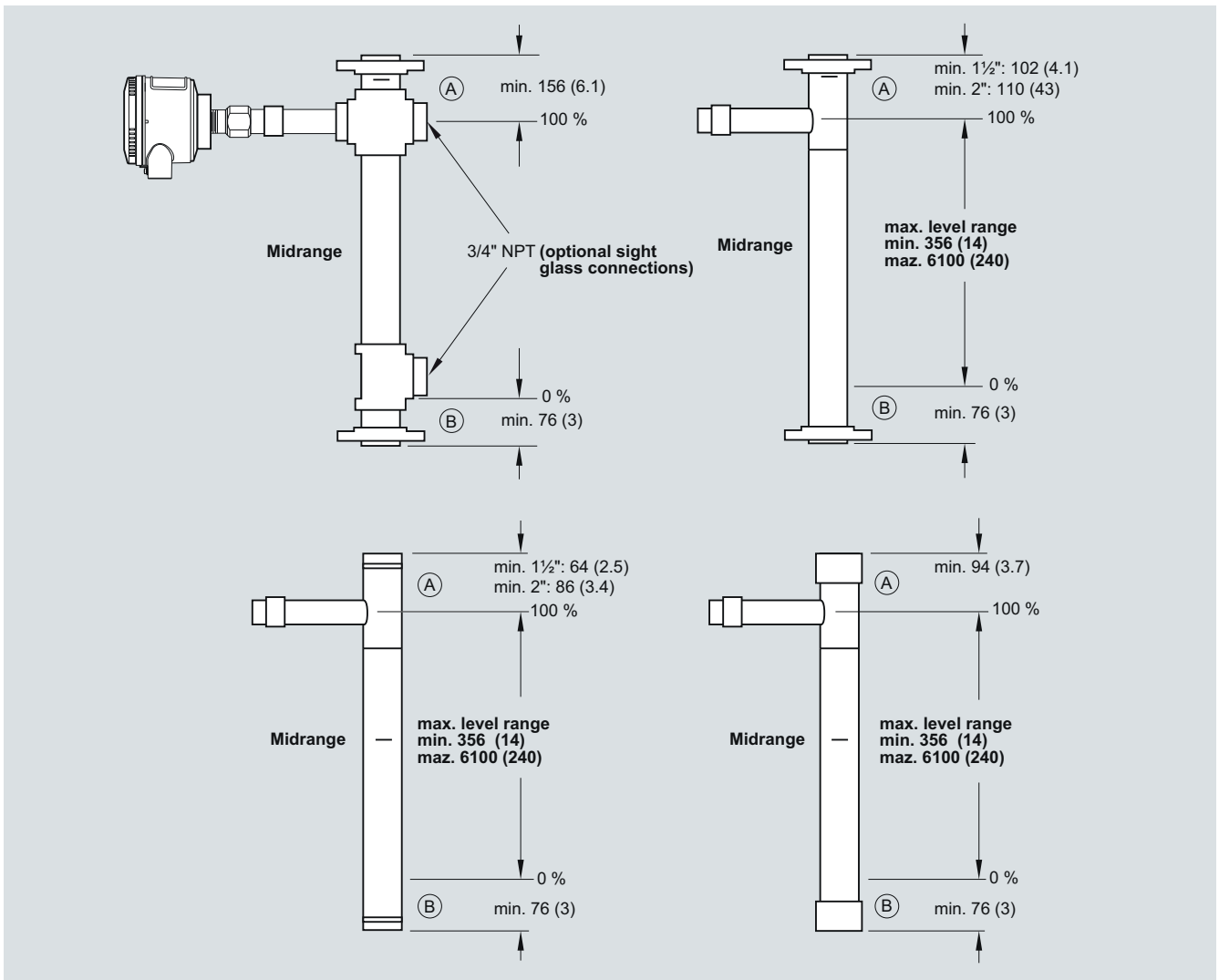


7ML1301-2 (7xD-x), 7ML1301-3 (7xP-x), 7ML1301-4 (7xR-x), 7ML1301-6 (7xT-x), Threaded or Flanged Connection



Probes	'X' Dimension (NPT)	'X' Dimension (Flanged)
7ML1301-2 (Coaxial HT/HP Probe)	217 (8.55)	277 (10.91)
7ML1301-3 (Coaxial HP Probe)	106 (4.18)	166 (6.54)
7ML1301-4 (Coaxial Overfill/Flooded Cage Probe), 7ML1301-6 (Coaxial Interface Probe)	150 (5.89)	167 (6.57)
7ML1301-5 (Coaxial HT/HP Steam Probe)	180 (7.10)	242 (9.52)

SITRANS LG200 (threaded process connection dimensions shown are NPT connections unless stated otherwise), dimensions in mm (inch)



SITRANS LG200 - Model 7ML1305-1 Chamber Replacement Probe, dimensions in mm (inch)

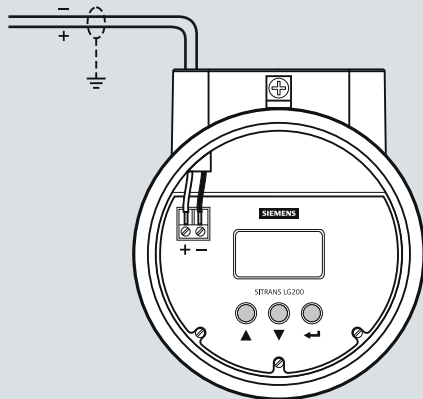
Level Measurement

Continuous level measurement - Guided wave radar transmitters

SITRANS LG200

Schematics

SITRANS LG200 General Purpose Wiring



Intrinsically Safe wiring

When connecting SITRANS LG200 in Intrinsically Safe applications, install an approved IS barrier in the non-hazardous (safe) area.

Explosion Proof wiring

When connecting SITRANS LG200 in hazardous areas with explosion hazard, the wiring for the transmitter must be contained in Explosion Proof conduit extending into the safe area. An Explosion Proof conduit fitting is not required within 457 mm (18") of the transmitter. An Explosion Proof conduit fitting is required between the hazardous and safe areas.

SITRANS LG200 connections

Level Measurement

Continuous level measurement - Capacitance transmitters

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

- Patented 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 signalling according to NAMUR NE 43
- Push-button calibration and programming
- Stilling well (ground tube) version for low dielectric media and non-metallic vessels

Application

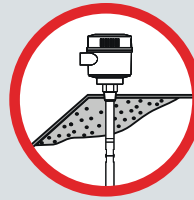
SITRANS LC300 is a 2-wire level measurement instrument combining a sophisticated, yet easy-to-adjust microprocessor with field-proven probes. It is available in four versions: rod, rod with stilling well, cable with PFA insulation, and cable without PFA insulation.

Materials with low or high dielectric properties are accurately measured and patented Active-Shield technology helps in ignoring the effects of buildup or condensation near vessel nozzle.

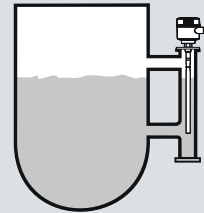
- Key Applications: Conductive and non-conductive media including: liquids and solids in standard industrial processes, bulk solids applications involving dust, and chemical processes involving vapour

Configuration

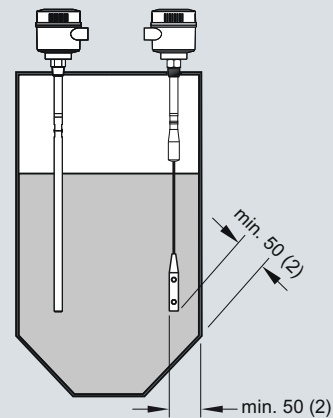
Installation



Build up of material in active shield area does not affect switch operation.



Mounting on a bypass area does not affect switch operation.



Install probe at least 50 mm (2") from tank wall.
Note angle of repose and adjust accordingly.

SITRANS LC300 installation, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC300

Technical specifications

Input	
Measuring range	1.66 ... 3300 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 conditions¹⁾	
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 to +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") with PFA jacket
• Cable version	9 mm (0.35") with PFA jacket, 6 mm (0.24") without PFA jacket
Active shield length	
• Rod version	threaded: 120 mm (4.72") flanged: 100 mm (3.94")
• Cable version	threaded: 125 mm (4.92") flanged: 105 mm (4.13")
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 signalling	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, C-TICK
Dust Ignition Proof (Intrinsically Safe probe circuit)	(Europe) ATEX 1/2 D T100 °C (US/Canada) FM/CSA: Class II, Div. 1, Groups E,F,G Class III T4
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)	(US/Canada) 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 5/277.

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"), max. 5000 mm (197")	Min. 300 mm (12"), max. 5000 mm (197")	Min. 1000 mm (40"), max. 25000 mm (984")
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

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order No.
SITRANS LC300, rod version	C) 7ML5670 -
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	 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
<u>Welded flange, 316L stainless steel, raised face¹⁾</u>	
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
<u>Welded flange, 316L stainless steel, Type A flat faced¹⁾</u>	
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)	
<u>Add order code Y01 and plain text:</u>	
<u>"Insertion length ... mm"</u>	
300 ... 1000 mm (11.81 ... 39.37")	A
1001 ... 2000 mm (39.41 ... 78.74")	B
2001 ... 3000 mm (78.78 ... 118.11")	C
3001 ... 4000 mm (118.15 ... 157.48")	D
4001 ... 5000 mm (157.52 ... 196.85")	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	
19 mm (0.75") diameter 316L stainless steel, PFA lined rod	0

Selection and Ordering data	Order No.
SITRANS LC300, rod version	C) 7ML5670 -
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	 0
Approvals	
General Safety (CSA, FM, CE, C-TICK)	A
Dust Ignition Proof With IS Probe	B
CE, C-TICK, ATEX II 1/2 D T100 °C	C
Flame Proof Enclosure With IS Probe	D
CE, C-TICK, 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	D
CSA/FM Class II, Div. 1, Gr. E, F, G	E
CSA/FM Class III T4	
Explosion Proof Enclosure With IS Probe	D
CSA/FM Class I, Div. 1, Gr. A, B, C, D	E
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
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 Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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	Order No.
English	C) 7ML1998-5HE02
French	7ML1998-5HE11
German	C) 7ML1998-5HE32
Spanish	7ML1998-5HE21
Note: The Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	C) 7ML1830-1KN
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC300

Selection and Ordering data

Order No.

SITRANS LC300, stilling well version

7 M L 5 6 7 1 -

An inverse frequency shift capacitance continuous level transmitter for liquid applications.

■ ■ ■ ■ ■ - ■ ■ ■ ■ 0

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 face¹⁾

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 faced¹⁾

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 ... 1000 mm (11.81 ... 39.37")

A

1001 ... 2000 mm (39.41 ... 78.74")

B

2001 ... 3000 mm (78.78 ... 118.11")

C

3001 ... 4000 mm (118.15 ... 157.48")

D

4001 ... 5000 mm (157.52 ... 196.85")

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") diameter stilling well, with 19 mm (0.75") diameter 316L stainless steel, PFA lined rod with PTFE spacers

1

Approvals

General Safety (CSA, FM, CE, C-TICK)

A

Dust Ignition Proof With IS Probe

B

CE, C-TICK, ATEX II 1/2 D T100 °C

C

Flame Proof Enclosure With IS Probe

C

CE, C-TICK, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C

D

Dust Ignition Proof With IS Probe

D

CSA/FM Class II, Div. 1, Gr. E, F, G

CSA/FM Class III T4

E

Explosion Proof Enclosure With IS Probe

CSA/FM Class I, Div. 1, Gr. A, B, C, D

CSA/FM Class II, Div. 1, Gr. E, F, G

CSA/FM Class III T4

E

Selection and Ordering data

Order No.

SITRANS LC300, stilling well version

7 M L 5 6 7 1 -

An inverse frequency shift capacitance continuous level transmitter for liquid applications.

■ ■ ■ ■ ■ - ■ ■ ■ ■ 0

Enclosure

Aluminum epoxy coated 2 x 1½" 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 1½" 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 Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text

Y15

Acceptance test certificate: 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

Order No.

English

C)

7ML1998-5HE02

French

C)

7ML1998-5HE11

German

C)

7ML1998-5HE32

Spanish

C)

7ML1998-5HE21

Note: The Operating Instructions should be ordered as a separate line item on the order.

This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.

Accessories

Electronic transmitter kit (includes transmitter and driver)

C)

7ML1830-1KN

SITRANS RD100 Remote display - see Chapter 8

SITRANS RD200 Remote display - see Chapter 8

SITRANS RD500 Remote display - see Chapter 8

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC300

Selection and Ordering data		Order No.	Selection and Ordering data		Order No.
SITRANS LC300, cable version		C) 7 M L 5 6 7 2 -	SITRANS LC300, cable version		C) 7 M L 5 6 7 2 -
An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.			An inverse frequency shift capacitance continuous level transmitter for non-conductive liquids and solids applications.		
Process Connection			Approvals		
Threaded, 316L stainless steel			General Safety (CSA, FM, CE, C-TICK)		A
1½" NPT [(Taper), ANSI/ASME B1.20.1]		0 D	Dust Ignition Proof With IS Probe		B
R 1½" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203]		1 D	CE, C-TICK, ATEX II 1/2 D T100 °C		C
G 1½" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]		3 D	Flame Proof Enclosure With IS Probe		D
<u>Welded flange, 316L stainless steel, raised face¹⁾</u>			CE, C-TICK, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C		E
1½" ASME, 150 lb		5 D	Dust Ignition Proof With IS Probe		
1½" ASME, 300 lb		5 E	CSA/FM Class II, Div. 1, Gr. E, F, G		
1½" ASME, 600 lb		5 F	CSA/FM Class III T4		
2" ASME, 150 lb		5 G	Explosion Proof Enclosure With IS Probe		
2" ASME, 300 lb		5 H	CSA/FM Class I, Div. 1, Gr. A, B, C, D		
2" ASME, 600 lb		5 J	CSA/FM Class II, Div. 1, Gr. E, F, G		
3" ASME, 150 lb		5 K	CSA/FM Class III T4		
3" ASME, 300 lb		5 L	Enclosure		
3" ASME, 600 lb		5 M	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP65		A
4" ASME, 150 lb		5 N	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP65		B
4" ASME, 300 lb		5 P	Aluminum epoxy coated 2 x ½" NPT via adapter - cable inlet, IP68		C
4" ASME, 600 lb		5 Q	Aluminum epoxy coated 2 x M20 x 1.5 cable inlet, IP68		D
<u>Welded flange, 316L stainless steel, Type A flat faced¹⁾</u>			1) Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5 or EN 1092-1 standard.		
DN 40, PN 16		6 C	2) Cable lengths from 15000 (590.55") to 25000 mm (984.25") can be used in non-conductive media. Contact Factory for assistance.		
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)					
<u>Add order code Y01 and plain text:</u>					
"Insertion length ... mm"					
1000 ... 2000 mm (39.37 ... 78.74")		A			
2001 ... 4000 mm (78.78 ... 157.48")		B			
4001 ... 6000 mm (157.52 ... 236.22")		C			
6001 ... 8000 mm (236.26 ... 314.96")		D			
8001 ... 10000 mm (315.00 ... 393.70")		E			
10001 ... 12000 mm (393.74 ... 472.44")		F			
12001 ... 14000 mm (472.48 ... 551.18")		G			
14001 ... 16000 mm (551.22 ... 629.92") ²⁾		H			
16001 ... 18000 mm (629.96 ... 708.66") ²⁾		J			
18001 ... 20000 mm (708.70 ... 787.40") ²⁾		K			
20001 ... 22000 mm (787.44 ... 866.14") ²⁾		L			
22001 ... 24000 mm (866.18 ... 944.88") ²⁾		M			
24001 ... 25000 mm (944.92 ... 984.25") 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			

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC300

Selection and Ordering data	Order No.
SITRANS LC300, PFA coated cable version C)	7 M L 5 6 7 3 -
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	
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
<u>Welded flange, 316L stainless steel, raised face¹⁾</u>	
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
<u>Welded flange, 316L stainless steel, Type A flat faced¹⁾</u>	
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)	
<u>Add order code Y01 and plain text:</u>	
<u>"Insertion length ... mm"</u>	
1000 ... 2000 mm (39.37 ... 78.74")	A
2001 ... 4000 mm (78.78 ... 157.48")	B
4001 ... 6000 mm (157.52 ... 236.22")	C
6001 ... 8000 mm (236.26 ... 314.96")	D
8001 ... 10000 mm (315.00 ... 393.70")	E
10001 ... 12000 mm (393.74 ... 472.44")	F
12001 ... 14000 mm (472.48 ... 551.18")	G
14001 ... 16000 mm (551.22 ... 629.92") ²⁾	H
16001 ... 18000 mm (629.96 ... 708.66") ²⁾	J
18001 ... 20000 mm (708.70 ... 787.40") ²⁾	K
20001 ... 22000 mm (787.44 ... 866.14") ²⁾	L
22001 ... 24000 mm (866.18 ... 944.88") ²⁾	M
24001 ... 25000 mm (944.92 ... 984.25") 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	
PFA coated cable and 316L stainless steel cable weight, PEEK isolator and PFA lined active shield	1
Approvals	
General Safety (CSA, FM, CE, C-TICK)	A
Dust Ignition Proof With IS Probe	B
CE, C-TICK, ATEX II 1/2 D T100 °C	

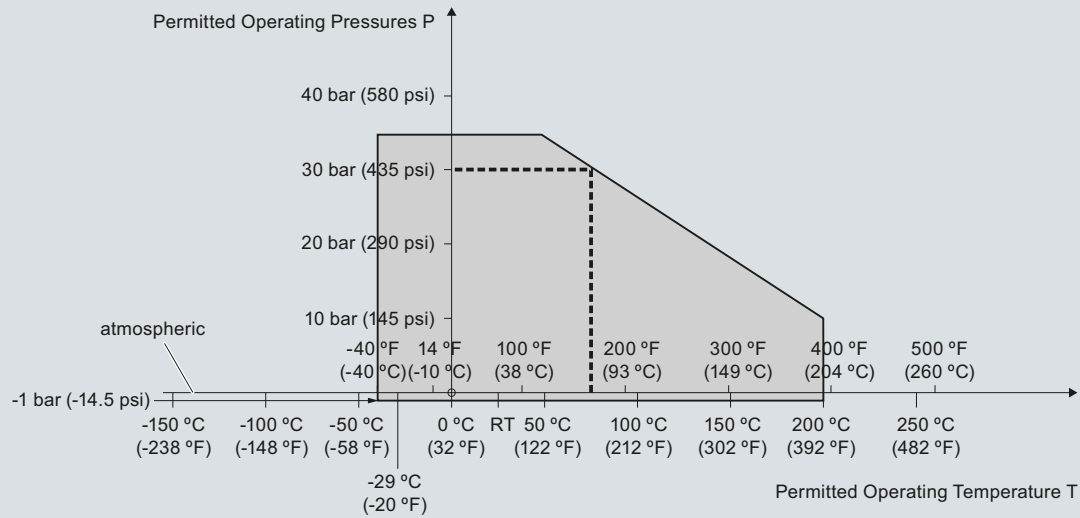
Selection and Ordering data	Order No.
SITRANS LC300, PFA coated cable version C)	7 M L 5 6 7 3 -
An inverse frequency shift capacitance continuous level transmitter for liquids and solids applications.	
Flame Proof Enclosure With IS Probe	C
CE, C-TICK, ATEX II 1/2 G EEx d [ia] IIC T6...T1, ATEX II 1/2 D T100 °C	
Dust Ignition Proof With IS Probe	D
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
Explosion Proof Enclosure With IS Probe	E
CSA/FM Class I, Div. 1, Gr. A, B, C, D	
CSA/FM Class II, Div. 1, Gr. E, F, G	
CSA/FM Class III T4	
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 15000 (590.55") to 25000 mm (984.25") can be used in non-conductive media. Contact Factory for assistance.

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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")]:	Y15
Measuring-point number/identification (max. 16 characters) specify in plain text	
Acceptance test certificate: 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	Order No.
English	C) 7ML1998-5HE02
French	7ML1998-5HE11
German	C) 7ML1998-5HE32
Spanish	7ML1998-5HE21
Note: The Operating Instructions should be ordered as a separate line item on the order.	
This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	
Accessories	
Electronic transmitter kit (includes transmitter and driver)	C) 7ML1830-1KN
SITRANS RD100 Remote display - see Chapter 8	
SITRANS RD200 Remote display - see Chapter 8	
SITRANS RD500 Remote display - see Chapter 8	
C) Subject to export regulations AL: N, ECCN: EAR99	

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

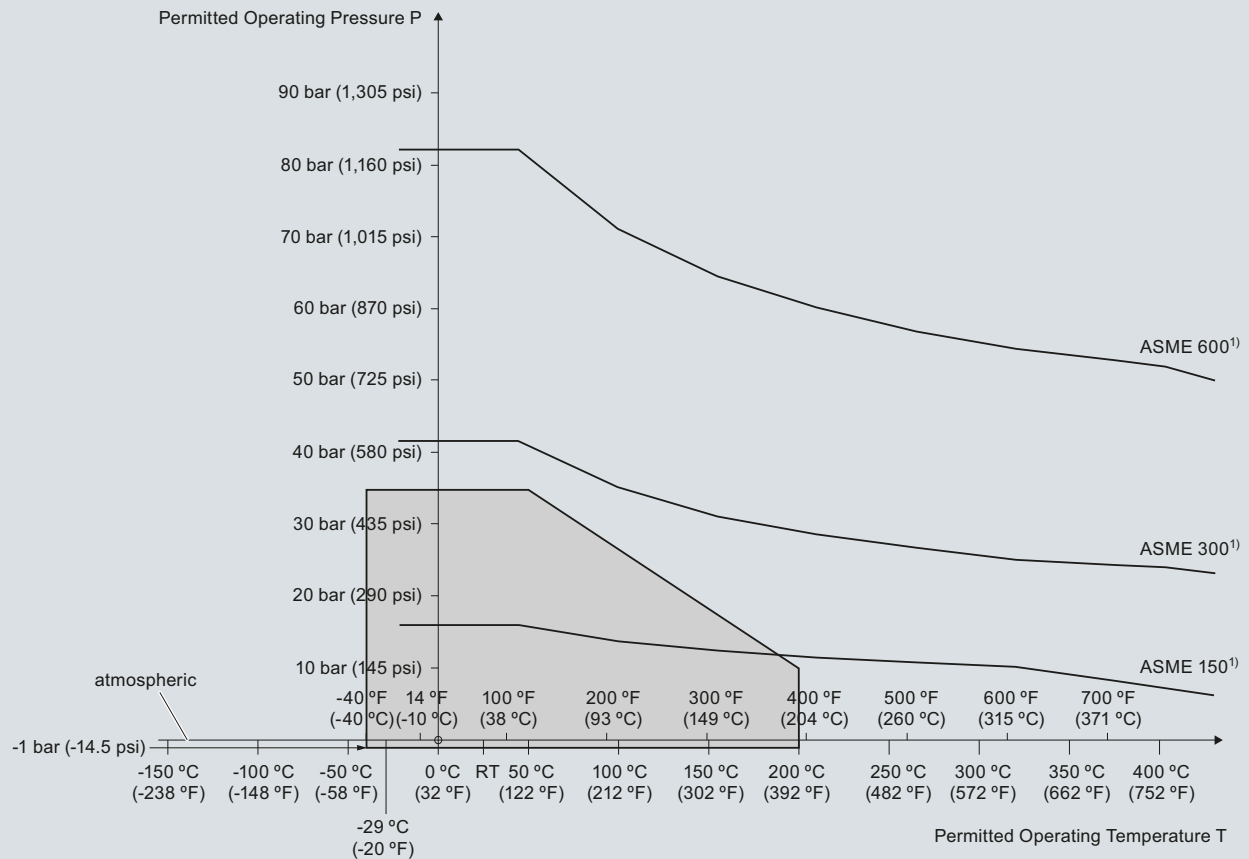
SITRANS LC300 Process Pressure/Temperature derating curves (7ML5670, 7ML5671, 7ML5672 and 7ML5673)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC300

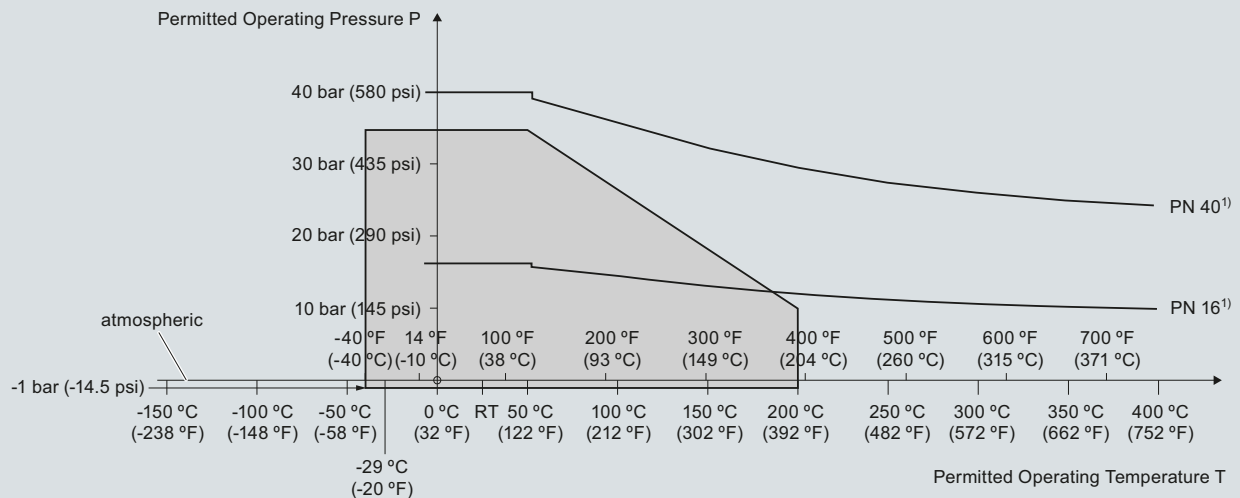
Pressure/Temperature Curve
LC300 Standard, Extended Rod and Cable Probes
ASME Flanged Process Connections
(7ML5670, 7ML5671, 7ML5620 and 7ML5673)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5670, 7ML5671, 7ML5672 and 7ML5673)

Pressure/Temperature Curve
LC300 Standard, Extended Rod and Cable Probes
EN Flanged Process Connections
(7ML5670, 7ML5610, 7ML5620 and 7ML5670)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

SITRANS LC300 Process Pressure/Temperature derating curves (7ML5670, 7ML5671, 7ML5672 and 7ML5673)

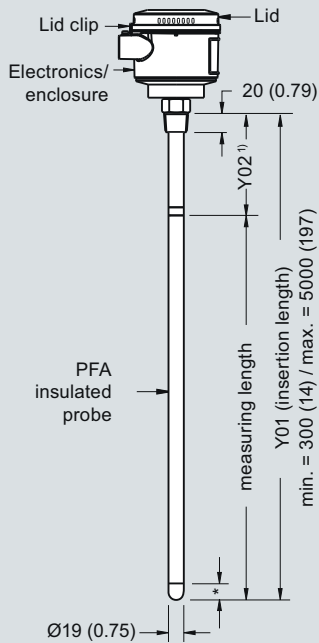
Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC300

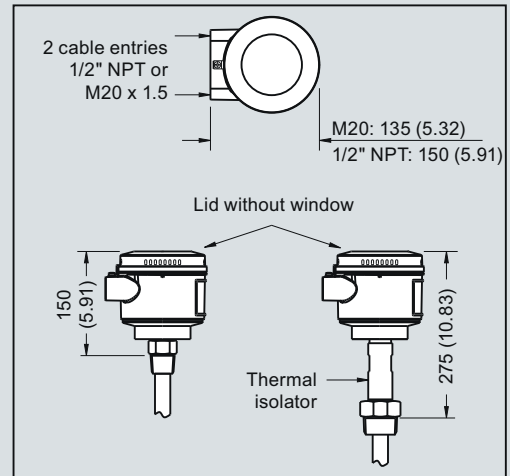
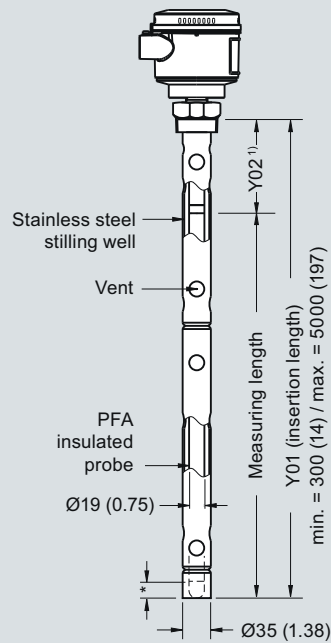
Dimensional drawings

Threaded (7ML5670)

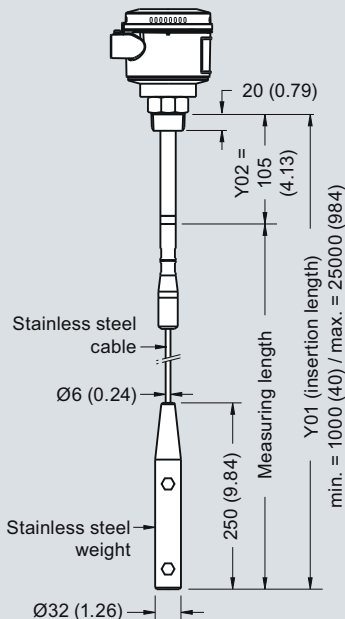
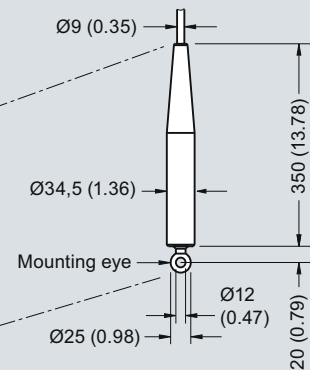
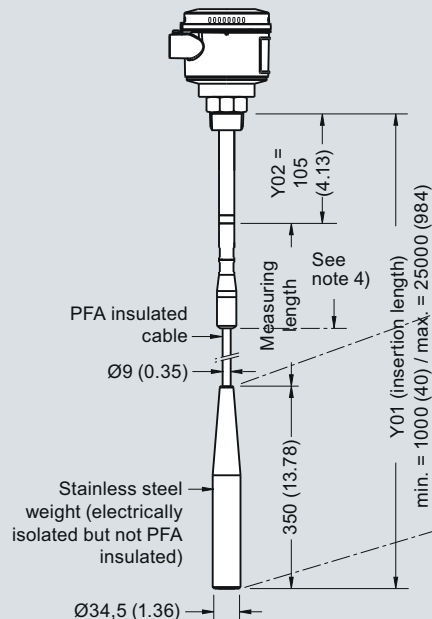


* = 30 (1.18) Inactive tip

Threaded (7ML5671)


Note:

- 1) Rod version Y02: Shield length = 100 mm (3.9") for threaded including process connection thread length, 100 mm (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)

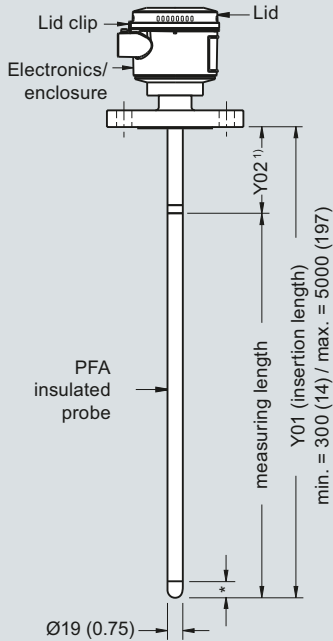
SITRANS LC300 - Threaded Process Connections, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Capacitance transmitters

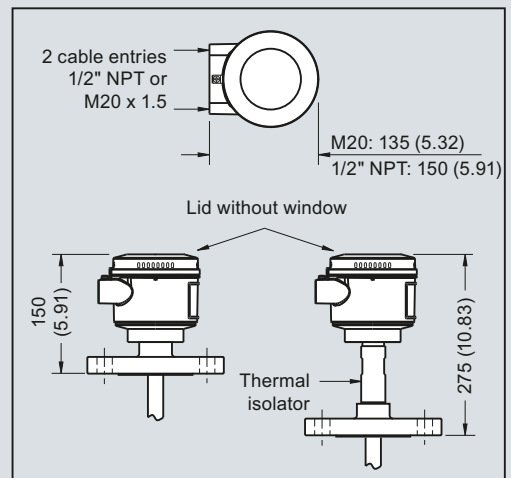
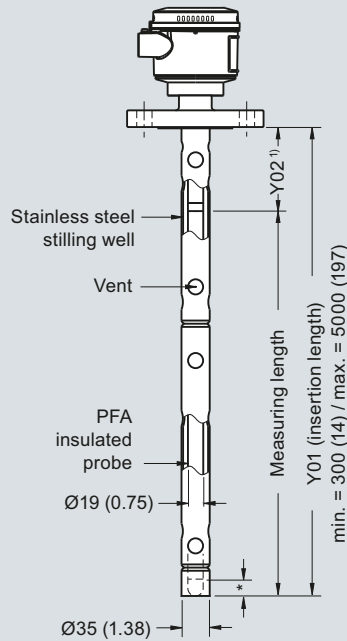
SITRANS LC300

Welded Flange (7ML5670)



* = 30 (1.18) inactive tip

Welded Flange (7ML5671)

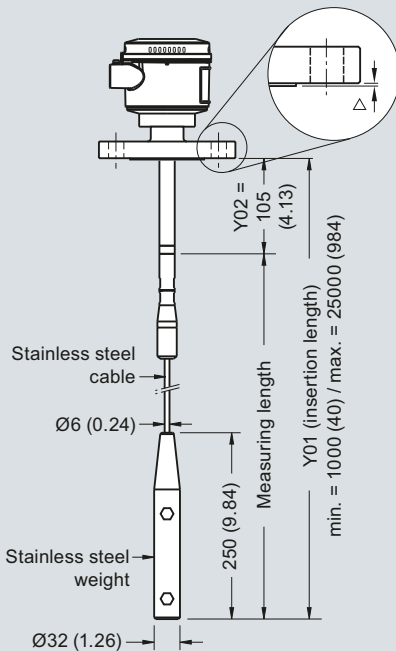


Flange Facing (raised face)	
Flange Class	Facing thickness
△ ASME 150/300	2 (0.08)
△ ASME 600/900	7 (0.28)
△ PN16/40	2 (0.08)

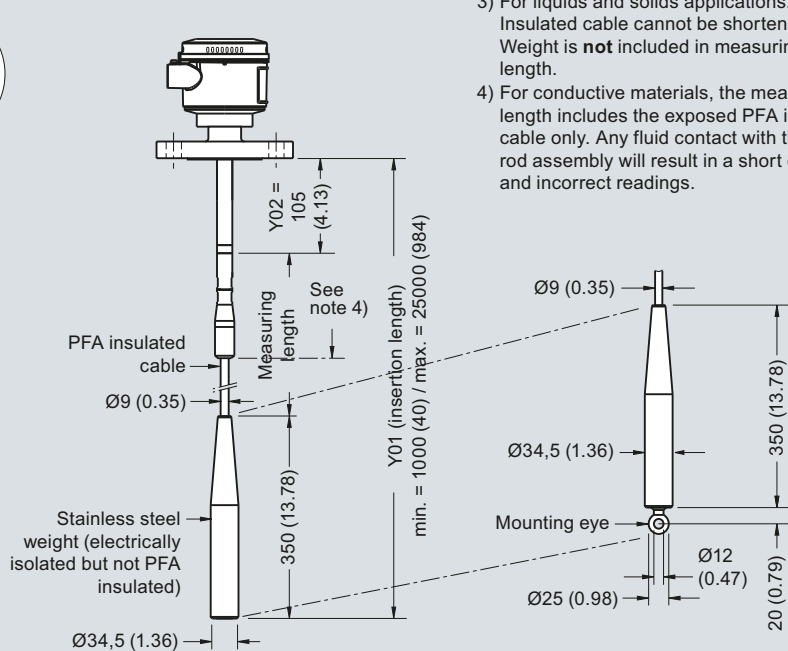
Note:

- 1) Rod version Y02: Shield length = 100 mm (3.9") for threaded including process connection thread length, 100 mm (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-insulated²⁾ Welded Flange (7ML5672)



Cable version, insulated³⁾ Welded Flange (7ML5673)



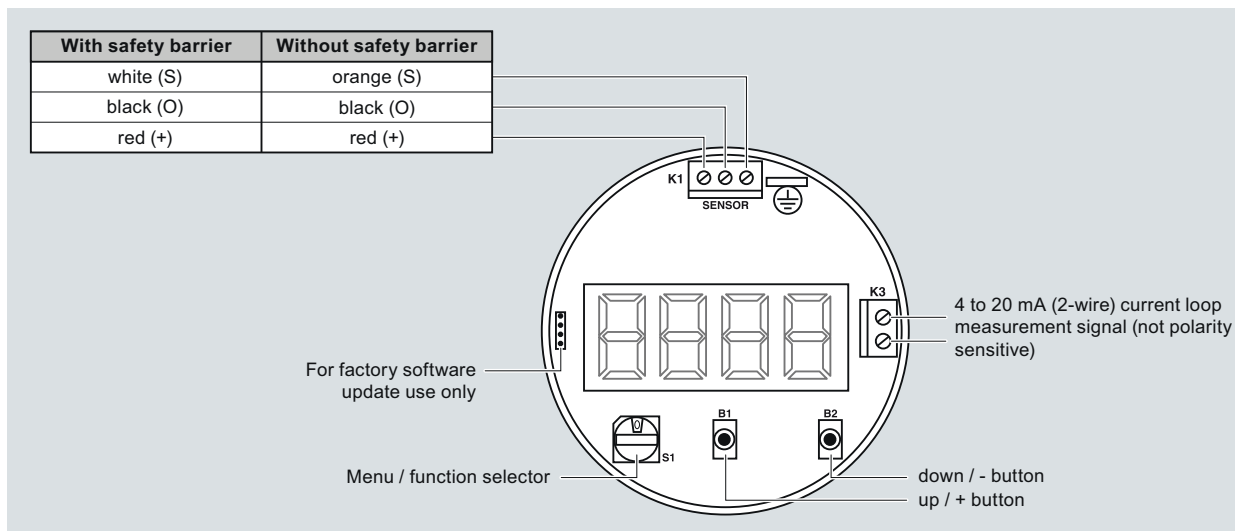
SITRANS LC300 - Flanged Process Connections, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC300

Schematics



SITRANS LC300 connections

Level Measurement

Continuous level measurement - Capacitance transmitters

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 vapours.

Benefits

- Patented 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.

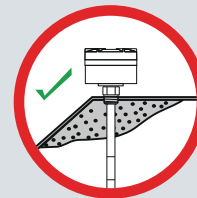
The unique mechanical probe design coupled with a high performance transmitter gives superior performance in toxic and aggressive chemicals, acids, caustics, adhesives and in viscous conductive and non-conductive materials.

The SMART 2-wire transmitter has HART® communications for remote commissioning and inspection.

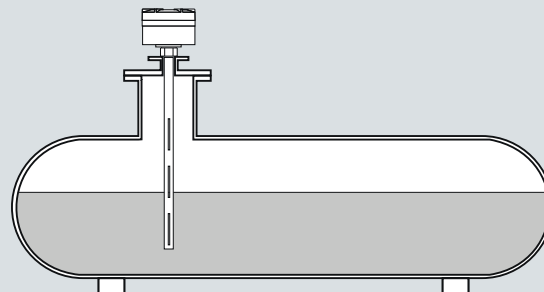
- Key Applications: Oil/water or foam/liquid interface measurement in separators or coalescers, cryogenic applications including CO₂ and liquified natural gas (LNG), distillation/regeneration tanks with high temperatures

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

Technical specifications

Input	
Measuring range	1 ... 3300 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

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Rated operating conditions¹⁾

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 on page 5/291.
- Standard (PFA) ³⁾	-50 ... +200 °C (-58 ... +392 °F)
- High temperature version with thermal isolator and enamel insulation	-60 ... +400 °C (-76 ... +752 °F)
- Cryogenic version	-200 ... +200 °C (-328 ... +392 °F)
• Process pressure	Contact nacc.smpi@siemens.com for details.
	Pressure rating of process seal is temperature dependent. See Pressure/Temperature curves on page 5/291.
• Standard (PFA)	-1 ... 150 bar g (2175 psi g)
• High temperature version (Enamel) ⁴⁾	Contact nacc.smpi@siemens.com for details.

Design

Material	
• Wetted parts material	
- Standard rod	316L stainless steel
• Probe insulation (rod)	PFA, enamel, contact nacc.smpi@siemens.com for details.
• Cable	316 stainless steel/ 316 stainless steel PFA
Probe diameter	
• Rod version	16 mm (0.63") or 24 mm (0.95")
• Cable version	9 mm (0.35") with PFA jacket, 6 mm (0.24") without PFA jacket
Active shield length	
• Minimum (rod version)	50 mm (1.97"), customer selectable (order number Y02)
Probe length	
• Rod version	Max. 3.5 m (138") with 16 mm rod, PFA Max. 1.5 m (59") with 16 mm rod, enamel Max. 5.5 m (216") with 24 mm rod, PFA
• Cable version	Max. 35 m (1378")
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/PP (JIS-P), JIS B 0202]
• Flange mounting	ASME, EN 1092-1
Enclosure	
• Material	Aluminium, epoxy-coated
• Cable inlet	2 x ½" 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 signalling	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, C-TICK
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 to 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 5/291.

²⁾ Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

³⁾ Not recommended for steam environments

⁴⁾ Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact nacc.smpi@siemens.com

Level Measurement

Continuous level measurement - Capacitance transmitters

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
Enamel ¹⁾	contact nacc.smpi@siemens.com for details.	contact nacc.smpi@siemens.com for details.	–
Length and Process parameters²⁾			
Rod length for PFA 16 mm version	Min. 200 mm (7.87") Max. 3500 mm (137.80")	Min. 200 mm (7.87") Max. 3500 mm (137.80")	Min. 200 mm (7.87") Max. 3500 mm (137.80")
Rod length for PFA 24 mm version	Min. 200 mm (7.87") Max. 5500 mm (216.54")	Min. 200 mm (7.87") Max. 5500 mm (216.54")	Min. 200 mm (7.87") Max. 5500 mm (216.54")
Rod length for enamel 16 mm version ³⁾	contact nacc.smpi@siemens.com for details.	contact nacc.smpi@siemens.com for details.	–
Cable length	Min. 1000 mm (39.37") Max. 35000 mm (1377.95")	Min. 1000 mm (39.37") Max. 35000 mm (1377.95")	Min. 5000 mm (196.85") ³⁾ Max. 35000 mm (1377.95") ³⁾
Maximum process pressure	See Pressure/Temperature curves for specific probe type		5 bar g (73 psi g)
Maximum process temperature	See Pressure/Temperature curves for specific probe type		+100 °C (+212 °F)

¹⁾ Thermal isolator is used if process connection temperature exceeds +85 °C (+185 °F).

²⁾ See Pressure/Temperature curves for specific probe type

³⁾ Refers to total insertion length. See dimensional drawing on page 5/301 for further explanation

- Not available as standard

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order No.
SITRANS LC500, Threaded or Welded Flange with Cable Sensor	C) 7 ML 5 5 1 3 -
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.	
Version¹⁾	
Cable, 9 mm (0.35") diameter, 316 stainless steel with PFA insulation, weighted	
<u>Add order code Y01 and plain text:</u>	
<u>"Insertion length ... mm"</u>	
1000 ... 2000 mm (39.37 ... 78.74")	0 E
2001 ... 4000 mm (78.78 ... 157.48")	1 E
4001 ... 6000 mm (157.52 ... 236.22")	2 E
6001 ... 8000 mm (236.26 ... 314.96")	3 E
8001 ... 10000 mm (315 ... 393.70")	4 E
Longer lengths possible to a max. of 35000 mm (114.83 ft). Contact nacc.smpi@siemens.com for details.	
Cable, 6 mm (0.24") diameter, 316L stainless steel, non-insulated, weighted (non-conductive media only)	
<u>Add order code Y01 and plain text:</u>	
<u>"Insertion length ... mm"</u>	
1000 ... 2000 mm (39.37 ... 78.74") ²⁾	0 F
2001 ... 4000 mm (78.78 ... 157.48") ^{2) 3)}	1 F
4001 ... 6000 mm (157.52 ... 236.22") ^{2) 3)}	2 F
6001 ... 8000 mm (236.26 ... 314.96") ^{2) 3)}	3 F
8001 ... 10000 mm (315 ... 393.70") ^{2) 3)}	4 F
Cable lengths up to 25000 mm (984.25") are possible for non-conductive media. Cable lengths up to 15000 mm (590.55") are possible for conductive media. Contact nacc.smpi@siemens.com for details.	
Process connection (316L Stainless steel)	
<u>Threaded connection</u>	
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
<u>Welded flange, raised face</u>	
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
<u>Welded flange, Type A flat faced</u>	
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	Order No.
SITRANS LC500, Threaded or Welded Flange with Cable Sensor	C) 7 ML 5 5 1 3 -
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, C-TICK	1
CSA/FM Class 1, Div. 2, Groups A, B, C, D T4;	2
ATEX II 3G 2D EExn A [ib] IIC T6 to T4 T100 °C;	
CSA/FM Class II and III, Div. 1, Groups E, F, G	4
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1	6
FM Class I, Div.1, Groups A, B, C, D, T4	
Enclosure/Cable inlet	
<u>Aluminum epoxy coated</u>	
2 x ½" NPT, IP68	1
2 x M20x1.5 (IP68, adapter)	2
Options	
No additional options	
With mounting eye ⁴⁾	A
Thermal isolator	
Without thermal isolator	
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)	A
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	
C) Subject to export regulations AL: N, ECCN: EAR99	

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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	See page 5/290
Accessories	See page 5/290

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Selection and Ordering data

Order No.

SITRANS LC500, Threaded or Welded Flange, with Rod Sensor

C) 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.

Version

NOTE:

Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact nacc.smpi@siemens.com

Rod, 16 mm (0.63"), PFA insulated

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

200 ... 1000 mm (7.87 ... 39.37")¹⁾

0 A

1001 ... 2000 mm (39.41 ... 78.74")

1 A

2001 ... 3000 mm (78.78 ... 118.11")²⁾

2 A

3001 ... 3500 mm (118.15 ... 137.80")²⁾

3 A

Rod, 16 mm (0.63"), PFA insulated with 35 mm

(1.38") stilling well in 316L stainless steel

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

200 ... 1000 mm (7.87 ... 39.37")^{1) 3)}

0 B

1001 ... 2000 mm (39.41 ... 78.74")³⁾

1 B

2001 ... 3000 mm (78.78 ... 118.11")^{2) 3)}

2 B

3001 ... 3500 mm (118.15 ... 137.80")^{2) 3)}

3 B

Rod, 24 mm (0.94"), PFA insulated

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

200 ... 1000 mm (7.87 ... 39.37")⁴⁾

0 C

1001 ... 2000 mm (39.41 ... 78.74")⁴⁾

1 C

2001 ... 3000 mm (78.78 ... 118.11")^{2) 4)}

2 C

3001 ... 4000 mm (118.15 ... 157.48")^{2) 4)}

3 C

4001 ... 5000 mm (173.26 ... 196.88")^{2) 4)}

4 C

5001 ... 5500 mm (196.89 ... 216.54")^{2) 4)}

5 C

Rod, 24 mm (0.94"), PFA insulated with 48 mm

(1.89") stilling well in 316L stainless steel

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

200 ... 1000 mm (7.87 ... 39.37")⁵⁾

0 D

1001 ... 2000 mm (39.41 ... 78.74")⁵⁾

1 D

2001 ... 3000 mm (78.78 ... 118.11")^{2) 5)}

2 D

3001 ... 4000 mm (118.15 ... 157.48")^{2) 5)}

3 D

4001 ... 5000 mm (173.26 ... 196.88")^{2) 5)}

4 D

5001 ... 5500 mm (196.89 ... 216.54")^{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),

S 0

JIS B 0202]

G 2" [(BSPP), EN ISO 228-1/PF (JIS-P), JIS B 0202]

T 0

Selection and Ordering data

Order No.

SITRANS LC500, Threaded or Welded Flange, with Rod Sensor

C) 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 lb²⁾

D 1

3", ASME, 300 lb²⁾

D 2

3", ASME, 600 lb²⁾

D 3

4", ASME, 150 lb²⁾

E 1

4", ASME, 300 lb²⁾

E 2

4", ASME, 600 lb²⁾

E 3

6", ASME, 150 lb²⁾

F 1

6", ASME, 300 lb²⁾

F 2

6", ASME, 600 lb²⁾

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 40²⁾

M 5

DN 100, PN 16²⁾

N 4

DN 100, PN 40²⁾

N 5

DN 125, PN 16²⁾

P 4

DN 125, PN 40²⁾

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, C-TICK
CSA/FM Class 1, Div. 2, Groups A, B, C, D T4;
ATEX II 3G 2D EExn A [ib] IIC T6 to T4 T100 °C;
CSA/FM Class II and III, Div. 1, Groups E, F, G
ATEX II 1/2 GD EEx d [ia] IIC T6 to T1
FM Class I, Div.1, Groups A, B, C, D, T4

1

2

4

6

Enclosure/Cable inlet

Aluminum epoxy coated

2 x ½" NPT, IP68

1

2 x M20x1.5 (IP68, adapter)

2

Options

No additional options

Slotted holes instead of standard vent holes in stilling well (refer to Operating Instructions for dimensions.)⁶⁾

A

B

Thermal isolator/remote version

Without thermal isolator or remote electronics

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)

A

B

Remote electronics with mounting bracket and cable⁷⁾

• Length: 2 m (79")

C

• Length: 3 m (118")

D

• Length: 4 m (158")

E

• Length: 5 m (197")

F

Electronic output

2-wire loop current 4 ... 20 mA

1

(transmitter MSP 2002-2 _3300 pF)

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 version 0B to 3B, 0D to 5D and 0F only

⁷⁾ Available with approval option 1 only

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order code
Further designs	
Please add "-Z" to Order 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")]: Y02: ... mm	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000	C11
Inspection Certificate Type 3.1 per EN 10204	C12
Manufacturing Test Report (Electrode Test)	C18
Operating Instructions	See page 5/290
Accessories	See page 5/290

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Selection and Ordering data

Order No.

SITRANS LC500, Single Piece Flanged with Rod C)

7 M L 5 5 1 7 -

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.

Version

NOTE:

Enamel insulation is available as a special order item, subject to application review. Please complete the Application Questionnaire on page 5/9 and contact nacc.smpi@siemens.com

Rod, 16 mm (0.63"), PFA insulated

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

250 ... 1000 mm (9.84 ... 39.37")¹⁾

0 A

1001 ... 2000 mm (39.41 ... 78.74")

1 A

2001 ... 3000 mm (78.78 ... 118.11")²⁾

2 A

3001 ... 3500 mm (118.15 ... 137.80")²⁾

3 A

Rod, 16 mm (0.63"), PFA insulated with 35 mm

(1.34") stilling well in 316L stainless steel

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

250 ... 1000 mm (9.84 ... 39.37")

0 B

1001 ... 2000 mm (39.41 ... 78.74")

1 B

2001 ... 3000 mm (78.78 ... 118.11")²⁾

2 B

3001 ... 3500 mm (118.15 ... 137.80")²⁾

3 B

Rod, 24 mm (0.94"), PFA insulated

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

250 ... 1000 mm (9.84 ... 39.37")

0 C

1001 ... 2000 mm (39.41 ... 78.74")

1 C

2001 ... 3000 mm (78.78 ... 118.11")²⁾

2 C

3001 ... 4000 mm (118.15 ... 157.48")²⁾

3 C

4001 ... 5000 mm (173.26 ... 196.88")²⁾

4 C

5001 ... 5500 mm (196.89 ... 216.54")²⁾

5 C

Rod, 24 mm (0.94"), PFA insulated with 48 mm

(1.89") stilling well in 316L stainless steel

Add order code Y01 and Y02 and plain text:

"Insertion length ... mm and active shield length ... mm"

250 ... 1000 mm (9.84 ... 39.37")

0 D

1001 ... 2000 mm (39.41 ... 78.74")^{2) 3)}

1 D

2001 ... 3000 mm (78.78 ... 118.11")^{2) 3)}

2 D

3001 ... 4000 mm (118.15 ... 157.48")^{2) 3)}

3 D

4001 ... 5000 mm (173.26 ... 196.88")^{2) 3)}

4 D

5001 ... 5500 mm (196.89 ... 216.54")^{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 lb²⁾

D 1

3", ASME, 300 lb²⁾

D 2

3", ASME, 600 lb²⁾

D 3

4", ASME, 150 lb²⁾

E 1

4", ASME, 300 lb²⁾

E 2

4", ASME, 600 lb²⁾

E 3

6", ASME, 150 lb²⁾

F 1

6", ASME, 300 lb²⁾

F 2

6", ASME, 600 lb²⁾

F 3

Selection and Ordering data

Order No.

SITRANS LC500, Single Piece Flanged with Rod C)

7 M L 5 5 1 7 -

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.

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 40²⁾

M 5

DN 100, PN 16²⁾

N 4

DN 100, PN 40²⁾

N 5

DN 125, PN 16²⁾

P 4

DN 125, PN 40²⁾

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 lb²⁾

D 4

3", ASME, 300 lb²⁾

D 5

3", ASME, 600 lb²⁾

D 6

4", ASME, 150 lb²⁾

E 4

4", ASME, 300 lb²⁾

E 5

4", ASME, 600 lb²⁾

E 6

6", ASME, 150 lb²⁾

F 4

6", ASME, 300 lb²⁾

F 5

6", ASME, 600 lb²⁾

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 40²⁾

M 7

DN 100, PN 16²⁾

N 6

DN 100, PN 40²⁾

N 7

DN 125, PN 16²⁾

P 6

DN 125, PN 40²⁾

P 7

(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, C-TICK

1

CSA/FM Class 1, Div. 2, Groups A, B, C, D T4;

2

ATEX II 3G 2D EExn A [ib] IIC T6 to T4 T100 °C;

CSA/FM Class II and III, Div. 1, Groups E, F, G

4

ATEX II 1/2 GD EEx d [ia] IIC T6 to T1

6

FM Class I, Div.1, Groups A, B, C, D, T4

Enclosure/Cable inlet

Aluminum epoxy coated

2 x ½" NPT, IP68

1

2 x M20x1.5 (IP68, adapter)

2

Options

None

Slotted holes instead of standard vent holes in stilling well (Refer to manual for dimensions)⁵⁾

A

B

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Selection and Ordering data	Order No.
SITRANS LC500, Single Piece Flanged with Rod C) 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.	7 ML 5 5 1 7 -
Thermal isolator/remote version Without thermal isolator 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) Remote electronics with mounting bracket and cable ⁶⁾	A B
• Length: 2 m (79") • Length: 3 m (118") • Length: 4 m (158") • Length: 5 m (197")	C D E 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 to F3, L4 to P5

4) Not available with versions 0E and 0F

5) Available with version 0B to 3B, 0D to 5D and 0F only

6) Available with approval option 1 only

C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s). Insertion length, specify in plain text: Y01: ... mm Active shield length, specify in plain text [min. length is 50 mm (2")]: Y02: ... mm Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text Acceptance test certificate: Manufacturer's test certificate M to DIN 55350, Part 18 and ISO 9000 Inspection Certificate Type 3.1 per EN 10204 Manufacturing Test Report (Electrode Test)	Y01 Y02 Y15 C11 C12 C18
Operating Instructions	See page 5/290
Accessories	See page 5/290

SITRANS LC500

Selection and Ordering data	Order No.
SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange¹⁾ Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.	7 M L 5 5 2 3 -
Version²⁾ Rod, 16 mm (0.63"), PFA insulated and 316L stainless steel flexible extension tube Total insertion length: <u>Add order code Y01 and plain text: "Total insertion length ... mm and Y02 and plain text: Active shield length ... mm"^{3) 4)}</u>	
• 5000 ... 10000 mm (196.85 ... 393.70") ¹⁾	0 A
• 10001 ... 15000 mm (393.74 ... 590.55") ¹⁾	1 A
• 15001 ... 20000 mm (590.59 ... 787.40") ¹⁾	2 A
• 20001 ... 25000 mm (787.44 ... 984.25") ¹⁾	3 A
• 25001 ... 30000 mm (984.29 ... 1181.10") ¹⁾	4 A
• 30001 ... 35000 mm (1181.14 ... 1377.95") ¹⁾	5 A
Rod, 24 mm (0.94"), PFA insulated and 316L stainless steel flexible extension tube Total insertion length: <u>Add order code Y01 and plain text: "Total insertion length ... mm and Y02 and plain text: Active shield length ... mm"^{3) 4)}</u>	
• 5000 ... 10000 mm (196.85 ... 393.70") ¹⁾	0 B
• 10001 ... 15000 mm (393.74 ... 590.55") ¹⁾	1 B
• 15001 ... 20000 mm (590.59 ... 787.40") ¹⁾	2 B
• 20001 ... 25000 mm (787.44 ... 984.25") ¹⁾	3 B
• 25001 ... 30000 mm (984.29 ... 1181.10") ¹⁾	4 B
• 30001 ... 35000 mm (1181.14 ... 1377.95") ¹⁾	5 B
Process connection (316L stainless steel) Threaded connection 2" NPT [(Taper), ANSI/ASME B1.20.1] R 2" [(BSPT), EN 10226/PT (JIS-T), JIS B 0203] G 2" [(BSPP), EN ISO 228-1/PF (JIS-P) JIS B 0202]	A 0 B 0 D 0
Welded flange, raised face 2", ASME, 150 lb 2", ASME, 300 lb 3", ASME, 150 lb ¹⁾ 3", ASME, 300 lb ¹⁾ 4", ASME, 150 lb ¹⁾ 4", ASME, 300 lb ¹⁾ 6", ASME, 150 lb ¹⁾ 6", ASME, 300 lb ¹⁾	C 1 C 2 D 1 D 2 E 1 E 2 F 1 F 2
Welded flange, Type A flat faced DN 50, PN 16 DN 50, PN 40 DN 80, PN 16 DN 80, PN 40 ¹⁾ DN 100, PN 16 ¹⁾ DN 100, PN 40 ¹⁾ DN 125, PN 16 ¹⁾ DN 125, PN 40 ¹⁾ (Note: Flange bolting patterns and facings dimensionally correspond to the applicable ASME B16.5, or EN 1092-1 standard.)	L 4 L 5 M 4 M 5 N 4 N 5 P 4 P 5
Approvals General Purpose: CE, CSA, FM, C-TICK CSA/FM Class 1, Div. 2, Groups A, B, C, D T4; ATEX II 3G 2D EExn A [ib] IIC T6 to T4 T100 °C; CSA/FM Class II and III, Div. 1, Groups E, F, G ATEX II 1/2 GD EEx d [ia] IIC T6 to T1 FM Class I, Div.1, Groups A, B, C, D, T4	1 2 4 6
Enclosure/Cable inlet Aluminum epoxy coated 2 x 1/2" NPT, IP68 2 x M20x1.5 (IP68, adapter)	1 2
Options No additional options With mounting eye	A B

Selection and Ordering data	Order No.
SITRANS LC500, Extended Cable version with Rod Sensor, threaded connection or welded flange¹⁾ Inverse frequency shift capacitance level and interface transmitter for short range continuous measurement in large storage vessels.	7 M L 5 5 2 3 -
Thermal isolator Without thermal isolator 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)	A 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 5/301 for further explanation of Y01. 4) Inactive length is equal to the flexible extension plus transition. See dimension drawings on page 5/301 for further explanation of Y02.	
Selection and Ordering data	Order code
Further designs Please add "-Z" to Order No. and specify Order code(s).	
Insertion length, specify in plain text: Y01: to mm	Y01
Active shield length, specify in plain text [min. length is 50 mm (2")]: Y02: to mm	Y02
Stainless steel tag [69 x 50 mm (2.71 x 1.97")]: Measuring-point number/identification (max. 16 characters) specify in plain text	Y15
Acceptance test certificate: 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 English French Spanish German Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	Order No. C) 7ML1998-5GE01 7ML1998-5GE12 7ML1998-5GE21 7ML1998-5GE31
Accessories Transmitter, MSP 2002-1, 330 PF ¹⁾ Transmitter, MSP 2002-2, 3300 PF ¹⁾ Transmitter, MSP 2002-3, 6600 PF (used with conductive fluids and probe lengths >10000 mm) ¹⁾ SITRANS RD100 Remote display - see Chapter 8 SITRANS RD200 Remote display - see Chapter 8 SITRANS RD500 Remote display - see Chapter 8	C) 7ML1830-1JP C) 7ML1830-1JQ D) 7ML1830-1JR
1) Transmitters not suitable for Intrinsically Safe application (ATEX II 1G EEx ia IIC T4 or CSA/FM Class 1 Div 1 Grp A,B,C and D) C) Subject to export regulations AL: N, ECCN: EAR99 D) Subject to export regulations AL: N, ECCN: EAR99H Please contact nacc.smpi@siemens.com for special requests.	

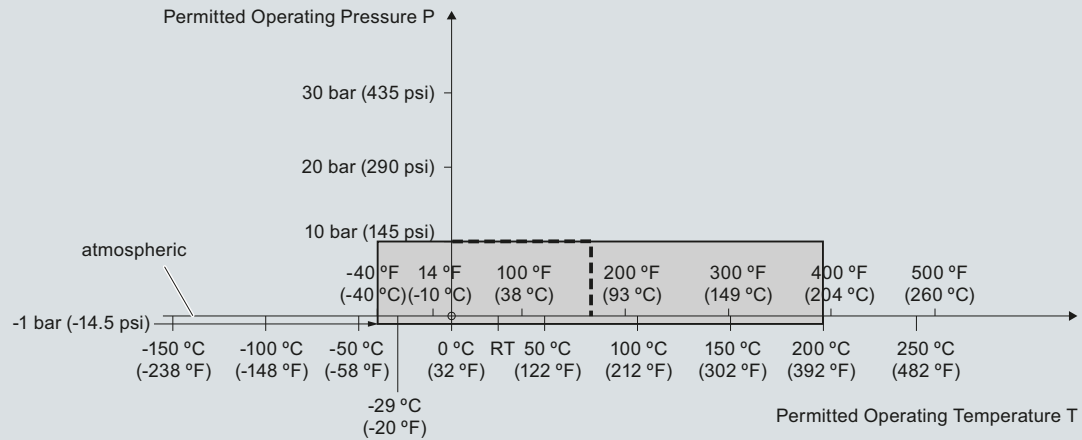
Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Characteristic curves

Pressure/Temperature Curve
LC500 Cable Probes
Threaded Process Connections
(7ML5513)



---- Example:
Permitted operating pressure = 10 bar (145 psi) at 75 °C

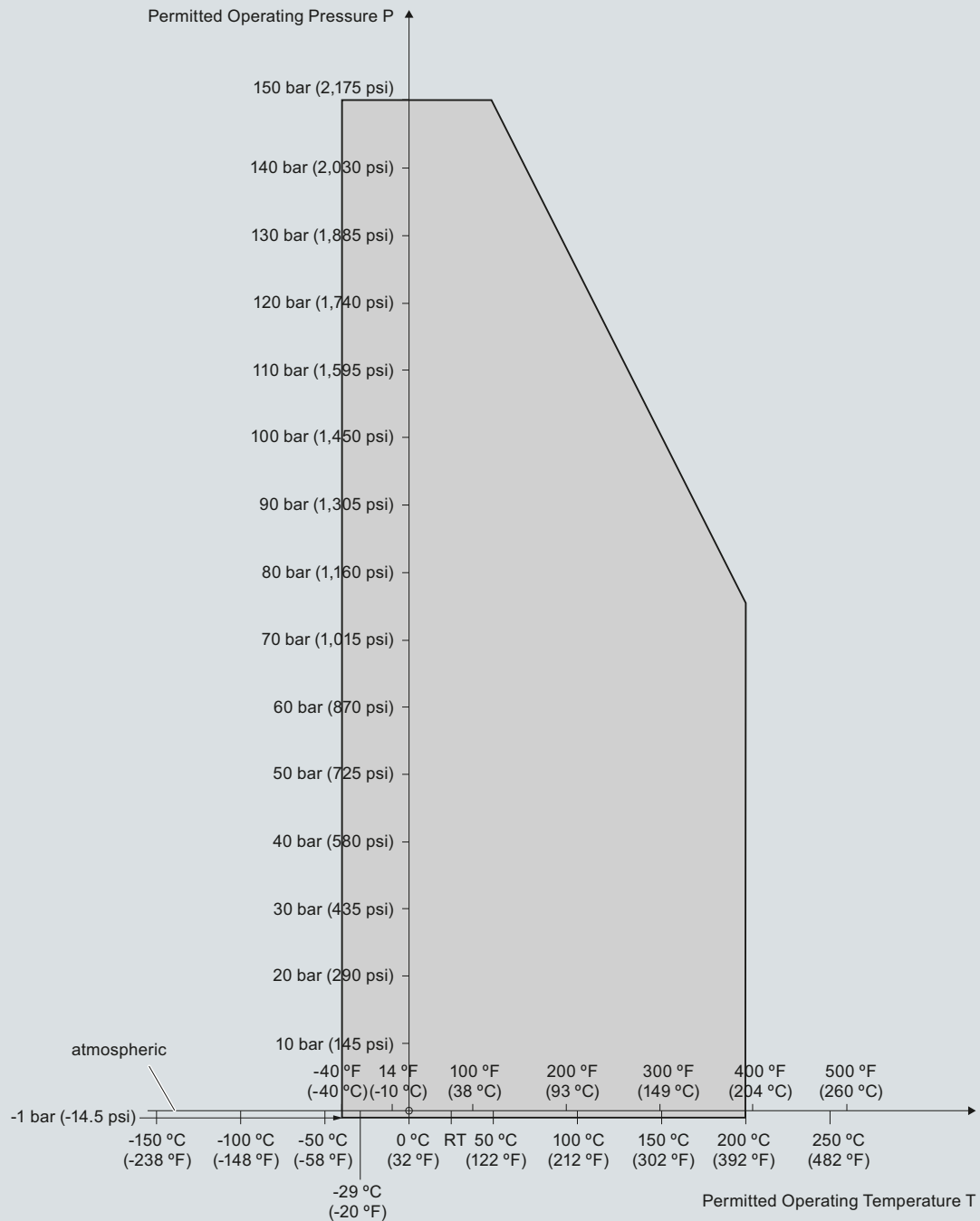
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Pressure/Temperature Curve
LC500 PFA Rod Probes
Threaded Process Connections
(7ML5515)

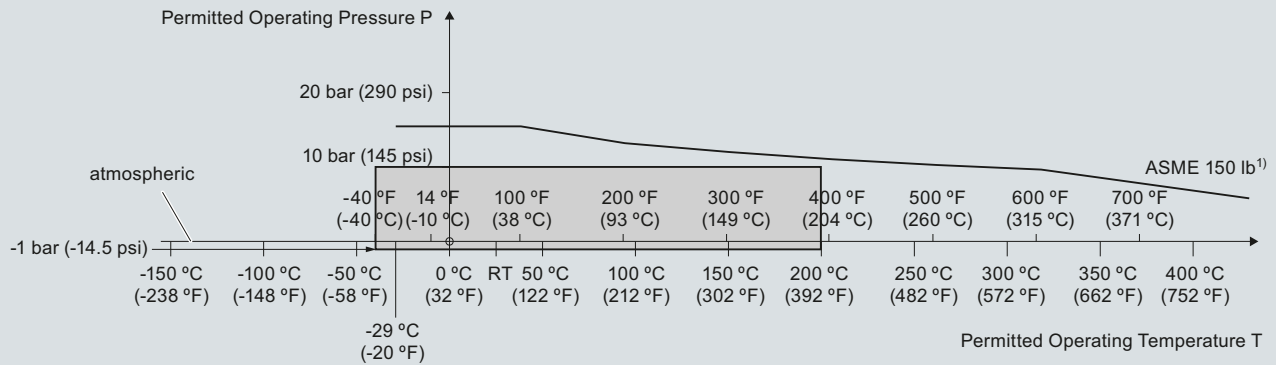


SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515)

Continuous level measurement - Capacitance transmitters

SITRANS LC500

**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.

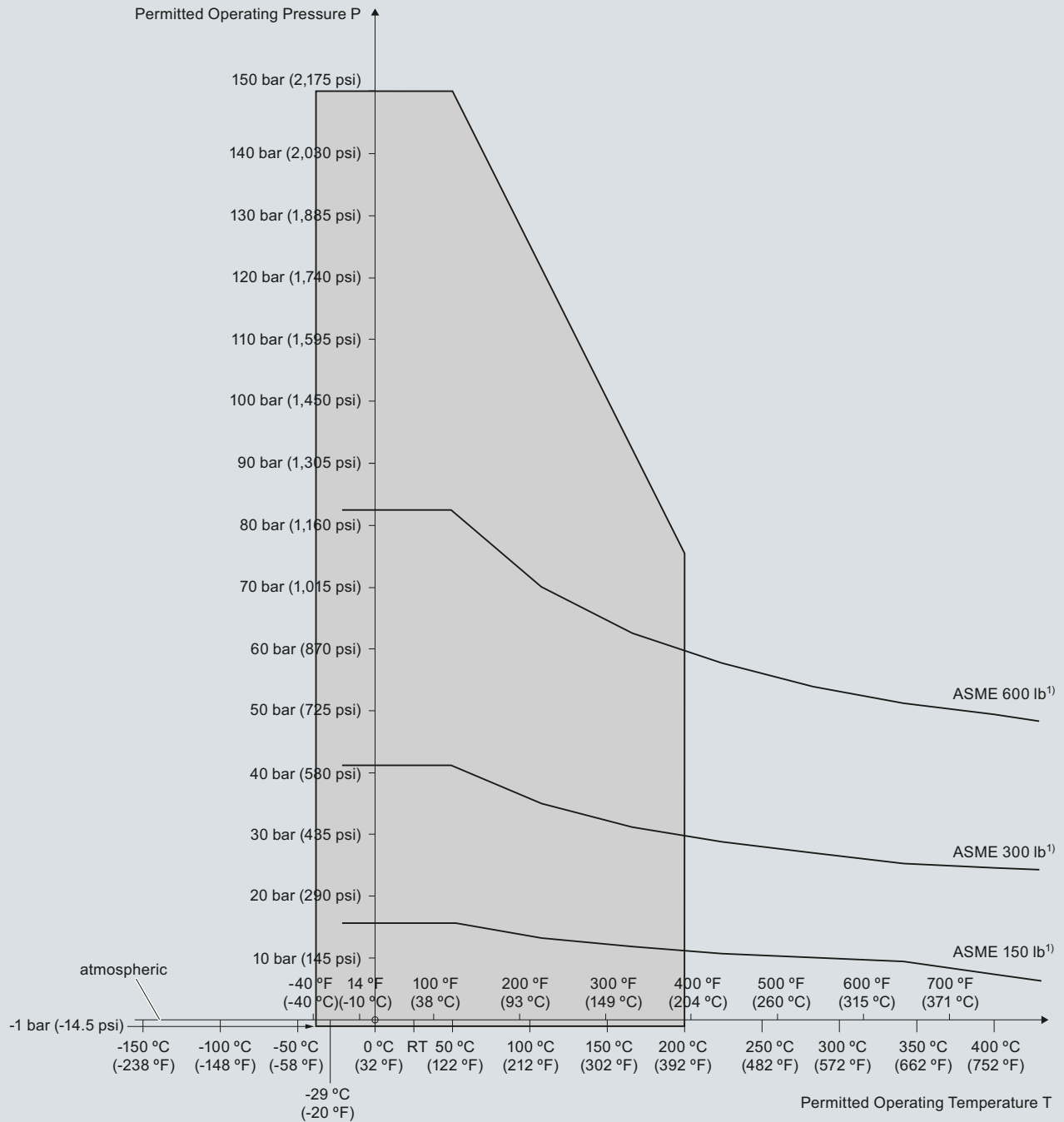
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

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.

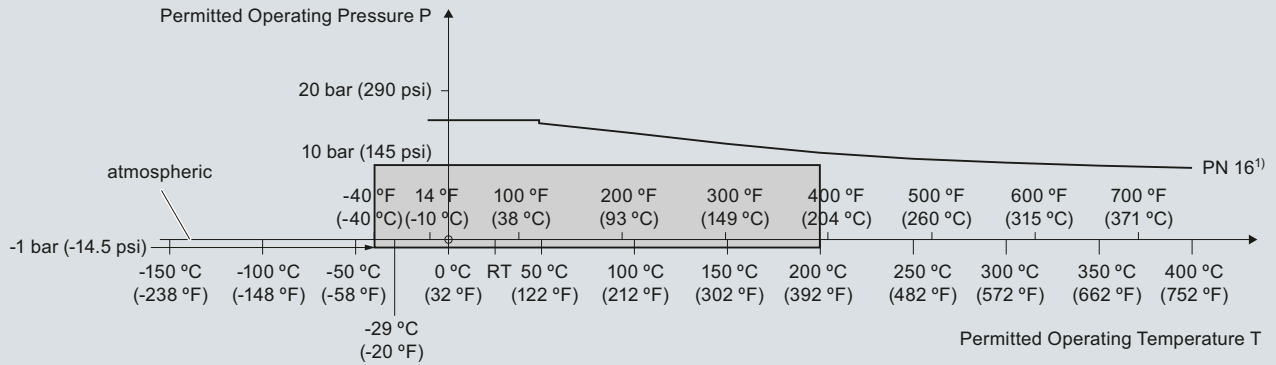
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

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.

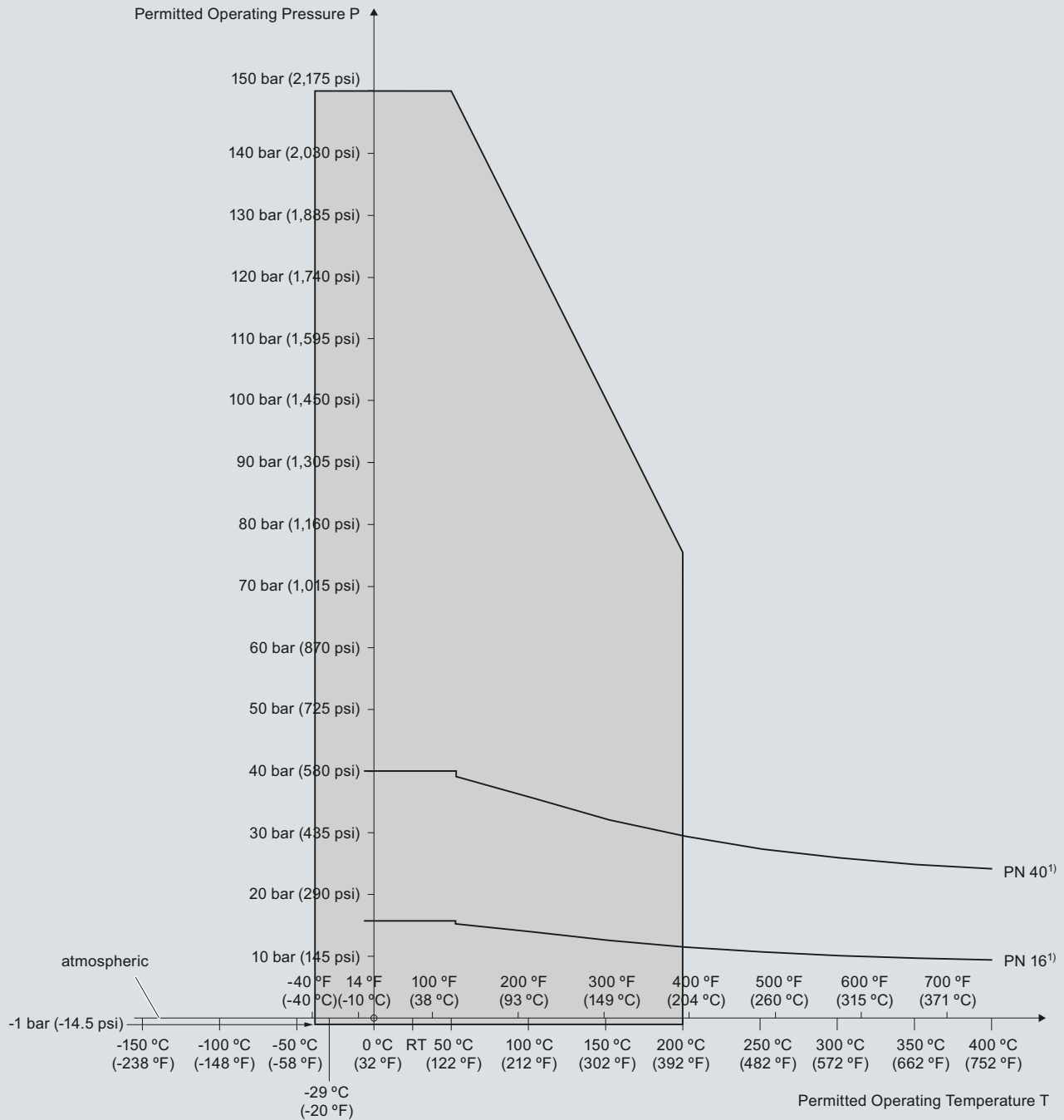
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5513)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

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.

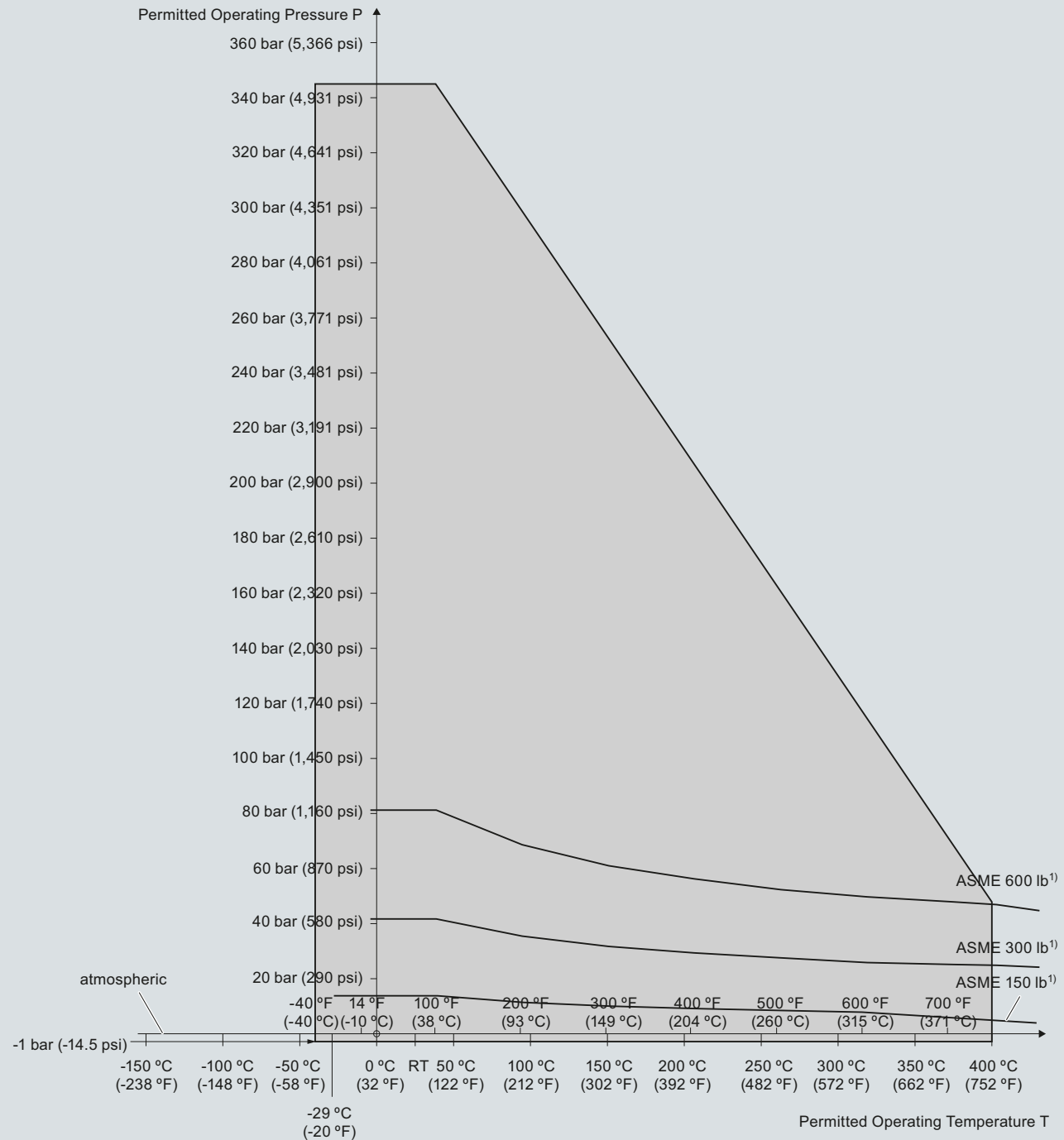
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Pressure/Temperature Curve
LC500 Enamel Rod Probes
ASME Flanged Process Connections (7ML5515 and 7ML5517)



¹⁾ The curve denotes the minimum allowable flange class for the shaded area below.

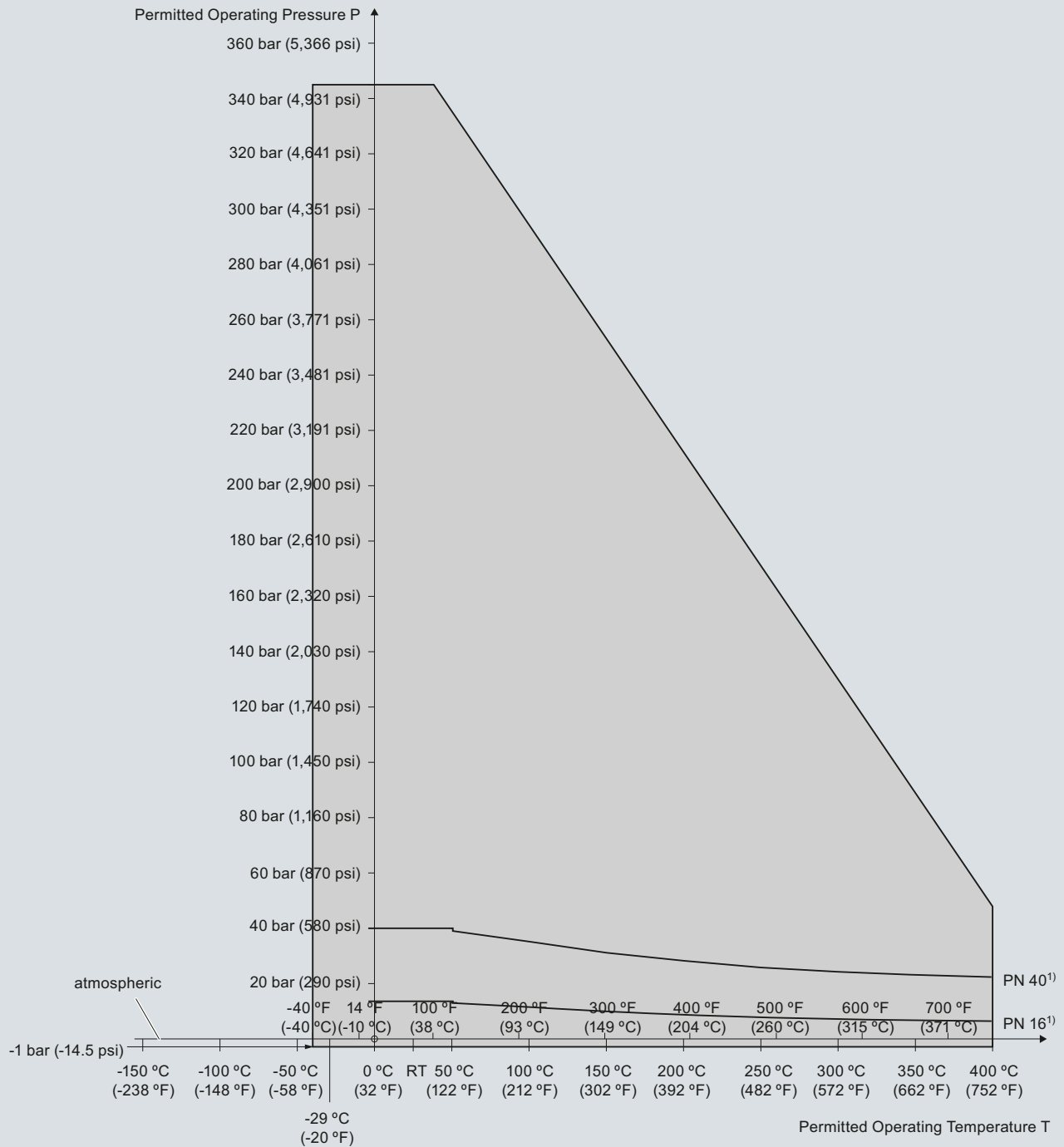
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Pressure/Temperature Curve
LC500 Enamel Rod Probes
EN Flanged Process Connections (7ML5515 and 7ML5517)



¹) The curve denotes the minimum allowable flange class for the shaded area below.

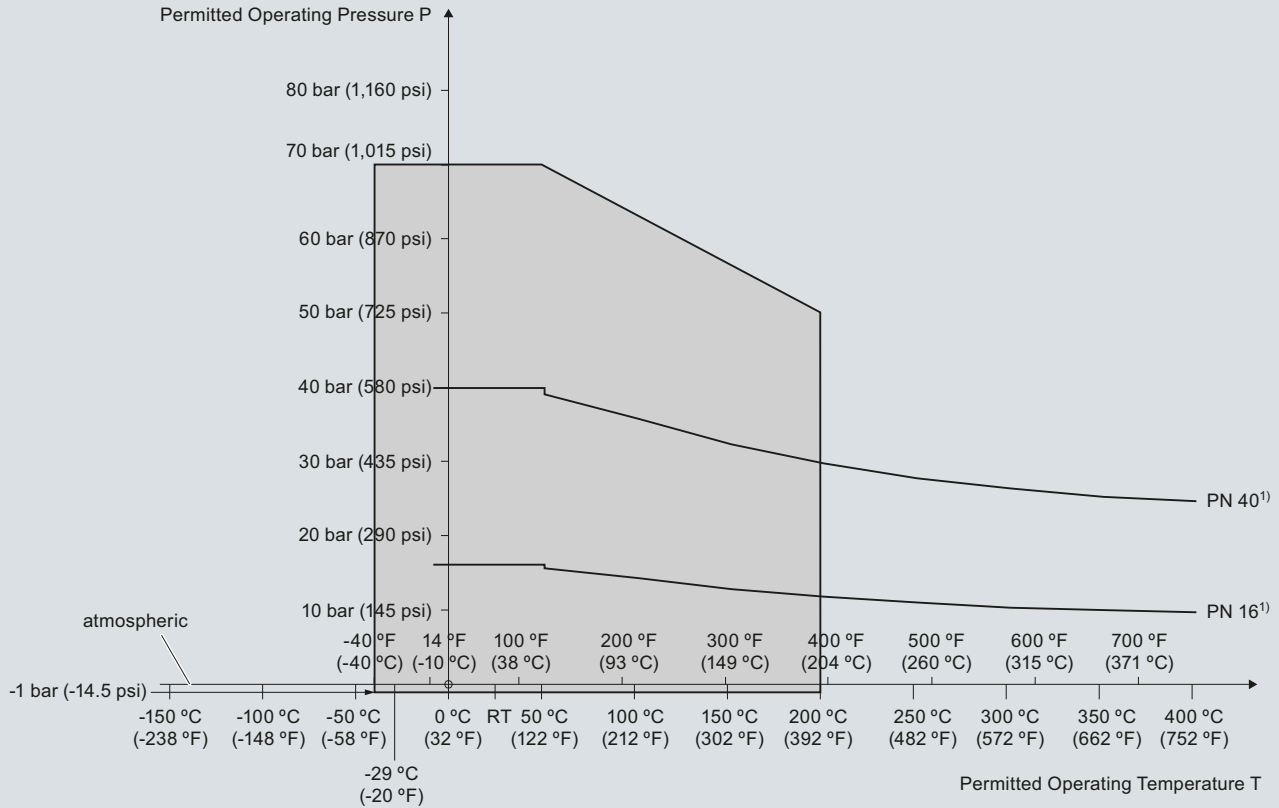
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5515 and 7ML5517)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

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.

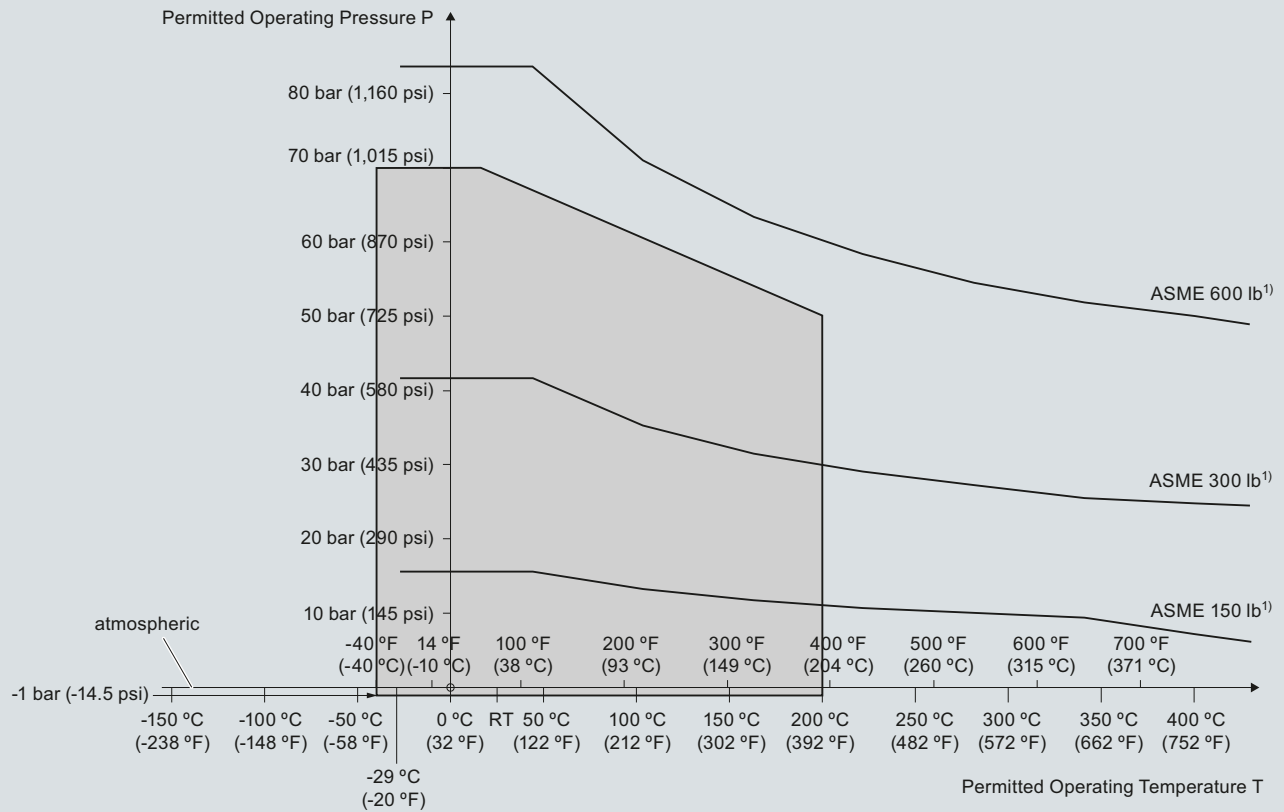
SITRANS LC500 Process Pressure/Temperature derating curves (7ML5517)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

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)

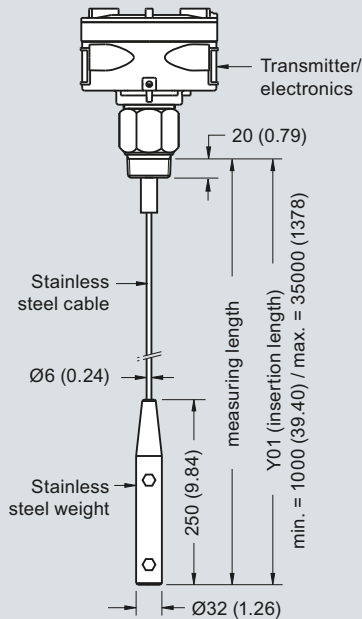
Level Measurement

Continuous level measurement - Capacitance transmitters

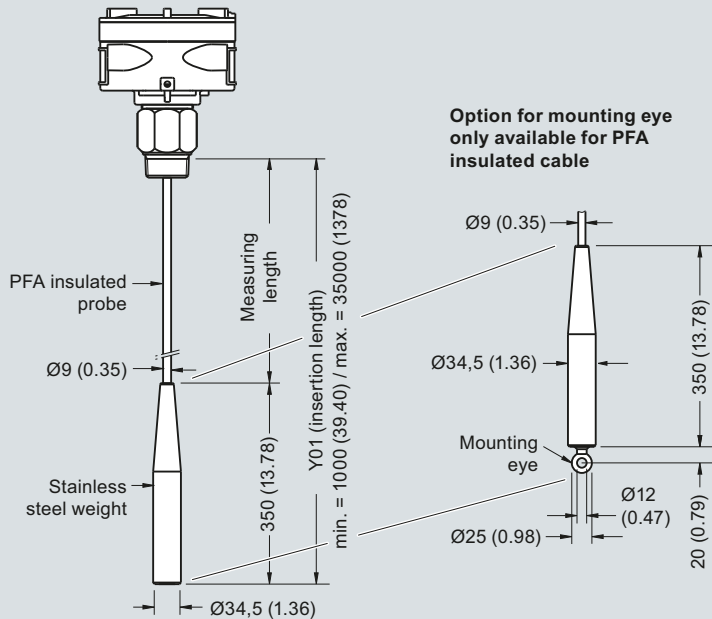
SITRANS LC500

Dimensional drawings

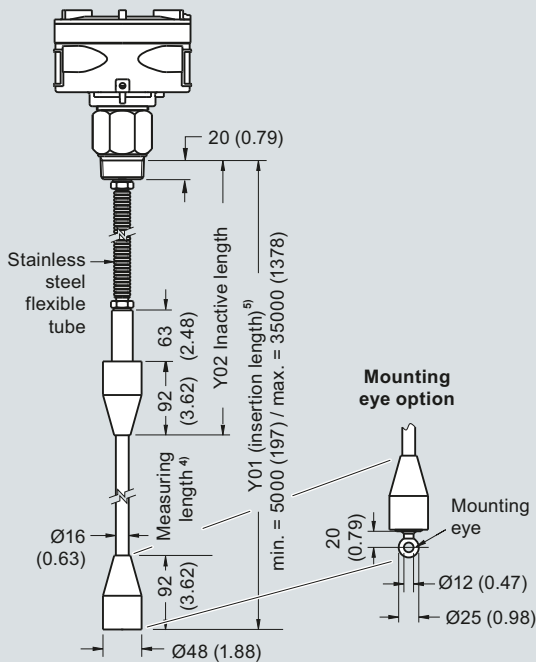
Cable version, non-insulated ¹⁾
Welded Flange (7ML5513)



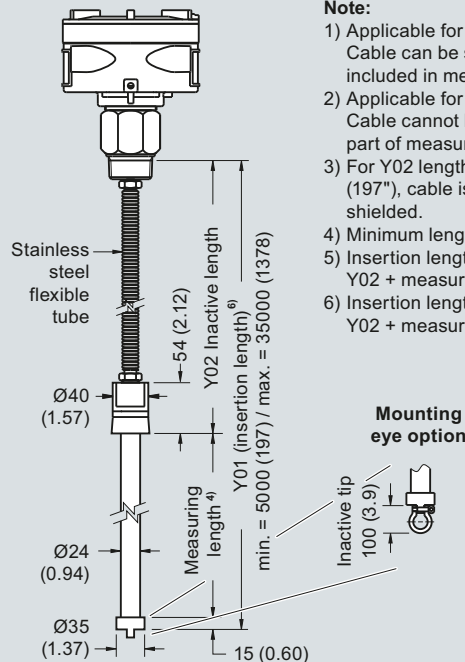
Cable version, insulated ²⁾
Welded Flange (7ML5513)



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 5000 mm (197"), cable is inactive and is **not** actively shielded.
- 4) Minimum length = 200 mm (7.87")
- 5) Insertion length Y01 = Y02 + measuring length + 92 mm (3.62")
- 6) Insertion length Y01 = Y02 + measuring length + 15 mm (0.59")

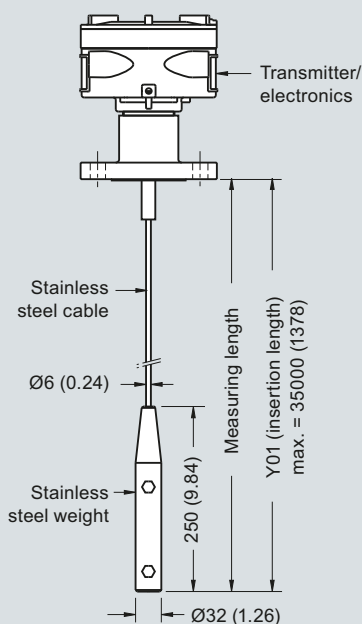
SITRANS LC500 - Cable Versions, dimensions in mm (inch)

Level Measurement

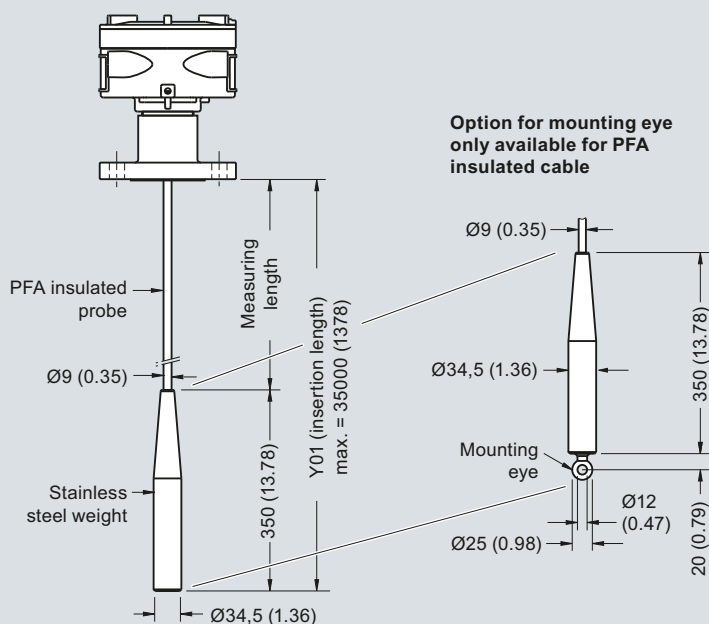
Continuous level measurement - Capacitance transmitters

SITRANS LC500

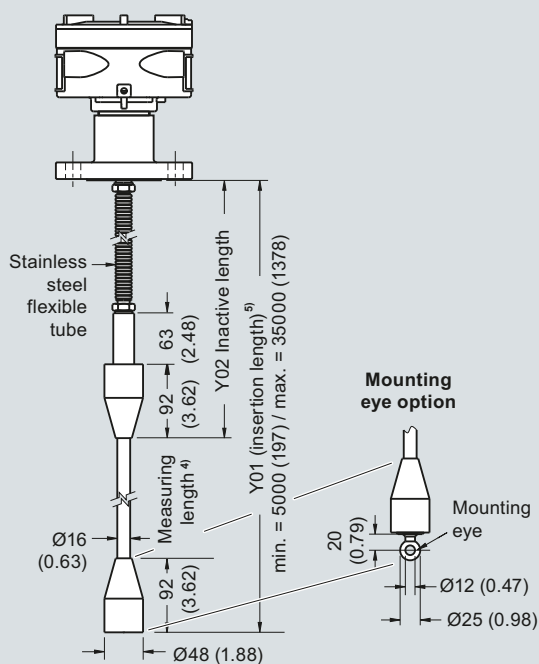
Cable version, non-insulated ¹⁾
Welded Flange (7ML5513)



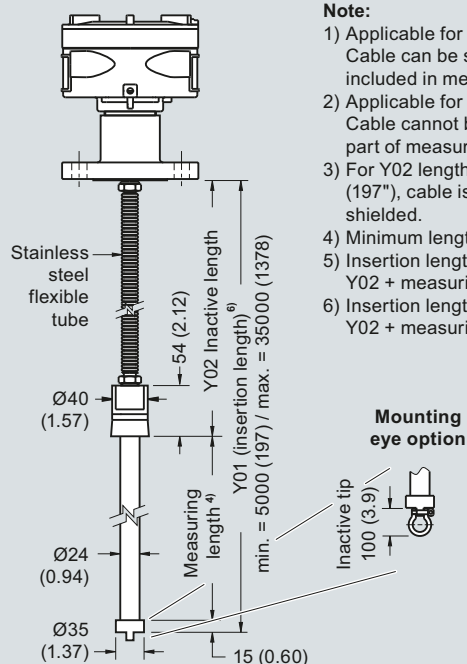
Cable version, insulated ²⁾
Welded Flange (7ML5513)



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 5000 mm (197"), cable is inactive and is **not** actively shielded.
- 4) Minimum length = 200 mm (7.87")
- 5) Insertion length Y01 = Y02 + measuring length + 92 mm (3.62")
- 6) Insertion length Y01 = Y02 + measuring length + 15 mm (0.59")

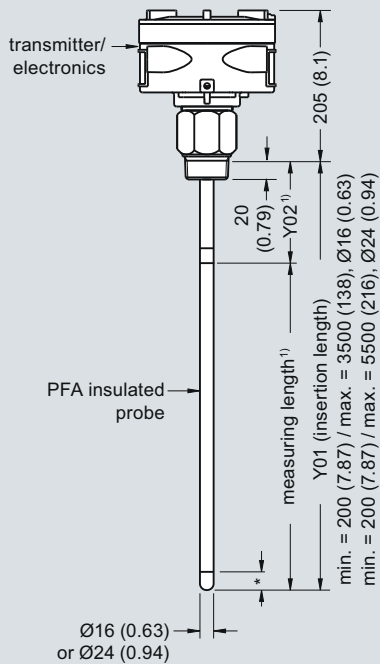
SITRANS LC500 - Cable Versions, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Rod version Threaded (7ML5515)

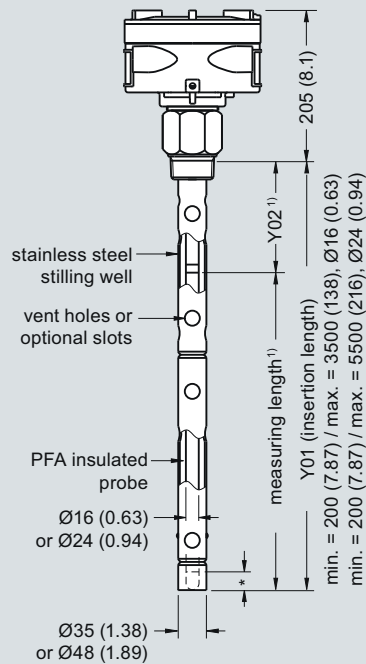


* = 30 (1.18) Inactive tip

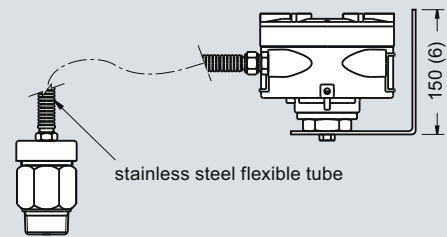
Note:

- 1) Minimum Y02 (active shield length) = 50 (1.96),
minimum measuring length = 200 (7.87)

Rod version with stilling well Threaded (7ML5515)

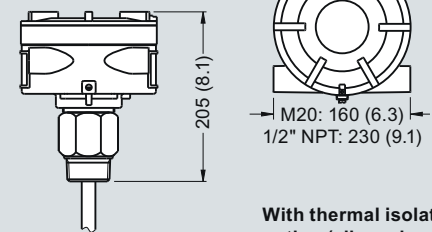


Remote electronics with mounting bracket option Threaded (7ML5515)



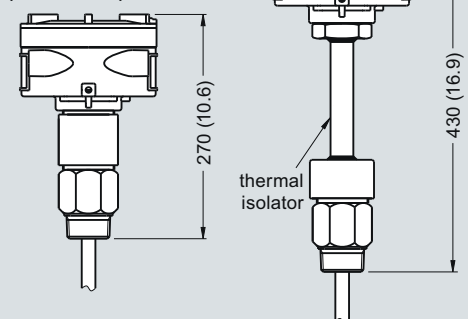
General Purpose approval only.

Standard configuration (all versions)



With thermal isolator option (all versions)

With explosion-proof seal option (all versions)



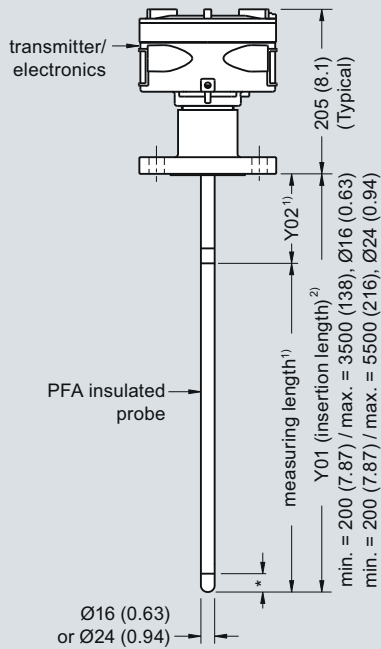
SITRANS LC500 - Rod Versions, dimensions in mm (inch)

Level Measurement

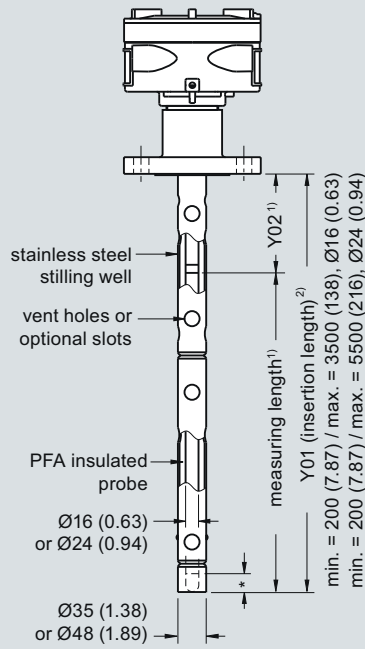
Continuous level measurement - Capacitance transmitters

SITRANS LC500

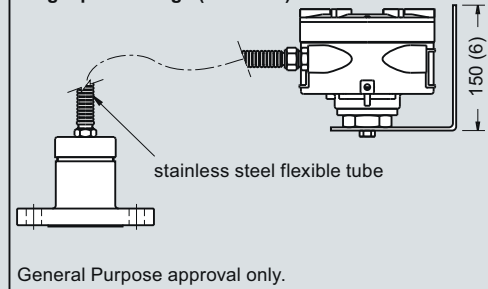
Rod version
Welded flange (7ML5515)
Single piece flange (7ML5517)



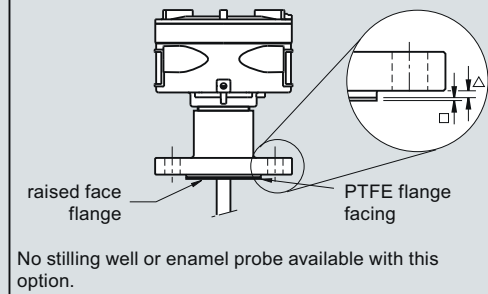
Rod version with stilling well
Welded flange (7ML5515)
Single piece flange (7ML5517)



Remote electronics with mounting bracket option
Welded flange (7ML5515)
Single piece flange (7ML5517)

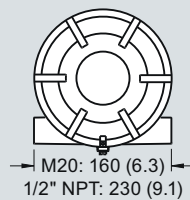
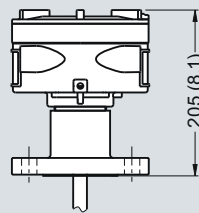


PTFE flange facing option
Single piece flange only (7ML5517)

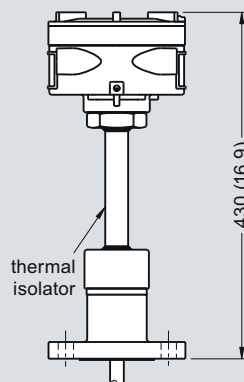


* = 30 (1.18) Inactive tip

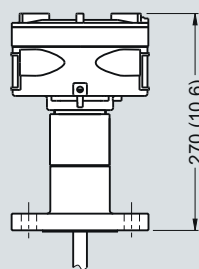
Standard configuration
(all versions)



With thermal isolator
option (all versions)



With explosion-proof
seal 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).

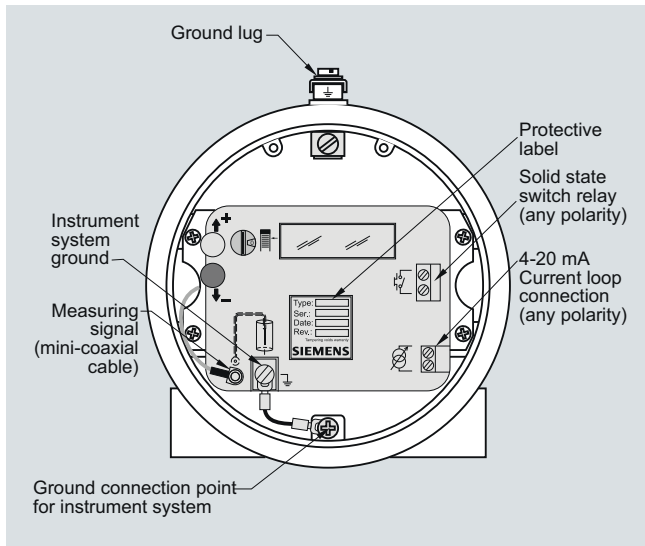
SITRANS LC500 - Rod Versions, dimensions in mm (inch)

Level Measurement

Continuous level measurement - Capacitance transmitters

SITRANS LC500

Schematics



SITRANS LC500 connections

Level Measurement

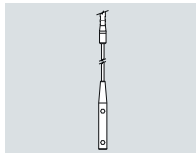
Continuous level measurement - Capacitance transmitters

SITRANS LC300/LC500 Specials

SITRANS LC300/LC500 Specials¹⁾

Order 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

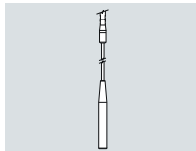
Kit, Stainless steel cable extension, 15 m, adjustable by customer

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

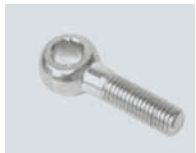
Kit, PFA cable extension, 15 m

A5E01163713

Kit, PFA cable extension, 20 m

A5E01163714

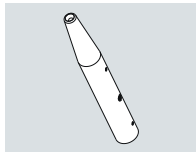
LC300 Mounting Eye



Spare mounting eye (LC300 PFA versions only)

A5E01163717

LC300 Weight Kit, 316L stainless steel



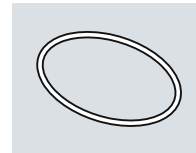
Kit, Spare stainless steel weight. To be used in any cable version of CLS300, or stainless steel cable version of LC300

A5E01163727

SITRANS LC300/LC500 Specials¹⁾

Order No.

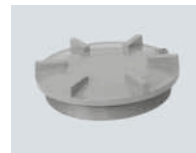
LC500 Gasket (IP65), Silicone



Spare gasket, LC500 enclosure version, IP65 N)

A5E01163728

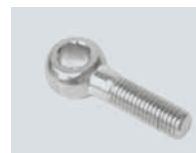
LC500 Blind Lid



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 Versions²⁾

¹⁾ Special flange sizes and facings are available.

²⁾ Please contact nacc.smpi@siemens.com for part number and pricing.

Submit Application Questionnaire found on page 5/9.

J) Subject to export regulations AL: 91999 ECCN: EAR99

Continuous measurement - Open channel flow - Ultrasonic controller

OCM III

Overview



The OCM III is a high accuracy ultrasonic flow monitor for open channels.

Benefits

- Influent and effluent monitor
- BS 3680 calculations provide exceptional accuracy in measuring flow
- 1 to 24 months data log, subject to logging rate
- RS-232 serial communication
- High accuracy on unique or non-standard weirs and flumes
- AC and DC operation. Automatically switches to battery operation for uninterrupted power
- Dual power input
- Low power remote monitoring
- Flow Reporter software available for remote monitoring, configuration and data retrieval

Application

In addition to monitoring flowrate in sewage works, OCM III can monitor industrial discharge, rainfall/storm water studies, in-flow/infiltration studies and sewer system evaluations. As well as being compatible with many standard weirs and flumes, the programmable head versus flow curve (up to 16 points) accurately defines flow rate on unique or non-standard weirs and flumes.

The OCM III has data logging and is adjustable from once per minute to once a day. It records the average flow rate for that time period. Daily, it records minimum/maximum of temperature and flow rates, and the time they occurred, as well as the daily total. Advanced functions include variable rate logging. It can be pre-programmed to log at a higher rate when needed. Under steady conditions, the OCM III automatically logs less frequently to conserve data log space.

The OCM III has two-way communication via RS-232 with a modem or a bi-polar current loop with a current-to-voltage communication converter. Data logs can be downloaded to a file that can be manipulated into a spreadsheet or ASCII format.

Technical specifications

Mode of Operation	
Measuring range ¹⁾	0.3 ... 1.2 m (1 ... 4 ft) or 0.6 ... 3 m (2 ... 10 ft)
Output	
Transducer	Echomax® XRS-5, 44 kHz
Relays	3 alarm/control relays, 1 SPDT Form C contact per relay, rated 5 A at 250 V AC non-inductive or 30 V DC
mA output	0/4 ... 20 mA, isolated
• Max. load	1 K Ω max. load
• Resolution	5 μ A
• Isolation	300 V AC continuous
• DC output	+24 V DC, 20 mA average to 200 mA at 1/10 duty cycle max. 0 ... 20
Accuracy	
Error in measurement	± 1 mm/m, calculated error less than 0.02 %
Resolution	0.2 mm (0.007")
Rated operating conditions	
Installation conditions	
• Location	Indoor/outdoor
• Installation category	II
• Pollution degree	4
Ambient conditions	
• Ambient temperature (enclosure)	-20 ... +50 °C (-5 ... +122 °F)
Design	
Weight	2.3 kg (5.1 lbs)
Material (enclosure)	Polycarbonate
Degree of protection (enclosure)	IP65/Type 4X/NEMA 4X
Cable	
Transducer and mA output signal	• Transducer: co-axial to be RG62-A/U low capacity • mA output signal to be 2 copper conductors, twisted, with foil shield/drain wire, 300 V 0.5 ... 0.75 mm² (22 ... 18 AWG) • Relay/power to be copper con- ductors per local requirements to meet 250 V 5 A contact rating
Max. separation between trans- ducer and transceiver	183 m (600 ft)
Displays and controls	
	LCD 5 x 7 dot matrix display with 2 lines of 40 characters each
Programming	Via removable programmer and communication link
Memory	3 V battery (NEDA 5003LC or equivalent), operating life 1 year, SuperCap capacitor for back-up during battery replacement
Power supply	
AC version	100/115/200/230 V AC ± 15 %, 50/60 Hz, 20 VA max.
DC version	9 ... 30 V DC, 8 W max.

OCM III

Certificates and approvals	CE, FM, CSA _{US/C} , MCERTS, C-TICK ²⁾
Communication	RS-232 or ± 20 mA bipolar current loop, 300, 600, 1200, 2400, 4800, 9600, 19200 baud
Options	
Temperature sensor	TS-2
Remote monitoring	Flow Reporter, a Windows [®] -based configuration software and data extractor
Velocity sensor	Consult with factory

1) Program range is defined as the empty distance to the face of the transducer plus any range extension

2) EMC performance available upon request
Windows[®] is a registered trademark of Microsoft Corporation

Selection and Ordering data	Order No.
OCM III High accuracy ultrasonic flow monitor for open channels.	C) 7ML1002-
Input voltage AC, voltage selector switch	A 0
Enclosure Wall mount, standard enclosure Wall mount, 6 entries, M20 holes ¹⁾	0 A B
Approvals CSA _{US/C} , FM, CE (EN61326), C-TICK CE ²⁾	5 6

1) Available with approval option 6 only

2) Available with enclosure option B only

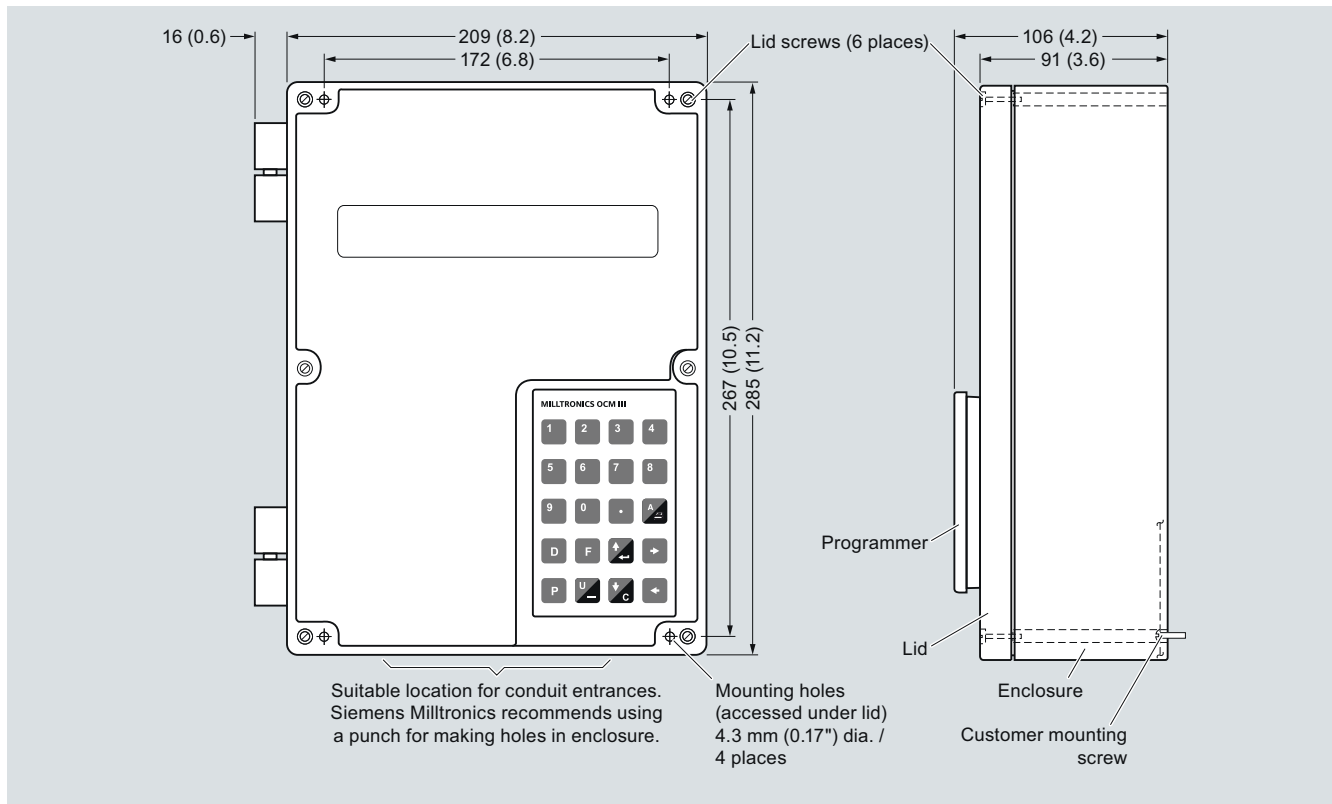
C) Subject to export regulations AL: N, ECCN: EAR99

Selection and Ordering data	Order No.
Further designs Please add "-Z" to Order No. and specify Order code(s).	
Operating Instructions English French Spanish German Note: The Operating Instructions should be ordered as a separate line item on the order. This device is shipped with the Siemens Milltronics manual CD containing the complete ATEX Quick Start and Operating Instructions library.	C) 7ML1998-5AB01 C) 7ML1998-1AB11 C) 7ML1998-1AB21 C) 7ML1998-1AB31
Required equipment TS-2 Temperature Sensor TS-2, 1 m cable TS-2, 5 m cable TS-2, 10 m cable TS-2, 30 m cable TS-2, 50 m cable TS-2, 70 m cable TS-2, 90 m cable TS-2 Operating Instructions Note: The TS-2 Operating Instructions should be ordered as a separate line item on the order.	7ML1812-1AA1 7ML1812-2AA1 7ML1812-3AA1 7ML1812-4AA1 C) 7ML1812-5AA1 C) 7ML1812-6AA1 C) 7ML1812-7AA1 C) 7ML1998-5EW01 C) 7ML1812-1AA1
Accessories Handheld programmer Tag, stainless steel, 12 x 45 mm (0.47 x 1.77"), one text line, suitable for enclosure M20 cable gland kit (6 M20 cable glands, 6 M20 nuts, 3 stop plugs) M20 cable gland kit (4 M20 cable glands, 4 M20 nuts, 4 washers) Flow Reporter software license Flow Reporter Kit (includes disk, authorization code and cable)	7ML1830-2AA 7ML1930-1AC 7ML1830-1GM 7ML1930-1FV B) 7ML1930-1AK B) 7ML1930-1AL
Spare parts Card, Mother, main Card, daughter/display Eprom Battery OCM III Lid overlay	C) 7ML1830-1MG C) 7ML1830-1LT C) 7ML1830-1KW C) 7ML1830-1JV 7ML1830-1KV

B) Subject to export regulations AL: N, ECCN: EAR99S

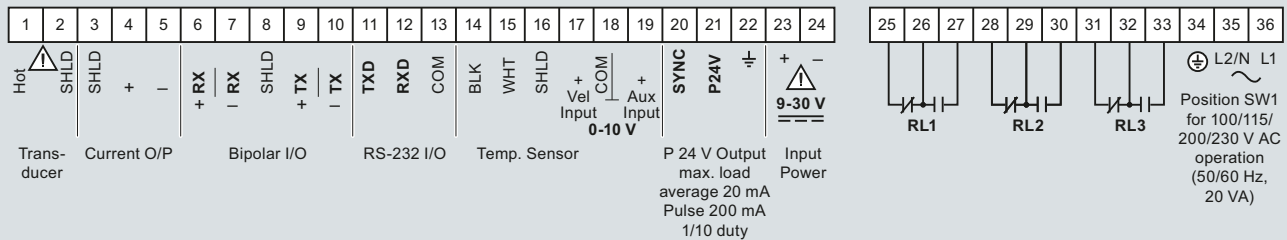
C) Subject to export regulations AL: N, ECCN: EAR99

Dimensional drawings



OCM III, dimensions in mm (inch)

Schematics



Note:

1. Use RG62-A/U coaxial (or equivalent) for extensions up to 183 m (600 ft).
Run in grounded metal conduit, separate from other wiring.
2. 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.
Relay de-energized when in alarm conditions and energized for pump control.

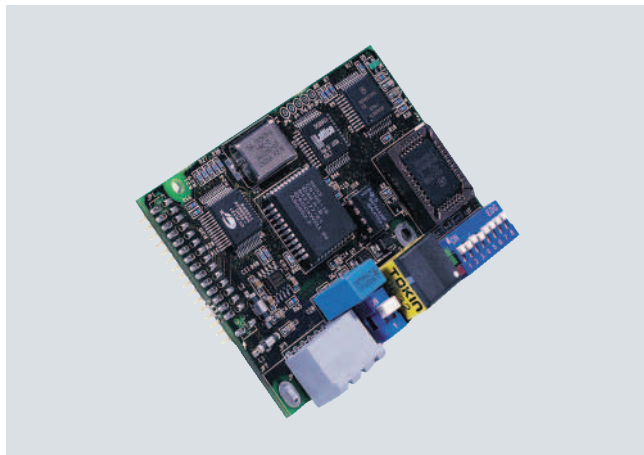
OCM III connections

Level Measurement

Communications and Displays

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, Allen-Bradley[®] Remote I/O and DeviceNet[™], Modbus[®] RTU

[®]Modbus is a registered trademark of Schneider Electric.

[®]Allen-Bradley is a registered trademark of Rockwell Automation

[™]DeviceNet is a trademark of Open DeviceNet Vendor Association

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	Allen Bradley Remote I/O
Interface	RIO
Transmission rate	57.6, 115.2 or 230.4 Kbaud
Rack address	1 ... 73, ¼ to full rack
Connection	RIO slave
SmartLinx module compatibility	• SITRANS LU01 • SITRANS LU02 • SITRANS LU10 • SITRANS LUC500 • MultiRanger 100/200 • HydroRanger 200

Module type	PROFIBUS DP
Interface	RS-485 (PROFIBUS standard)
Transmission rate	All valid PROFIBUS DP rates from 9600 Kbps to 12 Mbps
Rack address	0 ... 99
Connection	Slave
SmartLinx module compatibility	• SITRANS LU01 • SITRANS LU02 • SITRANS LU10 • SITRANS LUC500 • MultiRanger 100/200 • HydroRanger 200

Module type	MODBUS RTU
Interface	RS-232 or RS-485
Transmission rate in bps	1200, 2400, 4800, 9600, 19200, 38400
Rack address	1 ... 247
Connection	Slave
SmartLinx module compatibility	• SITRANS LU01 • SITRANS LU02 • SITRANS LU10 Included with product: • SITRANS LUC500 • 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	• SITRANS LUC500 • MultiRanger 100/200 • HydroRanger 200

Selection and Ordering data	Order No.
SmartLinx® module for SITRANS LU01, LU02, LU10	
Allen-Bradley Remote I/O module	7ML1830-1CP
PROFIBUS DP module	7ML1830-1CQ
Modbus RTU module	7ML1830-1CR
SmartLinx module for SITRANS LUC500 Rack and Panel Mount models	
Allen-Bradley Remote I/O module	7ML1830-1HP
PROFIBUS DP module	7ML1830-1CS
DeviceNet module	7ML1830-1HQ
SmartLinx module for SITRANS LUC500 Wall Mount model, MultiRanger 100/200, HydroRanger 200	
Allen-Bradley Remote I/O module	C) 7ML1830-1HS
PROFIBUS DP module	7ML1830-1HR
DeviceNet module	7ML1830-1HT
Operating Instructions	
Allen-Bradley Remote I/O communications module, English	C) 7ML1998-1AP03
PROFIBUS communications module	
• English	C) 7ML1998-1AQ03
• French	C) 7ML1998-1AQ12
• German	C) 7ML1998-1AQ33
Modbus RTU communications module, English	C) 7ML1998-1BF01
Modbus RTU communications module, French	C) 7ML1998-1BF11
Modbus RTU communications module, German	C) 7ML1998-1BF31
SmartLinx modem, English	C) 7ML1998-1BG01
DeviceNet	C) 7ML1998-1BH02
This device is shipped with the Siemens Milltronics manual CD containing Quick Starts and Operating Instructions.	
• English	C) 7ML1998-1BH02
• French	C) 7ML1998-1BH12
Spare SmartLinx software	
Allen-Bradley data diskette	C) 7ML1830-1CK
PROFIBUS DP data diskette	C) 7ML1830-1CL
DeviceNet data diskette	C) 7ML1830-1CM

C) Subject to export regulations AL: N, ECCN: EAR99

Level Measurement Communications and Displays

Dolphin Plus Software

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 LUC500
- HydroRanger Plus
- 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	Order No.
Dolphin Plus	N) 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.	AA0
Dolphin Plus Software includes a software CD, and a nine pin adapter with a 2.1 m (82.7") cable for connection to a PC serial port.	
RS-485 to RS-232 converter	
No	0
Yes	1
ComVerter	
No	0
Yes	1

N) Subject to export regulations AL: N, ECCN: 5D992

Selection and Ordering data	Order No.
Operating Instructions	
Connection manual, English: Included on Dolphin Plus CD and available at www.siemens.com/processautomation	
Spare parts	
Converter, RS 485 to RS 232 (D-Sub)	C) 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	C) 7ML1830-1MM

C) Subject to export regulations AL: N, ECCN: EAR99