Technology for Environmental Protection

Measuring. Controlling. Monitoring.

AFRISO EURO-INDEX

Dear business partner

The new complete AFRISO catalogue 11/12 provides you with all the important information on our products in a single volume – applications, descriptions, technical specifications, dimensional drawings and prices.

Whether you are looking for products for groundwater protection, flue gas control, energy saving or measuring and control technology solutions for process engineering – the AFRISO range provides proven, competitively priced series products.

In addition, we develop and manufacture complex customised products as well as complete system solutions – precisely to your specifications.

Going against the general trend, we insist on a high degree of vertical manufacturing integration from our own tool design and construction department all the way to fully automatic assembly machines for electronic components. This makes us fast, flexible and independent.

For us, globalisation is an opportunity to market our products – manufactured in Germany and Europe – on a global scale.

As a medium sized company, we place particular importance on personal contact with you. There are many factors that set AFRISO apart from others – one of them is the people who make up the company. Competent experts provide you with optimum solutions – both technically and economically. Our field service will be glad to come to your site and assist you in choosing the right products and systems. And whenever you need it, a well trained team of service experts is at your disposal.

We look forward to a successful cooperation.

Best regards

Matthias Blasinger
Managing Director Sales
AFRISO-EURO-INDEX GmbH

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Please feel free to get in touch with us! See page V for contact information.

Contents and Product Range

Level – Continuous: **Mechanical, pneumatic, hydrostatic, capacitance, ultrasound, potentiometric, magnetostrictive, guided micropulse**
Level – Switches: **Float, rotary paddle, conductive, capacitance, vibration** 1

PTC thermistor level sensors for indoor tanks, PTC thermistor level sensors for outdoor tanks, EX-protected PTC thermistor level sensors, overfill prevention systems with EX and WHG approval, level controllers 2

Alarm units for layer thickness alarm, overflow alarm, sand alarm or and oil-on-water alarm 3

Leak detectors - sight glass principle, leak detectors for systems with liquid in the interstitial space, vacuum/pressure based leak detectors, AFRISO WATCHDOG alarm units, leak monitoring instruments with probes (PTC thermistor, photoelectric, conductivity), drip pans, inner linings for fuel oil/diesel/rainwater/liquid fertiliser/AHL/AdBlue®, tank room linings 4

Gas alarm units for households, domestic technology and industrial applications,
gas alarm units in DIN rail housings, gas sensors, test gas units
Electronic gas and smoke detectors 5

Mounting accessories, tank fittings, overpressure devices, tank withdrawal systems, anti-siphon valves,
pull cord, screw connections, fuel oil filters, filter inserts, automatic fuel oil de-aerators 6

Boiler room vents, draft stabilisers, boiler water low level alarms, safety valves, combustion controllers, safety group assemblies and valves, anti-tamper cap valves, flow meters, boiler manifolds, heating pump and solar pump assemblies, bypass valves, flow filters, filling fittings, boiler filling and drain valves, quick air vents, distribution manifolds for heating systems, thermal actuators 7

Pressure reducers, water filters, check valves, strainers, boiler safety group assemblies, safety valves, signal anodes, sacrificial anodes, rainwater system centre, oil tank conversion kits, rainwater filters, accessories for rainwater harvesting, backup controller for rainwater storage tanks 8

Capsule pressure gauges, Bourdon tube pressure gauges, diaphragm pressure gauges, pressure gauges for differential pressure, accessories for pressure gauges, pressure gauges with electrical contact 9

Diaphragm seals, piston type chemical seals, in-line chemical seals 10

Pressure transducers, digital pressure gauges 11

Bimetal thermometers and gas filled thermometers, industrial thermometers, thermometers/pressure gauges with capillary tube, thermostats, safety temperature cut outs, safety temperature switches, thermostats with housing, resistance thermometers 12

Flue gas analysers, condensate filters, gas treatment systems, electronic handheld pressure measuring instrument for pressure/temperature/air speed/humidity/heating system check/4 Pa test, gas detectors, testers for tank servicing and heating systems, leak test sets for gas and oil pipes 13

Stationary gas sampling probes, universal filters, gas treatment systems, gas coolers, infrared gas analysers, oxygen probes, oxygen analysers, gas analyser BIOLYZER, emission computers 14

Isolation amplifiers, supply isolation amplifiers, trip amplifiers, selectors, EX safety barriers, EX supply isolation amplifiers, multifunction transducers, digital plug-in displays, digital display units, combined warning light and horn, alarm acknowledgement unit, event reporting systems, AFRISO Net web service, AFRISO WATCHDOG for event reporting systems 15

AFRISO service, specialised company search, checklists for enquiries, conversion table for pressure units, selection criteria for pressure gauges, dials for pressure gauges, information on the Pressure Equipment Directive, information on flanges and materials, information on EN 50379, certificates, Terms and Conditions, index 16

How to work with this catalogue

Table of Contents
Our product range covers measuring, control and monitoring technology for domestic, industrial and environmental applications. This includes products for groundwater protection, flue gas monitoring, efficient use of energy, use of the sun, geothermal and rain as well as a complete range of pressure, temperature and level instruments. In addition to the products presented in the catalogue, we manufacture special versions to customer specifications.

Please enquire.

Finding information
The catalogue is divided into 16 chapters. A chapter overview is provided on pages II and III. The blue chapter tabs on the side of the page let you easily find the desired chapter. Each chapter contains a detailed table of contents as well as an overview table and the main features of the products in that chapter to help you find the product page you need fast.
To find products, you can also use the comprehensive index in the appendix.
Usually, all information on a product is contained on one page and cross references guide you to other pages for fast and easy access to additional information such as fact sheets.

Enquiries
To make enquiries as simple as possible and to assist you in gathering all the necessary information, the appendix contains a number of checklists for enquiries, e.g. for pressure gauges, thermometers, level indicators and analysers.

Divisions / Contact persons
Our sales department is divided into three different divisions. You can find the division in charge of a given product on the corresponding catalogue page.

We would be pleased to help you with any questions you may have. You can reach your contact person on +49 7135 102-

Division I
Tank. Heating. Water technology.

North	-121
Centre	-169
South	-124
Export	-121

Division II
Pressure. Temperature. Level.

North	-138
Centre	-215
South	-101 or -235
Export	-132

Division III
Gas analysis. Special applications.

Germany	-131
Export	-166

Service and repairs

Hotline	-211

www.afriso.com/contact

Delivery times / stock items
All stock items have part numbers printed in blue in the price lists. Please enquire for the delivery times of non-stock items as they vary greatly depending on the product specifications.

Minimum order quantities / packing units
Many products can be manufactured in small quantities – in many cases, you may even order a single piece.
However, for some items there are minimum ordering quantities or packing units. The price list sections provide the appropriate information.

The product package contains the specified number of products or can be delivered in the specified order quantity

An additional package contains the specified number of product packages or products

Small order handling fee / minimum order value
For very small orders with net values below € 75.00 a handling fee of € 15.00 will be charged. No other minimum order conditions apply.

Return of goods
Please note that only standard stock items can be returned; products not available from stock and devices with ATEX approval cannot be returned. For returned stock items we charge 25 % of the price for testing and handling.

Prices / terms of delivery
Please refer to your local AFRISO representation or get in touch with the AFRISO headquarters for detailed price information and conditions.
Our Terms and Conditions apply (see www.afriso.com).
This catalogue supersedes all previous versions, including previous prices. All prices subject to change; the catalogue may contain printing errors.

Technical modifications
As we are constantly improving our products, we reserve the right to technical modifications without prior notice.

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AFRISO quality products
AFRISO quality products are continuously being enhanced and are subject to stringent inspections. Quality labels, approvals and certificates designate special features and application areas of our products. For certificates and manufacturer's declarations, please refer to chapter 16 or the Downloads > Certificates section of www.afriso.com.

All products with the quality label PROOFED BARRIER® are odour-tight. The quality label is awarded by the Fraunhofer-Institut (IVV) in Freising, Germany, exclusively for components that have passed stringent initial and repeat tests.

The Bio-Oil label certifies chemical resistance and guarantees full performance and functionality of the products even if biodiesel, biofuel or additives are used. The percentage shown corresponds to the maximum permissible admixture.

Solar components by AFRISO allow for effective use of thermal solar systems in domestic technology. All labelled products are universally applicable and tuned to each other.

IEC 61508/ IEC 61511 defines the requirements concerning safety-related systems in plants. This standard for functional safety describes Safety Instrumented Systems (SIS) and categorises them into Safety Integrity Levels (SIL 1 to SIL 4). AFRISO pressure transducers are rated SIL 2. Safety-related details are contained in the manufacturer's declaration.

The GOSSTANDART is required as an official certificate for the use or operation of measuring instruments in Russia. The certificate is issued by the Russian Meteorological Institute.

AFRISO is a company member of the expert network of the EHEDG (European Hygienic Engineering & Design Group). The EHEDG issues directives describing characteristics for the hygienic design of devices for processing food. It provides recommendations for the design of components and test methods for using and cleaning devices.

The FDA (Food and Drug Administration) is an agency of the United States Department of Health and Human Services. It issues recommendations, directives and test methods for the examination of materials. AFRISO products with the corresponding designations have been tested for material compatibility.

3-A Sanitary Standards, Inc. is a not-for-profit organisation in the USA dedicated to product safety in processes in the pharmaceutical and food industries.

The DVGW is the German technical and scientific association for gas and water. The association is concerned with technical and scientific aspects of the supply of gas and water, implements results in the form of the national German DVGW rules and also contributes to DIN, EN and ISO standards. AFRISO products bearing the DVGW label have been tested and approved in compliance with the strict safety requirements of the DVGW.

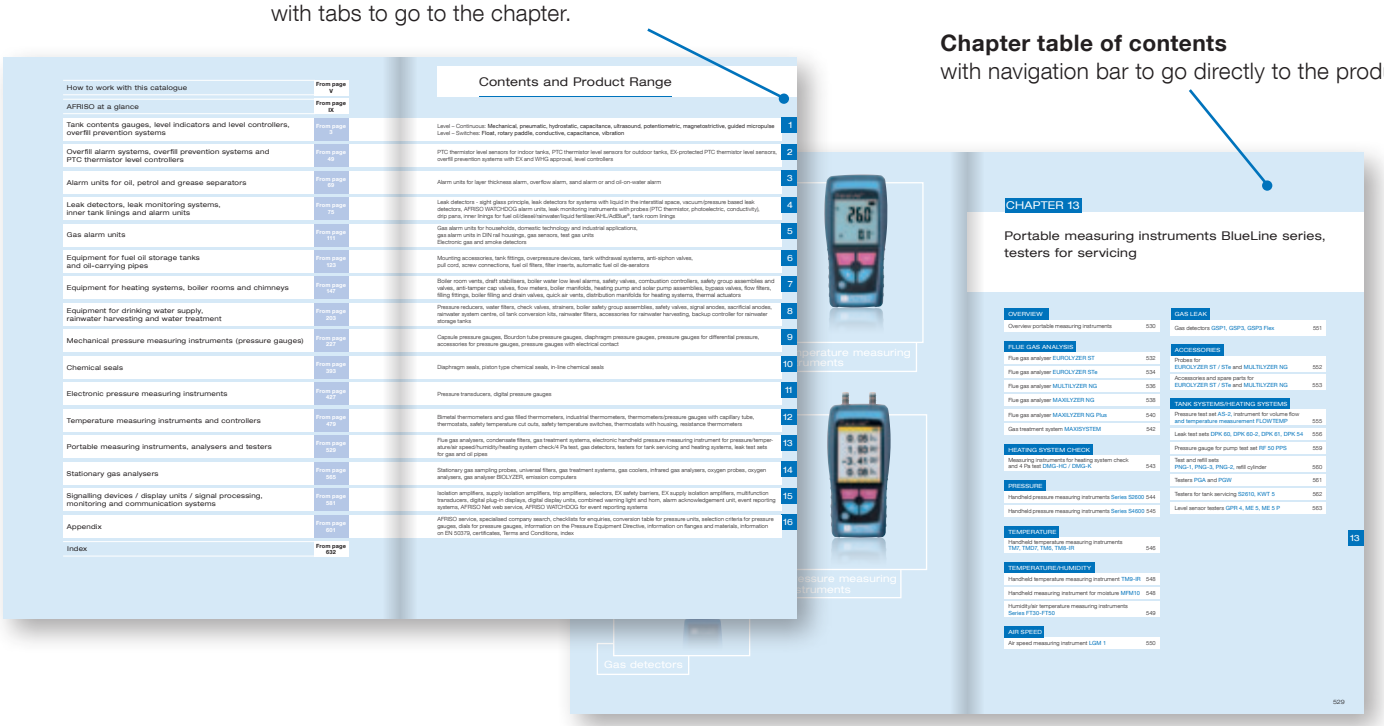
The PED (Pressure Equipment Directive 97/23/EC) specifies the requirements for selling pressure equipment within the European Economic Area. Please refer to chapters 9-11 for further details on our mechanical and electronic pressure gauges.

How to work with this catalogue

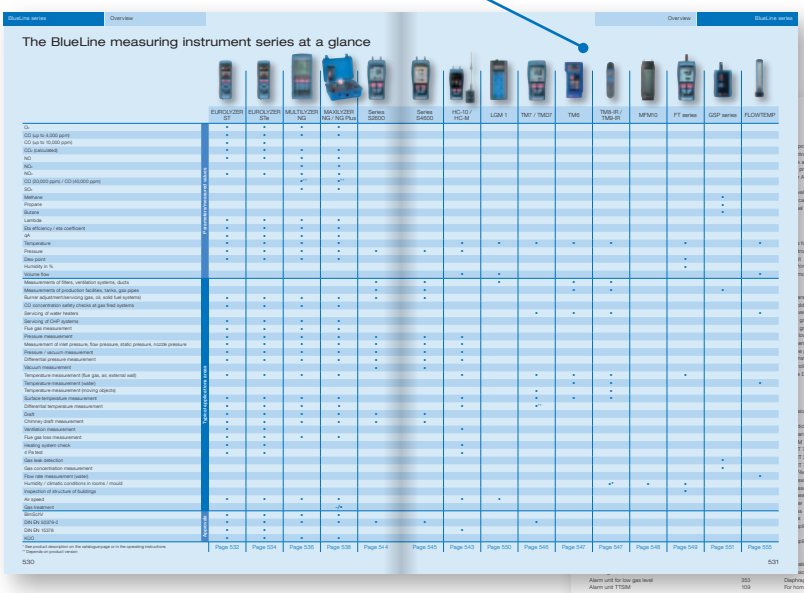
AFRISO complete catalogue: Clear structure and layout

Table of contents
with tabs to go to the chapter.

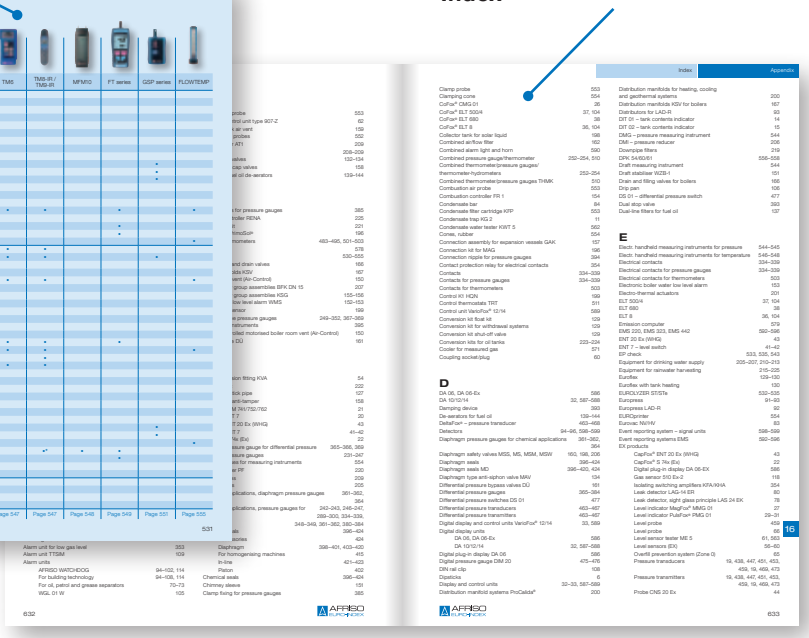
Chapter table of contents
with navigation bar to go directly to the product.



Overview table
to help you make your selection with comparison of product features.



Index



Find the desired product fast:

- Clear user guidance
- Detailed tables of contents
- Overview tables with product features
- Easy-to-find tabs
- Everything at a glance

Tab

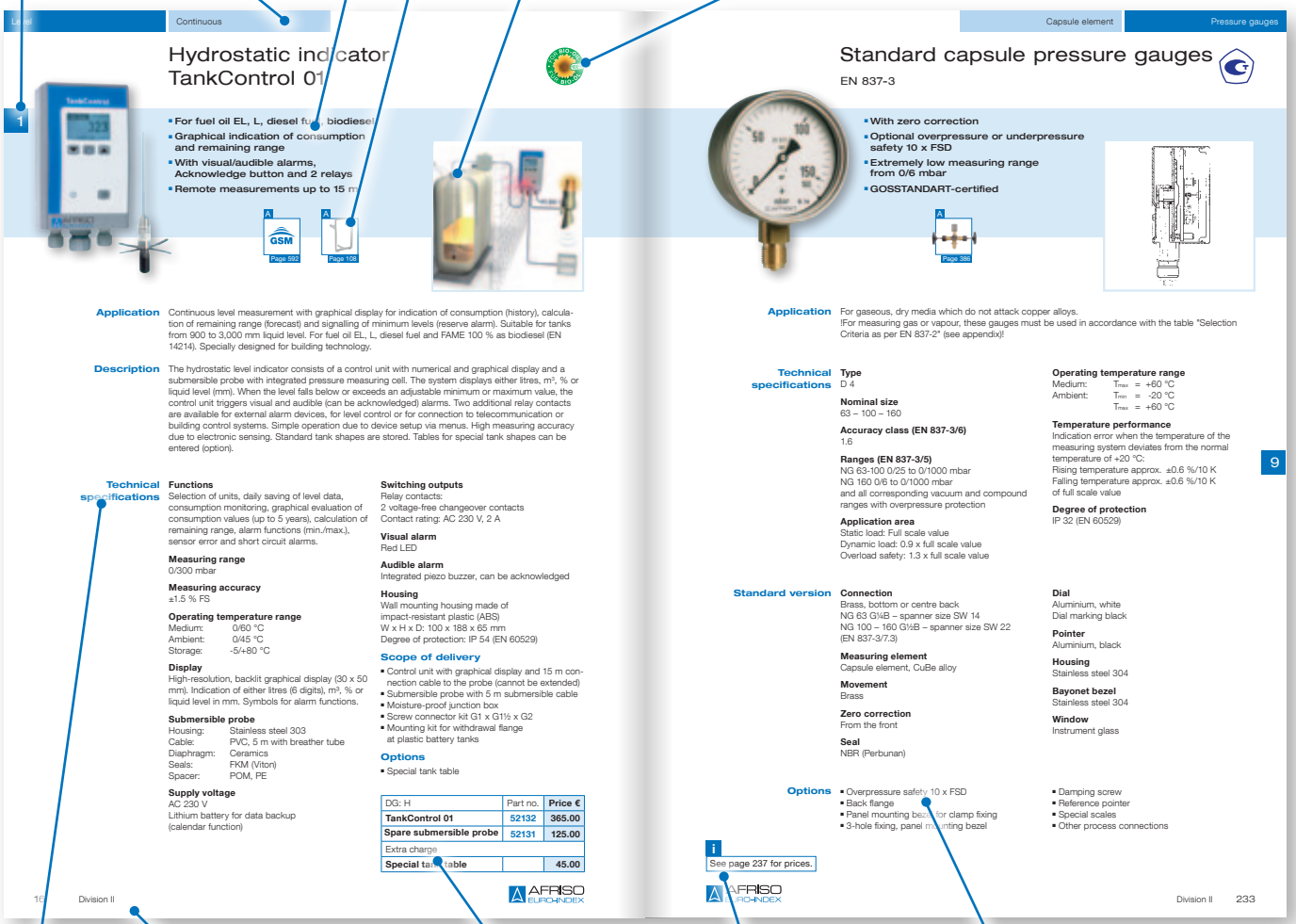
Navigation bar organised according to relevant selection criteria for fast orientation even when browsing through the catalogue.

Product advantages and **main benefits**

Appropriate **accessories** with page reference.

Application examples provide a clear picture of the application and available options.

Quality labels provide information about special characteristics or application areas of products.



Level | Continuous

Hydrostatic indicator TankControl 01

1

- For fuel oil EL, L, diesel fuel, biodiesel
- Graphical indication of consumption and remaining range
- With visual/audible alarms, Acknowledge button and 2 relays
- Remote measurements up to 15 m

A GSM Page 592

A Page 108

Application Continuous level measurement with graphical display for indication of consumption (history), calculation of remaining range (forecast) and signalling of minimum levels (reserve alarm). Suitable for tanks from 900 to 3,000 mm liquid level. For fuel oil EL, L, diesel fuel and FAME 100 % as biodiesel (EN 14214). Specially designed for building technology.

Description The hydrostatic level indicator consists of a control unit with numerical and graphical display and a submersible probe with integrated pressure measuring cell. The system displays either litres, m³, % or liquid level (mm). When the level falls below or exceeds an adjustable minimum or maximum value, the control unit triggers visual and audible (can be acknowledged) alarms. Two additional relay contacts are available for external alarm devices, for level control or for connection to telecommunication or building control systems. Simple operation due to device setup via menus. High measuring accuracy due to electronic sensing. Standard tank shapes are stored. Tables for special tank shapes can be entered (option).

Technical specifications

Functions
Selection of units, daily saving of level data, consumption monitoring, graphical evaluation of consumption values (up to 5 years), calculation of remaining range, alarm functions (min./max.), sensor error and short circuit alarms.

Measuring range
0/300 mbar

Measuring accuracy
±1.5 % FS

Operating temperature range
Medium: 0/60 °C
Ambient: 0/45 °C
Storage: -5/+80 °C

Display
High-resolution, backlit graphical display (30 x 50 mm). Indication of either litres (6 digits), m³, % or liquid level in mm. Symbols for alarm functions.

Submersible probe
Housing: Stainless steel 303
Cable: PVC, 5 m with breather tube
Diaphragm: Ceramics
Seals: FKM (Viton)
Spacer: POM, PE

Supply voltage
AC 230 V
Lithium battery for data backup (calendar function)

Switching outputs
Relay contacts:
2 voltage-free changeover contacts
Contact rating: AC 230 V, 2 A

Visual alarm
Red LED

Audible alarm
Integrated piezo buzzer, can be acknowledged

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 54 (EN 60529)

Scope of delivery
- Control unit with graphical display and 15 m connection cable to the probe (cannot be extended)
- Submersible probe with 5 m submersible cable
- Moisture-proof junction box
- Screw connector kit G1 x G1½ x G2
- Mounting kit for withdrawal flange at plastic battery tanks

Options
- Special tank table

DG: H	Part no.	Price €
TankControl 01	52132	365.00
Spare submersible probe	52131	125.00
Extra charge		
Special tank table		45.00

16 Division II

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Capsule element | Pressure gauges

Standard capsule pressure gauges

EN 837-3

- With zero correction
- Optional overpressure or underpressure safety 10 x FSD
- Extremely low measuring range from 0/6 mbar
- GOSSTANDART-certified

A Page 380

Application For gaseous, dry media which do not attack copper alloys.
!For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
63 – 100 – 160

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
NG 63-100 0/25 to 0/1000 mbar
NG 160 0/6 to 0/1000 mbar
and all corresponding vacuum and compound ranges with overpressure protection

Application area
Static load: Full scale value
Dynamic load: 0.9 x full scale value
Overload safety: 1.3 x full scale value

Operating temperature range
Medium: T_{min} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of +20 °C:
Rising temperature approx. ±0.6 %/10 K
Falling temperature approx. ±0.6 %/10 K of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or centre back
NG 63 G¼B – spanner size SW 14
NG 100 – 160 G½B – spanner size SW 22
(EN 837-3/7.3)

Measuring element
Capsule element, CuBe alloy

Movement
Brass

Zero correction
From the front

Seal
NBR (Perbunan)

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304

Bayonet bezel
Stainless steel 304

Window
Instrument glass

Options
- Overpressure safety 10 x FSD
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Damping screw
- Reference pointer
- Special scales
- Other process connections

i See page 237 for prices.

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Division II 233

Clearly structured **product description**, divided into application, description and technical specifications.

The **division** provides information about which expert team in the sales and distribution department can give you more information on the product. See page V for their extensions.

Order information table with part numbers, prices and packing unit details plus options/extra charges.

The **Info box** provides you with important information, e.g. about order processing, cross references and much more.

Since the product range is so extensive, we only include the basic versions. Many other variations and versions are available and listed under **Options**.

Technology for environmental protection

AFRISO monitors, controls and protects the elements fire, water, earth and air – in the broadest sense. On the one hand, these elements symbolically stand for the relief and protection of the environment – and on the other, they illustrate our fields of activity:

- Flue gas control
- Energy savings
- Groundwater protection
- Resource protection

Product development revolves around our motto "Technology for Environmental Protection". We strive to improve the environment, to make processes which work with greater environmental compatibility and to avoid putting a strain on the environment. With a balanced portfolio of innovations, proven products, systems and services, we offer our customers efficient solutions which are of great benefit.

Tank. Heating. Water technology.

With a comprehensive range of building technology products, AFRISO prides itself in "Making Tanks Safe". Irrespective of whether the heating system uses regenerative energy or fossil fuels. In addition to this extensive range, a large selection of alarm instruments for the fast detection of level, liquid spillage, leakage, gas or smoke is available.

- Mechanical/pneumatic level indicators
- Overfill prevention systems/overfill alarm systems
- Leak detectors/leak monitoring systems
- Inner tank linings
- Equipment for fuel oil storage tanks, oil carrying pipes, boiler rooms, boilers and heating systems
- Heating controllers
- Distribution manifolds for heating, cooling and geothermal systems
- Equipment for drinking water supply
- Rainwater harvesting

Gas analysis.

The BlueLine series is the perfect solution for official measurements, adjustment, servicing, maintenance and repair work. You benefit from an optimally tuned range of measuring instruments which is continuously setting new standards – from basic devices all the way to portable all-in-one flue gas analysers. AFRISO offers gas analysers, gas sampling probes and turnkey analysis systems with data acquisition systems for continuous emission monitoring.

- Portable gas analysers
- Portable measuring instruments, analysers and testers
- Gas alarm units
- Stationary gas analysers
- Emission measurement technology
- Measurement data acquisition systems

Pressure. Temperature. Level.

In addition to our comprehensive range of mechanical and electronic pressure, temperature and level instruments, we also offer suitable mounting and installation accessories as well as display, control and evaluation devices.
AFRISO measuring instruments cover the following ranges:
Pressure: 0/2.5 mbar to 0/4000 bar
Temperature: -50 °C to +1200 °C
Level: 0/20 cm to 0/100 m

- Pressure gauges
- Accessories for pressure gauges
- Chemical seals
- Pressure transducers
- Bimetal thermometers and gas filled thermometers
- Thermostats
- Resistance thermometers
- Electronic level indicators
- Display, evaluation and control units
- Event reporting systems/communication systems

Customised products. System solutions.

In addition to our comprehensive range of standardised, proven off-the-shelf products, we also offer customised special products made exactly to your requirements. We are constantly setting new standards with innovative concepts, e.g. using plastic fittings instead of metal ones or a combination of plastic and brass materials in complex assemblies. Our range does not only cover the delivery of individual sensors, but includes suitable components for power supply and evaluation of the measurement signals. In the case of system solutions, we do the entire engineering for you, all the way to the production of the finished system.

Adapted to your specific requirements

- Housing geometry
- Shape and colour
- Mechanical or electrical connections
- Pre-assembled, tested, ready-to-connect assemblies

Convincing solutions for a wide variety of applications.

We know your industry

AFRISO is at home wherever there is measuring, controlling or monitoring required. As a full-range manufacturer, we offer our customers a broad product portfolio from a single source. A wealth of experience from numerous applications as well as our knowledge of the requirements in the individual markets make us a reliable partner in your industry. We know what is necessary as a result of our many years as a supplier in the OEM business and our intensive contact with standardisation committees,

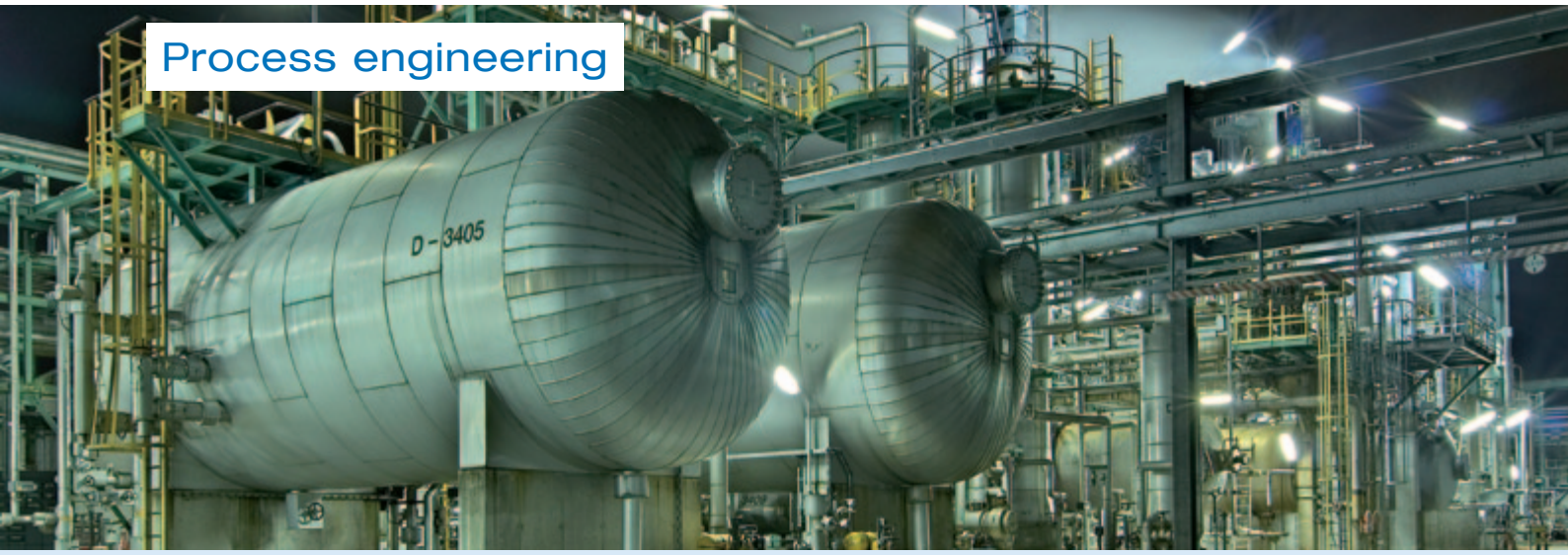
Building technology

The subject of saving energy has been our focus for almost 40 years. From the start, we have supported the move towards geothermal and solar systems as well as the use of biogenous fuels by supplying professional components and assemblies.
Our range for the secure storage of fuel oil and professional equipment for heating systems reduces operating costs, helps to make optimum use of fuels, provides timely warnings if hazardous situations arise and constitutes an active contribution to environmental protection. Innovative measuring instruments for flue gas analysis yield high-precision and reproducible results so that your customers can achieve their goals: the right amount of heat at the right time, low energy consumption and low emissions.

Target markets

- Manufacturers of burners and boilers
- Manufacturers of solar thermal systems
- Manufacturers of underfloor heating system
- Tank protection/revision
- Tank manufacturers
- Heating and plumbing system wholesalers
- Technical trade/electrical wholesalers
- Engineering and planning consultancies
- Manufacturers of fittings
- Chimney sweeps
- Public institutions, municipalities

associations and guilds. We tap our employees' know-how and expertise in the industry to make our customers' processes simpler, safer and more competitive. In process engineering, in building technology or facilities – you benefit with a strong partner at your side.



Process engineering

Reliability, precision and a long service life are crucial when it comes to highly automated processes. Our robust measuring devices deliver perfect measuring results and reliably monitor and control simple or complex processes – even under extreme conditions. AFRISO solutions comply with strict directives and standards. Certificates, for example for food-quality materials, explosion protection and resistance to media and temperatures attest to this.

AFRISO products meet the requirements

- Wide variety of process connections
- Large selection of materials
- Compact designs
- Hygienic and easy to clean
- Suitable for CIP and SIP
- FDA-listed materials
- Silicone-free versions
- Resistant to corrosive and abrasive media
- High overload safety
- Resistant to vibration and temperature

Target markets

- Machines and plants
- Tanks
- Food and beverages industry
- Chemical industry
- Pharmaceutical industry
- Cosmetics industry
- Biotechnology
- Refineries
- Offshore industry
- Mineral oil industry
- Raw materials industry
- Hydraulic and pneumatics (fluid engineering)
- Medical technology, safety engineering
- Energy production

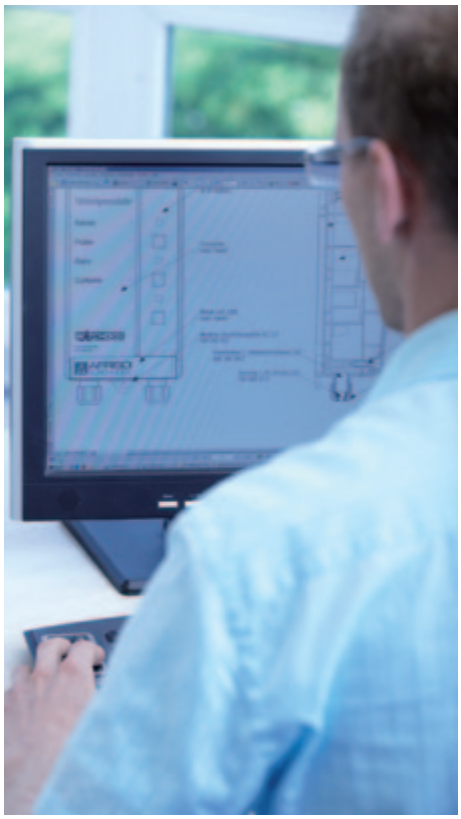
The guarantee for high-quality products.

AFRISO quality

Although we serve an extremely wide variety of markets and industries, all AFRISO employees work according to the same values. Reliability, flexibility and independence are the basis of our day-to-day work.
Our corporate culture is marked by a sense of responsibility. We want our employees to be content here with us. The "Beruf und Familie" ("Career and Family") certificate and the occupational health and safety management system implemented in 2009 help us show this to the outside world.

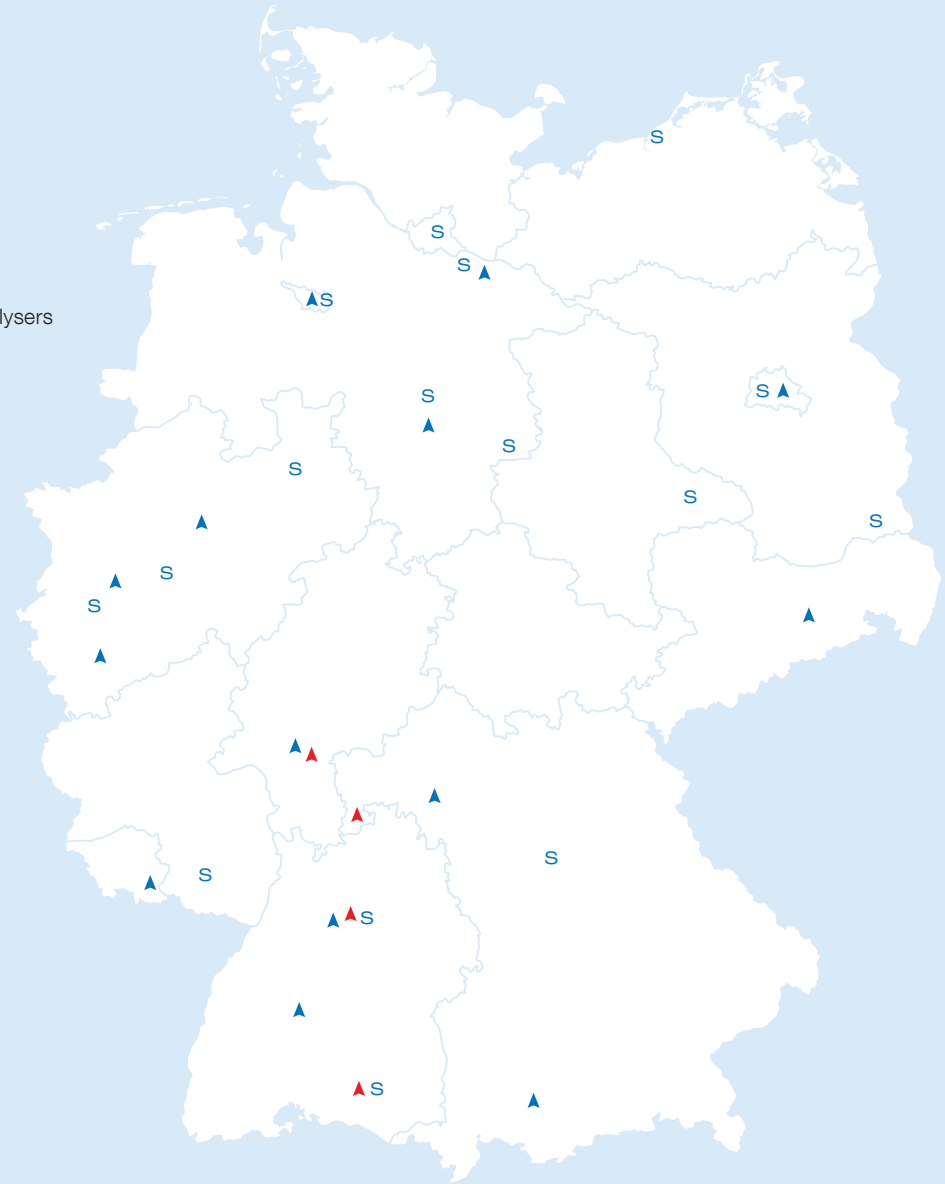
At AFRISO, quality is systematically planned and, at every stage of product development and production, managed and monitored. This is attested by national and international approvals and certificates. Quality Assurance as per ISO 9001 and environmental management in accordance with DIN EN ISO 14001 are a matter of course for us and implemented in every process.

TESA
Motorized
4.7.4
DCC



Sites in Germany

▲ AFRISO production site
▲ AFRISO sales office
S AFRISO service point
for measuring instruments and analysers



We ensure that you get professional, personal service.

With a staff of more than 70 field and internal experts! Please visit www.afriso.de/contact for further information on your specific contact person.
Business hours:
Monday – Thursday: 7:00 a.m. – 4:50 p.m.
Friday: 7:00 a.m.– 3:00 p.m.

Stocks and logistics

Maximum availability, short delivery times. Our range comprises more than 25,000 different products. More than 2,000 of them are on stock. A total of more than 750,000 individual devices and instruments are available ex stock.

AFRISO production sites in Germany

Headquarters
AFRISO-EURO-INDEX GmbH
Lindenstr. 20
74363 Güglingen
Baden-Württemberg

Plant Amorbach
AFRISO-EURO-INDEX GmbH
Friedhofstr. 3
63916 Amorbach
Odenwald/Bavaria

Plant Dietzenbach
AFRISO-EURO-INDEX GmbH
Waldstr. 23 / Halle C4
63128 Dietzenbach
Hessen

Plant Illmensee
Systronik GmbH
Gewerbestr. 57
88636 Illmensee
Lake Constance/Baden-Württemberg

A staff of 475 are at work for you in our four German production sites.

Close, direct customer contact as a result of consistent, international alignment.

On site worldwide for you

A tightly woven network of branches, distribution partners and service centres guarantees optimum consulting and delivery. 900 AFRISO employees respond to country-specific challenges with close customer contact and individual service on site – worldwide!

A total of 900 employees
Export to 60 countries

- AFRISO branch office
- AFRISO representation
- AFRISO authorised dealer

AFRISO Group

Headquarters
AFRISO-EURO-INDEX GmbH
Lindenstr. 20
74363 Güglingen, Germany
Phone +49 7135 102-0
Fax +49 7135 102-147
info@afriso.de
www.afriso.de

AFRISO-EUROJAUGE S.A.
17 A rue des Cerisiers
67117 Furdenheim, France
Phone +33 388 303138
info@eurojauge.fr
www.eurojauge.fr

AFRISO-EUROGAUGE Ltd.
Unit 4 Satellite Business Village
GB-Fleming Way, Great Britain
Crawley RH10 9NE
Phone +44 1293 658360
sales@eurogauge.co.uk
www.eurogauge.co.uk

EURO-INDEX bvba
607, Leuvensesteenweg
1930 Zaventem, Belgium
Phone +32 2 7579244
info@euro-index.be
www.euro-index.be

EURO-INDEX B.V.
Rivium 2e straat 12
2909 LG Capelle a/d IJssel
The Netherlands
Phone +31 10 2888000
info@euro-index.nl
www.euro-index.nl

AFRISO-EURO-INDEX AG
Industriestr. 11
9434 Au/SG, Switzerland
Phone +41 71 7443344
office@afriso.ch
www.afriso.ch

AFRISO-EURO-INDEX GmbH
Reichshofstr. 7a
6890 Lustenau, Austria
Phone +43 5577 83255
office@afriso.at
www.afriso.at

AFRISO IBÉRICA
Crta. Rubí-Sabadell, km 13,
nave 88 A
08191 Rubi (Barcelona), Spain
Phone +34 9 35 88 12 52
antonio.garcia@afriso.com
www.afriso.com

AFRISO-EURO-INDEX KFT
Kelenföldi út 2.
1115 Budapest, Hungary
Phone +36 1 2212496
info@afriso-euro-index.hu

AFRISO spol.s r.o.
Zakourilova 102
14900 Praha 4, Czech Republic
Phone +42 2 72953636
info@afriso.cz
www.afriso.cz

AFRISO SP. Z O.O.
Szalsza/k. Gliwice
ul. Koscielna 7
42-677 Czekanow, Poland
Phone +48 32 330 33 55
info@afriso.pl
www.afriso.pl

AFRISO-EURO-INDEX SRL
Bd. Tudor Vladimirescu No 45 A
050881 Bucuresti, sect.5,
Romania
Phone +40 21 4100702
info@afriso.ro
www.afriso.ro

AFRISO EMA AB
Kilvägen 2
23237 Arlöv, Sweden
Phone +46 40 922050
info@afriso.se
www.afriso.se

AFRISO LLC
Sosyury Str. 5, Of. 301
02090 Kiev, Ukraine
Phone +380 44 332 0132
info@afriso.com.ua
www.afriso.com.ua

AFRISO Ltd.
ul. Novoslobodskaya
House No. 73, CTP. 1, Office 513
127055 Moscow, Russia
Phone +7 495 685-3903
info@afriso.ru
www.afriso.ru

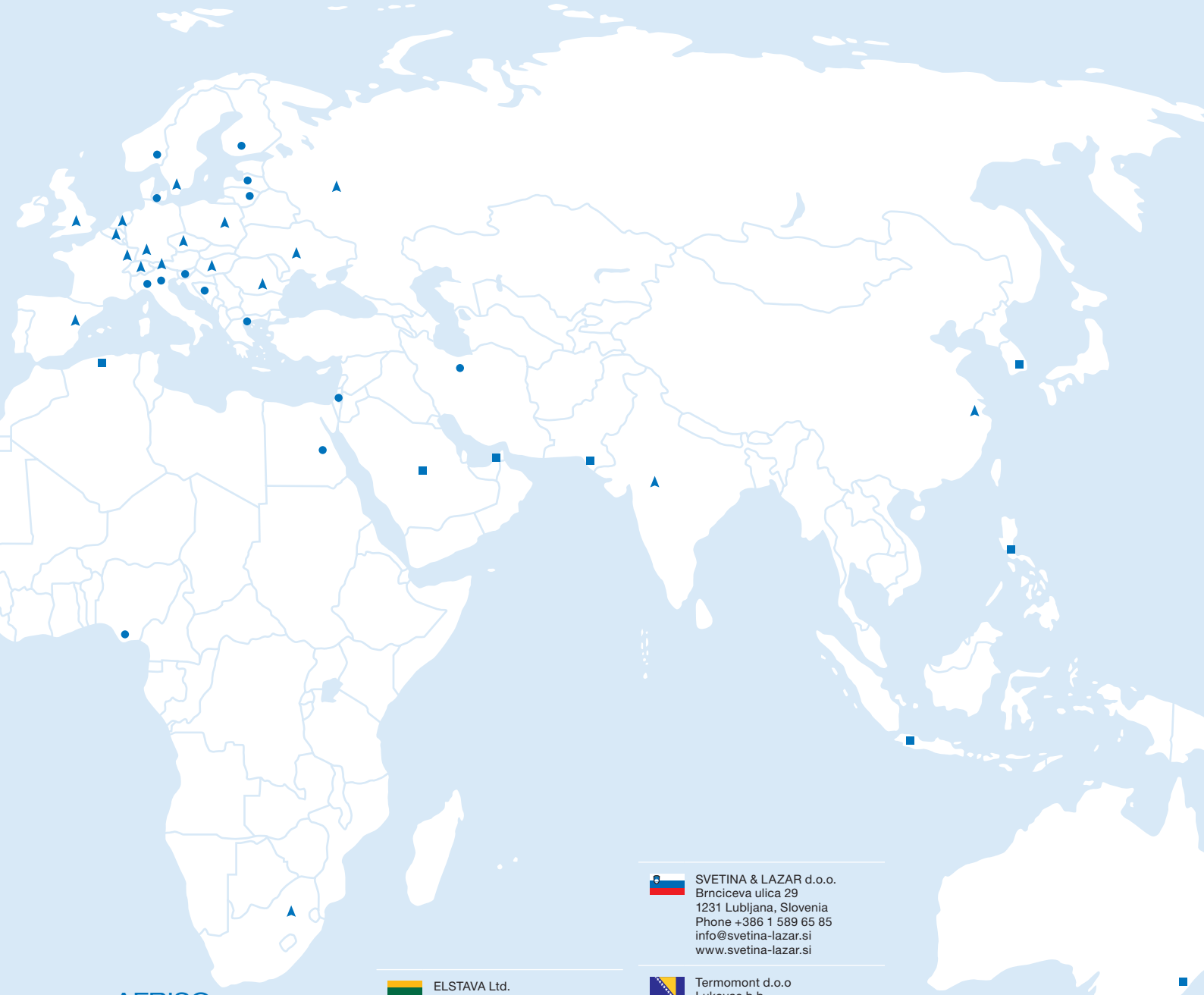
AFRISO SOUTH AFRICA (PTY) LTD.
P.O. Box 11201
1514 Rynfield, South Africa
Phone +27 11 914 4520
info@afrisosa.co.za
www.afrisosa.co.za

AFRISO Measurement & Control Technology (Suzhou) Co. Ltd.
Building No. 1, New-Tech Industrial Park
No. 98 Hengshan Road
215011 Suzhou City, China
Phone +86 512 6807 9460
info@afriso.cn
www.afriso.cn

AFRISO India Pvt. Ltd.
508, "Zenith Complex"
28/2, Shivajinagar
K. M. Gandhi Path
Pune – 411 005
Maharashtra, India
Phone +912025514336
nilkanth.jatar@afriso.de
www.afriso.in

AFRISO NORTH AMERICA
2 Homestead Drive
Medway, MA 02053
Phone +1 508 533-3153
frank.schuldt@afriso.com
www.afriso.com

AFRISO SUDAMÉRICA
Av. Boulevard 530, Int. 401
San Borja – Lima, Peru
Phone +511 4357577
raul.gutierrez@afriso.com
www.afriso.com



AFRISO representations

Hasvold a.s
Box 71 Arvoll
Lofthusveien 65
0590 Oslo, Norway
Phone +47 22 658610
info@hasvold.no
www.hasvold.no

Lyth-Instrument Oy
Peltosaarenkatu 2
11130 Riihimäki, Finland
Phone +358 19 760330
kari.jalonen@lyth.fi
www.lyth.fi

Power-Flex ApS
Taffelbays Allé 2
2900 Hellerup, Denmark
Phone +45 39 628787
info@powerflex.dk
www.powerflex.dk

ELSTAVA Ltd.
J. Kubiliaus g. 16
08236 Vilnius, Lithuania
Phone +370 5 244 2036
info@elstava.lt
www.elstava.lt

EVA-SAT SIA
Jaunmoku str. 26
1046, Riga, Latvia
Phone +371 67893870
janis.baumanis@evasat.lv
www.evasat.lv

EURO-CONTROL Systems s.r.l.
Via Mancalacqua 20/24
37060 Lugagnano (Verona), Italy
Phone +39 045 8680444
info@euro-control.it

Adami Dr. Ing Mario s.r.l.
Via Stilicone, 20
20154 Milano, Italy
Phone +39 02 34 93 44 76
info@adami.it
www.adami.it

SVETINA & LAZAR d.o.o.
Brnciceva ulica 29
1231 Lubljana, Slovenia
Phone +386 1 589 65 85
info@svetina-lazar.si
www.svetina-lazar.si

Termomont d.o.o
Lukovac b.b
88345 Sovici-Grude
Bosnia and Herzegowina
Phone +387 39 670 623
termomont@Phonenet.ba

FLOGA S.A
23 km Thessaloniki - Poligiros
57006 Lakkia Vasilika, Greece
Phone +30 239 602 3633
floga1@otenet.gr

EMS Engineering for
Measurement Systems
10, Mohandeseen Askareen
Naser City, 11371 Cairo, Egypt
Phone +20 2 24041672
info@ems-egypt.com

Netsach Nigeria Limited
5b Jo'babs Dare Close, Off
Adeyeri Close, Off Opebi, Ikeja
Lagos, Nigeria
Phone +234 1 8947587
info@netsachng.com
www.netsachug.com

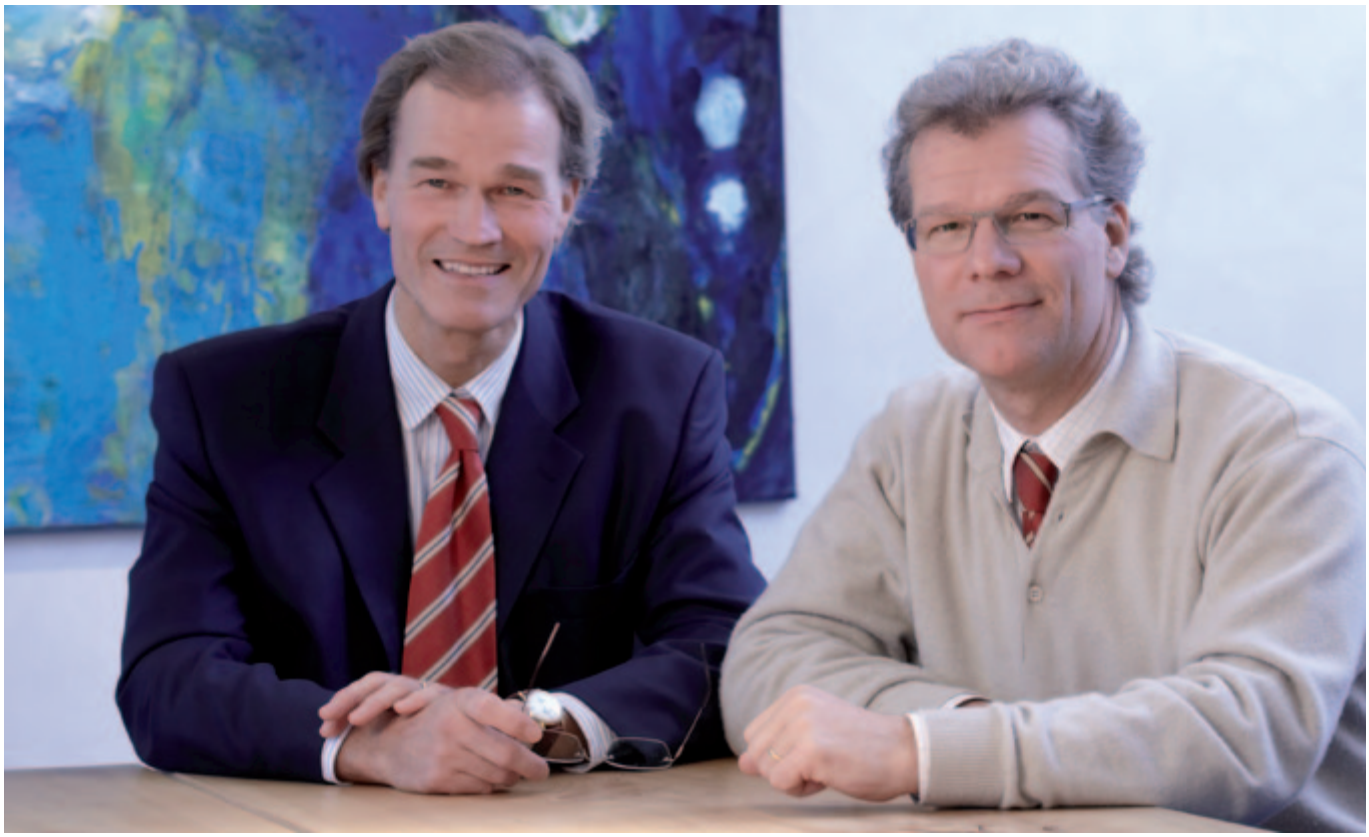
Automation Engineering Co. Ltd
No. 19, First Street, Bokharest
Ave.
Tehran, Iran
Phone +98 21 8872 2520-21
info@aec.co.ir
www.aec.co.ir

Lachmann Ltd.
21 Atir Yeda St.
44643 KFAR SABA, Israel
Phone: +972 9 766 7990
rotal@rotal.com
www.rotal.com

Intrial E.I.R.L.
Av. Boulevard 530, Int. 401
San Borja – Lima, Peru
Phone +511 4357577
ventas@intrial.com.pe
www.intrial.com.pe

Success for more than 140 years.

Tradition and innovation perfectly in tune



Jürgen and Elmar Fritz, great-grandsons of the company founder

In 1869, our great-grandfather Adalbert Fritz founded his company in Thuringia. When his son Franz Fritz, our grandfather, entered the company, the company name changed to "Adalbert Fritz & Sohn", or, in short, AFRISO – which became a renowned brand for temperature and pressure measurement.
For 50 years, the company focussed on glass thermometers, medical glass instruments and laboratory equipment.
A small, thin-walled, circular and concentrically shaped metal sheet completely changed the AFRISO world around 1920. Two diaphragm half shells form a capsule element which expands or contracts depending on the pressure.

Precision pressure gauges, blood pressure measurement instruments and temperature controllers became the most important products for the time up to 1945 and the new beginning after that.
After World War II, Franz Fritz and his son Georg, our father, rebuilt the company in Kleingartach and in Güglingen/Württemberg.
Pneumatic level measurement devices were developed on the basis of pressure measurement instruments, primarily for fuel oil storage tanks. Other innovations included overfill alarms and leak monitoring systems for the safe storage of mineral oil products. Technology for environmental protection became the main focus of the product range. AFRISO secured the market leadership in this sector.

Georg Fritz 1922 – 2004

Franz Fritz 1890 – 1968

Adalbert Fritz 1846 – 1918

The early 1960s marked the beginning of the internationalisation of AFRISO. AFRISO founded sales and production companies in almost all Western European countries and changed its name to AFRISO-EURO-INDEX.

After the oil crisis in 1973/1974, AFRISO developed a comprehensive range of products for the efficient and environmentally friendly operation of heating systems. After the political change in Eastern Europe, subsidiaries were founded in Hungary, Romania, the Czech Republic, Poland, Ukraine, Russia and China.

We are now the fourth Fritz generation to lead the company. We are very well aware of the benefits of a medium-sized company with a long tradition of innovation, run by its owners. And we will continue to be reliable partners for our customers, suppliers and employees.

Elmar Fritz

Jürgen Fritz

AFRISO milestones

Products for electronic level measurement extend the range for industrial applications.

Rebuilding of the company in Kleingartach and Güglingen/ Württemberg by Franz Fritz and son Georg Fritz.

Founding of sales and production companies in Western Europe. AFRISO renamed AFRISO-EURO-INDEX.

Company founded by Adalbert Fritz. Production of glass thermometers, glass instruments and laboratory equipment.

1869 **1920** **1950** **1955** **1958** **1960** **1972**

A new era begins: Production of capsule elements as the basis for precision pressure gauges, blood pressure measurement devices and temperature controllers.

Market launch: Level indicators for fuel oil tanks. This is followed by overfill prevention systems and leak monitoring systems for the safe storage of oil products.

Market launch of the first portable electronic flue gas analyser.

Integration of SYSTRONIK into the corporate group. Measuring instruments for the industry and the environment are combined in a new division.

Future-orientated: The Stationary Gas Analysis division engineers and implements system solutions for emission data acquisition.

Market launch: Product portfolio for solar thermal systems.

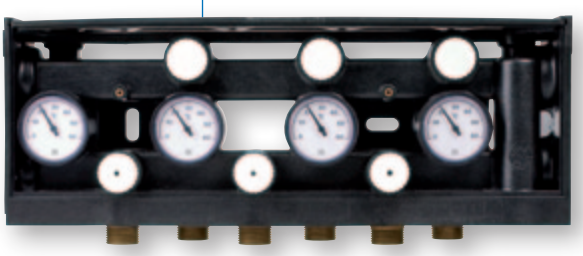
The future lies in the economical and environmentally compatible operation of heating systems. AFRISO launches a broad product portfolio on the market.

Internationalisation: Founding of subsidiaries in Eastern Europe and Russia.

1974 1981 1994 1996 2006 2009 2010

Founding of subsidiaries in South Africa, China, India and South America.

Market launch of the first compact manifold made of plastic.



Innovation: AFRISO presents the EUROLYZER STe, the first all-in-one flue gas analyser with ECO sensor.

Complete Catalogue

2011/2012

Unitop

TankControl

VarioFox

VibraFox®

CHAPTER 1

Level indicators, level controllers, overfill prevention systems

OVERVIEW

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LEVEL – CONTINUOUS

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Digital tank contents indicator for water DIT 02 15

Hydrostatic level indicator TankControl 16

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Capacitance level indicator with EX approval CapFox® S 74x 22

Probes for CapFox® EFM 741/752/762 23

Compact ultrasonic transmitter SonarFox® UST 02 25

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Conductivity level switch CoFox® ELT 8 36

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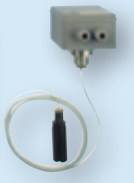
Capacitance level switch CapFox® ENT 7 41

Capacitance overfill prevention system with EX approval CapFox® ENT 20 Ex 43

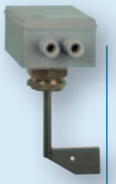
Probes for CapFox® ENT 20 Ex 44

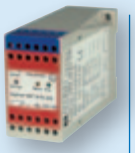
Vibration level switch for liquids VibraFox® GVG 45

Level indicators at a glance



		Dipstick	MT-Profil R	Unimes	Unitel	Unitop	DIT	TankControl	Cap Fox® EFT 7
Application area		Applications in the area of building technology/tank protection							
Indoor tanks	Tanks	•	•	•	•	•	•	•	•
Outdoor tanks	Tanks	•			•	•	•	•	•
Rectangular tanks	Tanks		•	•	•	•	•	•	•
Cylindrical tanks	Tanks	•	•	•	•	•	•	•	•
Plastic battery tanks	Tanks		•	•	•	•	•	•	
Silos	Tanks								
Hoppers	Tanks								
Additional tank types*	Tanks		•	•	•	•	•	•	•
Up to 2,000 mm	Tank height	•**		•					
Up to 2,500 mm	Tank height	•**	•		•**				
Up to 2,900 mm	Tank height	•**							
Up to 3,000 mm	Tank height				•**	•**	•**	•**	•
More than 3,000 mm	Tank height					•**	•**	•**	
Fuel oil/diesel fuel (EN 590)	Media	•	•	•	•	•	•**	•**	•
Diesel fuel (EN 590) with 20 % fatty acid methyl ester (FAME) as biodiesel (EN 14214)	Media		•	•			•**	•**	
Diesel fuel (EN 590) with 100 % fatty acid methyl ester (FAME) as biodiesel (EN 14214)	Media		•	•			•**	•**	
Fuel oil EL (DIN 51603-1) with 20 % fatty acid methyl ester (FAME) as biofuel (EN 14213)	Media		•	•			•**	•**	
Fuel oil EL (DIN 51603-1) with 100 % fatty acid methyl ester (FAME) as biofuel (EN 14213)	Media		•	•			•**	•**	
Water	Media	•	•	•	•	•	•**	•**	
AdBlue®	Media					•**			
Other liquid media*	Media								•
Other conductive media*	Media								
Other non-conductive media*	Media								•
Powdery media*	Media								
Other solid media*	Media								
Measuring principle	Design	Mechanical	Mechanical	Mechanical	Pneumatic	Pneumatic	Hydrostatic	Hydrostatic	Capacitance
Display	Design	•	•	•	•	•	•	•	
Min. alarm	Design							•	
Max. alarm	Design							•	
Indication of consumption	Design							•	
Calculation of remaining range	Design							•	
Control of additional devices	Design							•	•
Suitable for remote measurements	Design			•**	•	•	•	•	•
% liquid level	Indication/signal			•**	•	•			
% volume	Indication/signal				•*	•*	•	•	
Liquid level in cm	Indication/signal	•	•						
Liquid level in mm	Indication/signal						•	•	
Litres	Indication/signal			•**	•**	•**	•	•	
m^3	Indication/signal						•	•	
Analogue output (4–20 mA, 0–10 V)	Indication/signal								•
Binary output (relay, PNP)	Indication/signal							•	
Technical Approval of the German Institute for Building Technology	Certificates								
WHG/ VAwS	Certificates								
ATEX	Certificates								
* See product description/operating instructions ** Depends on product version		Page 6	Page 7	Page 7	Page 9	Page 10	Page 14	Page 16	Page 20





HydroFox® DMU 08	CapFox® EFM	Sonar Fox®	CoFox® CMG 01	MagFox® MMG 01	PulsFox® PMG	RotaFox® MLS	CoFox® ELT	CapFox® ENT	CapFox® ENT 20 Ex	VibraFox® GVG
Industrial applications										
•	•	•	•	•	•		•	•	•	•
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		•			•	•		•		
Hydrostatic	Capacitance	Ultrasound	Potentio-metric	Magneto-strictive	TDR	Rotary paddle	Conductive	Capacitance	Capacitance	Vibration fork
	•	•								
	•					•	•	•	•	•
	•					•	•	•	•	•
•	•	•	•	•	•	•	•	•	•	•
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•				•*	•				•	
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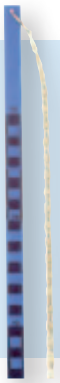
Dipstick, pipe for dipstick

1



Plastic dipstick

Application
For manual level measurement, primarily in cylindrical underground tanks. Suitable for the following media: fuel oil, diesel fuel.

Description
Dipstick made of flexible, break-proof plastic with 100 cm brass chain. Excellent readability due to cm graduation.

Technical specifications

Material
Plastic

Measuring ranges (tank height) / dipstick length
160 cm / 170 cm
200 cm / 210 cm
250 cm / 260 cm
290 cm / 300 cm

Pipe for dipstick

For suspension in 1" pipe. Protects inner tank linings and coatings against damage caused by the dipstick.

Pipe for dipstick, crimped at one end, closed at the other end. Various lengths available, suitable for AFRISO dipsticks.

Material
Steel, galvanised

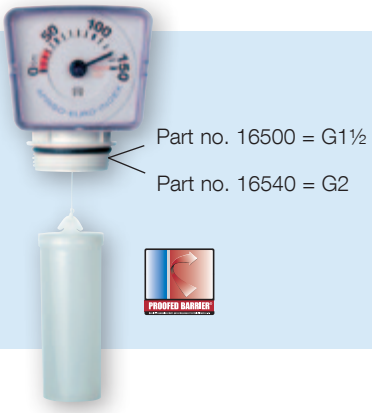
Connection
Suitable for measuring ranges
160 cm
200 cm
250 cm
290 cm

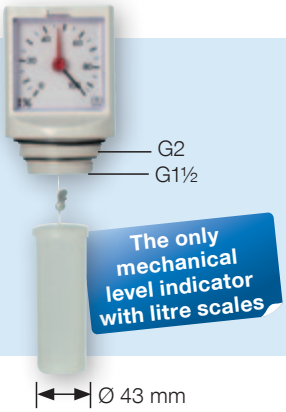
Cap for pipe for dipstick
with connection thread G1 female, brass

DG: G			Part no.	Price €
Plastic dipstick:				
Length 170 cm, measuring range 160 cm*	1	-	**20010**	
Length 210 cm, measuring range 200 cm*	1	-	**20011**	
Length 260 cm, measuring range 250 cm*	1	-	**20012**	
Length 300 cm, measuring range 290 cm*	1	-	**20013**	
Cap for pipe for dipstick G1 female x G1¼	1	140	**20464**	
Pipe for dipstick 160 cm*	1	-	**71315**	
Pipe for dipstick 200 cm*	1	-	**71320**	
Pipe for dipstick 250 cm*	1	-	**71330**	
Pipe for dipstick 290 cm*	1	-	**71335**	

*Extra shipping charges apply for dipsticks and pipes for dipsticks (all lengths).

Mechanical level indicators





MT-Profil R – 1½ and – 2

Application

For continuous level measurement in tanks containing fuel oil EL, diesel fuel, biodiesel and water. For tanks heights from 0 to 250 cm.

Description

Universal, mechanical level indicator with plastic planetary gear. Measuring range is adjustable from 0 to 250 cm by reversible scale. With reversible scale 0–150 cm and 0–250 cm for fast adaptation to the tank height. Odour-tight – suitable for flood areas.

Technical specifications

Measuring range (tank height)
0/150 to 0/250 cm

Displayed values
0/150 or 0/250 liquid level in cm

Connection thread
G1½ or G2

Housing/float
Display: ABS, impact-resistant
Float: PE-HD

Unimes

For continuous level measurement in tanks containing fuel oil EL, diesel fuel, biodiesel and other low-viscosity media which do not attack materials of the indicator. For tank heights from 900 to 2,000 mm.

Universal mechanical level indicator with with fully adjustable brass and nickel silver movement. The pointer deflection amounts to 270° at tank heights and diameters from at least 900 mm to 2,000 mm maximum. Indication in percentage of liquid level, litre scale can be retrofitted. With reference pointer for consumption monitoring.

Measuring range (tank height)
0/900 to 0/2,000 mm

Displayed values
0/100 % liquid level

Connection thread
G1½ and G2

Housing/float
Display: ABS, impact-resistant
Window: SAN
Float: PE-HD

Additional litre scales
For use with Unimes for all standard, cylindrical horizontal tanks. When ordering, please specify the shape and capacity of tank.

Special scales
For Unimes and tanks of any shape and dimension. When ordering, please include tank drawing or bearing chart.

DG: G			Part no.	Price €
Unimes	1	-	**11500**	
Additional litre scales	1	1	11900	
Special scales	1	1	11999	
MT-Profil R – 1½	1	75	**16500**	
MT-Profil R – 2	1	75	**16540**	
Reducer G2 x G1½	10	-	**20903**	

i See page 11 for suitable reducers.

Mechanical level indicator with remote display Unimes E

1

- **Direct indication at the tank without power supply and electronic remote indication up to 10 m**
- **Electronic remote display with battery supply**
- **Push-to-read function for extremely long battery service life**
- **Convenient monitoring of tank contents with easy-to-read display**

Application

For continuous level measurement in tanks containing fuel oil EL, diesel fuel and other low-viscosity media which do not attack the materials of the indicator. For tank heights from 900 to 2,000 mm. The additional remote display enables convenient level indication even if the tank is not easily accessible. Suitable for remote measurements up to 10 m.

Description

Universal mechanical level indicator with additional electronic remote indicator. The mechanical level indicator features a fully adjustable brass and nickel silver gear. The pointer deflection amounts to 270° at tank heights and diameters from at least 900 mm to 2,000 mm maximum. The contents is indicated in % liquid level. An electronic sensor at the gear supplies the remote indicator with a signal that is proportional to the level.
The remote indicator is connected to the mechanical level indicator by means of a 3-wire shielded cable and connector. The remote indicator is operated by means of a long-lasting battery; it is only switched on to read the level (push-to-read function). A wide variety of tank shapes are stored in a microprocessor; the level is indicated either in liquid level or volume, as desired. This combination of devices allows you to take readings directly next to the tank and from an easily accessible, different location.

Technical specifications

Functions
Indication in % liquid level, remote indication (push-to-read), selection of units, calculation of total volume

Measuring range
0/900 to 0/2,000 mm

Measuring accuracy
±3 % of full scale value

Operating temperature range
Medium: 0/60 °C
Ambient: 0/45 °C
Storage: -5/+80 °C

Displayed values
Direct indication: 0–100 % liquid level
Remote indication: Litres, m^3, %, liquid level in mm (4-digit 12 mm LCD)

Supply voltage
Direct indication: Mechanical measuring system without power supply
Remote indication: 1 x lithium battery 3.6 V
Service life approx. 5 years

Connection thread
G1½ and G2

Housing/float
Direct indication: ABS, impact-resistant
Depth Ø 80, height 100 mm
Float: PE-HD, Ø 42,
height 100 mm
Remote indication: PA6 glass-loaded,
height Ø 75,
depth 48 mm

Degree of protection
Direct indication: IP 30 (EN 60529)
Remote indication: IP 51 (EN 60529)

Weight
0.5 kg

Scope of delivery
- Mechanical level indicator
- Electronic remote display (with battery and wall bracket)
- Connection cable 10 m

DG: H	Part no.	**Price €**
Unimes E	**52130**	

Pneumatic level indicator Unitel

- No power supply required
- Reference pointer for easy consumption monitoring
- Zero correction possible
- For remote measurements up to 50 m

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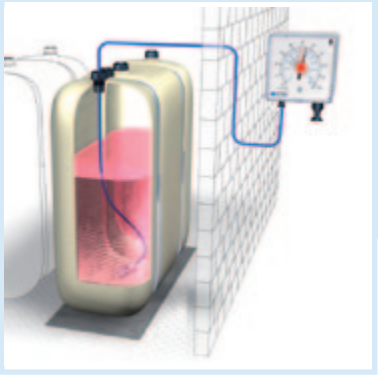

Application

For continuous level measurement in tanks containing fuel oil, diesel fuel and rainwater.
For tank heights from at least 900 to 3,000 mm (depends on version). Suitable for remote measurements up to 50 m.

Description

Universal pneumatic level indicator with capsule type movement. The tank height is fully adjustable. Measuring accuracy ±3 % of full scale value. A dual scale facilitates measurements in rectangular tanks (= linear tanks) and cylindrical tanks. Indication in % volume (Unitel) or % liquid level (Unitel for water). Impact-resistant plastic housing for wall mounting. With zero correction and integrated overpressure device. Reference pointer for easy consumption monitoring. Connection 6 mm outside diameter, universal, for pipe or hose for tight connection of the measuring line (e.g. Pneumofix).

Technical specifications

Medium
Fuel oil or diesel fuel (density = 0.84 g/cm³) or water (density = 1 g/cm³) for Unitel for water

Measuring range (tank height)
0/3,000 mm (part no. 72500)
0/2,500 mm (part no. 72511)

Measuring accuracy
±3 % of full scale value

Operating temperature range
Ambient: -5/+55 °C

Scale (displayed values)
Unitel: Dual scale 0/100 % volume
Outer for rectangular tanks,
inner for cylindrical tanks
Unitel for water: 0/100 % liquid level

Housing
Wall mounting housing made of impact-resistant plastic with integrated hand pump
W x H x D: 145 x 135 x 65 mm

Options

Additional litre scales
For Unitel and Unitel for water. For all standard, cylindrical horizontal tanks. When ordering, please specify the shape and capacity of tank.

Special scales
For Unitel and Unitel for water. For tanks of any shape and dimension. Scales are individually calibrated to customer's specification. Please specify exact details of tank shape, size and capacity.

Montagefix extension kit
For measuring line extension. 10 m PE measuring line 4 x 1 mm with hose extension piece

Unitel-Montagefix Water
Complete mounting kit for installation in rainwater harvesting systems with all required installation accessories, consisting of:
Unitel for water, 3.1 m standpipe with balance chamber, 10 m PE measuring line 4 x 1 mm, mounting parts and accessories.

DG: G			Part no.	Price €
Unitel	1	-	**72500**	
Unitel for water	1	-	**72511**	
Unitel-Montagefix water	1	-	**72499**	
Additional litre scale (for cylindrical horizontal tanks)	1	-	**725..**	
Special scale (special designs)	1	-	72599	
Montagefix extension kit	1	-	**20132**	
Measuring line 4 x 1, 50 m reel	1	-	**20158**	
Hose connector	1	10	**43945**	

i See chapter 8 for more products for rainwater harvesting.

Pneumatic pneumatic level indicator Unitop

1

- No power supply required
- Consumption monitoring with date indication
- Zero correction possible
- Sturdy brass connector for safe and tight installation of the measuring line
- For remote measurements up to 50 m

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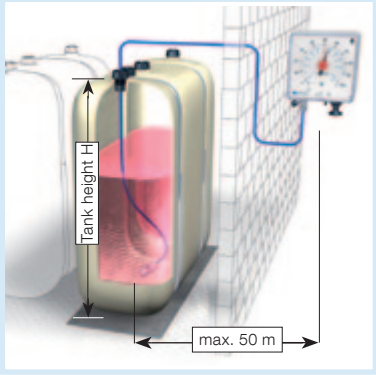

Application

For continuous level measurement in tanks containing fuel oil and diesel fuel. For tank heights from 700 to 4,000 mm (depends on version). Suitable for remote measurements up to 50 m.

Description

Universal, pneumatic level indicator with capsule type movement. The tank height is fully adjustable. Measuring accuracy ±2 % of full scale value. A dual scale facilitates measurements in rectangular tanks (= linear tanks) and cylindrical tanks. The basic version indicates % of volume so that it is independent of the tank shape. Impact-resistant plastic housing for wall mounting. With zero correction at the front side, reference pointer and date indication for easy consumption monitoring; with integrated overpressure device. The mechanism carrier of extremely rugged plastic is separated from the housing for stable zero point and high measurement accuracy. Sturdy brass connector with pressure screw for pipe or hose (Ø 6 mm) for tight monitoring of the measuring line. A vent screw, integrated in the connector, allows you to check the zero setting of the pointer.

Technical specifications

Medium
Fuel oil or diesel fuel (density = 0.84 g/cm³)

Measuring range (tank height)
0/700 to 0/1,200 mm (part no. 28100)
0/900 to 0/3,000 mm (part no. 28000)
0/3,000 to 0/4,000 mm (part no. 28200)

Measuring accuracy
±2 % of full scale value

Operating temperature range
Medium: 0/35 °C
Ambient: -5/+55 °C
Storage: -5/+55 °C

Scale (displayed values)
Dual scale 0/100 % volume
Outer for rectangular tanks,
inner for cylindrical tanks

Housing
Wall mounting housing made of impact-resistant plastic with integrated hand pump
W x H x D: 155 x 166 x 73 mm

Scope of delivery
Level indicator with connection kit and screws
For Unitop 3000: Litre scales for cylindrical tanks 3,000/5,000, 7,000/10,000, 16,000/18,000

Additional litre scales
Additional litre scales for Unitop 3000, Unitop 1200 and Unitop 4000. Suitable for all cylindrical horizontal tanks.
When ordering, please specify the shape and capacity of tank.

Special scales
For tanks of any shape and dimensions, suitable for Unitop 1200, Unitop 3000 and Unitop 4000. Scales are individually calibrated to customer's specification.
When ordering, please enclose a drawing or a bearing chart of the tank or specify exact tank shape, dimensions and capacity.

DG: G			Part no.	Price €
Unitop 1200	1	-	28100	
Unitop 3000	1	-	**28000**	
Unitop 4000	1	-	28200	
Additional litre scales	1	-	**289..**	
Special scales	1	-	28999	

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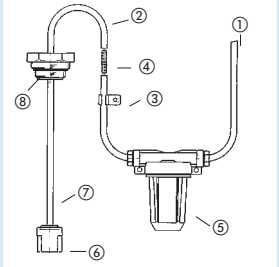
Unitop for AdBlue® see page 13.

Mounting accessories pneumatic level indicators

Pneumofix

Description Complete, universal mounting kit for pneumatic level indicators. Can be used for tanks of up to 3,000 mm in height or diameter. Consisting of screw fitting G1 and G1¼, reducer G1 x 1½ x 2. Standpipe in tank (3.1 m long) with balance chamber, condensate trap. Polyethylene measuring line 10 m. Hose clamps and steel nails, hose extension piece.
If no connection socket is available at the tank, it is recommended to use Euroflex (see page 104).



① To level indicator
② Measuring line L = 10 m
③ Hose clamp
④ Hose extension piece
⑤ Condensate trap
⑥ Spacer / balancing chamber
⑦ Hose, inside diameter 4
⑧ Dual thread tank adaptor

Pneumofix

Montagefix extension kit

Description For extending the measuring line of pneumatic level indicators.
Consisting of:
10 m PE measuring line 4 x 1 mm with hose extension piece.

Montagefix extension kit

Condensate trap KG 2

Description For protection of pneumatic level indicators against condensate. Made of high-grade, impact-resistant plastic. The condensate trap can be easily unscrewed for emptying. Universal connections for hose or pipe with 6 mm outside diameter.

Condensate trap KG 2

Reducers/adapters

Description **Reducer 2 x 1½**
Reducer G2 x G1½ made of grey plastic (ABS).

Reducer 1½ x 1
Reducer G1½ x G1 made of grey plastic (ABS).

Description **Flange adaptor**
Flange adaptor G2 x G1½ made of grey plastic (ABS).

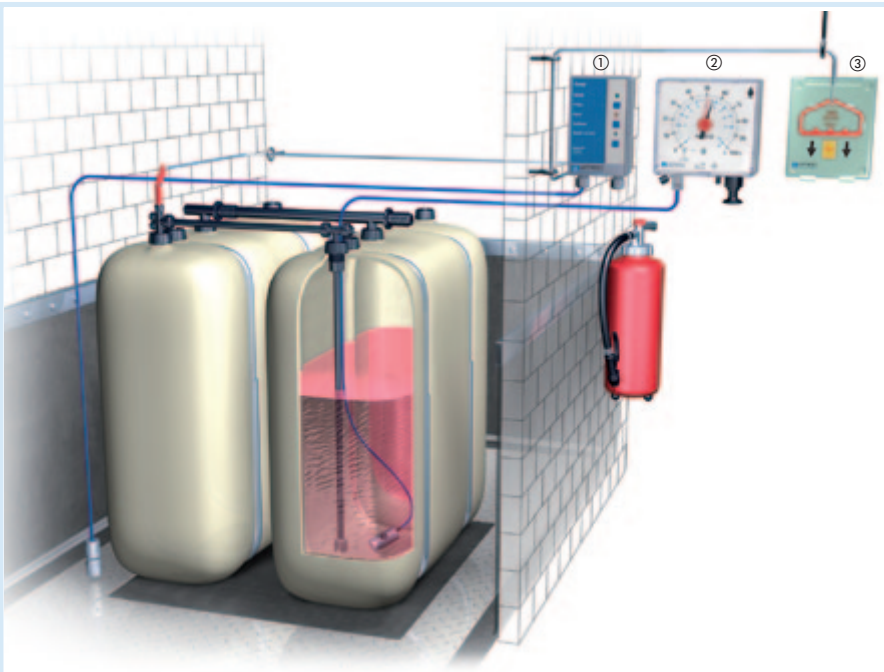
Reducers

Flange adapter

DG: G			Part no.	Price €
Pneumofix	1	-	**20153**	
Montagefix extension kit	1	-	**20132**	
Measuring line 50 m	1	-	**20158**	
Hose connector	1	10	**43945**	
Condensate trap KG 2	5	-	**20320**	
Reducer 2 x 1½	10	-	**20903**	
Reducer 1½ x 1	10	-	**20905**	
Flange adaptor	1	-	**20900**	

Level indicators with mounting kit for plastic battery tanks

1



The tank room under control with
① AFRISO WATCHDOG oil / water alarm*
② Unitop**
③ Pull cord***

This mounting kit enables quick and easy retrofitting of plastic battery tanks without interruption of regular operation.

Immediate installation – no problem!

1. Drill a hole into the flange
2. Install the measuring line
3. Check the level

Benefits:
No components need to be dismantled for installation. Oil-carrying pipes do not need to be dismantled and then recommissioned and deaerated.

Application

Many plastic fuel tanks become opaque over the years due to sediments, dirt and age. Often there is no connection available for a level indicator. This special mounting kit makes it possible to connect a pneumatic level indicator. There is no need to switch off the burner. Many withdrawal systems already have corresponding markings on the mounting flanges for the holes.

Attention:
In most cases, it is prohibited to drill through the tank wall.
This may render the warranty for the tank to be void.

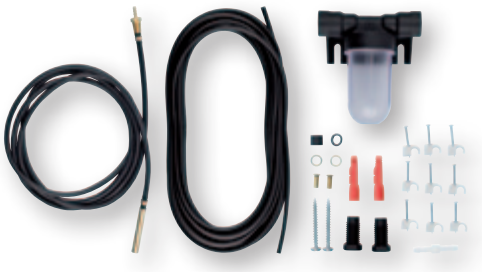
Unitel-Set
This universal, pneumatic level indicator for remote measurement up to 50 m comes with a mounting kit for installation on plastic battery tanks.

See the Unitel product description.

Unitop-Set
Universal, pneumatic level indicator Unitop 3000 for remote measurement up to 50 m, with mounting kit for installation on plastic battery tanks.

See Unitop product description.

Mounting kit
Consisting of the standpipe 2.10 m with weight (Ø 9 mm), self-sealing connection piece for a 10 mm hole, 10 m measuring line, hose clamps, steel nails and a hose extension piece.



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*See page 97–98 for oil/water alarm
**See page 9–10 for Unitel/Unitop
***See page 131 for a pull cord

DG: G			Part no.	**Price €**
Unitel-Set	1	-	**72512**	
Unitop-Set	1	-	28004	

Pneumatic level indicator for AdBlue® – Unitop-Set AdBlue

- Specially calibrated for AdBlue®
- Universally adjustable
- Easy installation
- Complete with special mounting kit
- No power supply required

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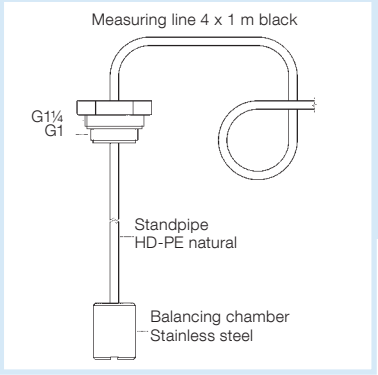

Application

For continuous level measurement in tanks containing AdBlue® (density 1.09 g/cm³). For tank heights from 700 to 2,300 mm. Suitable for remote indication up to 50 m. The term AdBlue® is the same as "NOx Reducing Agent AUS 32" and "Urea solution 32.5 %".

Description

Universal, pneumatic pneumatic level indicator with capsule type movement. Specially adjusted to the specific weight (density) of AdBlue® = 1.09 g/cm³. Fully adjustable from 700 to 2,300 mm tank height. Measuring accuracy ±2 % of full scale value. Indication in % volume; optional litre scales are available. With zero correction at the front side, reference pointer and date indication for easy consumption monitoring; with integrated overpressure device. Universal measuring line connection for pipe or hose with an outside diameter of 6 mm. Easy installation with mounting kit specially adapted to AdBlue®. Process connection G1 and G1¼, standpipe HD-PE 2.5 m with stainless steel balance chamber, 10 m measuring line PE 4 x 1 mm, reducer G1 x G1½ x G2.

Technical specifications

Measuring range
0/700 to 0/2,300 mm tank height

Measuring accuracy
±2 % of full scale value

Operating temperature range
Medium: 0/35 °C
Ambient: -5/+55 °C
(Please observe the pertinent regulations concerning the storage of AdBlue®!)

Scale (displayed values)
0/100 % volume

Housing
Wall mounting housing made of impact-resistant plastic with integrated hand pump
W x H x D: 155 x 166 x 73 mm

Process connection
G1 and G1¼, reducer G1 x G1½ x G2

Standpipe
Plastic HD-PE natural
Length 2.5 m balance chamber stainless steel

Measuring line
PE hose 4 x 1 mm
Length 10 m

Scope of delivery
Level indicator, mounting kit and reducers G2 x G1½ as well as G1½ x G1

Additional litre scales
Additional litre scales for Unitop. Suitable for all cylindrical horizontal tanks. When ordering, please specify the shape and capacity of tank.

Special scales
For tanks of any shape and dimension, suitable for Unitop. Scales are individually calibrated to customer's specification.
When ordering, please enclose a drawing or a bearing chart of the tank or specify exact tank shape, dimensions and capacity.

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Make sure to observe all pertinent legislation concerning selection of materials and construction when building storage facilities for AdBlue®.
See chapter 2 for suitable overfill prevention system and chapter 4 for inner tank linings.

DG: G			Part no.	**Price €**
Unitop-Set AdBlue	1	-	**28040**	
Additional litre scales	1	-	**289..**	
Special scales	1	-	**28999**	

Digital tank contents indicator DIT 01 for fuel oil and diesel fuel

1

- **Universal application in tanks of up to 3 m in height or diameter**
- **Fast and safe mounting with complete mounting accessories**
- **No external supply voltage required.**
- **Push-to-read function for extremely long battery service life**

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Application

Suitable for continuous level measurement in tanks containing fuel oil EL, L or diesel fuel and FAME 100 % as biodiesel (EN 14214). Specially suitable for underground tanks and basement tanks. For filling levels from 900 mm to 3,000 mm.

Description

The hydrostatic level indicator consists of a control unit with digital display and a submersible probe with integrated pressure measuring cell. The version DIT-E also contains the combination fitting Euroflex 3. High measuring accuracy due to electronic sensor (pressure measuring cell). Simple operation due to device setup via menus. No bearing charts required since all standard tank shapes are stored. Connection cable of the display unit can be extended by up to 10 m.

Technical specifications

Functions
Push-to-read, selection of units, calculation of total volume

Measuring range
0/300 mbar

Measuring accuracy
±1.5 % FS

Operating temperature range

Medium:	0/60 °C
Ambient:	0/45 °C
Storage:	-5/+80 °C

Display
4-digit, 12 mm high LCD 7-segment display with additional symbols

Displayed values
Litres, m³, %, liquid level in mm

Submersible probe

Housing:	Stainless steel 303
Cable:	PVC, 5 m with breather tube
Diaphragm:	Ceramics
Seals:	FKM (Viton)
Spacer:	POM, PE

Supply voltage
1 x lithium battery 3.6 V (included)
Service life approx. 5 years

Housing
PA6, glass-loaded, blue, Ø 75 mm, wall mounting, degree of protection IP 51 (EN 60529)

Scope of delivery

DIT 01
- Control unit with digital display
- 5 m connection cable to probe (can be extended by up to 10 m)
- Moisture-proof junction box
- Submersible probe with 5 m submersible cable
- Screw connector kit G1 x G1½ x G2
- Mounting kit for withdrawal flange (PG 9 gland)
- Wall mounting

DIT 01-E
- Control unit with digital display
- 5 m connection cable to probe
- Moisture-proof junction box
- Submersible probe with 5 m submersible cable
- Combination fitting Euroflex 3 (suction and return pipe 3.10 m with integrated submersible probe, connection thread G1, pipe connections 2 x Ø 8 mm and Ø 10 mm each)
- Wall mounting

DG: H	Part no.	Price €
DIT 01	**52122**	
DIT 01-E	**52123**	
Spare submersible probe	**52131**	
Spare battery	**68309**	

Digital tank contents indicator DIT 02 for water

- **Universal application in tanks of up to 4 m in height or diameter**
- **No external supply voltage required**
- **Fast and safe mounting with complete mounting accessories**
- **Push-to-read function for extremely long battery service life**

Application

Specially suitable for continuous level measurement in rainwater tanks and cisterns. For liquid levels from 900 to 4,000 mm.

Description

The hydrostatic level indicator consists of a control unit with digital display and a submersible probe with integrated pressure measuring cell. High measuring accuracy due to electronic sensor (pressure measuring cell). Simple operation due to device setup via menus. No bearing charts required since all standard tank shapes are stored.

Technical specifications

Functions
Push-to-read, selection of units, calculation of total volume

Measuring range
0/400 mbar

Measuring accuracy
±1.5 % FS

Operating temperature range

Medium:	0/60 °C
Ambient:	0/45 °C
Storage:	-5/+80 °C

Display
4-digit, 12 mm high, 7-segment LCD with additional symbols

Displayed values
Litres, m³, %, liquid level in mm

Submersible probe

Housing:	Stainless steel 303
Cable:	FEP, 6 m with breather tube
Diaphragm:	Ceramics
Seals:	FKM (Viton)
Spacer:	POM, PE

Supply voltage
1 x lithium battery 3.6 V (included) service life approx. 5 years

Housing
PA6, glass-loaded, blue, Ø 75 mm, wall mounting

Degree of protection
IP 51 (EN 60529)

Scope of delivery

- Control unit with digital display
- 15 m connection cable to probe (cannot be extended)
- Moisture-proof junction box
- Submersible probe with 6 m submersible cable
- Screw connector kit G1 x G1½ x G2
- Mounting kit for 15 mm hole (PG 9 gland)
- Wall mounting

DG: H	Part no.	Price €
DIT 02	**52124**	
Spare submersible probe	**52137**	
Spare battery	**68309**	

Hydrostatic indicator TankControl 01

1

- For fuel oil EL, L, diesel fuel, biodiesel
- Graphical indication of consumption and remaining range
- With visual/audible alarms, Acknowledge button and 2 relays
- Remote measurements up to 15 m

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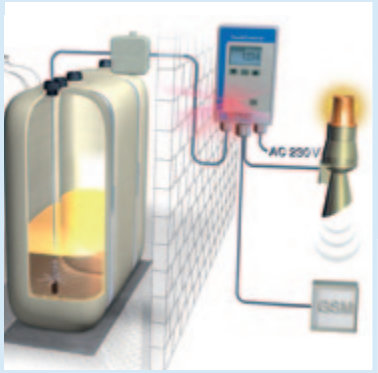

Application

Continuous level measurement with graphical display for indication of consumption (history), calculation of remaining range (forecast) and signalling of minimum levels (reserve alarm). Suitable for tanks from 900 to 3,000 mm liquid level. For fuel oil EL, L, diesel fuel and FAME 100 % as biodiesel (EN 14214). Specially designed for building technology.

Description

The hydrostatic level indicator consists of a control unit with numerical and graphical display and a submersible probe with integrated pressure measuring cell. The system displays either litres, m^3, % or liquid level (mm). When the level falls below or exceeds an adjustable minimum or maximum value, the control unit triggers visual and audible (can be acknowledged) alarms. Two additional relay contacts are available for external alarm devices, for level control or for connection to telecommunication or building control systems. Simple operation due to device setup via menus. High measuring accuracy due to electronic sensing. Standard tank shapes are stored. Tables for special tank shapes can be entered (option).

Technical specifications

Functions
Selection of units, daily saving of level data, consumption monitoring, graphical evaluation of consumption values (up to 5 years), calculation of remaining range, alarm functions (min./max.), sensor error and short circuit alarms.

Measuring range
0/300 mbar

Measuring accuracy
±1.5 % FS

Operating temperature range
Medium: 0/60 °C
Ambient: 0/45 °C
Storage: -5/+80 °C

Display
High-resolution, backlit graphical display (30 x 50 mm). Indication of either litres (6 digits), m^3, % or liquid level in mm. Symbols for alarm functions.

Submersible probe

Housing:	Stainless steel 303
Cable:	PVC, 5 m with breather tube
Diaphragm:	Ceramics
Seals:	FKM (Viton)
Spacer:	POM, PE

Supply voltage
AC 230 V
Lithium battery for data backup (calendar function)

Switching outputs
Relay contacts:
2 voltage-free changeover contacts
Contact rating: AC 230 V, 2 A

Visual alarm
Red LED

Audible alarm
Integrated piezo buzzer, can be acknowledged

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 54 (EN 60529)

Scope of delivery

- Control unit with graphical display and 15 m connection cable to the probe (cannot be extended)
- Submersible probe with 5 m submersible cable
- Moisture-proof junction box
- Screw connector kit G1 x G1½ x G2
- Mounting kit for withdrawal flange at plastic battery tanks

Options

- Special tank table

DG: H	Part no.	Price €
TankControl 01	**52132**	
Spare submersible probe	**52131**	
Extra charge		
Special tank table		

Hydrostatic level indicator TankControl 01 ZT

- **Additional probe for differential alarm**
- **For fuel oil EL, L, diesel fuel, biodiesel**
- **Graphical indication of consumption and remaining range**
- **With visual/audible alarms, Acknowledge button and relay**

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Application

Continuous level measurement with graphical display for indication of consumption (history), calculation of remaining range (forecast) and signalling of minimum levels (reserve alarm). Suitable for tanks from 900 to 3,000 mm liquid level. For fuel oil EL, L, diesel fuel and FAME 100 % as biodiesel (EN 14214). Specially designed for building technology. Specially suitable for signalling level difference in communicating tanks (e.g. battery tanks).

Description

Like TankControl 01, but with additional submersible probe for differential alarm. For submersible probe 1, the system displays either litres, m³, % or liquid level (mm). When the level falls below or exceeds an adjustable minimum or maximum value, the control unit triggers visual and audible (can be acknowledged) alarms. The value for submersible probe 2 is displayed in mm. If an adjustable level difference between submersible probe 1 and submersible probe 2 is exceeded, an alarm is triggered.

Technical specifications

Functions
Selection of units, daily saving of level data, consumption monitoring, graphical evaluation of consumption values (up to 5 years), calculation of remaining range, alarm functions (min./max./difference), sensor error and short circuit alarms.

Measuring range
0/300 mbar

Measuring accuracy
±1.5 % FS

Operating temperature range
Medium: 0/60 °C
Ambient: 0/45 °C
Storage: -5/+80 °C

Display
High-resolution, backlit graphical display (30 x 50 mm). Indication of either litres (6 digits), m³, % or liquid level in mm. Symbols for alarm functions.

Submersible probes
Housing: Stainless steel 303
Cable: PVC, 5 m with breather tube
Diaphragm: Ceramics
Seals: FKM (Viton)
Spacer: POM, PE

Supply voltage
AC 230 V
Lithium battery for data backup (calendar function)

Switching outputs
Relay contacts: 2 voltage-free changeover contacts
Contact rating: AC 230 V, 2 A

Visual alarm
Red LED

Audible alarm
Integrated piezo buzzer, can be acknowledged

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 54 (EN 60529)

Scope of delivery

- Control unit with graphical display and 2 x 15 m connection cables to the probe (cannot be extended)
- 2 submersible probes with 5 m submersible cable each
- 2 moisture-proof junction boxes
- 2 screw connector kits G1 x G1½ x G2
- 2 mounting kits for withdrawal flange at plastic battery tanks

Options

- Special tank table

DG: H	Part no.	Price €
TankControl 01 ZT	**52135**	
Spare submersible probe	**52131**	
Extra charge		
Special tank table		

Hydrostatic level indicator TankControl 02/02 ZS

1

- **Universal application with fuel oil EL, L, diesel fuel, water and similar media**
- **With visual/audible alarms, Acknowledge button and relay**
- **TankControl 02 ZS with additional floating probe**

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Application

Continuous level measurement with graphical display for indication of consumption (history), calculation of remaining range (forecast) and signalling of minimum or maximum levels as well as for level control. For tanks from 1,000 to 4,000 mm liquid level. Suitable for fuel oil EL, L, diesel fuel and FAME 100 % as biodiesel (EN 14214), water (no drinking water!) as well as similar liquids. TankControl 02 ZS with additional floating probe is also suitable for backpressure alarms.

Description

The hydrostatic level indicator consists of a control unit with numerical and graphical display and a submersible probe with integrated pressure measuring cell. The system displays either litres, m^3, % or liquid level (mm). When the level falls below or exceeds an adjustable minimum or maximum value, the control unit triggers visual and audible (can be acknowledged) alarms. Two additional relay contacts are available for external alarm devices, for level control or for connection to telecommunication or building control systems. Simple operation due to device setup via menus. High measuring accuracy due to electronic sensing.
Standard tank shapes are stored. Tables for special tank shapes can be entered (option).

Technical specifications

Functions
Selection of units, daily saving of level data, consumption monitoring, graphical evaluation of consumption values (up to 5 years), calculation of remaining range (where applicable), alarm functions (min./max.), sensor error and short circuit alarms.

Measuring range
0/400 mbar

Measuring accuracy
±1.5 % FS

Operating temperature range
Medium: 0/60 °C
Ambient: 0/45 °C
Storage: -5/+80 °C

Display
High-resolution, backlit graphical display (30 x 50 mm). Indication of either litres (6 digits), m^3, % or liquid level in mm. Symbols for alarm functions.

Submersible probe
Housing: Stainless steel 303
Cable: FEP, 6 m with breather tube
Diaphragm: Ceramics
Seals: FKM (Viton)
Spacer: POM, PE

Supply voltage
AC 230 V
Lithium battery for data backup (calendar function)

Switching outputs
Relay contacts: 2 voltage-free changeover contacts
Contact rating: AC 230 V, 2 A

Visual alarm
Red LED

Audible alarm
Integrated piezo buzzer, can be acknowledged

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 54 (EN 60529)

Scope of delivery

- Control unit with graphical display and 15 m connection cable to the probe (cannot be extended)
- Submersible probe with 6 m submersible cable
- Moisture-proof junction box
- Screw connector kit G1 x G1½ x G2
- Mounting kits for withdrawal flange at plastic battery tanks

TankControl 02 ZS:

- With additional floating probe with 5 m probe cable

DG: H	Part no.	Price €
TankControl 02	**52134**	
TankControl 02 ZS	52136	
Spare submersible probe	**52137**	
Extra charge		
Special tank table		

Hydrostatic level indicator HydroFox® DMU 08

SIL
Protect your process!

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- SIL 2
- Compact and sturdy stainless steel design
- Special calibration for all standard pressure units possible
- Version with PUR or FEP cable

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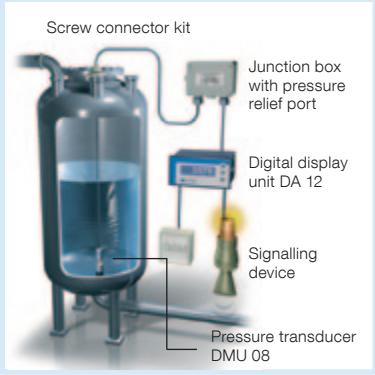


Application

For electronic, continuous level measurement, e.g. in wells, drilling holes, water, containers or in waste water systems. Suitable for groundwater, drinking water, waste water (with optional FEP cable), diesel fuel, fuel oil and similar media.

Description

The level indicators HydroFox® DMU 08 use silicon technology and feature calibrated, amplified sensor signals which are available as standardised voltage or current outputs.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point setting (non-linearity, hysteresis, repeatability): < ±0.35 % FSO (measuring ranges 0/100 mbar to 0/400 mbar < ±0.5 % FSO)

Measuring ranges
Relative pressure: 0/100 mbar to 0/25 bar

Overpressure safety
At least 2 x FS (burst pressure at least 5 x FS)

Operating temperature range
Medium: -10/+70 °C
Ambient: -10/+70 °C
Storage: -40/+70 °C
EX version max. 60 °C

Temperature error band
In compensated range
0/70 °C < 1 % FSO/10 K

Dynamic characteristics
Response time < 10 ms

Materials
Housing: Stainless steel 316 L
Diaphragm: Stainless steel 316 L
Seals: FKM (Viton)

Pressure transmission liquid
Silicone oil

Supply voltage
DC 8–32 V
EX version DC 10–28 V

Output signal
4–20 mA, 2-wire

Load
$4\text{–}20\ \text{mA} \leq \frac{U_B - U_{Bmin}}{0.02\ \text{A}}\ [\text{Ohm}]$

Current input
4–20 mA < 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection (degree of protection)
PUR cable (IP 68)

Safety integrity level
SIL 2 (IEC 61508/61511)

Accessories (options)
- Screw connector kit
- Junction box
- Lightning protection
- Clamp
- Extended weight

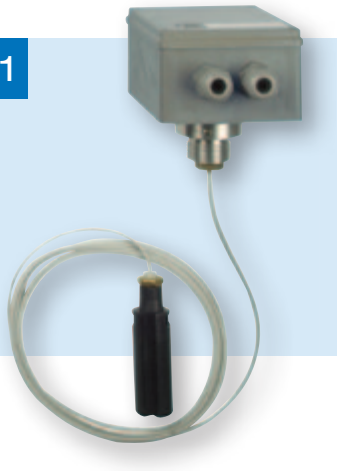
Options

- EX version (II 1/2 G Ex ia IIC T4)
- FEP cable

DG: H	Part no.	Price €
DMU 08 with 5 m PUR cable		
Measuring range		
0/100 mbar	31555	
0/160 mbar	31556	
0/200 mbar	31557	
0/250 mbar	31558	
0/300 mbar	31519	
Screw connector kit plastic, G2 x 1½ x 1	52125	
Junction box with pressure relief port	31824	

i Complete range of Pressure transducers see chapter 11.

Capacitance level indicator CapFox® EFT 7



- For non-conductive media such as fuel oil and diesel fuel
- Band electrode can be shortened on site as required
- Rod probe for tank heights exceeding 200 mm

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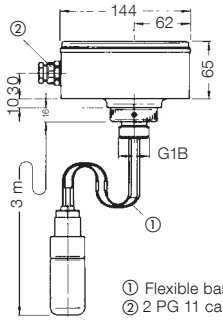
Dimensions (in mm)



① Flexible band electrode
② 2 PG 11 cable glands

Application

Capacitance level indicator for continuous measurement of levels in tanks and containers with liquid levels of 200 mm to 3,000 mm. Suitable for non-conductive media, especially fuel oil and diesel fuel.

Description

The compact CapFox® EFT 7 capacitance level indicator, the control unit and the probe form a unit. The device is available with either a flexible band electrode or a rigid probe. The flexible band electrode can be used for liquid levels from a minimum of 1,150 mm to a maximum of 3,000 mm. The rigid probe version with shielding tube is used for applications involving small containers with heights or diameters of 200 mm to 1,500 mm. Please specify the length of the rigid probe when ordering. Zero and full scale can be adjusted via an internal potentiometer. The output signals are proportional to the liquid level.

Technical specifications

Measuring range
0/200 mm to 0/3,000 mm,
depending on selected probe

Measuring accuracy
±2 % FS

Operating temperature range
Ambient: -20/+50 °C

Process pressure
Atmospheric

Process connection
Aluminium
Flexible band electrode G1B
Rod probe G1½B

Flexible band electrode
3,000 mm long flexible electrode band cable
(can be shortened to 1,150 mm)
with plastic probe weight

Rigid rod probe
Electrode stainless steel 316 Ti
Concentric shielding tube, steel
Required probe length must be specified with order
Minimum length 200 mm
Maximum length 1,500 mm

Supply voltage
AC 230 V, DC 24 V, AC 24 V

Power input
AC 3 VA/DC 2 W

Output signals (load)
4–20 mA (max. 500 Ohm)
0–10 V (min. 10 kOhm)

Capacitance range
0–200 pF

Housing
Impact-resistant plastic (ABS)
W x H x D: 104 x 65 x 144 mm

Degree of protection
IP 65 (EN 60529)

Electrical connections
2 x cable gland PG 11

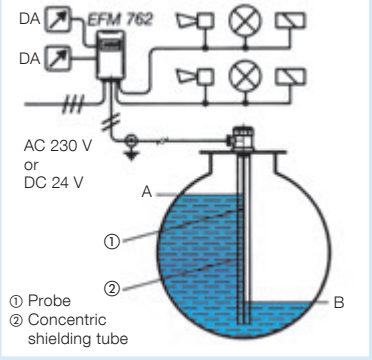
Options

- Flexible band electrode 6,000 mm
- Other lengths

DG: E	Part no.	Price €
CapFox® EFT 7 with flexible band electrode 3 m	**52107**	
CapFox® EFT 7 with rod probe, please specify length!	52108	

Capacitance level indicator CapFox® EFM 741/752/762

- **Suitable for liquid, powdery, electrically conductive or non-conductive media.**
- **Various probes available for optimum adaptation to the application.**
- **Can be used as ready-to-connect filling or emptying controller**



Application

For continuous level measurement in containers, silos, tanks or filling systems. Suitable for liquid, powdery, electrically conductive or non-conductive media. Also suitable for pressurised or vacuum tanks.

Description

The capacitance level indicator consists of a control unit with digital display (transducer), a probe and a pre-amplifier which is factory-mounted in the probe head. CapFox® EFM 752 features a limit switch with freely adjustable limit value for minimum/maximum signals with variable hysteresis which can be used for control functions via a voltage-free relay contact. CapFox® EFM 762 allows you to control filling or emptying processes. The choice of probe (partially or fully insulated, rigid or flexible) depends on the properties of the medium to be measured and the shape of the tank. Fully insulated probes must be used for conductive media. The probes are equipped with a capacitance voltage transducer (HF probe insert) in the probe head and are mounted vertically. Customised special probes are available.

Technical specifications

Measuring range
0/200 mm to 0/12,000 mm,
depending on selected probe

Measuring accuracy
±2 % FS

Operating temperature range
Ambient: -10/+50 °C

Process pressure
Depending on selected probe

Display
3½ digit LCD
Resolution 0.1 % (±1 digit)

Displayed values
0–100 % liquid level

Supply voltage
AC 230 V, DC 24 V

Power input
5 VA

Outputs
0–10 V/4–20 mA

Relay outputs (relay contacts)
EFM 741 without
EFM 752 1 x voltage-free changeover contact
EFM 762 2 x voltage-free changeover contact

Switch rating
AC 250 V, 3 A
DC 24 V 0.5 A

Visual indication (752/762)
Green LED: Normal operation
Red LED: Alarm condition switch point indication

Fail-safe mode (752/762)
Integrated selector for min. or max. fail-safe mode (low/high)

Housing
Wall mounting housing with plug-in base made of impact-resistant plastic (ABS)
W x H x D: 76 x 150 x 115 mm
Degree of protection: IP 30 (EN 60529)

Scope of order
Items to be ordered separately
- Probe
- Control unit EFM
- HF probe insert part no. 51790
- Concentric shielding tube
  (not required with flexible band electrode since the earth electrode is already integrated)

DG: E	Part no.	Price €
EFM 741	**51741**	
EFM 752	**51752**	
EFM 762	**51762**	

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Probes and pre-amplifiers see page 23–24.

Capacitance level indicator with EX approval CapFox® S 74x

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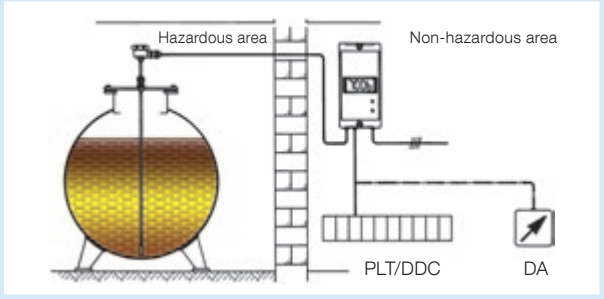
- For liquid and powdery media
- Various probes available for optimum adaptation to the process



Application

For continuous level measurement in tanks and containers in hazardous areas, Ex zones 0, 1 and 2. Suitable for liquid, powdery, electrically conductive or non-conductive media. Also suitable for pressurised or vacuum tanks.

Description

The capacitance level indicator consists of the control unit CapFox® S 74x with digital display, a probe and an EX pre-amplifier which is factory-mounted in the probe head. CapFox® S 74x has an intrinsically safe power circuit. In order to ensure the intrinsic safety of the circuit, the S 74x control unit may only be operated in conjunction with the HF pre-amplifier (part no. 51791) and a capacitance rod probe type 88. The control unit must be installed outside of the hazardous area.
The choice of measuring probe (partially or fully insulated, rigid) depends on the properties of the medium to be measured and the shape of the tank. Fully insulated probes must be used for conductive media. The probes are equipped with a capacitance voltage transducer (HF probe insert) in the probe head and are mounted vertically.

Technical specifications

Measuring range
0/200 mm to 0/3,000 mm,
depending on selected probe

Measuring accuracy
±1.5 % FS

Operating temperature range
Ambient: -10/+50 °C

Process pressure
Depending on selected probe

Display
3½ digit LCD
Resolution 0.1 % (±1 digit)

Displayed values
0/100 % liquid level

Supply voltage
AC 230 V or DC 24 V

Power input
5 VA

Outputs
0–10 V/0–1 mA/4–20 mA

Visual indication
Yellow LED: Power on

Intrinsically safe circuit
UM = 250 V, U0 = 13.0 V, I0 = 76 mA
P0 = 0.25 W, C0 = 1.0 µF, L0 = 6.1 mH

Housing
Wall mounting housing with plug-in base made of impact-resistant plastic (ABS)
W x H x D: 76 x 150 x 115 mm
Degree of protection IP 30 (EN 60529)

EX approval
II (1) G [Ex ia] II C T6
BASEFA 02ATEX0088

HF pre-amplifier EX
HF pre-amplifier insert part no. 51791 exclusively for the CapFox® S 74x to ensure the intrinsic safety of the circuit. The pre-amplifier is factory-mounted in the probe head.

Scope of order
Complete measuring system
(items to be ordered separately):
- Control units S 74x
- HF probe insert part no. 51791
- Rod probe series 88
- Concentric shielding tube

DG: E	Part no.	Price €
S 74x AC 230 V	51745	
S 74x DC 24 V	51746	
HF pre-amplifier EX	51791	

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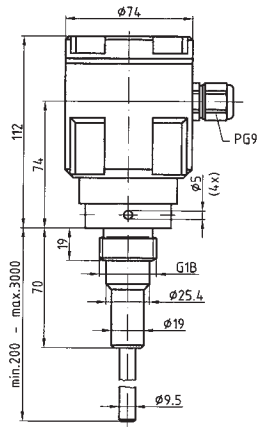
Probes and accessories see page 23–24.

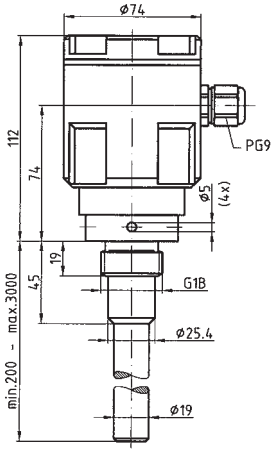
Probes for CapFox® EFM 741/752/762

Types and dimensions (mm)

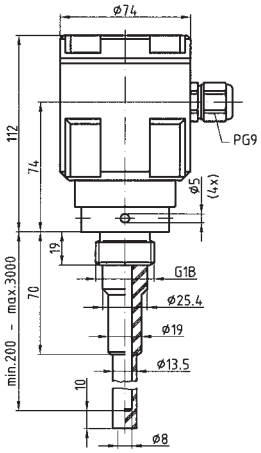
Rod probe CNS 01 partially PTFE-insulated



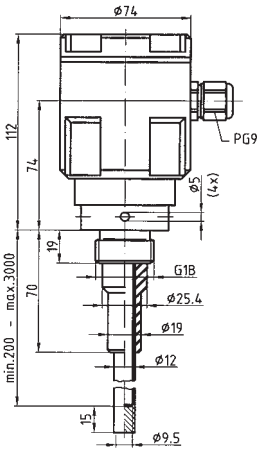
Rod probe CNS 02 heavy-duty version partially PTFE-insulated



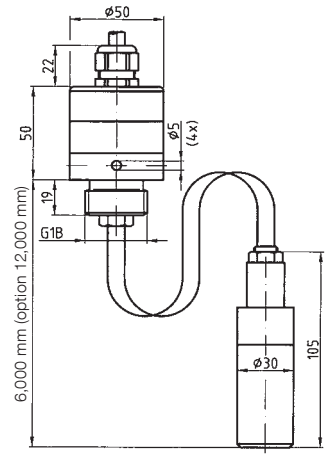
Rod probe CNS 03 fully PP-insulated



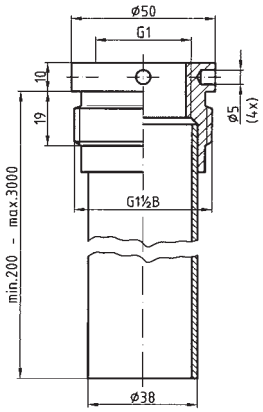
Rod probe CNS 04 fully PTFE-insulated



Band electrode CNS 05 F



Concentric shielding tube



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Many other probe versions are available.
Please enquire. See page 24 for prices.

Probes for CapFox® EFM 741/752/762

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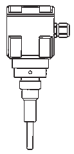
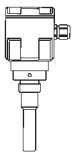
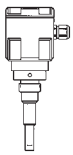
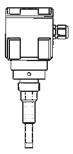
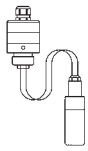
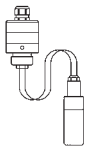
DG: E

Type	CNS 01 Rod probe	CNS 02 Rod probe	CNS 03 PP Rod probe	CNS 04 PTFE Rod probe	CNS 05 F Flexible band electrode	CNS 05 F Flexible band electrode
Version						
Type number	8812-21-3000	8812-22-3000	8812-61-3300	8812-81-3300	8022-56-000	8022-56-000
Price €	**251.00**	**282.00**	**323.00**	**625.00**	**338.00**	**441.00**
Part no.	55509	55510	55520	55532	**55552**	**55553**
Probe head						
Material	Aluminium die cast	Aluminium die cast	Aluminium die cast	Aluminium die cast	Aluminium	Aluminium
Electrical connection	PG 9	PG 9	PG 9	PG 9	2 m fixed cable	2 m fixed cable
Degree of protection	IP 66	IP 66	IP 66	IP 66	IP 68	IP 68
Process connection	G1B (G1½B)**	G1B (G1½B)**	G1B (G1½B)**	G1B (G1½B)**	G1B	G1B
Electrodes						
Material	Stainless steel 316 Ti	Stainless steel 316 Ti	Stainless steel 316 Ti	Stainless steel 316 Ti	Copper	Copper
Insulation	PTFE partially insulated	PTFE partially insulated	PP fully insulated	PTFE fully insulated	PE partially insulated	PE partially insulated
Diameter	9.5 mm	19 mm	13.5 mm	12 mm	2 x 0.5 mm	2 x 0.5 mm
Length*	up to 1,000 mm	up to 1,000 mm	up to 1,000 mm	up to 1,000 mm	6,000 mm can be shortened	12,000 mm can be shortened
Application area						
Process pressure	-1/+20 bar	-1/+20 bar	0/+20 bar	0/+5 bar	no pressure	no pressure
Temperature of medium	-20/+220 °C	-20/+220 °C	20 bar: 50 °C 10 bar: 100 °C	5 bar: 50 °C 3 bar: 150 °C	-20/+50 °C	-20/+50 °C
Extra charges	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
HF probe insert	51790	51790	51790	51790	Standard	Standard
HF probe insert EX	51791	51791	51791	51791	---	---
Probe extension per m (max. 3,000 mm)*					---	---
Shielding tube steel up to 3,000 mm*	55555	55555	55555	55555	---	---
Shielding tube stainless steel 1.4571 up to 1,000 mm*	55557	55557	55557	55557	---	---
Extension shielding tube stainless steel per m (max. 3,000 mm)*					---	---

* Please specify exact probe length.
** If a concentric shielding tube is used, the process connection changes to G1½B

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Select according to the operating conditions. Special customised probes are available in addition to the standard probes listed. Please enquire.

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Compact ultrasonic transmitter SonarFox® UST 02

- Non-contact level measurement of liquid and solid media
- Specially suitable for sewage treatment plants and power plants
- Very narrow sound cone

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Application

For continuous, non-contact level measurement of liquid and solid media with a wide variety of types of consistencies and surface characteristics. Especially suitable for controlling rakes and gates in sewage treatment plants and power plants.

Description

The compact SonarFox® UST 02 ultrasonic transmitter consists of a ultrasonic transducer, process connection and housing with screw-on cover. A programming display can be plugged onto the electronics block in the housing. This makes it possible to calibrate the measuring range without time-consuming filling and emptying procedures. The vibration-decoupled ultrasonic transducer is mounted below the process connection. SonarFox® UST 02 is equipped with an output relay for echo loss alarm.

Technical specifications

Measuring range
0/6,000 mm (blocking distance 250 mm)

Measuring accuracy
± 0.2 % FS

Measuring frequency
80 kHz

Sound cone
5°

Operating temperature range
Medium: -30/+80 °C
Ambient: -30/+60 °C

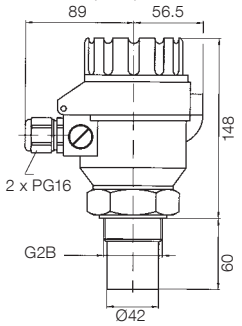
Process pressure
0.3 to 3 bar absolute

Programming display (option)
6-digit display

Process connection
PVDF, G2B

Ultrasonic transducer
PVDF

Dimensions (mm)



Supply voltage
AC 10.5–28 V
DC 10.5–40 V

Power input
AC: 4 VA, DC: 3.6 W

Output signal (load)
4–20 mA (max. 600 Ohm), 4-wire

Echo loss alarm
Relay contact: 1 voltage-free changeover contact
Contact rating: AC 250 V, 3 A

Delay
Adjustable 6, 10 or 30 s

Housing
Impact-resistant plastic (PTB),
glass-fibre reinforced

Degree of protection
Housing: IP 67 (EN 60529)
Sensor: IP 68 (EN 60529)

Electrical connections
2 x cable gland PG 16

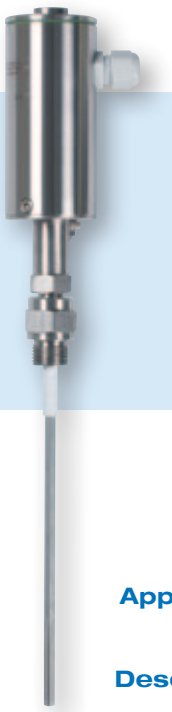
Options

- Programming display
- Other process connections
- Other materials
- Supply voltage: AC 85–255 V

DG: E	Part no.	Price €
UST 02 AC 10.5–28 V DC 10.5–40 V	56119	
UST 02 AC 85–255 V	56129	
Programming display	56109	

Potentiometric level indicator CoFox® CMG 01

NEW



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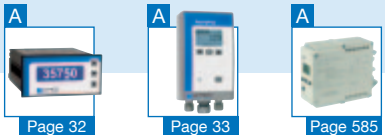
- Ideal for hygienic processes
- Measurements independent of pressure, temperature and density
- For liquid, electrically conductive media
- Automatic detection of the mounting position
- Error signal as per NAMUR recommendation



Application

For continuous high-precision measurement of levels in tanks and containers with liquid levels of 200 mm to 6,000 mm. Suitable for liquid, electrically conductive media. Ideal for use in hygienic processes.

Description

CoFox® CMG 01 operates on the basis of the potentiometric principle. Measurements are unaffected by changes in pressure, temperature or density. The measuring range is freely adjustable over the entire probe length.

Technical specifications

Measuring range
Probe length: 200 mm to 6,000 mm
smallest adjustable range >10 mm (e.g. 0/11 mm)

Conductivity range
≥ 1 µS/cm

Measuring accuracy
± 1 % FS
Resolution < 0.1%

Operating temperature range
Medium: -40/+150 °C
Ambient: -40/+85 °C

Process pressure
150 bar at 20 °C
25 bar at 150 °C

Process connection
Stainless steel 316 Ti,
connection thread R¾

Probe
Stainless steel 316 Ti, Ø 6 mm,
probe length 1,000 mm
(min. length 200 mm / max. length 6,000 mm)
Seal PEEK

Supply voltage
DC 8–30 V

Output signal
4 … 20 mA, 2-wire

Housing
Rugged field housing with screw cover
Stainless steel 303, Ø 50 mm
Degree of protection: IP 68 (EN 60529)

Electrical connections
Cable gland M16 x 1.5

Options

- Other process connections
- Hygienic process connections
- Other probe materials
- PTFE seals
- Other probe shapes
- HART protocol

DG: E	Part no.	Price €
CoFox® CMG 01 mono probe 200–1,000 mm please specify probe lengths, process connection R¾	53511	
Extra charge mono probe probe extension per 100 mm		
Extra charge probe pipe electropolished		
Extra charge mono probe probe extension per 100 mm electropolished		
CoFox® CMG 01 coaxial probe for non-conducting tanks, please specify probe lengths, for applications with limited space, process connection R1	53512	
CoFox® CMG 01 dual probe rigid, please specify probe lengths, for non-conductive tanks, process connection G2	53513	
Extra charge coaxial/dual probe, rigid, probe extension per 100 mm		

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Magnetostrictive level indicator MagFox® MMG 01

- High measuring accuracy ±0.25 mm
- Shock- and vibration-resistant
- Freely adjustable measuring range over the entire probe length
- Very short measuring intervals
- ATEX approval for zone 0 and HART protocol (option)

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Application

For continuous high-precision measurement of levels in tanks and containers with liquid levels of 200 mm to 4,000 mm. Suitable for liquid, not highly viscous media which do not adhere to the probe.

Description

MagFox® MMG 01 operates on the basis of the magnetostrictive principle. A wire consisting of magnetostrictive material is integrated in the probe pipe. The microprocessor-controlled sensor electronics generate pulses which pass through the wire and generate a circular magnetic field. The float of the probe contains a magnet which magnetises the wire at the float's position. A torsion wave is generated at the point of overlay of the two magnetic fields; this wave passes back to the probe head. The propagation time is detected and evaluated by the electronics.

Technical specifications

Measuring range
0/200 mm to 0/4,000 mm

Measuring accuracy
± 0.25 mm, resolution < 0,1 mm

Operating temperature range
Medium: -40/+125 °C
Ambient: -40/+ 85 °C

Process pressure
Max. 16 bar

Process connection
Stainless steel 316 Ti, compression fitting G½, height-adjustable

Probe
Stainless steel 316 Ti, Ø 12 mm, probe length 1,000 mm (min. length 200 mm/max. length 4,000 mm)

Float
For density of medium ≥ 0.70 g/cm³
Stainless steel 316 Ti, PN 16, cylindrical 43 x 43 mm (Ø x H)

Supply voltage
DC 10–30 V

Output signal
4–20 mA, 2-wire

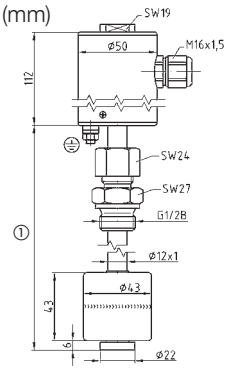
Housing
Robust field housing with screw cover
Stainless steel 303, Ø 50
Degree of protection: IP 68 (EN 60529)

Electrical connections
Cable gland M16 x 1.5

Options

- EX version
- Other process connections
- Other process pressures
- Other probe materials
- Other floats
- Higher operating temperature range
- HART protocol
- Flexible probe
- Interface layer measurement via HART protocol

Dimensions (mm)



① Probe length

DG: E	Part no.	Price €
MMG 01 200–1,000 mm please specify probe length!	53510	**870.00**
Extra charges		
Probe extension per 100 mm		**11.50**
Process connection R1½, brass		**no extra charge**
EX version (II ½ G Ex ia IIC)		
Operating temperature range (medium) -40/+250 °C		

Guided micropulse level indicators

- **The measurement is unaffected by changes in dielectric constant, pressure, temperature or density**
- **Foam, steam, dust or a turbulent surface of the medium do not affect the accuracy of the measurement**
- **No recalibration is required when a different medium is used**
- **A great number of materials and process connections are available and allow the application of the systems even with extremely corrosive media or in the food industry, for example**

Application

Guided micropulse devices are used to measure levels of liquids, granular materials and powders.

Function principle

PulsFox® PMG 01 level indicators operate on the basis of the TDR principle (time domain reflectometry). This principle uses a probe as a micropulse guide. Electromagnetic pulses are emitted at the speed of light, reflected by the surface of the medium to be measured and received by the signal converter. The reflection depends on the dielectric constant (ε_r) of the measured medium. Media with a high dielectric constant reflect the pulses with a high intensity. The devices do not have any moving parts, thus being almost maintenance-free. Changes of the medium do not affect the measuring accuracy of the TDR principle. The pulse's propagation time is directly proportional to the distance between the probe and the surface of the medium.

Probe selection

Rigid/flexible mono probe Type F/E	**Flexible dual probe Type B**	**Coax probe Type C**
Typical application areas		
▪ Cement, limestone ▪ Highly viscous liquids ▪ Plastic powder, e.g. PVC ▪ Granular plastic materials	▪ Granular plastic materials ▪ Light powders with a low dielectric constant ▪ Alcohols ▪ Water supply tanks	▪ Tank height < 6 m ▪ Solvents, NH_3, foam, alcohol, oil/water, separators
Recommended for the following applications		
In particular for fine powders ▪ FEP coating for crystallising products ▪ Application with conductive foams	**For high silos or tanks with liquids, granular materials** ▪ Like rigid probes, but up to 24 m ▪ For smaller tanks with little headroom	**Only for level measurement in clean liquids** ▪ In turbulent or flowing liquids the probe acts like a stilling well ▪ Liquid or stream jet in vicinity of probe ▪ Can have contact with metal or tank wall ▪ For very low dielectric constants
Do not use:		
▪ With small socket diameters (< DN 100) ▪ High sockets	▪ Turbulent liquids where probe cannot be anchored ▪ Temperature of the medium > 240 °C	▪ Crystallising liquids ▪ Liquids containing solid matter ▪ Products tending to adhere ▪ Powders ▪ Viscous liquids (e.g. crude oil)

Guided micropulse level indicator PulsFox® PMG 01

- For liquid, powdery, granular, electrically conductive or non-conductive media
- Ideal for changing media
- Large measuring ranges
- High temperatures and pressures

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Application

For continuous level measurement in containers, tanks or silos. Suitable for liquid, powdery, granular, electrically conductive or non-conductive media. Also suitable for pressurised or vacuum tanks.

Description

PulsFox® level indicators operate on the basis of the TDR principle (time domain reflectometry). The measurement is unaffected by changes in dielectric constant, pressure, temperature or density. Foam, steam, dust or a turbulent surface of the medium do not affect the accuracy of the measurement. No recalibration is required when a different medium is used.

Technical specifications

Measuring range
B/E probe ≤ 24 m
C probe ≤ 6 m
F probe ≤ 3 m
See probe type for probe version

Measuring accuracy
Liquids:
L < 15 m: ±5 mm
L ≥ 15 m: ±0.05 % of measured value
Powders/granular materials:
L < 15 m: ±20 mm
L ≥ 15 m: ±0.05 % of measured value

Dielectric constant (ε_r)
Mono probe ≥ 2.3
Dual probe ≥ 1.8
Coax probe ≥ 1.5

Operating temperature range
Medium: -30/+200 °C
Flange: -30/ +90 °C
Ambient: -30/ +60 °C
(EX version -30/ +55 °C)

Process pressure
40 bar

Process connection
G1B (for PMG 01 DF = G1½B)

Probe type/probe material
F = rigid mono probe:
Stainless steel 316 Ti, B / E = 1–2
flexible probe(s): Stainless steel 316 (Ø 4 mm)
C = Coax probe: Stainless steel 316 Ti
Wetted parts:
Stainless steel 316 Ti/316, PTFE, FKM

Supply voltage
DC 18–35 V
EX version ≤ DC 28 V

Output signal
4–20 mA/HART, 2-wire

Housing
Aluminium die cast

Degree of protection
IP 65 (EN 60529)

Electrical connection
Connector ISO 4400
(DIN 43650-A), IP 65

Accessories
Operating and configuration software

Options

- EX versions
- Other process connections
- Higher pressures
- Other probe diameters
- Higher flange temperatures
- FEP coatings
- Other seal materials
- Digital plug-in displays

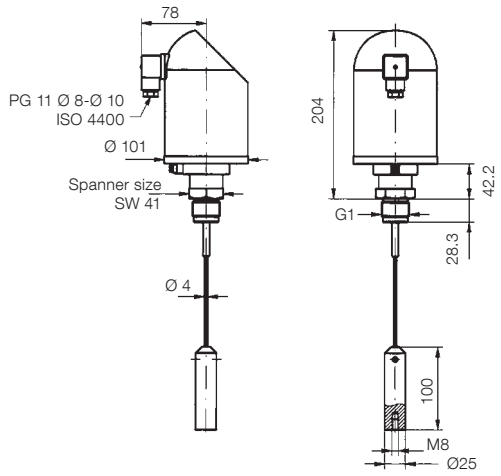
i See page 31 for prices.

Guide micropulse level indicator PulsFox® PMG 01

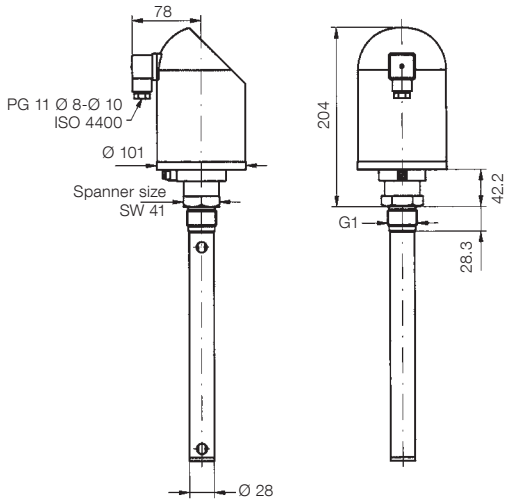
1

Types and dimensions (mm)

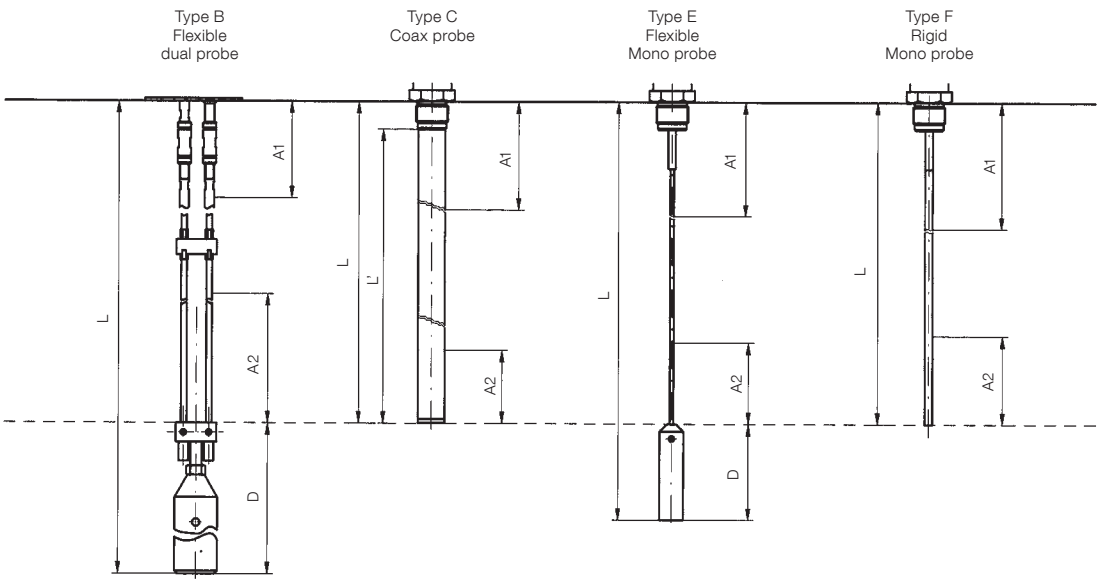
Housing with flexible mono probe and ISO 4400 connector



Housing with coax probe and ISO 4400 connector



Probes

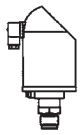
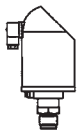
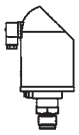
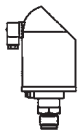


L = Length (L' = Length for coax probe with flange); A1 = Upper blocking distance;
A2 = Lower blocking distance; D = Range that cannot be measured

Dielectric constant	Zone	Type B	Type C	Type E	Type F
80	A1	300 mm	0 mm	400 mm	400 mm
80	A2	20 mm	10 mm	20 mm	20 mm
2	A1	330 mm	0 mm	500 mm	500 mm
2	A2	100 mm	100 mm	200 mm	200 mm
–	D	80 mm	–	100 mm	–

Guide micropulse level indicator PulsFox® PMG 01

DG: H

Type	PMG 01 MS	PMG 01 MF	PMG 01 KX	PMG 01 DF
Version				
Probe type	Mono probe, rigid	Mono probe, flexible (Ø 4 mm)	Coax Probe	Dual probe, flexible
Standard probe length	3 m (max. 3 m)	3 m (max. 24 m)	3 m (max. 6 m)	3 m (max. 24 m)
Measuring accuracy	See data sheet	See data sheet	See data sheet	See data sheet
Max. flange temperature	Up to 90 °C	Up to 90 °C	Up to 90 °C	Up to 90 °C
Seal	FKM	FKM	FKM	FKM
Supply voltage	DC 18–35 V	DC 18–35 V	DC 18–35 V	DC 18–35 V
Output signal	4–20 mA/HART	4–20 mA/HART	4–20 mA/HART	4–20 mA/HART
System	2-wire	2-wire	2-wire	2-wire
Electrical connection	Connector as per ISO 4400 (DIN 43650-A)			
Base price €				
Part no.	53468	53470	53472	53474
Extra charges €				
ATEX II 1 G IIC or IIB T6...T3				
ATEX II 1/2 D T100 °C (powder)				
Max. EX flange temperature up to 200 °C				
Process connection				
G1B PN 40	**Standard**	**Standard**	**Standard**	---
G1½B PN 40	---	---	---	**Standard**
1" NPT PN 40	**No extra charge**	**No extra charge**	**No extra charge**	---
DIN and ANSI flanges	**On request**	**On request**	**On request**	**On request**
Clamp connection	**On request**	**On request**	**On request**	**On request**
Dairy fitting DIN 11851	**On request**	**On request**	**On request**	**On request**
Probe				
Probe extension per m	---			
Probe diameter 8 mm	---		---	---
Probe extension Ø 8 mm per m	---		---	---
FEP coating for probe length up to 3 m (only for probe diameter 4 mm)	---		---	---
FEP coating per m	---		---	---
Seal				
FFKM				
Accessories			Part no.	**Price €**
HART USB modem			53485	
Digital plug-in display DA 06			**31278**	
Digital plug-in display DA 06-EX			31279	

* Process connection = G1½B, Weight = Ø 40 x 260 mm

Digital display units DA 10/12/14

1

- Text-based user interface
- Linearisation for volume indication (24 points)
- Selectable units
- Integrated supply voltage for transducer
- Universal power supply unit

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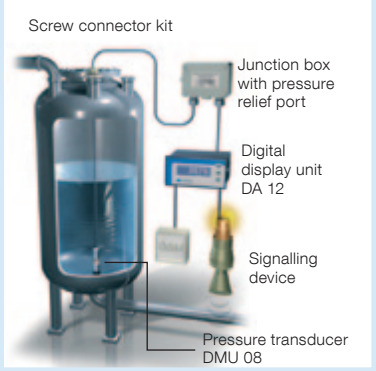

Description

Digital display device (DA 10), also available with additional relay output (DA 12/14) for electronic transducers.

Technical specifications

Display
5-digit graphical LC display, backlit (white), text-based user interface, user interface language selectable (German/English/French), selectable units.

Measuring range
± 99,999 digits (start and end values scalable as required)

Linearity
±0.1 % of measuring range

Resolution
Decimal point position can be set as required

Response time
< 0.2 s

Operating temperature range
Ambient: -10/+55 °C

Supply voltage
AC/DC 20–253 V

Sensor supply
Integrated, galvanically isolated power supply for transducer:
DC 20 V/20 mA

Sensor input
All analogue standard signals, e.g. 4–20 mA, 0–20 mA, 0–1 V, 0–10 V

Analogue output
0/4–20 mA, galvanically isolated

Housing
Standard rack mounting housing
W x H x D 96 x 48 x 135 mm

Panel cut out
W x H: 92 x 45 mm

Degree of protection (front)
IP 65 (EN 60529)

Electrical connection
Plug-in screw terminals (1.5 mm²)

Linearisation
Customer-specific linearisation with a max. of 24 points for the indication of volume (e.g. litres) in non-linear tanks. Bearing charts for cylindrical horizontal tanks and spherical tanks are pre-programmed.

Min./max. value memory
The highest and lowest values attained during operation can be displayed.

Additional functions DA 12

Analogue output 2
0–10 V, galvanically isolated

Switching outputs
Relay contacts: 2 x voltage-free changeover contact (adjustable switching hysteresis)
Contact rating: AC 250 V, 2 A, 100 VA

Additional functions DA 14

Analogue output 2
0–10 V, galvanically isolated

Switching outputs
Relay contacts: 4 x voltage-free changeover contact (adjustable switching hysteresis)
Contact rating: AC 250 V, 2 A, 100 VA

DG: H	Part no.	Price €
DA 10	**31281**	
DA 12	**31282**	
DA 14	**31283**	
Wall mounting housing WAG 01 for one DA*	31287	
WAG 02 for two DA*	31288	
WAG 03 for three DA*	31289	
WAG 04 for four DA*	31290	

* Price includes mounting if DA and WAG are ordered together.

i Complete range "Digital Display Units" see pages 586–589.

Digital display and control units VarioFox® 12/14

- **Can be used as compact, ready-to-connect filling or emptying controller**
- **Text-based user interface**
- **Selectable units**
- **2 or 4 switching output**
- **Data logger function**

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Application

For recording process parameters. Together with the event reporting system EMS and the AFRISO Net webservice, this unit serves as an economical measuring and control station with data logging and remote monitoring functionality.

Description

Compact, ready-to-connect display and control unit in a robust wall-mounting housing. With integrated sensor supply and 2 relay outputs. Together with a transducer (e.g. for pressure, temperature, level, etc.), VarioFox® forms an autonomous measuring and control system. VarioFox® is universally applicable and freely configurable.

Technical specifications

Display
5-digit graphical LC display, backlit (white), text-based user interface, user interface language selectable (German/English/French), selectable units.

Measuring range
99.999...– 9,999 (start and end values as well as decimal point can be adjusted)

Linearity
±0.1 % of measuring range

Resolution
10 bits, decimal point position can be set as required

Response time
< 0.2 s, filter can be activated

Operating temperature range:
Ambient: -10/+55 °C

Supply voltage
AC 50–253 V
DC 20–253 V

Sensor supply
Integrated, galvanically isolated power supply for transducer: DC 20 V/20 mA

Analogue input
All analogue standard signals, e.g. 4–20 mA, 0–20 mA, 0–10 V

Binary input
Transistor PNP (e.g. for VibraFox GVG)

Visual alarm
1 red LED

Audible alarm
Integrated piezo buzzer, can be acknowledged

Analogue output 1
0/4–20 mA, galvanically isolated

Analogue output 2
0–10 V, galvanically isolated

Switching outputs
Relay contacts: 2 voltage-free changeover contacts (adjustable switching hysteresis)
Contact rating: AC 250 V
2 A 100 VA

Housing
Robust wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 54 (EN 60529)

Linearisation
Customer-specific linearisation with a max. of 24 points for the indication of volume (e.g. litres) in non-linear tanks. Bearing charts for cylindrical horizontal tanks and spherical tanks are pre-programmed.

Min./max. value memory
The highest and lowest values attained during operation can be displayed.

Data storage and clock
Long-term monitoring data is stored on a memory card (SD/MMC). Memory card not included. PC evaluation software VarioView for storing the data in daily files (option).

Additional functions VarioFox®14

Relay contacts: 4 voltage-free changeover contacts (adjustable switching hysteresis)

DG: H	Part no.	Price €
VarioFox® 12 (2 relay contacts)	31235	
VarioFox® 14 (4 relay contacts)	31236	
VarioView evaluation software	31238	
SD memory card	31237	

i Complete range "Digital Display Units" see pages 586–589.

Level switches Minimelder, Minimelder-R and Maximelder-R

1

- **For fuel oil EL, L, M, oil/water mixtures and many other media.**
- **With visual/audible alarms and Acknowledge button**
- **Wall mounting housing for fast, professional mounting**

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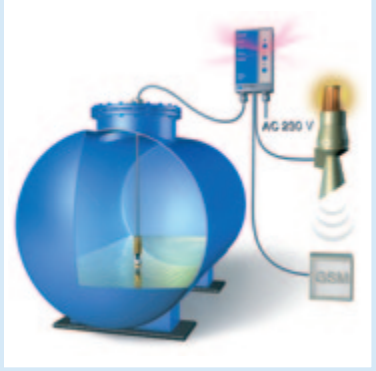


Application

Designed to signal minimum or maximum levels of water, heating oil EL, L, M, oil/water mixtures and neutral, non-viscous and non-adhesive liquids in tanks.

Description

Minimelder/Maximelder consist of a control unit and a height-adjustable float probe. The Minimelder probe is mounted in the bottom area of the tank and generates an alarm signal when the liquid level falls and the probe is no longer submerged in the liquid. The Maximelder probe is mounted in the top area of the tank and generates an alarm when the liquid reaches the probe. The liquid levels are adjustable. When these levels are reached, the units generate visual and audible alarms.

Minimelder: Generates an alarm signal when the level falls below the minimum level. System owners are alerted when the supply runs low.

Minimelder-R: Like Minimelder, but with a relay (normally open contact) for transmission of the signal to external alarm equipment or for connection to telecommunication or building control systems.

Maximelder-R: Generates an alarm when the level exceeds the adjusted maximum liquid level; in all other respects identical to Minimelder-R.

Technical specifications

Operating temperature range
Medium: -5/+50 °C
Ambient: -5/+55 °C

Process connection
Plastic screw fitting G1,
with cable gland for height adjustment

Probe
Magnetic float switch
L x Ø: 85 x 25.2 mm
Float: Plastic (PA/PP)
Cable: 5 m oil-resistant cable 2 x 0.5 mm²
Weight: Brass
Degree of protection: IP 68 (EN 60529)
Probe voltage: Max. AC 17 V

Connection probe – control unit
Length: 5 m (optionally up to 50 m)

Supply voltage (control unit)
AC 230 V

Power input
5 VA

Switching output
Minimelder-R and Maximelder-R:
Relay contact: 1 voltage-free normally open contact
Contact rating: AC 250 V, 2 A

Visual indication
1 green LED (operation)
1 red LED alarm

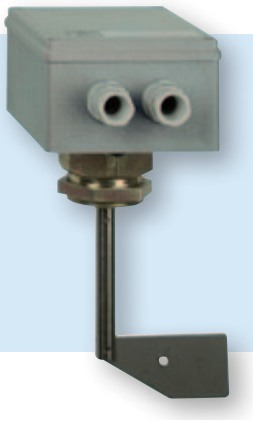
Audible alarm
Integrated piezo buzzer, can be acknowledged

Function test
By means of test button

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

DG: G			Part no.	Price €
Minimelder	1	-	**16700**	
Minimelder-R	1	-	**16701**	
Maximelder-R	1	-	**16702**	
Spare probe for Minimelder	1	-	**16703**	
Spare probe for Maximelder	1	-	**16704**	
Accessories				
Mounting frame	1	-	**43521**	
Sealing kit (IP 54)	1	-	**43416**	

Compact rotary paddle switch RotaFox® MLS 10



- For bulk solids
- Universal use in silos and tanks
- Switching output for connection of additional equipment
- Can be used for maximum or minimum alarms

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Application

Rotary paddle switch for detection of levels of bulk solids with a minimum density of 100 g/dm³. Suitable for use in silos and tanks.

Description

RotaFox® MLS 10 is a universal level switch. The sensor and the control unit form a unit. The rotary paddle is driven by a synchronous motor via a reduction gear. When the free rotation of the paddle is impeded by material covering the paddle, a micro contact disconnects power to the motor and a second micro contact generates an alarm signal. RotaFox® MLS 10 can transmit the signal to external equipment such as flaps, sliders, pumps, visual or audible alarm units (e.g. alarm lamp, horn or event reporting system EMS). When the level drops and the paddle is released, the motor restarts and rotates the paddle.

Technical specifications

Minimum density of medium
100 g/dm³

Operating temperature range
Ambient
Control unit: -20/+60 °C
Rotary paddle: -20/+80 °C

Process pressure
Atmospheric pressure

Process connection
G1½B

Paddle shaft
Stainless steel 303, including dust seal
Length 140 mm

Speed of rotation of paddle
5 rpm

Load on the rotary paddle
Max. 250 N on the shaft (lateral)
Max. 120 N on the shaft tip

Mechanical service life
500,000 switchings

Supply voltage
AC 230 V

Power input
3.5 VA

Switching output
Microswitch: 1 voltage-free changeover contact
Contact rating: AC 250 V, 4 A (resistive load)

Response delay
Approx. 1 s

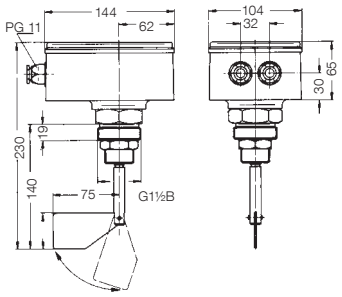
Housing
Impact-resistant plastic (ABS)
W x H x D: 104 x 65 x 144 mm
Degree of protection: IP 55 (EN 60529)

Electrical connections
2 x cable gland PG 11

Options

- Longer paddle shaft (max. 1,000 mm)

Dimensions (mm)



DG: E	Part no.	Price €
MLS 10 Paddle shaft 140 mm	**56100**	
MLS 10 Paddle shaft 500 mm	56116	
MLS 10 Paddle shaft 750 mm	56117	
MLS 10 Paddle shaft 1,000 mm	56118	

Conductivity level switch CoFox® ELT 8

- **For conductive media such as water, waste water, emulsions and many more.**
- **Can be used as a level switch, level controller for filling or level controller for emptying**
- **With LEDs for normal operation and relay output**

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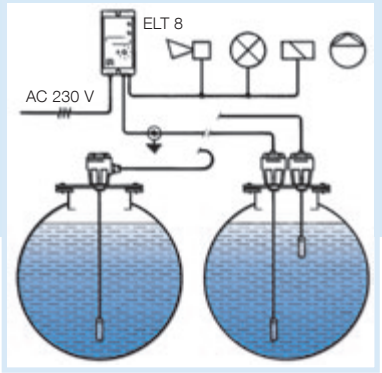

Application

Suitable for use with electrically conductive liquids which do not foam excessively, are not viscous and not adhesive (bridging), e.g. water, emulsions or waste water. Can also be used as a water alarm unit in conjunction with floor water probe BWS 11.

Description

The CoFox® ELT 8 level switch operates on the basis of conductivity.
The following functions can be selected:
- Level switch
- Level control for filling
- Level control for emptying

The sensitivity is adjustable. 2 voltage-free relay contacts are provided for switching functions.
The units feature LEDs for normal operation and relay output active.

Switching functions

Level switch: The relay can be set to either energise or de-energise in case of contact or loss of contact with the liquid of the probe rod. The switching point must be adjusted according to the conductivity of the liquid.

Level control for filling: A minimum of 2 probe rods are required. Set the internal switch to "max" (H). The relay energises when the min. probe loses contact with the liquid. Relay de-energises when the max. probe comes into contact with the liquid.

Level control for emptying: A minimum of 2 probe rods are required. Set the internal switch to "min" (L). The relay energises when the max. and min. probes have contact with the liquid. The relay de-energises when the min. probe loses contact with the liquid.

Technical specifications

Adjustment range
2.5–50 kOhm (20–400 µS/cm)
Fully adjustable

Operating temperature range
Ambient: -10/+60 °C

Supply voltage
AC 230 V or DC 24 V

Power input
4 VA

Probe circuit
Max. AC 3 V

Switching outputs
Relay contact: 2 voltage-free changeover contacts
Contact rating: AC 250 V, 500 VA
DC 12 V, 1 A

Visual indication
Green LED: Normal operation
Red LED: Alarm condition

Fail-safe mode
Integrated selector for min. or max. fail-safe mode (low/high)

Housing
Wall mounting housing with plug-in base, impact-resistant plastic (ABS)
W x H x D: 53 x 113 x 108 mm
Degree of protection: IP 30 (EN 60529)

Scope of delivery
Level switch without probe

Version	DG	Part no.	Price €
ELT 8 AC 230 V	E	**53503**	
ELT 8 DC 24 V	E	**53503A**	
Accessories			
Alarm acknowledgement unit AQ 220	H	**53230**	
Combined alarm light and horn	G	**61020**	
Cable extension fitting KVA	G	**40041**	

i
See page 39/40 for probes for level switches; water alarm units from page 100.

Conductivity alarm unit CoFox® ELT 500/4

- For conductive media such as water, waste water, emulsions and many more.
- With visual alarm and Reset button
- Relay contact for connection of additional alarm equipment
- Up to 4 zones can be monitored

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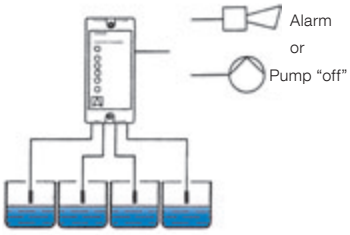


Up to 4 zones / areas can be monitored

Application

Suitable for use with electrically conductive liquids which do not foam excessively, are not viscous and not adhesive (bridging), e.g. water, emulsions or waste water.
Ideal for generating alarms in large installations and facilities. Several zones (also large areas) can be monitored simultaneously with electrodes (probes) at various points.

Description

The CoFox® ELT 500/4 level controller operates on the basis of conductivity. The electrodes connected to the control unit monitor the status at several points. When one or several electrodes are bridged, the red LED belonging to the corresponding electrode circuit is switched on. For fast and precise location of the leak, a label is provided for each LED. A common voltage-free relay contact can be used to control separate alarm devices (e.g. alarm light or horn). The function is only activated by electrode signals which are longer than 1 second in duration. The alarm is saved and cannot be reset for the duration of the signal. The alarm condition must cleared before the alarm can be reset by means of the Reset button on the device.

CoFox® ELT 500/4 can be cascaded for large area monitoring from a centralised location.

Technical specifications

Zone monitoring
4 input circuits

Response threshold
50 kOhm

Operating temperature range
Ambient: -10/+50 °C

Supply voltage
AC 230 V

Power input
3 VA

Probe circuit
Max. AC 3 V

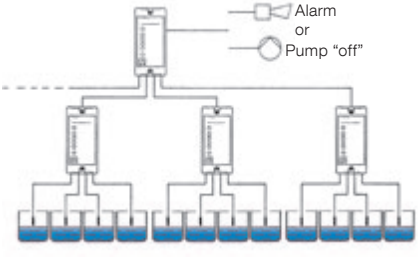
Switching output
Relay contact: 1 voltage-free changeover contact
Contact rating: AC 250 V 500 VA

Visual indication
Yellow LED: Power on
4 red LEDs: Alarm condition

Housing
Wall mounting housing with plug-in base, impact-resistant plastic (ABS)
W x H x D: 53 x 113 x 108 mm

Degree of protection
IP 30 (EN 60529)

Scope of delivery
Level switch without probe



Large area monitoring

Version	DG	Part no.	Price €
ELT 500/4 AC 230 V	E	53505	
Accessories			
Alarm acknowledgement unit AQ 220	H	53230	
Combined alarm light and horn	G	61020	
Cable extension fitting KVA	G	40041	

i See page 39/40 for probes for level switches; page 96 for additional application examples.

Conductivity level switch CoFox® ELT 680

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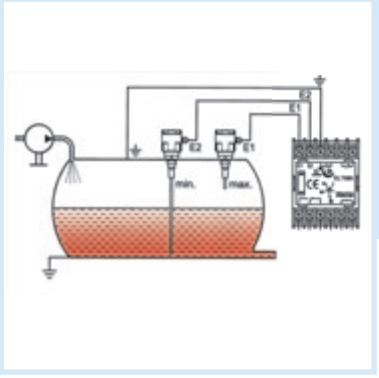
- **Specially designed for applications in the food industry**
- **Detection of interface layers between liquids with different levels of conductivity (product, foam)**
- **Adjustable delay helps to avoid unwanted switching**
- **Contact resistance does not influence measurement**

A Page 65

A Page 590



Application

Suitable for use with electrically conductive media, predominantly liquids, e.g. milk, wine, fruit juices, waste water or lyes. Also suitable for foaming or adhesive media, e.g. beer or yoghurt.

Description

The CoFox® ELT 680 level switch operates on the basis of conductivity. A delay can be set to avoid undesired switching as a result of surface turbulence. The sensitivity and adjustment range of the device have been designed in such a way as to keep contact resistance from impairing the reliability of the unit (e.g. caused by foam on the electrode insulator (in breweries, dairies and ice-cream plants). Furthermore, the unit is capable of interface layer detection between liquids having different levels of conductivity (e.g. water and milk) in pipes and tanks.

Switching functions

The unit can be operated either with one electrode as a single-point controller or with two electrodes as a dependent dual-point controller.

Technical specifications

Adjustment range
Variable adjustment
HR: 1 kOhm to 100 kOhm
LR: 50 Ohm to 2,000 Ohm

Operating temperature range
Ambient: -10/+60 °C

Supply voltage
AC 230 V or DC 24 V

Power input
2.5 W

Probe circuit
Max. AC 3 V

Switching output
Relay contact: 1 voltage-free changeover contact
Contact rating: AC 250 V, 750 VA
DC 12 V, 1 A

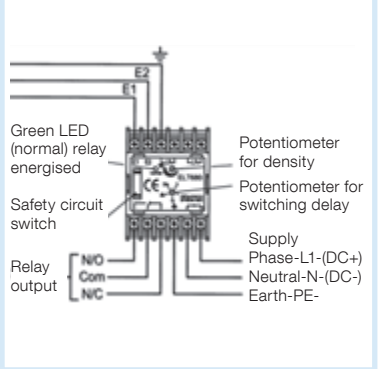
Visual indication
Green LED: Power on

Delay
Adjustable from 0 to 20 s

Fail-safe mode
Integrated selector for min. or max. fail-safe mode (low/high)

Housing
DIN rail housing made of impact-resistant plastic (ABS)
W x H x D 73 x 55 x 112 mm
Degree of protection: IP 40 (EN 60529)

Scope of delivery
Level switch without probe



	DG	Part no.	Price €
ELT 680 DC 24 V	E	**53682**	
ELT 680 AC 230 V	E	**53681**	
Accessories			
Alarm acknowledge-ment unit AQ 220	H	**53230**	

i

See page 39/40 for probes for level switches.

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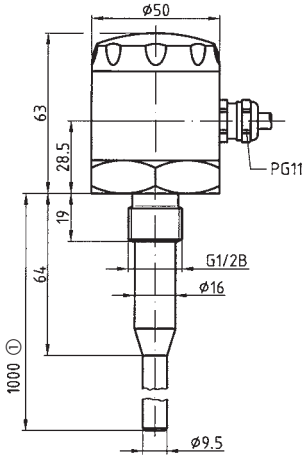
Probes for conductivity level switches, suitable for CoFox® ELT 8, ELT 500/4, ELT 680

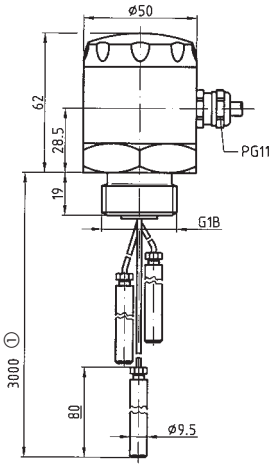
Types and dimensions (mm)

Single-rod probe LST 12



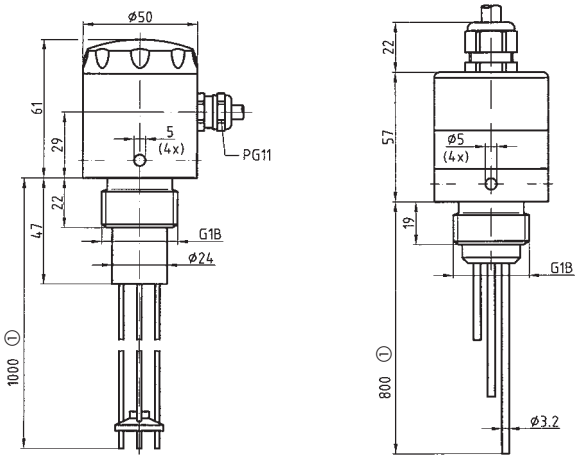
① Standard length (can be shortened)

Flexible probe LSE 23



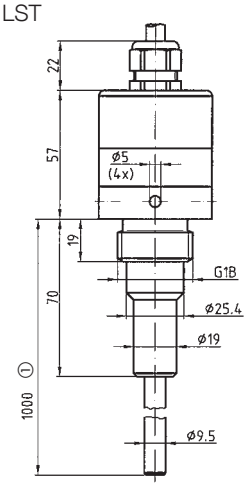
① Standard length (can be shortened)

Multi-rod probes LSM 01/LSM 02



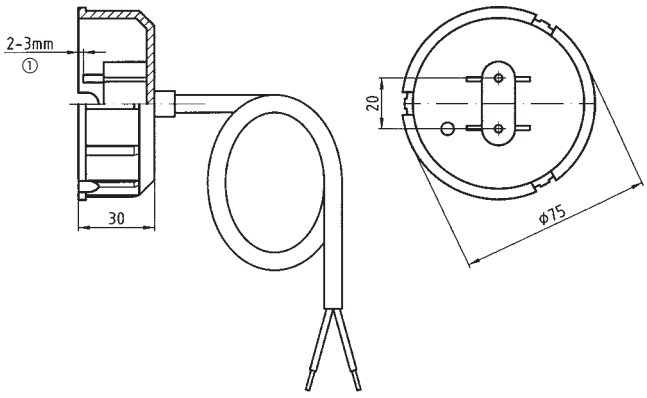
① Standard length (can be shortened)

Single-rod probe LST 32



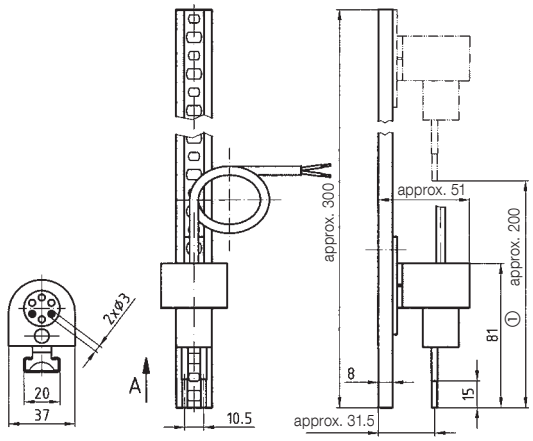
① Standard length (can be shortened)

Floor water probe BWS 11



① Response level

Wall mounting rail probe WSS



① Adjustment range

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Many other probe versions are available. Please enquire.

Probes for conductivity level switches, suitable for CoFox® ELT 8, ELT 500/4, ELT 680

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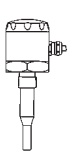
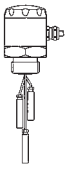
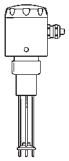
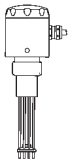
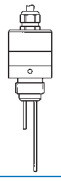
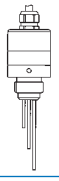
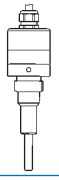
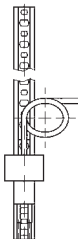
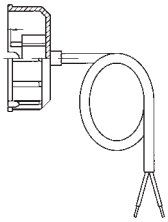
DG: E

Type	Single-rod probe LST 12	Flexible probe LSE 23	Triple-rod probe LSM 01	Quadruple-rod probe LSM 01	Dual-rod probe LSM 02	Triple-rod probe LSM 02	Single-rod probe LST 32
Version							
Type number	6921 21 1000	6622 27 1030	6272 14 1230	6272 14 1240	6812 24 002P	6812 24 003P	6812 21 000P
Suitable for	CoFox® ELT 8 / CoFox® ELT 680						
Price €							
Part no.	**55312**	**55323**	**55034**	**55021**	55041	55044	55332
Probe head							
Material	Aluminium, screw cover ABS	Aluminium, screw cover ABS	PVC, screw cover ABS	PVC, screw cover ABS	Stainless steel 316 Ti	Stainless steel 316 Ti	Stainless steel 316 Ti
Electrical connection	PG 11	PG 11	PG 11	PG 11	2 m fixed cable	2 m fixed cable	2 m fixed cable
Degree of protection	IP 66	IP 65	IP 65	IP 65	IP 66	IP 66	IP 66
Process connection	G½B	G1B	G1B	G1B	G1B	G1B	G1B
Electrodes							
Number	1	3	3	4	2	3	1
Material	316 Ti	316 Ti	316 Ti	316 Ti	316 Ti	316 Ti	316 Ti
Insulator	PTFE	PTFE	Epoxy resin	Epoxy resin	PTFE	PTFE	PTFE
Diameter	9.5 mm	9.5 mm	3.2 mm	3.2 mm	3.2 mm	3.2 mm	9.5 mm
Length	1,000 mm	3,000 mm	1,000 mm	1,000 mm	800 mm	800 mm	1,000 mm
Application area							
Process pressure	0/3 bar	0/2 bar	0/3 bar	0/3 bar	0/10 bar	0/10 bar	-1/+20 bar
Temperature of medium	-20/+150 °C	2 bar: 0/50 °C 1 bar: 0/100 °C	0/50 °C	0/50 °C	-20/+120 °C	-20/+120 °C	-20/+220 °C

Wall mounting rail probe WSS		
	Application	Height-adjustable wall mounting probe, suitable for CoFox® ELT 500/4 / CoFox® ELT 8 / CoFox® ELT 680
	Price €	
	Part no.	**55050**
	Temperature of medium	0/50 °C
	Adjustment range	Approx. 200 mm
	Electrical connection	Permanently installed cable, 150 cm

Floor water probe BWS 11		
	Application	Suitable for CoFox® ELT 500/4 / CoFox® ELT 8 / CoFox® ELT 680
	Price €	
	Part no.	**55111**
	Response level	Approx. 2–3 mm
	Temperature of medium	0/50 °C
	Probe diameter	75 mm
	Material	PP, black
	Electrical connection	Permanently installed cable, 150 cm

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Select according to the operating conditions. Special customised probes are available in addition to the standard probes listed. Please enquire.

Compact capacitance level switch CapFox® ENT 7

- **Specially designed for powdered and finely grained bulk solids or liquids**
- **For rough application conditions**
- **Relay contact for connection of external equipment or alarm units**
- **Optional high-temperature version (HT)**

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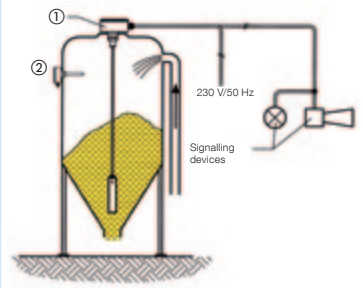


① Min. alarm
② Max. alarm

Application

Suitable for detecting levels of powdered and finely grained bulk solids or of liquids. Especially suitable for use in silos, hoppers, tanks and containers.

Description

The compact capacitance level switch CapFox® ENT 7, the control unit and the probe form a unit. The device can be supplied with a flexible probe or a rod probe. The probes, rigid or flexible (tensioned, if required), can be mounted horizontally, vertically or at an angle. Flexible probes can be retrofitted to the control unit via an adapter. The response sensitivity is adjustable. CapFox® ENT 7 features a voltage-free relay contact which switches when the limit value is reached. The contact can be used to control external equipment such as flaps or sliders, pumps, visual or audible alarms (e.g. alarm lamp, horn or event reporting system EMS) or to transmit the signal to a PLC. Minimum or maximum fail-safe modes can be selected as required.

Technical specifications

Capacitance range
0–200 pF

Operating temperature range
Medium: -20/+80 °C
Ambient: -20/+60 °C

Process pressure
Atmospheric pressure

Process connection
G1½B

Rod probe
Stainless steel 316 Ti, partially PP-insulated, probe length 300 mm (min. length 300 mm – max. length 1,000 mm) or fully PTFE-insulated, probe length 300 mm

Flexible probe
Stainless steel 316 Ti, fully PP-insulated
Probe length 3,000 mm
(min. length 1,000 mm – max. length 6,000 mm)

Supply voltage
AC 230 V

Power input
5 VA

Switching output
Relay contact: 1 voltage-free changeover contact
Contact rating: AC 250 V, 4 A (resistive load)

Fail-safe mode
Integrated selector for min. or max. fail-safe mode (low/high)

Housing
Impact-resistant plastic (ABS)
W x H x D: 104 x 65 x 144 mm

Degree of protection
IP 65 (EN 60529)

Electrical connections
2 x cable gland PG 11

Options

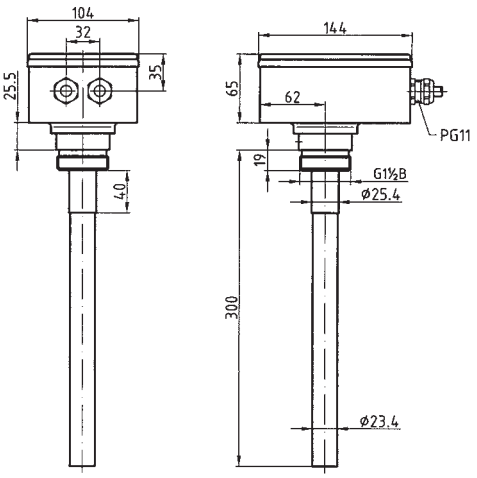
- Supply voltage DC 24 V
- Other probe lengths
- Other probe designs
- High-temperature version (HT) up to max. 220 °C

DG: E	Part no.	Price €
ENT 7, 300 mm partially PP-insulated	52701	
Extra charge probe extension per 100 mm		
ENT 7, 300 mm fully PTFE-insulated	52707	
ENT 7, 3 m flexible probe	52708	
Extra charge probe extension per m		
ENT 7 HT high temperature version up to max. 220 °C (300 mm active probe length)	52709	

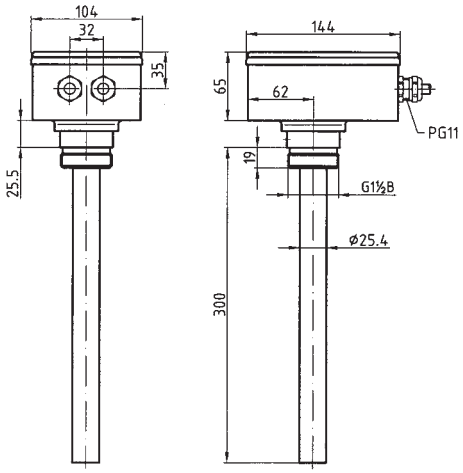
Capacitance level switch CapFox® ENT 7

1 Types and dimensions (mm)

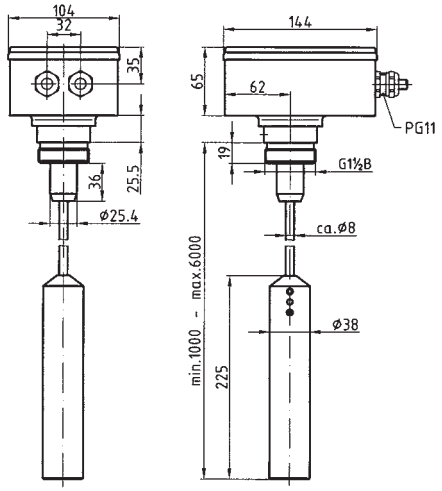
CapFox® ENT with rod probe, partially PP-insulated



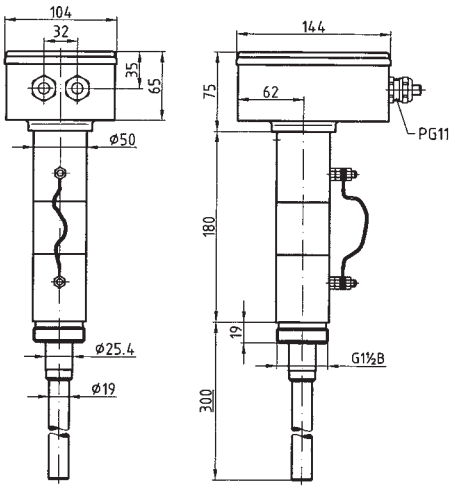
CapFox® ENT 7 with rod probe, fully PTFE-insulated



CapFox® ENT 7 with flexible probe



CapFox® ENT 7 HT with high-temperature barrier



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Many other probe versions are available. Please enquire.

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Capacitance overfill prevention system CapFox® ENT 20 Ex according to WHG

- For corrosive media
- Compact isolation amplifier
- Can be used as an overfill prevention system according to WHG in conjunction with CNS 20 probe
- ATEX approval

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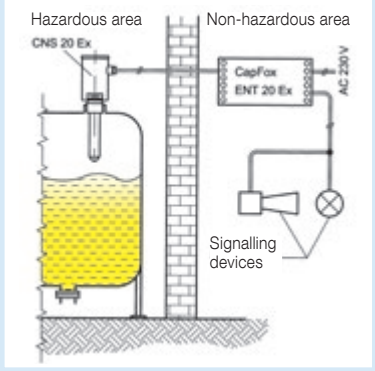

Application

Can be used as an overfill prevention system according to WHG in conjunction with the CNS 20 capacitance probes for electrically conductive and non-conductive media. It is especially suitable for use in corrosive media due to the (partial) PTFE insulation of the probes. The system can also be used in hazardous areas zone 0 in conjunction with the CNS 20 Ex high-temperature probe.

Description

The CapFox® ENT 20 Ex isolation amplifier consists of an amplifier and a voltage-free output relay. The control circuit is intrinsically safe (Ex ia II C). CNS 20 and CNS 20 Ex probes can be connected. A green LED indicates power on. A yellow LED indicates that the level sensor has responded. In case of line interruptions or short circuits, the red LED lights up. The output relay de-energises in the case of any fault. The isolation amplifier must be installed outside of the hazardous area.

Technical specifications

Operating temperature range
Ambient: -20/+60 °C

Supply voltage

ENT 20 Ex-230	AC 230 V
ENT 20-Ex-24	DC 24 V

Power input

ENT 20 Ex-230	Approx. 1.5 W
ENT 20-Ex-24	Approx. 1.8 W

Probe circuit
According to (NAMUR) EN 60947-5

Switching output
Relay contact: 1 voltage-free changeover contact
Contact rating: AC 250 V, 4 A
DC 24 V, 4 A

Visual indication

Green LED:	Power on
Yellow LED:	Probe in contact with the medium
Red LED:	Alarm condition

Housing
DIN rail housing
W x H x D: 40 x 70 x 110 mm

Degree of protection
IP 20 (EN 60529)

Approval
Overfill prevention system according to WHG
Technical Approval of the German Institute for Building Technology:
Z-65.13-156
TÜV 01 ATEX 1660 (Ex ia II C)

i See page 44 for probes.

DG: H	Part no.	Price €
CapFox ENT 20 Ex-230 AC 230 V	53420	
CapFox ENT 20 Ex-24 DC 24 V	53425	

Probes for capacitance overfill prevention systems CapFox® ENT 20 Ex

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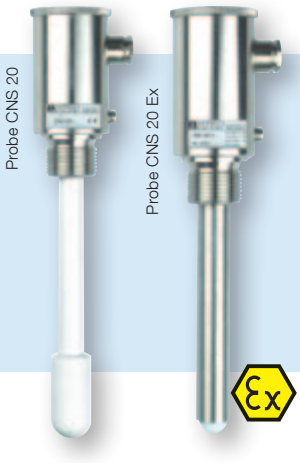
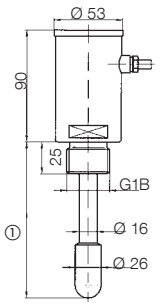
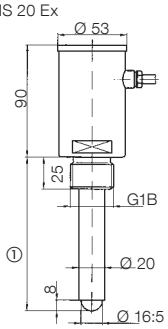


Probe CNS 20



① Installation length

Probe CNS 20 Ex



① Installation length

Description

The level electrode and the pre-amplifier of the CNS 20 and CNS 20 Ex probes are integrated in a robust field housing; they are designed as sensors according to EN 60947 (NAMUR). The electrode and pre-amplifier are fully encapsulated in the housing.

The electrode is (partially) PTFE-insulated; in conjunction with a conductive tank wall or an earthed counter-electrode, it forms a capacitor whose capacitance depends on the electric characteristics of the environment. As soon as the dielectric is no longer formed by a gas (free electrode), the capacitance changes; this change is converted into a switching signal by the CapFox® ENT 20 Ex isolation amplifier.

The constant direct current supplied by the pre-amplifier to the isolation amplifier is within a given range when there are no interferences. In case of a defective probe or connection cable, this range is exceeded, the relay switches and a visual alarm is generated.

Technical specifications

Operating temperature range
CNS 20: -20/+60 °C
CNS 20 Ex: -40/+120 °C

Process pressure
CNS 20: 0/16 bar
CNS 20 Ex: 0/30 bar

Process connection
G1B as per DIN 3852-A

Installation lengths
CNS 20: 250 to 1,000 mm as required
CNS 20 Ex: 80 to 1,000 mm as required

Electrode
CNS 20: Fully PTFE-insulated,
Seal FKM (Viton)
CNS 20 Ex: Stainless steel 316 Ti
Probe tip PTFE-insulated
Seal FKM (Viton)

Switching characteristics
Contact with the medium (can be adjusted in the terminal box via potentiometer)

Housing
Robust field housing with screw cover
Stainless steel 316 Ti

Degree of protection
IP 67 (EN 60529)

Electrical connection
Cable gland PG 11

Approval
Overfill prevention system according to WHG
Technical Approval of the German Institute for Building Technology: Z-65.13-156
CNS 20 Ex additionally:
TÜV 01 ATEX 1661 (Ex ia II C T6...T4)

DG: H	Part no.	Price €
CNS 20-250 Length 250 mm	53430	
CNS 20-400 Length 400 mm	53432	
CNS 20-600 Length 600 mm	53434	
CNS 20-800 Length 800 mm	53436	
CNS 20-1000 Length 1000 mm	53438	

DG: H	Part no.	Price €
CNS 20 Ex-80 Length 80 mm	53440	
CNS 20 Ex-200 Length 200 mm	53442	
CNS 20 Ex-400 Length 400 mm	53444	
CNS 20 Ex-600 Length 600 mm	53446	
CNS 20 Ex-1000 Length 1,000 mm	53448	

Vibration level switch for liquids VibraFox® GVG

- Compact design
- WHG approval
- Maintenance-free
- High resistance to chemicals
- Various process connections
- Commissioning without calibration

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Application

Suitable for detecting limit levels in liquids with a maximum dynamic viscosity of 10,000 mPa • s and a minimum density of 0.7 kg/dm³. Specially useful in applications in which float switches cannot be used due to liquid flow, turbulence or product adherence. Ideally suited as an overflow alarm or for dry-run protection. Due to the WHG approval, VibraFox® can be used as part of an approved overfill prevention system.

Description

The vibration fork of VibraFox® is excited to its resonance frequency. When the fork comes into contact with the medium, there is a change in frequency which is detected by the electronics and converted into a switching signal. The unique evaluation electronics enable the application of the system even under adverse conditions, e.g. in vibrating tanks or with turbulent liquid surfaces.

Technical specifications

Minimum density of medium
0.7 kg/dm³

Dynamic viscosity of the medium
Max. 10,000 mPa • s

Operating temperature range
Medium: -40/+100 °C
Ambient: -40/+70 °C

Process pressure
-1/+64 bar

Process connection
G¾A or G1A (PN 64)

Vibration fork
Stainless steel 316 L
Installation length 69 mm or 117 mm

Supply voltage
AC/DC 20–253 V (2-wire)
Load current min. 10 mA max. 250 mA
or DC 10–55 V (3-wire)
Load current max. 250 mA

Power input
2-wire: Depending on external load
3-wire: Max. 0.6 W

Output
2-wire AC/DC or 3-wire transistor (PNP) DC

Switching delay
After immersion: 0.5 s
After removal: 0.5 s

Switching point
Vertical installation: 13 mm
(in water at 25 °C)

Switching hysteresis
Vertical installation:2 mm
Horizontal installation:2 mm
(in water at 25 °C)

Visual indication
Bi-colour LED green/red

Function test
With test magnet (included)

Housing
Stainless steel 1.4435, cover PEI

Electrical connection
Connector and junction box as per ISO 4400 (DIN 43650-A) IP 65 or M 12 x 1 (IP 67)

Technical Approval of the German Institute for Building Technology
Z-65.11-412

Options

- Other process connections (e,g, NPT, Clamp, dairy fitting)
- Surface roughness Ra < 0.8 µm
- Weld-in sockets
- Other electrical connections
- Coupling relay (only for DC version)
- Extended operating temperature range -40/+150 °C (medium)

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See page 47 for prices.

Vibration level switch for liquids
VibraFox® GVG

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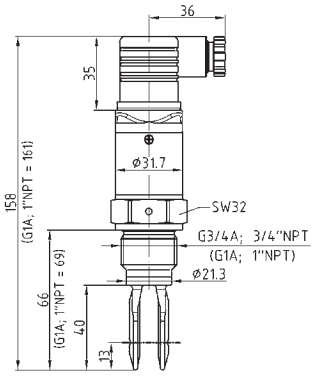
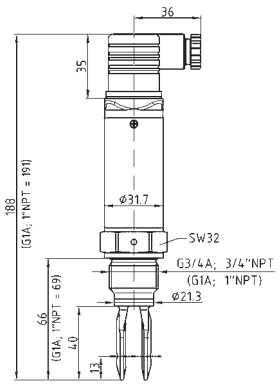
Electrical connections and dimensions (mm)

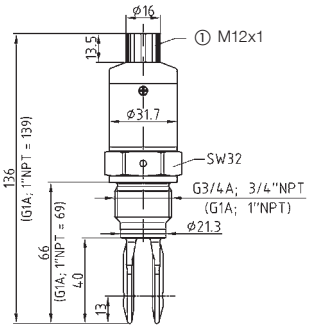
GVG 10/12
Standard version



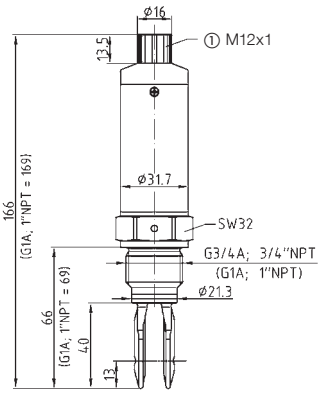
GVG 10 HT/12 HT
High temperature version



GVG 11
Standard version

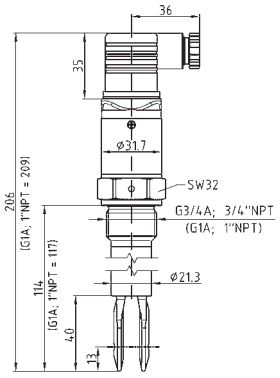


GVG 11 HT
High temperature version

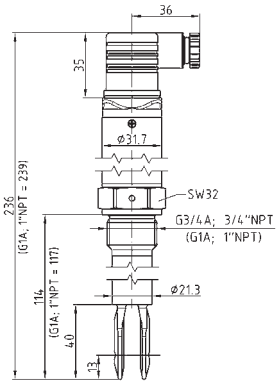


① Protective cover thread

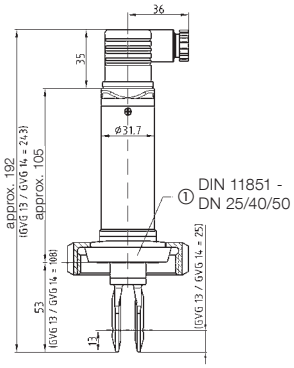
GVG 13/14
Standard version



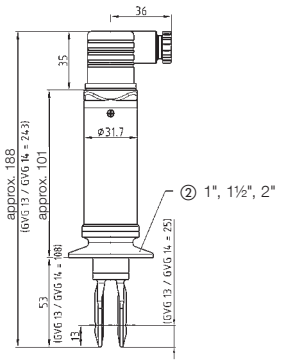
GVG 13 HT/14 HT
High temperature version



GVG 10 MR/GVG 12 MR
Dairy fitting

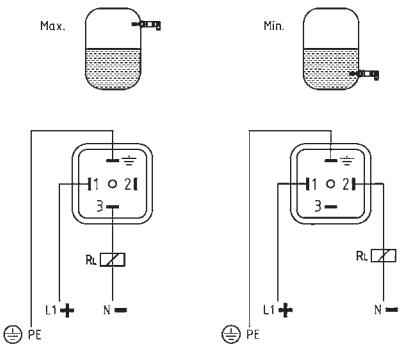


GVG 10 CP/GVG 12 CP
Tri-Clamp

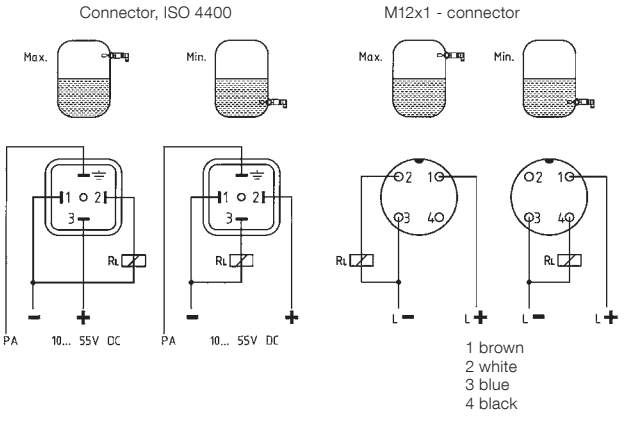


① Screwed pipe connection
② Tri-Clamp

Wiring diagram non-contact switch AC/DC

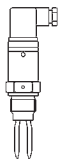
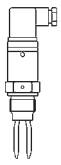
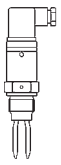
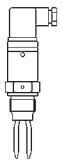


Wiring diagram transistor output (PNP) DC



Vibration level switch for liquids
VibraFox® GVG

DG: E

Type	GVG 10	GVG 11	GVG 12	GVG 13	GVG 14
Version					
Process connection	G¾A	G¾A	G¾A	G¾A	G¾A
Price €					
Part no.	**56164**	**56166**	**56168**	56170	56172
Process connection	G1A	G1A	G1A	G1A	G1A
Price €					
Part no.	**56165**	**56167**	**56169**	56171	56173
Installation length	69 mm	69 mm	69 mm	117 mm	117 mm
Supply voltage	AC/DC 20–253 V	DC 10–55 V	DC 10–55 V	AC/DC 20–253 V	DC 10–55 V
Output	Non-contact Switch	Transistor output PNP	Transistor output PNP	Non-contact switch	Transistor output PNP
Electrical connection	Connector and junction box as per ISO 4400 (DIN 43650-A)	M 12 x 1	Connector and junction box as per ISO 4400 (DIN 43650-A)	Connector and junction box as per ISO 4400 (DIN 43650-A)	Connector and junction box as per ISO 4400 (DIN 43650-A)
Extra charges	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
Extended operating temperature range (medium) -40 °C/+150 °C					
Process connection*					
¾" NPT					
1“ NPT					
Tri-Clamp 1“, PN 16, Ra ≤ 0.8 µm, -40/+150 °C**					
Tri-Clamp 2“, PN 16, Ra ≤ 0.8 µm, -40/+150 °C**					
Dairy fitting DIN 11851, DN 25, PN 40, Ra ≤ 0.8 µm, -40/+150 °C**					
Dairy fitting DIN 11851, DN 40, PN 40, Ra ≤ 0.8 µm, -40/+150 °C**					
Dairy fitting DIN 11851, DN 50, PN 25, Ra ≤ 0.8 µm, -40/+150 °C**					

Accessories	Part no.	**Price €**
Coupling relay KR 100 ST (only for DC versions) output: 1 x voltage-free changeover contact	53700	
Spare test magnet for function test	56155	

* Extra charge as compared to version with process connection G¾A
** Extra charges already include extended operating temperature range -40 °C/+150 °C

Overfill prevention systems

Level sensors

Accessories

CHAPTER 2

Overfill alarm systems, overfill prevention systems and PTC thermistor type level controllers

OVERVIEW

Overview overfill prevention systems/overfill alarm systems 50

OVERFILL ALARM SYSTEMS

Level sensor for indoor tanks GWG 12 52
Filler caps, KVA and reducers 54
Level sensors for outdoor tanks GWG 23 56
Level sensors for outdoor tanks GWG 83 58
Level sensors for outdoor tanks GWG 84 58
Level sensors for outdoor tanks GWG 81 59
Level sensor testers GPR, ME 61

OVERFILL PREVENTION SYSTEMS

Transducers UFS 01 62
Transducers NB 220 H, NB 220 QS 63
Level probes UFS 01, type 76 AH 64
Transducers LS 500 65
Alarm acknowledgement units AQ 220 65
Level probes LS 300 EU/FU 66

LEVEL CONTROLLERS

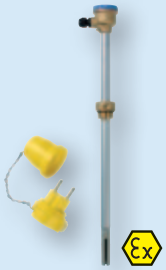
Level controllers RG 210 67

Overfill alarm systems/overfill prevention systems at a glance

		GWG 12 K/1	GWG 12 K/1C	GWG 12 K/MT	GWG 23 – Ro	GWG 23 – T
		Level sensors				
Rectangular tanks (DIN 6625-1)	Tanks	•	•	•		
Cylindrical horizontal steel tanks (EN 12285-1, 12285-2, DIN 6624-1)	Tanks				•	•
Cylindrical vertical steel tanks (DIN 6618-1)	Tanks				•	•
Cylindrical vertical steel tanks (DIN 6619-1)	Tanks				•	•
Cylindrical vertical steel tanks (DIN 6623-1)	Tanks				•	•
Underground tanks for petrol	Tanks				•**	•
Aboveground tanks for petrol	Tanks				•**	•
Flat bottom tanks (DIN 4119-1)	Tanks					
Plastic tanks	Tanks	•	•	•	•	•
Other tank types*	Tanks				•	•
Fuel oil EL (DIN 51603-1)	Media	•	•	•	•	•
Diesel fuel (EN 590)	Media	•	•	•	•	•
Fuel oil EL (DIN 51603-1) with 20 % fatty acid methyl ester (FAME) as biofuel (EN 14213)	Media	•	•	•	•	•
Fuel oil EL (DIN 51603-1) with 100 % fatty acid methyl ester (FAME) as biofuel (EN 14213)	Media	•		•	•	•
Diesel fuel (EN 590) with 20 % fatty acid methyl ester (FAME) as biodiesel (EN 14214)	Media	•	•	•	•	•
Diesel fuel (EN 590) with 100 % fatty acid methyl ester (FAME) as biodiesel (EN 14214)	Media	•		•	•	•
Petrol (EN 228)	Media				•	•
Aviation petrol	Media					
Aviation/Gasoline	Media					
Aviation turbine fuels	Media					
Special grade fuels	Media					
Aliphatic hydrocarbons	Media					
Gearbox oils, motor oils and hydraulic oils	Media					
Transformer oils	Media					
Vegetable oils	Media					
Oil/water mixtures	Media					
Antifreeze agents	Media					
AdBlue®	Media					
Other inflammable/non-inflammable liquids*	Media					
TRbF 511	Approvals	•	•	•	•	•
Technical Approval of the German Institute for Building Technology	Approvals	•	•	•	•	•
ATEX	Approvals				•**	
		Page 52	Page 53	Page 53	Page 56	Page 56

* See the product description on the corresponding catalogue page or the operating instructions for suitability for other tanks/media

** Depending on product version



GWG 23 – Wa	GWG 83 UV	GWG 84 – UVT-R	GWG 81-D-Ex	UFS 01	NB 220	LS 500
Level sensors				Overfill prevention systems		
				•	•	•
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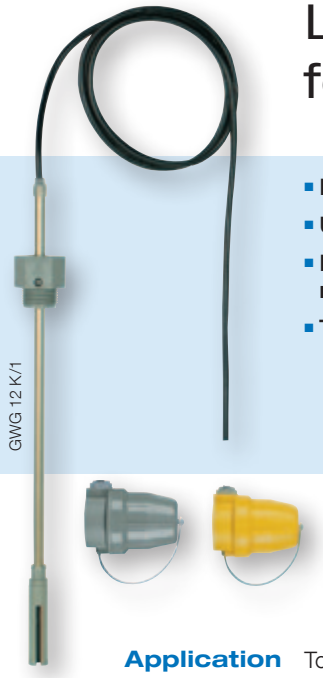
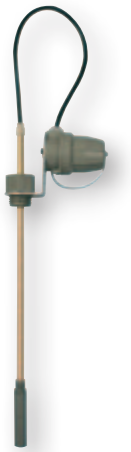
Level sensors for indoor tanks



- **Design as per EN 13616 (TRbF 511/512)**
- **Universal due to variable height adjustment**
- **Impact-resistant, shock-resistant and deformation-resistant GWG connection fitting (type 905 yellow)**
- **The right version for each application**



GWG 12 K/1 with bracket

Application

To be used as part of a control chain for overfill alarm systems to avoid overfilling of tanks. Designed for use with battery type tanks made of sheet steel according to DIN 6620-1 type B and rectangular tanks according to DIN 6625-1 welded on site with heights between 1 and 4 m and for plastic tanks, also in battery arrangement (up to 25 individual tanks).

Description

PTC thermistor type level sensor consisting of probe, screw fitting, fitting for wall mounting as well as cable between probe and fitting. The GWG connection fitting type 905 yellow is shock-resistant, impact-resistant and deformation-resistant.
GWG 12 K/1 (bracket) with pre-mounted connection fitting type 905 made of grey plastic. The connection fitting is fixed to an aluminium bracket. The connection cable of the level sensor is factory-wired to the connection fitting. For tanks with direct filling (without filling pipe from the outside. See the ordering table for the available versions, fitting colours, probe and cable lengths. GWG filler cap type 906 (part no. 20430) can also be used.

Technical specifications

Process connection
Screw fitting G1, plastic

Media
- Fuel oil EL (DIN 51603-1)
- Diesel fuel (EN 590)
- FAME 100 % as biofuel (EN 14213)
- FAME 100 % as biodiesel (EN 14214)

Adjustment range
Probe length 360 mm: 80 to 338 mm
Probe length 480 mm: 80 to 438 mm

Technical Approval of the German Institute for Building Technology
Z-65.17-182

DG: G	Probe length	Fitting	Cable length			Part no.	**Price €**
GWG 12 K/1 yellow	360 mm	Yellow	1.5 m	1	25	**45100**	
GWG 12 K/1 grey	360 mm	Grey	1.5 m	1	25	**45105**	
GWG 12 K/1 grey	480 mm	Grey	1.5 m	1	25	**45102**	
GWG 12 K/1 yellow	360 mm	Yellow	5.0 m	1	15	**45160**	
GWG 12 K/1 grey	360 mm	Grey	5.0 m	1	15	**45165**	
GWG 12 K/1	360 mm	Without	1.5 m	1	25	**45166**	
GWG 12 K/1	360 mm	Without	5.0 m	1	20	**45167**	
GWG 12 K/1 with bracket	360 mm	Grey	0.4 m	1	25	**45104**	

Level sensors for indoor tanks

Application

To be used as part of a control chain for overfill alarm systems to avoid overfilling of tanks. Designed for use with battery type tanks made of sheet steel according to DIN 6620-1 type B and rectangular tanks according to DIN 6625-1 welded on site with heights between 1 and 4 m and for plastic tanks. GWG 12 K/MT also for tanks in battery arrangement (up to 25 individual tanks).

GWG 12 K/1C (Euroflex 312)

Description

PTC thermistor type level sensor consisting of probe, screw fitting, fitting for wall mounting as well as cable between probe and fitting. The screw fitting is a withdrawal unit Euroflex 312 with quick-action shut-off valve with connection for flow, return and measuring lines. The GWG connection fitting type 905 yellow is shock-resistant, impact-resistant and deformation-resistant. GWG filler cap type 906 (part no. 20430) can also be used.

Design as per EN 13616 (TRbF 511/512)

Technical specifications

Fitting
Type 905 yellow for wall mounting

Process connection
Screw fitting G1½

Medium
- Fuel oil EL (DIN 51603-1)
- Diesel fuel (EN 590)
- FAME 20 % as fuel oil (EN 14213)
- FAME 20 % as biodiesel (EN 14214)

Adjustment range
80 to 338 mm

Probe length
360 mm

Hose length
Part no. 20190: 2.15 m
Part no. 20186: 3.15 m

Cable length
5 m

Technical Approval of the German Institute for Building Technology
Z-65.17-182

GWG 12 K/MT

PTC thermistor type level sensor consisting of mechanical level indicator MT-Profil-R, probe, screw fitting, fitting for wall mounting as well as cable between probe and fitting. The GWG connection fitting type 905 yellow is shock-resistant, impact-resistant and deformation-resistant. GWG filler cap type 906 (part no. 20430) can also be used.

Design as per EN 13616 (TRbF 511/512)

Fitting
Type 905 yellow for wall mounting

Process connection
Screw fitting G1½

Medium
- Fuel oil EL (DIN 51603-1)
- Diesel fuel (EN 590)
- FAME 100 % as biofuel (EN 14213)
- FAME 100 % as biodiesel (EN 14214)

Measuring range level (tank height)
Reversible scale 0/150 cm and 0/250 cm.

Adjustment range level sensor
80 to 338 mm

Probe length
360 mm

Cable length
5 m

Technical Approval of the German Institute for Building Technology
Z-65.17-182

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Cable extension fitting KVA,

GWG filler cap see page 54.

DG: G			Part no.	Price €
GWG 12 K/1 C with withdrawal unit Euroflex	1	10	**20190**	
GWG 12 K/1 C with withdrawal unit Euroflex	1	10	**20186**	
GWG 12 K/MT with level indicator MT-Profil R	1	10	**45311**	

Accessories for level sensors

GWG filler cap

Application
The filler cap without colour code may only be used with systems which are exclusively used with fuel oil EL standard, diesel fuel and biodiesel.

Description
GWG filler cap with bayonet connection G2 as per EN 14420-6 with integrated level sensor connection fitting. Male coupling made of brass. Cap made of oil- and weather-resistant plastic. Lockable with standard padlock.

GWG filler cap

GWG filler cap – green

Application
The green filler cap may only be used with systems which are exclusively operated with low-sulphur fuel oil EL. Together with the red plate "Also for fuel oil EL standard", the filler cap may also be used with systems which are operated both with low-sulphur fuel oil EL and with fuel oil EL standard, diesel fuel and biodiesel.

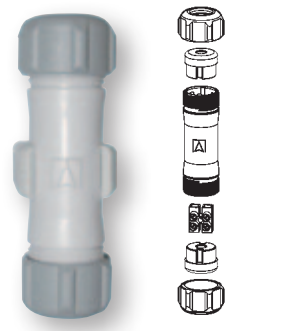
Description
Green GWG filler cap with red plate "Also for fuel oil EL standard". Bayonet connection G2 according to EN 14420-6 with integrated level sensor connection fitting. Male coupling made of brass. Cap made of oil- and weather-resistant plastic. Lockable with standard padlock.

GWG filler cap – green

Cable extension fitting KVA

Application
For 2-wire electrical cables (max. 42 V/4 A).

Description
Clamp connections (gland) at both ends for cable diameters between 6 and 8.3 mm.
Wire cross section: Max. 2.5 mm²
Degree of protection: IP 54



Cable extension fitting KVA

Reducers

Reducer G1½ x G1
Reducer G1½ x G1 made of grey plastic (ABS).

Reducer G2 x G1½
Reducer G2 x G1½ made of grey plastic (ABS).

Reducers

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See page 126/127 for additional filler caps.
See page 61 for level sensor test instruments.
See page 60 for fittings for level sensors.

DG: G			Part no.	Price €
GWG filler cap	1	10	**20430**	
GWG filler cap – green	1	10	**20443**	
Reducer G1½ x G1	10	-	**20905**	
Reducer G2 x G1½	10	-	**20903**	
Cable extension fitting KVA	1	10	**40041**	

Level sensors for outdoor tanks

as per EN 13616 (TRbF 511/512)

Fittings for level sensors

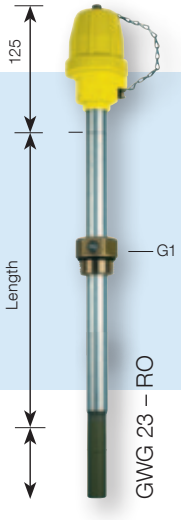
1. Coupling plug type 902
2. Coupling socket type 903, fitting for wall mounting type 905
3. Coupling socket type 903

Benefits

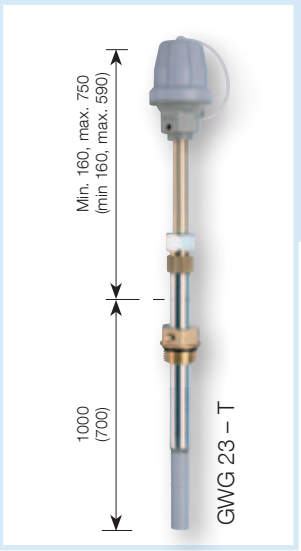
- **The right version for each application**
- **Compact, corrosion-free design**
- **Adjustable for different tank sizes**
- **Universal due to variable height adjustment**
- **Yellow fitting made of impact-resistant plastic with ATEX approval (zone 0)**
- **Chemical resistance even if used with biodiesel, biofuel or admixtures up to 100 %**
- **Easy and fast installation**

Various types of level sensor fittings are available – depending on site conditions and requirements. Customers requiring high quality order the "yellow fitting", oil companies often order the brass fitting. See ordering table, page 60.

Level sensor GWG 23 – Ro/T for outdoor tanks as per EN 13616 (TRbF 511/512)



- **Fuel oil EL, diesel fuel, biofuel/biodiesel and petrol**
- **Yellow fitting with ATEX approval (zone 0)**
- **Variable height adjustment**



Application

To be used as part of a control chain for overfill alarm systems to avoid overfilling of tanks. For tanks according to EN 12285-1, 12285-2, DIN 6618, 6619, 6623, 6624, 4119 or equivalent tanks whose diameters and volumes correspond to the EN 12285-1 design. Suitable for the following media: fuel oil EL and diesel fuel as well as biofuel, biodiesel or petrol under certain conditions. See the operating instructions for additional information.

Description

PTC thermistor type level sensor consisting of height-adjustable probe and screw fitting. Pressure- and vacuum-tight.

GWG 23 – Ro with tube fitting made of yellow plastic, highly impact-resistant, deformation-resistant with strong chain and flange gasket. Suitable for use in hazardous areas (EX areas).

GWG 23 – T with telescopic tube for height adjustment of the connection fitting. Tube fitting made grey plastic, shock-resistant, with tie, without flange gasket.

When selecting a level sensor, please check to see that the fitting is as close as possible to the access chamber cover – the distance should be no less than 20 mm and no more than 300 mm. See the operating instructions for the adjustment depth in the tank.

Technical specifications

Probe length
From 400 to 1,500 mm,
see ordering table

Process connection
Screw fitting G1

Operating temperature range
Medium: -25/+50 °C
Ambient: -25/+60 °C

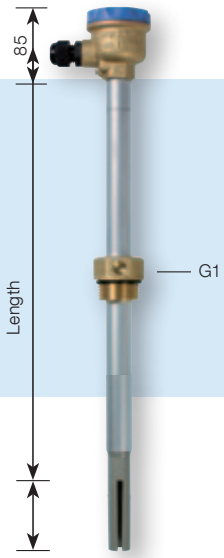
Operating pressure in the tank
No pressure

Material
GWG fitting: Plastic
Probe tube: Steel, galvanised
Screw fitting: Brass
PTC thermistor: Glass-encapsulated

Approvals
Technical Approval of the German Institute for Building Technology:
Z-65.17-366
GWG with yellow fitting: Ex II 1 G Ex ia IIB T3

i
See page 60 for prices and versions.

Level sensor GWG 23 Wa for outdoor tanks as per EN 13616 (TRbF 511/512)



- **Fitting for wall mounting**
- **For fuel oil EL, diesel fuel and biofuel/biodiesel**
- **Yellow fitting with ATEX approval (zone 0)**
- **Variable height adjustment**

GWG fitting for wall mounting

2

Application

To be used as part of a control chain for overfill alarm systems to avoid overfilling of tanks. For tanks according to EN 12285-1, 12285-2, DIN 6618, 6619, 6623, 6624, 4119 or equivalent tanks whose diameters and volumes correspond to the EN 12285-1 design. Suitable for the following media: fuel oil EL and diesel fuel as well as biofuel, biodiesel or petrol under certain conditions. See the operating instructions for additional information.

Description

PTC thermistor type level sensor consisting of height-adjustable probe, screw fitting, junction box at the upper end of the tube and fitting for wall mounting. Pressure- and vacuum-tight.

When selecting a level sensor, please check to see that the fitting is as close as possible to the access chamber cover – the distance should be no less than 20 mm and no more than 300 mm. See the operating instructions for the adjustment depth in the tank.

Technical specifications

Probe length
From 400 to 1,500 mm,
see ordering table

Process connection
Screw fitting G1

Operating temperature range
Medium: -25/+50 °C
Ambient: -25/+60 °C

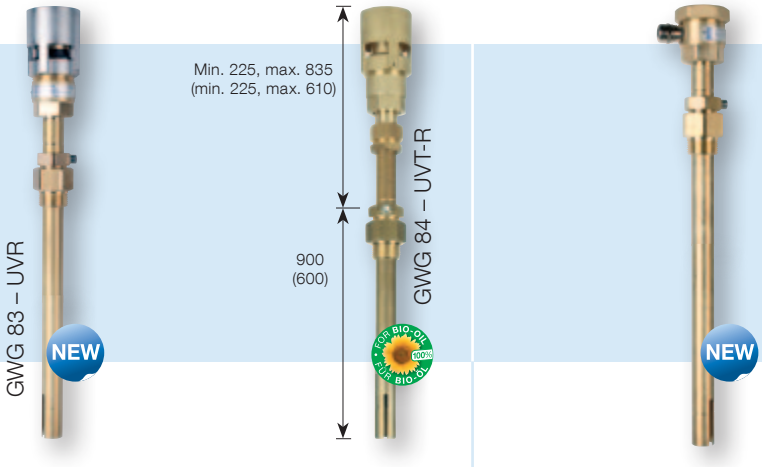
Operating pressure in the tank
No pressure

Material
Junction box: Brass/plastic
GWG fitting (wall mounting): Plastic
Probe tube: Steel, galvanised
Screw fitting: Brass
PTC thermistor: Glass-encapsulated

Approvals
Technical Approval of the German Institute for Building Technology:
Z-65.17-366
GWG with yellow fitting: Ex II 1 G Ex ia IIB T3

i
See page 60 for prices and versions.

Level sensor GWG 83/84 for outdoor tanks as per EN 13616 (TRbF 511/512)



Application

To be used as part of a control chain for overfill alarm systems to avoid overfilling of tanks. For tanks as per DIN 6608, 6616, 6617, 6619, 6624 and TGL 5315. GWG 83 also for tanks as per DIN 6623. Suitable for fuel oil EL, diesel fuel and petrol. See the operating instructions for additional information.

GWG 83 – UVR
GWG 84 – UVT-R

Description

PTC thermistor type level sensor consisting of height-adjustable probe and screw fitting. Pressure- and vacuum-tight.

GWG 84 - UVT-R with telescopic tube for height adjustment of the GWG connection fitting.

When selecting a level sensor, please check to see that the fitting is as close as possible to the access chamber cover – the distance should be no less than 20 mm and no more than 300 mm. See the operating instructions for the adjustment depth in the tank.

Technical specifications

Probe length
From 400 to 1,000 mm,
see ordering table

Process connection
Screw fitting G1

Operating temperature range
Medium: -25/+50 °C
Ambient: -25/+70 °C

Operating pressure in the tank
No pressure

Material

GWG fitting:	Brass
Probe tube:	Brass
Screw fitting:	Brass
PTC thermistor:	Stainless steel-encapsulated

Approvals
Technical Approval of the German Institute for Building Technology:
Z-65.17-363
EC Type Examination Certificate:
TÜV 03 ATEX 2033 Ex II 1G Ex ia IIB T3

GWG 83 – UVW

PTC thermistor type level sensor consisting of height-adjustable probe, screw fitting, junction box at the upper end of the tube and and GWG fitting for wall mounting. Pressure- and vacuum-tight.

When selecting a level sensor, please check to see that the fitting is as close as possible to the access chamber cover – the distance should be no less than 20 mm and no more than 300 mm. See the operating instructions for the adjustment depth in the tank.

Probe length
From 400 to 1,000 mm,
see ordering table

Process connection
Screw fitting G1

Operating temperature range
Medium: -25/+50 °C
Ambient: -25/+70 °C

Operating pressure in the tank
No pressure

Material

Junction box:	Brass
Probe tube:	Brass
Screw fitting:	Brass
PTC thermistor:	Stainless steel-encapsulated

Approvals
Technical Approval of the German Institute for Building Technology:
Z-65.17-363
EC Type Examination Certificate:
TÜV 03 ATEX 2033 Ex II 1G Ex ia IIB T3

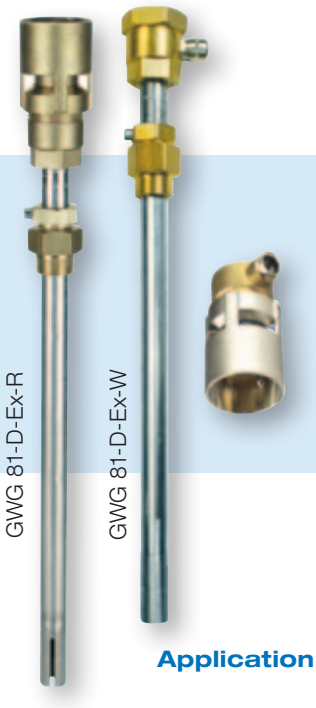
i

See page 60 for prices and versions

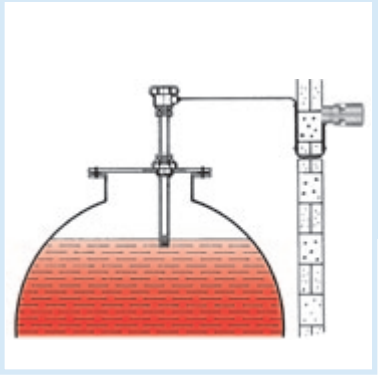
Please enquire for coded inserts for QSS and filling hose safeguard (ASS).

Level sensor GWG 81-D-Ex

as per EN 13616 (TRbF 511/512)



- For a wide array of media
- Height-adjustable probe
- Easy and fast installation
- Fitting with flame arrestor



Application

To be used as part of a control chain for overfill alarm systems to avoid overfilling of tanks in hazardous areas (zone 0). For tanks according to EN 12285-1, 12285-2, DIN 6624-1, 6624-2, 6619-1, 6619-2, 6623-1, 6623-2 or equivalent tanks whose diameters and volumes correspond to the EN 12285-1 design. For the media listed below.

Description

EX-protected PTC thermistor type level sensor. Consisting of height-adjustable probe and screw fitting. With GWG fitting 907-R.

GWG 81-D-Ex-W: With junction box at tube end and GWG fitting 907-W for wall mounting.

Media

1. Fuel oil EL (DIN 51603-1)

2. Fuels

2.1 Diesel fuel (EN 590)
- Biodiesel as per EN 14214
- Petrol (super and regular) as per EN 228
- Aviation petrol
- Aviation/Gasoline 80
- Aviation/Gasoline 100/100 LL
- Aviation/Gasoline 115/145

2.2 Aviation turbine fuels
- Aviation turbine fuel kerosene type Jet-A
- Aviation turbine fuel wide out type Jet-B
- Aviation turbine fuel

3. Special grade fuels
- Petroleum ether according to DIN 51630
- Special boiling point spirit as per DIN 51631
- Solvent naphtha as per DIN 51632
- Safety lamps mineral spirit as per DIN 51634
- FAM standard mineral spirit as per DIN 51635
- Lamp, burning and solvent kerosene as per DIN 51636

4. Aliphatic hydrocarbons
- Hexane, octane, nonane, n-decyl hydride, isodecyl hydride, heptane

5. Aromatic hydrocarbons
- Benzene
- Toluene
- Xylene
- Solvent naphtha (light) as per DIN 51 633

6. Alcohols
- Propanol
- Butanol
- Ethanol

Technical specifications

Probe length
From 400 to 1,000 mm,
see ordering table

Process connection
Screw fitting G1

Operating temperature range
Medium: -25/+50 °C
Ambient: -25/+60 °C

Operating pressure in the tank
No pressure

Material

Junction box:	Brass
GWG fitting:	Brass
Probe tube:	Stainless steel 304
Screw fitting:	Brass
PTC thermistor:	Stainless steel-encapsulated

Approvals
Technical Approval of the German Institute for Building Technology
Z-65.17-362
EC Type Examination Certificate
TÜV 03 ATEX 2034 Ex II 1G Ex ia IIB T3 and Ex II 1/2G Ex ia IIB T3

i

See page 60 for prices and versions.

Please enquire for coded inserts for QSS and filling hose safeguard (ASS).

Level sensor for outdoor tanks as per EN 13616 (TRbF 511/512)

	Fitting	Probe length (mm)		DG			Part no.	Price €
GWG 23 – Ro 400	Yellow	400		G	1	-	**46115**	
GWG 23 – Ro 700	Yellow	700		G	1	-	**46116**	
GWG 23 – Ro 1000	Yellow	1,000		G	1	-	**46117**	
GWG 23 – Ro 1500	Yellow	1,500		G	1	-	**46120**	
GWG 23 – Ro So	Yellow	Max. 3,000		G	1	-	46118	
GWG 23 – Ro 400	Grey	400		G	1	-	**46125**	
GWG 23 – Ro 700	Grey	700		G	1	-	**46126**	
GWG 23 – Ro 1000	Grey	1,000		G	1	-	**46127**	
GWG 23 – Ro 1500	Grey	1,500		G	1	-	**46129**	
GWG 23 – Wa 400	Yellow	400		G	1	-	**46130**	
GWG 23 – Wa 700	Yellow	700		G	1	-	**46131**	
GWG 23 – Wa 1000	Yellow	1,000		G	1	-	**46132**	
GWG 23 – Wa 1500	Yellow	1,500		G	1	-	46135	
GWG 23 – Wa So, special lengths	Yellow	Up to max. 3,000		G	1	-	46133	
GWG 23 – T 700	Grey	Min. length: 860	Max. length: 1,290	G	1	-	**47622**	
GWG 23 – T 1000	Grey	1,160	1,750	G	1	-	**47623**	
GWG 81-D-Ex 400-R	Brass	400		H	1	-	47455	
GWG 81-D-Ex 700-R	Brass	700		H	1	-	47456	
GWG 81-D-Ex 1000-R	Brass	1,000		H	1	-	47457	
GWG 81-D-Ex special length R Extra charge per 100 mm	Brass	-		Net	1	-	47458	
GWG 81-D-Ex 400-W	Brass	400		H	1	-	47440	
GWG 81-D-Ex 700-W	Brass	700		H	1	-	47441	
GWG 81-D-Ex 1000-W	Brass	1,000		H	1	-	47442	
GWG 81-D-Ex special length W Extra charge per 100 mm	Brass	-		Net	1	-	47447	
GWG 83 – UV 400 R	Brass	400		G	1	-	47504	
GWG 83 – UV 500 R	Brass	500		G	1	-	47505	
GWG 83 – UV 600 R	Brass	600		G	1	-	47506	
GWG 83 – UV 700 R	Brass	700		G	1	-	47507	
GWG 83 – UV 800 R	Brass	800		G	1	-	47508	
GWG 83 – UV 900 R	Brass	900		G	1	-	47509	
GWG 83 – UV 1000 R	Brass	1,000		G	1	-	47510	
GWG 83 – UV 400 W	Brass	400		G	1	-	47515	
GWG 83 – UV 500 W	Brass	500		G	1	-	47521	
GWG 83 – UV 600 W	Brass	600		G	1	-	47519	
GWG 83 – UV 700 W	Brass	700		G	1	-	47516	
GWG 83 – UV 800 W	Brass	800		G	1	-	47522	
GWG 83 – UV 900 W	Brass	900		G	1	-	47517	
GWG 83 – UV 1000 W	Brass	1,000		G	1	-	47518	
GWG 84 – UVT-R-600-Ms	Brass	Min. length: 825	Max. length: 1,210	H	1	-	47600	
GWG 84 – UVT-R-900-Ms	Brass	1,125	1,735	H	1	-	47610	

Please enquire for coded plug inserts for QSS and filling hose control system (ASS).

Accessories	Fitting	DG:			Part no.	Price €
GWG fitting 907-R	Brass	G	1	-	40060	
GWG fitting 905-W	Grey	G	1	-	**40050**	
GWG fitting 905-W	Yellow	G	1	-	**40052**	
GWG fitting 907-W	Brass	G	1	-	40065	
Coupling socket 903	-	G	1	-	40030	
Coupling plug 902	-	G	1	-	40045	

Level sensor testers GPR/ME

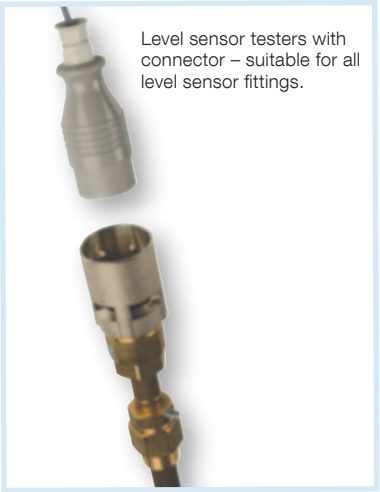
GPR 4

Application

For use with storage tanks for fuel oils and diesel fuels. Not permitted for use in hazardous areas and not for level sensors which are installed in tanks containing hazardous media.

Description

Simple level sensor tester with connector, suitable for all level sensor fittings. A signal lamp indicates function or error. Battery-operated. Delivery with level sensor connection fitting, also suitable for level sensor with brass fitting.



Level sensor testers with connector – suitable for all level sensor fittings.

ME 5/ ME 5 P

For genuine function checks of all level sensors approved as per EN 13616 (TRbF 511/512). For use with storage tanks for fuel oils and diesel fuels; also permitted for use in hazardous areas and for level sensors which are installed in tanks containing hazardous media (zone 0).

EX-approved level sensor tester with intrinsically safe level sensor power circuit. The characteristic of the PTC thermistor is fully checked via a micro-processor program. Test instructions as well as the test result are alphanumerically displayed. Version with connector, suitable for all level sensor fittings. Battery-operated.

Version ME 5 P with additional product ID.

EC Type Examination Certificate
TÜV 03 ATEX 2141 Ex II (2) G Ex ia IIB

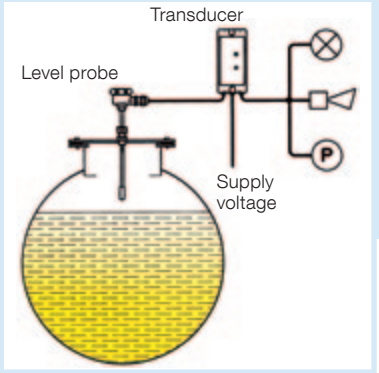
DG: H	Part no.	Price €
Level sensor tester GPR 4	**62301**	
Level sensor tester ME 5	**62230**	
Level sensor tester ME 5 P	62240	
Accessories		
Carrying case of ME 5	**62231**	
Charger for ME 5	**62232**	

Transducer for overfill prevention system UFS 01 (WHG / VAwS)

NEW

- **Compact, modern design**
- **With visual/audible alarms, Test and Acknowledge buttons**
- **2 relay outputs for additional alarm equipment, EMS, etc.**
- **Fail-safe, self-monitoring transducer for maximum reliability**

A Page 64 | A Page 590 | A GSM Page 592



Application

To avoid overfilling of stationary tanks and stationary-use tanks.
Suitable for a wide range of inflammable and non-inflammable water-polluting liquids.

Description

Type-approved together with all level probes type series 76 and UFS 01 as part of an overfill prevention system. UFS 01 in a wall mounting housing consists of a transducer and a suitable level probe (to be ordered separately). The transducer contains all display elements and controls as well as all electronic components for signal processing and conversion of the level probe signal into a digital output signal. The level probe and the transducer are connected by means of a 2-wire signal cable. When the maximum permissible level is reached, UFS 01 triggers visual and audible alarms. The filling process is stopped. The transducer also features two output relays for connection of event reporting systems or additional alarm equipment.
Ancillary control unit type 907-Z can be connected as an additional control unit to enable connection to a road tanker with filling system.

Media

- Fuel oil EL, diesel fuel, biodiesel
- Diesel/biodiesel mixtures
- Used gearbox oils and motor oils
- Unused motor oils, gearbox oils and hydraulic oils
- Transformer oil
- Hexanol 1
- Ethyl aceto-acetate (aceto-acetic ester)
- Acrylic acid 2-ethyl hexylene ester (2-ethyl hexylene acrylate)
- Cyclohexyl acetate, benzaldehyde
- Methyl aceto-acetate
- Nitrobenzene, 1.2 dichlorobenzene
- 2.4 dimethylaniline (N, N dimethylaniline)
- n octanol (n octyl alcohol)
- Diethyloxalate
- Aniline
- Vegetable oil (also as per EN 51605)
- Oil/water mixtures (e.g. drilling oil or lubricating oil)
- Perchloroethylene and trichloroethylene
- Antifreeze agents
- Cleaning agent/water mixtures
- AdBlue® (urea solution) as per DIN 70070

as well as comparable water-polluting liquids with identical heat conductivity with a flash point of > 55 °C.

Technical specifications

Operating temperature range
Ambient: -20/+60 °C

Supply voltage
AC 230 V

Output relay
1 changeover contact
1 normally open contact (can be acknowledged)

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm

Degree of protection
IP 40 (EN 60529)

Weight
0.6 kg

Technical Approval of the German Institute for Building Technology
Z-65.11-18

	DG	Part no.	Price €
Transducer UFS 01	H	**53202**	
Accessories			
Mounting frame	G	**43521**	
Sealing kit (IP 54)	G	**43416**	
Ancillary control unit type 907-Z, 230 V	H	53232	

i Level probe see page 64.

Transducer for overfill prevention wsystems (WHG / VAwS)

Application

To avoid overfilling of stationary tanks and stationary-use tanks. Suitable for a wide range of inflammable and non-inflammable water-polluting liquids with a flash point of > 55 °C to 100 °C (see product description UFS 01 for list of substances).

Transducer NB 220 H

Description

Type-approved together with all level probes type series 76 and UFS 01 as part of an overfill prevention system. When the level probe comes in contact with the liquid, the relay switches.

Technical specifications

Supply voltage
AC 230 V

Power input
Max. 4 VA/6 W

Output
Voltage-free changeover contact

Contact rating
AC 250 V, max. 500 VA

Housing (degree of protection)
Plug-in housing, (IP 30)
W x H x D: 50 x 110 x 110 mm

Technical Approval of the German Institute for Building Technology
Z-65.11-193

Transducer NB 220 QS

Type-approved together with all level probes type series 76 and UFS 01 as part of an overfill prevention system. With integrated alarm lamp, alarm horn and Mute button for the alarm horn. An external alarm lamp and alarm horn can be connected via connection terminals. When the level probe comes in contact with the liquid, NB 220 QS generates visual and audible alarms and the relay switches.
Ancillary control unit type 907-Z can be connected as an additional control unit to enable connection to a road tanker with filling system.

Supply voltage
AC 230 V

Power input
Max. 4 VA/6 W

Output current circuits
- 1 x AC 230 V (100 W) e.g. for lamp/solenoid valve, cannot be acknowledged
- 1 x AC 230 V (50 W) e.g. for horn, can be acknowledged

Housing (degree of protection)
Plug-in housing (IP 30)
W x H x D: 75 x 150 x 110 mm

Technical Approval of the German Institute for Building Technology
Z-65.11-193

i
See page 64 for level probe UFS 01.
See page 62 for a list of liquids (substances).

DG: H			Part no.	**Price €**
Transducer NB 220 H	1	-	**53210**	
Transducer NB 220 H – DC 24 V	1	-	**53219**	
Transducer NB 220 QS	1	-	**53213**	
Ancillary control unit type 907-Z, 230 V	1	-	53232	

Level probes for overfill prevention systems (WHG / VAwS)

Application

Level probe for transducers as part of an overfill prevention system for stationary tanks and stationary-use tanks used to store inflammable and non-inflammable water-polluting liquids with a flash point of > 55 °C to 100 °C (see product description UFS 01 for list of substances).

Level probe UFS 01

Description

Approved as part of an overfill prevention system together with level transducer UFS 01, NB 220 H and NB 220 QS. The level probe UFS 01 consists of a probe tube with a stainless steel-encapsulated PTC thermistor sensor at the lower end, a junction box and a screw fitting. Tube length 100 to 3,000 mm in increments of 100 mm. Standard lengths up to 500 mm. The overfill prevention system must be set up in such a way that the filling process is stopped and a sufficiently loud audible alarm is triggered when the maximum permissible level is reached.

Technical specifications

Material

Junction box:	Brass/plastic
Probe tube:	Stainless steel 316 Ti
Screw fitting:	Stainless steel 316 Ti
PTC thermistor:	Stainless steel-encapsulated

Process connection
Connection thread G¾

Operating temperature range
Medium: -25/+50 °C

Degree of protection
IP 54 (EN 60529)

Technical Approval of the German Institute for Building Technology
Z-65.11-18

Level probe type 76 AH

Approved as part of an overfill prevention system together with level transducer UFS 01, NB 220 H and NB 220 QS. The level probe type 76 AH consists of a probe tube with a stainless steel-encapsulated PTC thermistor sensor at the lower end, a junction box and a screw fitting. Tube length 100 to 3,000 mm in increments of 100 mm. Standard lengths up to 500 mm. The overfill prevention system must be set up in such a way that the filling process is stopped and a sufficiently loud audible alarm is triggered when the maximum permissible level is reached.

Material

Junction box:	Brass
Probe tube:	Stainless steel 304 or 316 Ti
Screw fitting:	Brass
PTC thermistor:	Stainless steel-encapsulated

Process connection
Connection thread G¾

Operating temperature range
Medium: -25/+80 °C

Degree of protection
IP 54 (EN 60529)

Technical Approval of the German Institute for Building Technology
Z-65.11-193

DG: H	Part no.	Price €
Level probe UFS 01 100 mm	**53245**	
200 mm	**53246**	
300 mm	**53247**	
400 mm	**53248**	
500 mm	**53249**	
Level probe type 76 AH* 500 mm	**53214**	

*Please enquire for other response lengths

i
See page 62 for a list of liquids (list of substances).

Transducer for overfill prevention systems Ex and WHG / VAwS

Transducer LS 500

Application

To avoid overfilling of stationary tanks and stationary-use tanks. Approved without list of substances for inflammable liquids (zone 0) and non-inflammable, water-polluting liquids (WHG/VAwS).

Description

Type-approved together with the level probes LS 300 EU, LS 300 FU or LS 300 ESPU as part of an overfill prevention system. The transducer supplies the level probe via an intrinsically safe circuit, evaluates the change in resistance of the PTC thermistor, continuously checks the PTC thermistor operation and monitors the system (power failure, short circuit, line interruption, etc.). Negative results cause the overfill prevention system to respond.

The overfill prevention system must be set up in such a way that the filling process is stopped or visual and audible alarms are triggered when the maximum permissible level is reached. The transducer must be installed outside of the hazardous area.

Technical specifications

Supply circuit
Supply voltage: AC 230 V
Power input: max. 4 VA
(Supply voltage:
DC 24 V or AC 24 V at extra charge)
Output current circuit 1 voltage-free changeover contact
Sensor current circuit (intrinsically safe)
Voltage: < DC 15.8 V
Current: < 154 mA
Power: < 600 mW

Operating temperature range
-25 °C/+50 °C

Housing (degree of protection)
Wall mounting housing (IP 40)
W x H x D: 75 x 150 x 110 mm

Technical Approval of the German Institute for Building Technology:
Z-65.11-228

EC Type Examination Certificate:
TÜV 00 ATEX 1641 Ex II (1)G [Ex ia] IIC

i
See page 66 for level probes.

Alarm acknowledgement unit AQ 220

For connection to overfill prevention systems and leak alarm systems.

Integrated visual and audible alarms indicate fault conditions. The audible alarm can be muted with the Acknowledge button. The visual alarm remains on until the probe is no longer in contact with the medium (e.g. "Tank full" signal) or until a fault condition is corrected. As soon as the visual alarm is switched off, the system resumes normal operation. Additional external alarm equipment can also be connected and acknowledged.

Supply voltage
AC 230 V

Outputs
1 voltage-free, normally open contact (horn), can be acknowledged
1 voltage-free, normally open contact (lamp)

Contact rating
Max. 250 V, 2A

Operating temperature range
-10/+60 °C

Housing (degree of protection)
Wall mounting housing (IP 30)
W x H x D: 53 x 113 x 107 mm

DG: H	Part no.	Price €
LS 500	**53310**	
Alarm acknowledgement unit AQ 220	**53230**	

Level probes for overfill prevention systems Ex and WHG / VAwS

2

Application

Level probe for transducers as part of an overfill prevention system for stationary and stationary-use tanks. Suitable for installation in all tank versions. Approved without list of substances for inflammable liquids (zone 0) and non-inflammable, water-polluting liquids (WHG).

Description

Level probe LS 300 EU

Approved part of an overfill prevention system according to WHG together with the LS 500 transducer – self-monitoring and with automatic corrosion monitoring. LS 300 EU consists of a height-adjustable probe tube made of stainless steel with a PTC thermistor sensor element at the lower end, a screw fitting and a brass junction box with integrated overvoltage protection. Standard length 500 mm, max. length 3,000 mm. The level probe can be used in inflammable liquids up to 3 bar overpressure (please specify higher pressure ranges when ordering).

Level probe LS 300 FU

LS 300 FU consists of a probe tube, welded to the flange (gas-tight) and can be installed in tanks with an overpressure of up to 3 bar. (Please specify higher pressures when ordering). A stainless steel version with a coating is available for use in containers with very corrosive media (acids). An additional protective sleeve can be supplied if strong gas/air flows are present in the response area of the level probe.

Technical specifications

Material
Junction box: Brass, chrome-plated
Probe tube: Stainless steel 316 Ti
Screw fitting: Stainless steel 316 Ti
PTC thermistor: Stainless steel-encapsulated

Process connection
Screw fitting G⅜

Operating temperature range
Medium: -25/+50 °C or
-25/+80 °C (optional)

Degree of protection
IP 67 (EN 60529)

Technical Approval of the German Institute for Building Technology
Z-65.11-228

EC Type Examination Certificate
TÜV 00 ATEX 1656X
Ex II 1G Ex ia IIC T4
Ex II 1/2G Ex ia IIC T4

Material
Junction box: Brass/chrome-plated
Probe tube: Stainless steel 316 Ti
Flange: Stainless steel 316 Ti
PTC thermistor: Stainless steel-encapsulated

Process connection
As per DIN 2527, DN 25/PN 16

Operating temperature range
Medium: -25/+50 °C or
-25/+80 °C (optional)

Degree of protection
IP 54 (EN 60529)

Technical Approval of the German Institute for Building Technology
Z-65.11-228

EC Type Examination Certificate
TÜV 00 ATEX 1656X
Ex II 1G Ex ia IIC T4
Ex II 1/2G Ex ia IIC T4

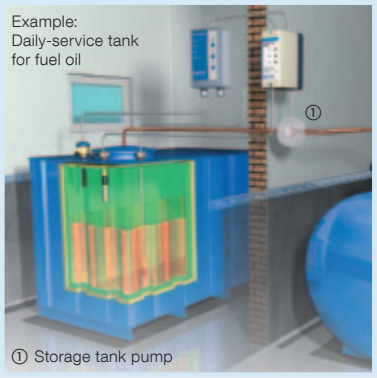
i

Please specify the following when ordering:
- Response length in mm
- Pressure level (max. 25 bar) PN
- Nominal diameter DN
- Flange standard
- Medium (stored liquid)

DG: H	Part no.	Price €
Level probe LS 300 EU, 500 mm	**53300**	
Extra charge for high-temperature version -25 °C, +80 °C		
Special lengths – extra charge per 100 mm		
Level probe LS 300 FU, 500 mm	53307	

PTC thermistor level controller RG 210

- **Compact control unit**
- **Universal application due to selectable functions**



Application

For use in electrically conductive and non-conductive liquids which are not viscous or adhesive: fuel oil, diesel fuel, emulsions, water, and media which are not corrosive.

Description

PTC thermistor type level controller with selectable functions:
- Level switch (1 probe)
- Level control for filling (2 probes)
- Level control for emptying (2 probes)

Level switch with 1 probe:
The relay switches in case of contact or loss of contact with the liquid. When the switch point is set, it must be observed that the PTC thermistor requires approx. 8 seconds to heat up depending on the ambient temperature.

Level control for filling with 2 probes:
Set internal switch to "fill". The relay energises after the min. probe has heated up. Relay de-energises when the max. probe comes into contact with the liquid.

Level control for emptying with 2 probes:
Set internal switch to "empty". Relay energises when max. probe has contact with the liquid. Relay de-energises when the min. probe loses contact with the liquid and heats up.

Technical specifications

Operating temperature range
Medium: -25/+55 °C
Ambient: -10/+55 °C

Probe
PTC thermistor probe, types 150 or 937
Cable length 3 m (max. 50 m)
Process connection G1

Supply voltage
AC 230 V

Power input
12 VA

Relay contact (output)
1 voltage-free changeover contact

Housing (degree of protection)
Plug-in housing (IP 30)
W x H x D: 53 x 113 x 108 mm

Flexible PTC thermistor probe type 150
Flexible PTC thermistor probe designed for use with electrically conductive and non-conductive liquids which are not viscous or adhesive, for connection to RG 210. See RG 210 for further characteristics of the liquids. Stainless steel-encapsulated PTC thermistor, with oil-resistant probe cable (3 m long) and G1 gland connection, pressure-proof up to 1 bar.

Flexible PTC thermistor probe type 937
Flexible PTC thermistor designed for oils and other electrically non-conductive liquids (low-viscosity, non-adhesive). The PTC thermistor connection wires are not encapsulated. Not suitable for installation in humid environments.

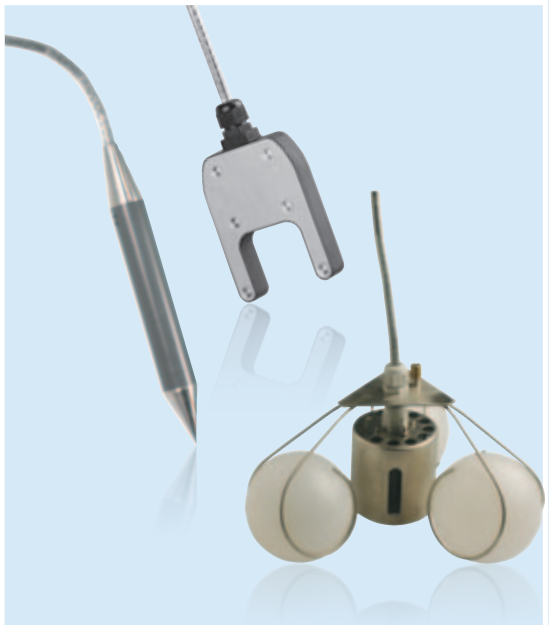
i

Note: Not to be used as an overfill prevention system according to TRbF. Requires either the connection of an overflow pipe to the tank or the additional installation of an overfill prevention system according to TRbF / WHG.

DG: H			Part no.	**Price €**
RG 210	1	-	**53206**	
Flexible PTC thermistor probe type 150	1	-	**53208**	
Flexible PTC thermistor probe type 937	1	-	**53204**	

Alarm unit for oil and petrol separators

Alarm units for oil, petrol and grease separators



Probes for alarm units

CHAPTER 3

Alarm units for oil, petrol and grease separators

OIL/PETROL

Alarm unit (layer thickness alarm/overflow alarm) WGA 01 70

OIL/PETROL/GREASE

Alarm units (layer thickness alarm/overflow alarm) WGA 02, WGA 03 71

Alarm units (sand alarm/layer thickness alarm) WGA 04, WGA 05 72

Alarm unit (oil-on-water alarm/layer thickness alarm) WGA 06 73

Alarm unit for separators WGA 01

- For oil and petrol separators
- Layer thickness/overflow alarm

Application

Oil and petrol pose a great danger to groundwater and waste water. WGA 01 monitors the thickness of the layer of separated liquid in oil and petrol separators and generates an alarm signal when it is time to drain the separator. In addition, the maximum level in the separator can be detected. This prevents overfilling that may be caused by clogged outlets or other circumstances. The unit keeps harmful substances from reaching the sewage water system.

Description

WGA 01 consists of a control unit, a capacitance probe (WGA-ES4) for monitoring the thickness of the oil or grease layer and an optional additional PTC thermistor probe (WGA-R6) for detecting the maximum level (overflow alarm). The control unit is equipped with 2 relay outputs, visual and audible alarms as well as Test and Acknowledge buttons. The WGA-ES4 probe is mounted at least 150 mm below the constant level of the separator. As soon as the oil or petrol layer reaches the critical level, the device generates an alarm signal. By installing the optional WGA-R6 probe above the constant level, you can also monitor the maximum level. The control unit monitors the probes for short circuits or cable breaks.

Technical specifications

Operating temperature range
Medium: -20/+40 °C
Ambient: 0/40 °C

Probe WGA-ES4
Function principle: capacitance
Length 220 mm, Ø 25 mm
Cable length 5 m

Probe WGA-R6 (option)
Function principle: PTC thermistor
Length 100 mm, Ø 22 mm
Cable length 5 m

Connection probe – control unit
Max. 200 m

Supply voltage
AC 230 V

Power input
Approx. 4 VA

Switching outputs
Relay contacts: voltage-free changeover contacts (cannot be acknowledged)
1 x for layer thickness
1 x for overfilling (overflow)
Contact rating: AC 250 V/5 A/ 100 VA

Visual indication
1 green LED layer thickness (operation)
1 green LED overflow (operation)
1 red LED layer thickness (alarm)
1 rote LED overflow (alarm)

Audible alarm
Integrated piezo buzzer, can be acknowledged

Function test
By means of Test button

Housing
Wall mounting housing made of impact-resistant plastic (polycarbonate)
W x H x D: 175 x 125 x 75 mm

Degree of protection
IP 65 (EN 60529)

ATEX approvals
Control unit:
Ex II (1) G [Ex ia] II B
Probes:
WGA-ES4: Ex II 1 G Ex ia II A T4
WGA-R6: Ex II 1 G Ex ia II A T3

Scope of delivery
Control unit, probe WGA-ES4

Options

Probe WGA-R6

DG: E	Part no.	Price €
WGA 01 incl. probe WGA-ES4 (layer thickness)	53410	
Additional probe WGA-R6 (overflow)	53419	
Spare probe WGA-ES4	53418	

Alarm unit for separators WGA 02/WGA 03

- For oil, petrol and grease separators
- Layer thickness/overflow alarm

Application

Oil, grease and petrol pose a great danger to groundwater and waste water. WGA 02 monitors the thickness of the layer of separated liquid in oil, petrol and grease separators and generates an alarm signal when it is time to drain the separator.
WGA 03 can also detect the maximum level in the separator. This avoids overfilling that may be caused by clogged outlets or other circumstances. The unit keeps harmful substances from reaching the sewage water system.

Description

WGA 02 consists of a control unit and a conductivity probe (WGA-SD 02) for monitoring the oil or grease layer. The control unit is equipped with 2 relay outputs, visual and audible alarms as well as Test and Acknowledge buttons. The WGA-SD 02 probe is mounted below the constant level of the separator. As soon as the oil, petrol or grease layer reaches the critical level, the device generates an alarm signal.
WGA 03 is equipped with an additional capacitance probe (WGA-AS). It is mounted above the constant level. An alarm is triggered when the maximum level is reached.
The control unit monitors the probes for short circuits or cable breaks.

Technical specifications

Operating temperature range
Medium: -20/+60 °C
Ambient: -25/+50 °C

Probe WGA-SD 02 (layer thickness)
Function principle: conductivity
Length 214 mm, Ø 25 mm
Cable length 5 m, PVC, oil-resistant

Connection probe – control unit
Max. 300 m

Supply voltage
AC 230 V

Power input
Approx. 2 VA

Switching outputs
Relay contact: 2 voltage-free changeover contacts (1 can be acknowledged)
Contact rating: AC 250 V/5 A/100 VA

Visual indication
1 green LED operation
1 red LED alarm
1 red LED error

Audible alarm
Integrated piezo buzzer, can be acknowledged

Housing
Wall mounting housing made of impact-resistant plastic (polycarbonate)
W x H x D: 175 x 125 x 75 mm
Degree of protection IP 65 (EN 60529)

ATEX approvals
Control unit: Ex II (1) G [Ex ia] II C
Probe WGA-SD 02: Ex II 1 G Ex ia II A T5 Ga

Scope of delivery
Control unit, probe WGA-SD 02, junction box, mounting material

Additional specifications WGA 03

Probe WGA-AS (overflow)
Function principle: capacitance
Length 81 mm, Ø 82 mm
Cable length 5 m, PVC, oil-resistant

Power input
Approx. 4 VA

Visual indication
1 green LED operation
2 red LEDs alarm
2 red LEDs error

ATEX approvals
Probe WGA-AS: Ex II 1 G Ex ia II A T5 Ga

Scope of delivery
Like WGA 02, but with additional WGA-AS probe

DG: E	Part no.	Price €
WGA 02 incl. probe WGA-SD 02	53400	
WGA 03 incl. probes WGA-SD, WGA-AS	53411	
Spare probe WGA-SD 02	53403	
Spare probe WGA-AS	53415	

Alarm unit for separators WGA 04/WGA 05

- **For oil, petrol and grease separators**
- **Sand alarm/layer thickness alarm**

Application

WGA 04 monitors oil, petrol and grease separators for accumulations of sand and sludge and generates an alarm signal when it is time to clean the separator. WGA 05 additionally monitors the thickness of the layer of separated liquid and generates an alarm signal when it is time to drain the separator.

Description

WGA 04 consists of a control unit and an ultrasonic probe (WGA-SN 01). The probe generates an alarm signal when it detects solid matter between the two probe tips. The control unit is equipped with 2 relay outputs, visual and audible alarms as well as Test and Acknowledge buttons.
WGA 05 is additionally equipped with a conductivity probe (WGA-SD 02) for monitoring the layer of oil, petrol or grease. The WGA-SD 02 probe is mounted below the constant level of the separator. As soon as the oil, petrol or grease layer reaches the critical level, the device generates an alarm signal. The control unit monitors the probes for short circuits or cable breaks.

Technical specifications

Operating temperature range
Medium: 0/60 °C
Ambient: -25/+50 °C

Probe WGA-SN 01 (sand)
Function principle: ultrasound
length 142 mm, width 79 mm
Cable length 5 m, PVC, oil-resistant

Connection probe – control unit
Max. 300 m

Supply voltage
AC 230 V

Power input
Approx. 2 VA

Switching outputs
Relay contact: 2 voltage-free changeover contacts (1 can be acknowledged)
Contact rating: AC 250 V/5 A/100 VA

Visual indication
1 green LED operation
1 red LED alarm
1 red LED error

Audible alarm
Integrated piezo buzzer, can be acknowledged

Function test
By means of Test button

Housing
Wall mounting housing made of impact-resistant plastic (polycarbonate)
W x H x D: 175 x 125 x 75 mm
Degree of protection IP 65 (EN 60529)

ATEX approvals
Control unit: Ex II (1) G [Ex ia] II C
Probe WGA-SN 01: Ex II 1 G Ex ia II B T5 Ga

Scope of delivery
Control unit, probe WGA-SN 01, junction box, mounting material

Additional specifications WGA 05

Probe WGA-SD (layer thickness)
Function principle: conductivity
Length 214 mm, Ø 25 mm

Power input
Approx. 4 VA

Visual indication
1 green LED operation
2 red LEDs alarm
2 red LEDs error

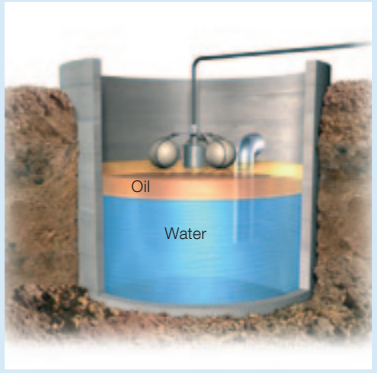
ATEX approvals
Probe WGA-SD 02: Ex II 1 G Ex ia II A T5 Ga

Scope of delivery
Like WGA 04, but with additional probe WGA-SD 02

DG: E	Part no.	Price €
WGA 04 incl. probe WGA-SN 01	53412	
WGA 05 incl. probes WGA-SN 01, WGA-SD 02	53413	
Spare probe WGA-SN 01	53416A	
Spare probe WGA-SD 02	**53403**	

Alarm unit for separators WGA 06

- For oil, petrol and grease separators
- Oil-on-water alarm/overflow alarm



Application

Together with the WGA-ÖW probe, WGA 06 monitors pump and control shafts in separator systems for oil accumulations and generates an alarm signal before pollutants can reach the sewage system. It is also possible to connect the WGA-AS probe. This way, the maximum levels in separators or retention tanks can be detected. This avoids overfilling that may be caused by clogged outlets or other circumstances. The unit keeps harmful substances from reaching the sewage water system.

Description

WGA 06 consists of a control unit and a capacitance probe (WGA-ÖW or WGA-AS). The control unit is equipped with 2 relay outputs, visual and audible alarms as well as Test and Acknowledge buttons. Either the floating probe WGA-ÖW or the fixed probe WGA-AS can be connected. WGA-ÖW floats on the surface of the water in the shaft and generates an alarm signal when an oil, grease or petrol layer of at least 15 mm has built up. WGA-AS is mounted above the constant level of the separator or the retention tank. An alarm is triggered when the maximum level is reached. The control unit monitors the probes for short circuits or cable breaks.

Technical specifications

Operating temperature range
Medium: -25/+60 °C
Ambient: -25/+50 °C

Floating probe WGA-ÖW (oil-on-water)
Function principle: capacitance
3 PVC float balls
Height 120 mm, Ø 370 mm
Cable length 5 m, PVC, oil-resistant

Probe WGA-AS (overflow)
Function principle: capacitance
Length 81 mm, Ø 82 mm
Cable length 5 m, PVC, oil-resistant

Connection probe – control unit
Max. 300 m

Supply voltage
AC 230 V

Power input
Approx. 2 VA

Switching outputs
Relay contact: 2 voltage-free changeover contacts (1 can be acknowledged)
Contact rating: AC 250 V/5 A/100 VA

Visual indication
1 green LED operation
1 red LED alarm
1 red LED error

Audible alarm
Integrated piezo buzzer, can be acknowledged

Function test
By means of Test button

Housing
Wall mounting housing made of impact-resistant plastic (polycarbonate)
W x H x D: 175 x 125 x 75 mm
Degree of protection IP 65 (EN 60529)

ATEX approvals
Control unit: Ex II (1) G [Ex ia] II C
Probes: WGA-ÖW: Ex II 1 G Ex ia II A T5 Ga
WGA-AS: Ex II 1 G Ex ia II A T5 Ga

Scope of delivery
Control unit: without probes
Probe: with junction box, without mounting material

DG: E	Part no.	Price €
WGA 06 without probes	53414	
Floating probe WGA-ÖW (oil-on-water)	53417	
Probe WGA-AS (overflow)	53415	

AFRISO WATCHDOG alarm units

Vacuum type leak detectors EUROVAC

Inner tank linings

Leak detectors – sight glass principle

CHAPTER 4

Leak detectors, leak monitoring systems, inner tank linings and alarm units

OVERVIEW

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AFRISO-WATCHDOG alarm units and application examples 94

LEAK DETECTION

Leak detectors - sight glass principle LAS 78

Leak detector LAG 13-K 79

Leak detector LAG 14 ER 80

Accessories for leak detectors 81

Vacuum type leak detector Eurovac NV 82

Vacuum type leak detector Eurovac HV 83

Protective equipment for leak detectors liquid barrier, condensate bar 84

Spare parts for leak detectors 85

Pressure type leak detector Europress 91

Pressure type leak detector Europress LAD-R 92

Manifold for Europress LAD-R 93

LEAK PROTECTION

Tank protection package AK-S for fuel oil, diesel 86

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Inner linings for rainwater harvesting 88

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ALARM UNITS FOR OIL/WATER

Oil/water alarm unit ÖWWG 3 97

Oil/water alarm unit with burner connection kit ÖWWG 3 98

Oil alarm unit and water alarm unit OM 5, WM 5 99

Water alarm unit ÖWU for separate detection of oil and water ÖWU 100

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ALARM UNITS FOR WATER

Water alarm unit WWG 102

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ACCESSORIES FOR ALARM UNITS

Floor water probe, wall mounting rail probe floating probe 106

PTC thermistor probe, photoelectric probe, drip pan 107

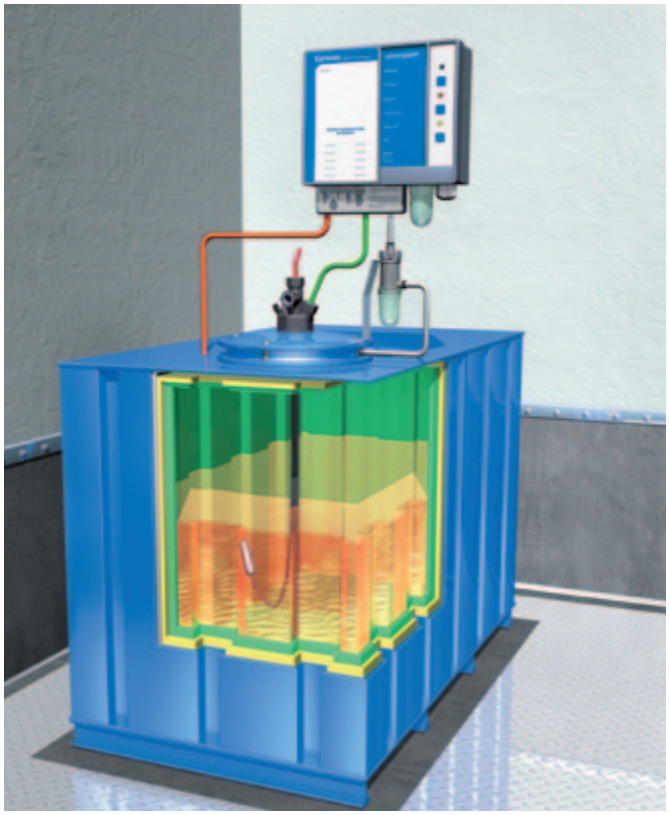
Mounting frame, sealing kit, DIN rail clip 108

Professional equipment and convincing solutions for tank protection

With a comprehensive range of building technology products, AFRISO prides itself in "Making Tanks Safe". This extensive portfolio also includes a large selection of alarm units for fast detection of levels, unwanted accumulations of liquids, leaks, gases or smoke.

Advantages – your benefits

- Complete range of products for professional tank protection from a single supplier
- Maximum protection against fuel oil accidents with brand products with Technical Approval of the German Institute for Building Technology
- Chemical resistance even with biodiesel, biofuel and admixtures
- Inner linings and tank room linings, exactly made to size and ready for easy installation
- 10 years warranty on material and workmanship for plastic inner linings
- Fittings and devices ready to be installed, with all required mounting accessories

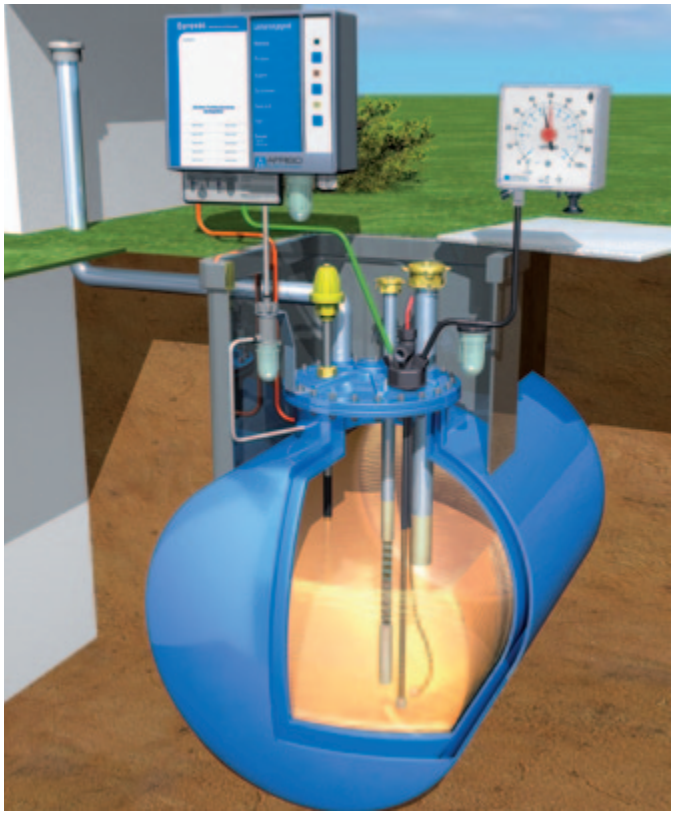


Leak protection and tank room linings

The installation of customised AFRISO leak protection linings turn single-walled steel tanks into double-walled tanks. Complex drip pans or collection facilities are no longer required. Oil cannot escape even if there is a leak in the outer tank wall. The Eurovac leak detector uses a vacuum in the interstitial space between the inner lining and the tank wall to monitor both walls for leaks. Malfunctions and leaks are immediately signalled.

Damages such as settlement cracks can cause leaks in oil tank protection rooms. AFRISO tank room linings in new and renovated installations safely protect tank rooms.

Leak detectors and the AFRISO-WATCHDOG family of alarm units
The uniform appearance not only ensures customer confidence, but also underpins the professionalism of the specialised company.



Leak monitoring

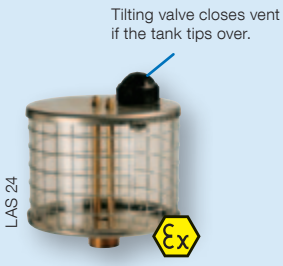
Application areas
- Cylindrical steel or plastic (glass-fibre reinforced plastic) tanks
- Double-walled steel tanks
- Tanks welded in basements
- Spherical tanks
- Oil storage rooms/collection rooms
- Containers, cisterns, cesspits

Media
- Fuel oil EL
- Diesel fuel
- Biofuel with up to 20 % FAME
- Biodiesel with up to 20 % FAME
- AHL
- AdBlue®
- Rainwater

Oil tank conversion kits

If oil tanks can no longer be used or if the heating system is converted to other types of energy or if old unused cesspits and cisterns are available, the containers can be equipped with a plastic inner lining for rainwater harvesting and integrated into a rainwater harvesting system.
Various conversion kits, inner linings and a complete range of accessories are available.

Leak detectors – sight glass principle



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Application

For aboveground double-walled tanks containing inflammable liquids and non-inflammable, water-polluting liquids. Application under atmospheric conditions for steel tanks according to DIN 6618-3 and double-walled tanks with approval for leak detectors. Types LAS 24 E, LAS 39 E and LAS 72 E for hazardous liquids according to classes A I, A II, A III and B (as per former classification VbF). Types LAS 24, LAS 39, LAS 72 and LAS 230 for hazardous liquids according to class A III.

Description

Leak detector for liquid systems consisting of a transparent acrylic glass cylinder, stainless steel housing covers and bottoms. Connection thread G1. Technical Approval of the German Institute for Building Technology Z-65.24-381.

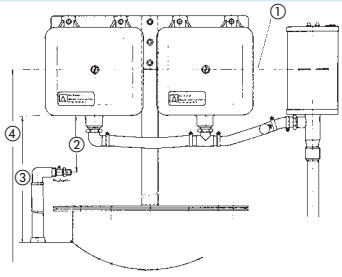
Versions

Version E with wire mesh cylinder. LAS 24 EK for mobile tanks with tilting valve to protect against loss of leak detection fluid during transport and for venting on site. LAS 39 and 72 with G1 connection at the side for up to 4 additional containers with 4.5 litres each. The additional containers allow for leak detection at tanks with a greater interstitial space (see overview).

Overview LAS 72 with additional containers

Number Additional containers	Usable contents LAS 72 and additional containers in litres	Max. leak detection fluid in the interstitial space in litres	Suitable for tanks with a volume of Litres
0	2.1 l	max. 72 l	approx. 10,000 l
1	6.6 l	max. 230 l	approx. 40,000 l
2	11.1 l	max. 387 l	approx. 80,000 l
3	15.6 l	max. 545 l	approx. 100,000 l
4	20.1 l	max. 700 l	approx. 80,000 l

*Values for LAS 39 on request.



① Make sure to observe height
② min. 100 mm
③ min. 500 mm
④ max. 5 m to tank bottom

DG: H	Usable contents	Interstitial space of tank	Max. no. of additional tanks	Part no.	**Price €**
LAS 24	0.7 l	max. 24 l	-	43515	
LAS 24 E	0.7 l	max. 24 l	-	43516	
LAS 24 EK	0.7 l	max. 24 l	-	43517	
LAS 39	1.1 l	max. 39 l	4	43526	
LAS 39 E	1.1 l	max. 39 l	4	43525	
LAS 72	2.1 l	max. 72 l	4	43528	
LAS 72 E	2.1 l	max. 72 l	4	43527	
LAS 230	6.6 l	max. 232 l	-	43550	
Mounting kit LAS 0 (test valve)	-	-	-	43529	
Mounting kit LAS 1*	-	-	-	43530	
Mounting kit LAS 2*	-	-	-	43531	
Mounting kit LAS 3*	-	-	-	43532	
Mounting kit LAS 4*	-	-	-	43533	

* Including the corresponding number of additional containers (Ex-Elstat I)

Leak detector LAG-13 K

- **Version as per German WHG/VAwS and BetrSichV**
- **For monitoring of aboveground, double-walled tanks**

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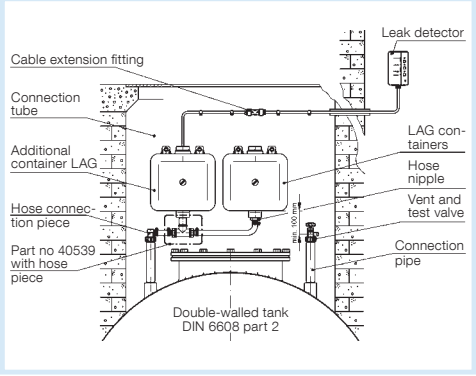

Application

For double-walled tanks with liquid in the interstitial space. For monitoring inflammable liquids of danger classes A I, A II, A III, B (according to former classification VbF) and non-inflammable water-polluting liquids stored aboveground. Approved for tanks according to EN 12285-1, 12285-2, DIN 6618-B, 6619, 6623 and DIN 6624 under atmospheric conditions.

Since July 2003, the LAG-13 leak detector may only be used for replacement deliveries for underground, double-walled tanks as a result of the reclassification of water-polluting liquids in Germany!

Description

Class II leak detector (EN 13160-1), not intrinsically safe. Consisting of control unit, leak detection fluid container (LAG container white) and probe. Control unit with operating and alarm indicators, audible/visual alarm, test button and increased interference protection. The audible alarm can be muted with the Acknowledge button. Suitable for panel mounting with a mounting frame; a sealing kit (IP 54) is available for rough application conditions. The LAG container serves as detection container and as expansion vessel at the same time. For aboveground tanks, the ratio between usable contents and total volume of leak detection fluid must be no more than 1:35. An additional container must be used if the ratio exceeds this value. Version LAG-13 KR with voltage-free relay contact for connection of additional alarm equipment (such as horns, EMS event reporting system).

Technical specifications

Operating temperature range
Ambient: -5/+55 °C
Storage: -10/+60 °C

Supply voltage
AC 230 V

Control unit
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

Switching outputs (LAG 13 KR)
Relay outputs: 1 voltage-free normally open contact
Contact rating: AC 250 V, 2A

Container
Plastic, white
W x H x D: 300 x 380 x 150 mm
Usable contents / total contents: 4.5 l / 9.7 l
Outlet: G¾" female
Degree of protection: IP 20 (EN 60529)

Technical Approval of the German Institute for Building Technology
Z-65.24-380

DG: G			Part no.	Price €
LAG-13 K (not intrinsically safe) with container and probe	1	5	43500	
LAG-13 KR (not intrinsically safe) with relay and probe	1	-	43501	
LAG container white without probe	1	-	40730	
Control unit LAG-13 K	1	-	40630	
Control unit LAG-13 KR	1	-	40638	
Accessories				
Mounting frame	1	-	43521	
Sealing kit (IP 54)	1	-	43416	
LAG mounting kit	1	-	40540	
Mounting kit for 1 additional LAG container (without container)	1	-	40539	
Leak detection fluid concentrate	1	-	43645	

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See page 81 for a detailed product description LAG container.

Leak detector LAG-14 ER

- **ATEX approval**
- **Version as per German WHG/VAwS and BetrSichV**
- **For monitoring of aboveground, double-walled tanks**

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4

Application

For double-walled tanks with liquid in the interstitial space. For monitoring inflammable liquids of danger classes A I, A II, A III, B (according to former classification VbF) and non-inflammable water-polluting liquids stored aboveground. The LAG container can be installed in hazardous areas zones I and II (e.g. manhole pit of petrol tanks). Approved for tanks according to EN 12285-1, 12285-2, DIN 6618-1, 6619-1, 6623-1 and DIN 6624-1 under atmospheric conditions.

Since July 2003, the LAG-14 leak detector may only be used for replacement deliveries for underground, double-walled tanks as a result of the reclassification of water-polluting liquids in Germany!

Description

Class II leak detector (EN 13160-1), with intrinsically safe probe circuit. The system consists of a control unit, a container for leak detection fluid (LAG container black) and a probe. Control unit with operating and alarm indicators, audible/visual alarm, test button and increased interference protection. The audible alarm can be muted with the Acknowledge button. The voltage-free relay contact is provided for connection of additional external alarm equipment (such as horns, EMS event reporting system). Suitable for panel mounting with a mounting frame; a sealing kit (IP 54) is available for rough application conditions. The LAG container serves as detection container and as expansion vessel at the same time. For aboveground tanks, the ratio between usable contents and total volume of leak detection fluid must be no more than 1:35. An additional container must be used if the ratio exceeds this value.

Technical specifications

Operating temperature range
Ambient: -5/+50 °C
Storage: -10/+60 °C

Supply voltage
AC 230 V

Control unit
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 30 (EN 60529)

Switching outputs
Relay outputs: 1 voltage-free normally open contact
Contact rating: AC 250 V, 2A

LAG container
Antistatic plastic, black
W x H x D: 300 x 380 x 150 mm
Usable contents / total contents: 4.5 l / 9 l
Outlet: G¾" female
Degree of protection: IP 20 (EN 60529)

Technical Approval of the German Institute for Building Technology
Z-65.24-1

ATEX approval
TPS 03 ATEX 15639 6
Ex II (1) G [Ex ia] IIC / [Ex ia] IIB

DG: G			Part no.	Price €
LAG-14 ER with relay, including container and probe	1	5	**43410**	
LAG container black, without probe	1	5	**40731**	
Control unit LAG-14 ER	1	-	**40642**	
Accessories				
Mounting frame	1	-	**43521**	
Sealing kit (IP 54)	1	-	**43416**	

i See page 81 for a detailed product description LAG container.

Accessories for leak detectors

LAG container

Description

Detection container for LAG leak detectors. The LAG container also serves as an expansion vessel. For above-ground tanks, the ratio between usable contents and total volume of leak detection fluid must be no more than 1:35. An additional container must be used if the ratio exceeds this value.
Since July 2003, the LAG-14 ER and LAG 13 KR leak detectors may only be used for replacement deliveries for underground, double/walled tanks as a result of the reclassification of water-polluting liquids in Germany!

LAG container black

Technical specifications

LAG container black
Suitable for LAG-14 ER
W x H x D: 300 x 380 x 150 mm
Usable contents / total contents: 4.5 l / 9 l
Outlet: G¾" female
Degree of protection: IP 20 (EN 60529)

LAG container white

Technical specifications

LAG container white
Suitable for LAG-13 K/KR
W x H x D: 300 x 380 x 150 mm
Usable contents / total contents: 4.5 l / 9.7 l
Outlet: G¾" female
Degree of protection: IP 20 (EN 60529)

LAG mounting kit

Description

For approved hydraulic mounting of leak detectors.

LAG mounting kit

Leak detection fluid concentrate

Description

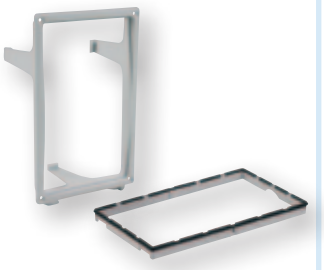
For use with leak detectors for double-walled tanks. Concentrate for mixing the leak detection fluid for the interstitial space. 10 l container with 4 l leak detection liquid concentrate Antifrogen N (BAM no.: 1.3/9790-5.1/3436), can be mixed with water to 8 l at up to -30 °C or 10 l at up to -25 °C. Please enquire for larger containers.

Leak detection fluid concentrate

Mounting frame and sealing kit

Description

Suitable for all wall mounting housings of the AFRISO WATCHDOG series (alarm units). Mounting frame for fast integration into control cabinet. Sealing kit for rough application conditions. The sealing kit is easy to mount between the housing cover and base. This increases the degree of protection of the alarm unit to IP 54.



Mounting frame and sealing kit

DG: G			Part no.	**Price €**
LAG container white	1	1	**40730**	
LAG container black	1	1	**40731**	
LAG mounting kit	1	-	**40540**	
Mounting kit for 1 additional LAG container	1	1	**40539**	
Leak detection fluid concentrate	1	-	**43645**	
Mounting frame	1	1	**43521**	
Sealing kit (IP 54)	1	1	**43416**	

Vacuum type leak detector Eurovac NV (as per German WHG, VAwS and BetrSichV)

- With visual/audible alarm, Acknowledge button and switching output
- High energy efficiency: economical, powerful DC motor with high starting torque
- Service indicator for annual maintenance
- With power failure monitoring

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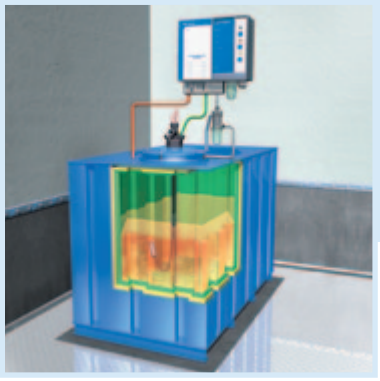


4

Application

Vacuum type leak detector according to EN 13160 (class I) for safe monitoring of double-walled and single-walled tanks with inner lining for the storage of inflammable liquids (mineral oil products) of danger class A III as well as AdBlue® (urea solution 32.5 %) according to DIN 70070. The broad voltage range (AC 100–240 V) allows for application in a large variety of countries.

Description

Compact leak detector in a robust wall mounting housing with audible and visual alarms. The audible alarm can be muted with the Acknowledge button. Eurovac NV maintains a vacuum in the interstitial space of the tank (low vacuum range). The vacuum pump is operated by an economical DC motor with a high starting torque (energy efficiency class AA++). Eurovac features a switching output for additional equipment (such as EMS event reporting system) or integration into building control systems. The pump operating time can be displayed.
Three hose connections (red, white, green) for the pneumatic connection to the interstitial space of the tank. The universal connection pieces can be used for 4 mm and 6 mm hoses.
The sintered plastic filter in the condensate trap indicates the current degree of pollution and can easily be replaced from the outside, if necessary. Electrical connection from the top or from the bottom. An optional 9 V battery can be connected so that an alarm is triggered in the case of power failure. For outdoor applications, Eurovac NV is available in a protective housing (IP 55).

Technical specifications

Operating temperature range
Ambient: -5/+50 °C

Supply voltage
AC 100–240 V

Nominal power
< 10 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Contact rating
Max. 250 V, 2 A, resistive load

Operating pressure
Interstitial space: -60 to -85 mbar

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 202 x 230 x 70 mm
Degree of protection: IP 30 (EN 60529)

Alarm sound
Min. 70 dB(A)

Technical Approval of the German Institute for Building Technology
Z-65.22-382

Eurovac in protective housing

i

See page 86 for inner linings and a complete range of mounting accessories.

Test equipment for vacuum leak detectors see page 562.

DG: H	Part no.	Price €
Eurovac NV (low vacuum)	**43755**	
Eurovac NV in protective housing (IP 55)	43782	
Eurovac NV in protective housing (IP 55) with heating	43789	

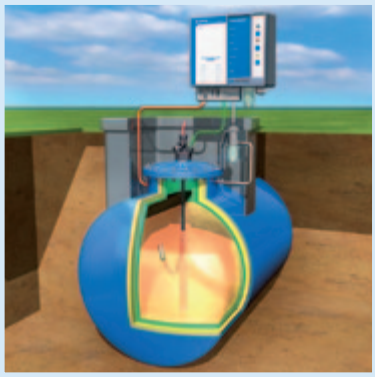
Vacuum type leak detector Eurovac HV (as per German WHG, VAwS and BetrSichV)

- With visual/audible alarm, Acknowledge button and switching output
- High energy efficiency: economical, powerful DC motor with high starting torque
- Service indicator for annual maintenance
- With power failure monitoring

A Page 84

A Page 562

A GSM Page 592



Application

Vacuum type leak detector according to EN 13160 (class I) for safe monitoring of double-walled and single-walled tanks with inner lining for the storage of inflammable liquids (mineral oil products) of danger class A III as well as AdBlue® (urea solution 32.5 %) according to DIN 70070. Eurovac enables monitoring of additional media (such as used oil, hydraulic oil, cooling agent from grinding processes, brake fluid, etc.). The broad voltage range (AC 100–240 V) allows for application in a large variety of countries.

Description

Compact leak detector in a robust wall mounting housing with audible and visual alarms. The audible alarm can be muted with the Acknowledge button. Eurovac HV maintains a vacuum in the interstitial space of the tank (high vacuum range). The vacuum pump is operated by an economical DC motor with a high starting torque (energy efficiency class AA++). Eurovac features a switching output for additional equipment (such as EMS event reporting system) or integration into building control systems. The pump operating time can be displayed.
Three hose connections (red, white, green) for the pneumatic connection to the interstitial space of the tank. The universal connection pieces can be used for 4 mm and 6 mm hoses.
The sintered plastic filter in the condensate trap indicates the current degree of pollution and can easily be replaced from the outside, if necessary. Electrical connection from the top or from the bottom. An optional 9 V battery can be connected so that an alarm is triggered in the case of power failure. For outdoor applications, Eurovac HV is available in a protective housing (IP 55).

Technical specifications

Operating temperature range
Ambient: -5/+50 °C

Supply voltage
AC 100–240 V

Nominal power
< 10 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Contact rating
Max. 250 V, 2 A, resistive load

Operating pressure
Interstitial space: approx. -400 mbar

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 202 x 230 x 70 mm
Degree of protection: IP 30 (EN 60259)

Alarm sound
Min. 70 dB(A)

Technical Approval of the German Institute for Building Technology
Z-65.22-4

Eurovac in protective housing

i

See page 86 for inner linings and a complete range of mounting accessories.

Test equipment for vacuum leak detectors see page 562.

DG: H	Part no.	Price €
Eurovac HV (high vacuum)	**43750**	
Eurovac HV in protective housing (IP 55)	43776	
Eurovac HV in protective housing (IP 55) with heating	43781	

Protective equipment for Eurovac leak detectors

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Liquid barrier

Application

For the protection of vacuum type leak detectors used on double-walled tanks to avoid the ingress of liquid into the device.

Description

Liquid barrier with condensate trap for visual inspection, complete with fixing bracket for easy mounting to manhole cover. The liquid barrier is mounted directly into the suction line between the leak detector and the double-walled tank. The liquid carried in the suction line (condensate or, in the event of a leak, the medium or ground water) is collected in the condensate trap of the liquid barrier. An integrated float shuts off the suction line if too much liquid is contained in the liquid barrier. The condensate bowl can be easily unscrewed for emptying.

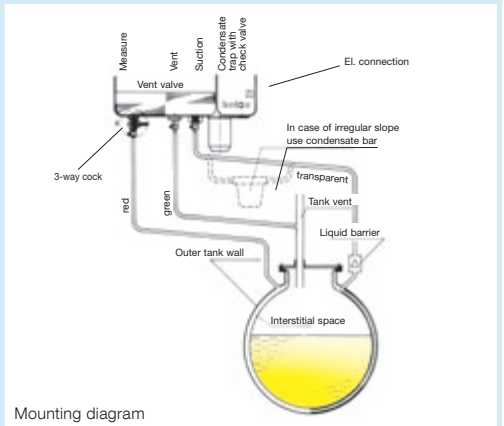
- Tightness-tested according to EN 13160-2
- Compact, robust design made of high-strength plastic
- Compatible with hoses with 4/6 mm inside diameter

Technical specifications

Hose connection
Interchangeable Ø 4 or 6 mm

Housing
Plastic

Scope of delivery
- Liquid barrier with condensate trap
- Mounting bracket
- Hose connection Ø 4/6 mm



Mounting diagram

Condensate bar

For the protection of vacuum type leak detectors used on double-walled tanks to avoid ingress of condensate liquid into the device or the system.

Condensate bar with three condensate traps for visual inspection, with integrated bracket for easy wall mounting. The condensate bar is installed at the lowest point of the measurement, vent and suction lines directly upstream of the vacuum type leak detector. When condensate forms, the liquid is collected in the relevant condensate trap. The condensate bowls can be easily unscrewed for emptying.

- Tightness-tested according to EN 13160-2
- Compact, robust design made of high-strength plastic
- Compatible with hoses with 4/6 mm inside diameter

Hose connection
Ø 4 and 6 mm

Housing
Plastic

Scope of delivery
Condensate bar with 3 condensate traps

DG: H			Part no.	Price €
Liquid barrier	1	1	**43646**	
Condensate bar	1	1	**43692**	

Spare parts for leak detectors

When ordering spare parts, please specify the unit designation (refer to type designation plate on the control unit). Spare parts for discontinued models are also listed. Visit www.afriso.de for additional spare parts lists.

LAG spare parts

DG: G	Part no.			Price €
LAG probe, plug-in connection, for LAG 13 and LAG 14	**40510**	1	-	
Foil keypad for control units 1996 and later	**18 05 000002**	1	-	
Foil keypad for control units 2007 and later	**18 05 000003**	1	-	
Spare parts LAG mounting kit				
Test valve plastic, complete	**40555**	1	-	
Double nipple G1	**40556**	1	-	
Hose connection G1 (angled)	**40557**	1	-	
Hose nipple G¾	**40558**	1	-	
Hose EPDM 14 x 3 (price per m)	**40543**	Specify length	Specify length	

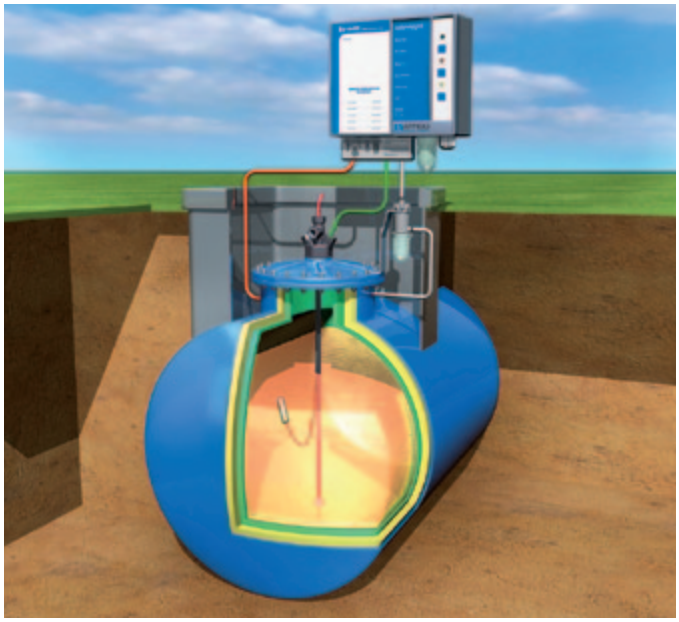
LAZ spare parts

DG: H	Part no.			Price €
Pump with motor LAZ-04/1 (HV)	**43651**	1	-	
Pump with motor LAZ-04/3 (NV)	**43652**	1	-	
Pressure switch HV	**43653**	1	-	
Pressure switch NV	**43654**	1	-	
Complete PCB with relay	**43639**	1	-	
Check valve LAZ	**43605**	1	-	
"Operation" indicator lamp LAZ-04 (yellow)	**43659**	1	-	
"Alarm" indicator lamp LAZ-04 (red)	**43658**	1	-	
"Operation" indicator lamp LAZ-04 (green)	**43661**	1	-	

Eurovac/Europress spare parts

DG: H	Part no.			Price €
Pump with motor Eurovac HV	**43777**	1	-	
Pump with motor Eurovac NV	**43783**	1	-	
Pressure switch Eurovac HV	**43780**	1	-	
Pressure switch Eurovac NV	**43787**	1	-	
Foil keypad Eurovac / Europress	**18 05 00004**	1	-	

Tank protection packages AK-S for fuel oil and diesel Inner linings with complete accessories



Application
For fuel oil EL (DIN 51603-1), diesel fuel (EN 590) and biofuel (EN 14213) as well as biodiesel (EN 14214) with up to 20 % FAME.

Description
Tank protection package with Technical Approval of the German Institute for Building Technology for cylindrical tanks.

Approval
Technical Approval of the German Institute for Building Technology: Z-65.30-162.

4

Scope of delivery
- Leak protection lining according to standard or made to size
- Vacuum type leak detector Eurovac
- Front wall lining made of fleece LSV2
- Intermediate layer made of fleece
- Mipoplast plate 800 x 800 mm
- Condensate bar triple 4/6 mm
- Liquid barrier 4/6 mm
- Angled nipple with spacer 6 x 6 or 6 x 4 mm
- Angled nipple long 6 x 6 or 6 x 4 mm
- PVC suction line 3 x 6 mm perforated or not perforated
- Fastening ring 500 mm or 600 mm
- Hose connector 6 x 6 mm
- T piece hose connection 6 x 6 x 6 mm
- Hose connector kit G⅜ x G⅛ x G¼ mm
- Warning sign with holder and felt overshoes

AK-S for cylindrical, standard tanks (EN/DIN)

DG: H	Part no.	**Price €**
3,000 l	43901.003	
5,000 l	43901.005	
7,000 l	43901.007	
10,000 l	43901.010	
13,000 l	43901.013	
15,000 l	43901.015	
16,000 l	43901.016	
20,000 l	43901.020	
25,000 l	43901.025	
30,000 l	43901.030	
40,000 l	43901.040	
50,000 l	43901.050	
60,000 l	43901.060	
80,000 l	43901.080	
100,000 l	43901.100	

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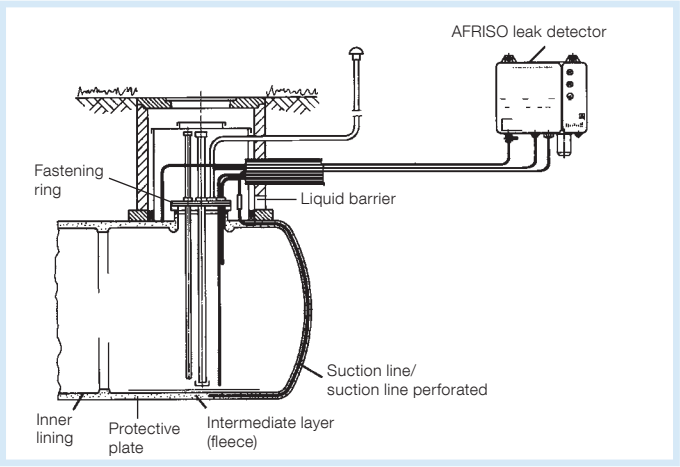
On request:
- Dimensional drawings for customised inner linings
- Tank protection packages for rectangular and spherical tanks
- Training seminars on installation of inner linings and leak detectors

Inner linings AF-S for the storage of liquid fertiliser AHL, AdBlue®



Application

For liquid fertiliser AHL and urea solution 32.5 % AdBlue®.

Description

Plastic inner linings, blue, with Technical Approval of the German Institute for Building Technology for cylindrical standard tanks, rectangular tanks consisting of steel, glass fibre reinforced or asbestos cement manufactured on site. Made of PVC film WP6120, 0.8 mm thick.

When AdBlue® is stored, the surface temperature must not exceed 35 °C!

Approvals

Technical Approval of the German Institute for Building Technology: Z-65.30-483

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DG: H	Part no.	Price €
Internal linings for AHL and AdBlue® for rectangular per m²	43870	
Stainless steel fastening ring V2A flat steel (without seal), 40 x 8 mm, glass bead blasted, 500 mm diameter.	43900N	
Stainless steel fastening ring V2A flat steel (without seal), 40 x 8 mm, glass bead blasted, 600 mm diameter.	43900O	

Inner linings for AHL and AdBlue® for cylindrical standard tanks (EN/DIN)

DG: H	Part no.	Price €
2,000 l	43880.002	
3,000 l	43880.003	
4,000 l	43880.004	
5,000 l	43880.005	
6,000 l	43880.006	
7,000 l	43880.007	
8,000 l	43880.008	
9,000 l	43880.009	
10,000 l	43880.010	
11,000 l	43880.011	
12,000 l	43880.012	
13,000 l	43880.013	
14,000 l	43880.014	
15,000 l	43880.015	
16,000 l	43880.016	
20,000 l	43880.020	
25,000 l	43880.025	
30,000 l	43880.030	
40,000 l	43880.040	
50,000 l	43880.050	
60,000 l	43880.060	
80,000 l	43880.080	
100,000 l	43880.100	

*Please enquire for larger linings and other shapes.
Scope of delivery does not include accessories

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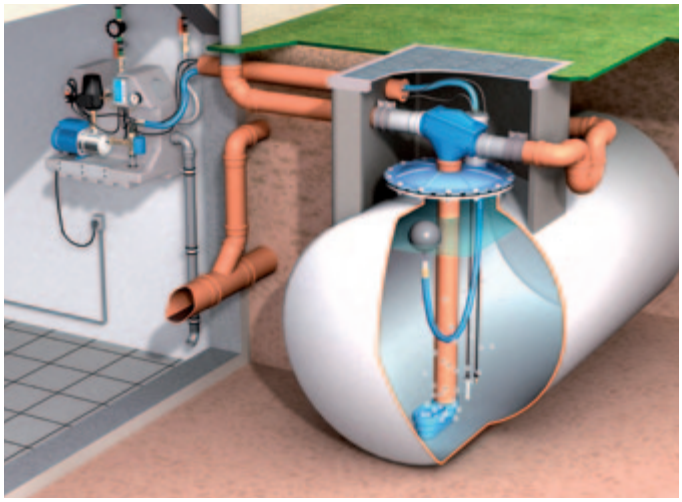
On request:
- Dimensional drawings for customised inner linings
- Complete tank protection packages
- Training seminars on installation of inner linings and leak detectors

Inner linings for rainwater harvesting



Application

When old heating oil storage tanks are taken out of service, for example due to corrosion, or if the heating system is converted to other types of fuel, the existing tanks can be used to collect rainwater. For integration into a rainwater harvesting system, the tank is cleaned and then fitted with a special inner lining suitable for water. The old, standardised manhole cover (Ø 500 mm) is replaced with a plastic cover which is specially designed for rainwater systems .

Description

Plastic inner linings for rainwater tanks. For hygienic sealing of cylindrical or rectangular tanks to be used in rainwater harvesting systems. Please enquire for inner linings for spherical tanks, cisterns, cesspits and other containers. It is advisable to install a leak detector, but this is not mandatory.

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Inner lining for rainwater for cylindrical tanks *

DG: H	Part no.	**Price €**
3,000 l	43887.003	
5,000 l	43887.005	
7,000 l	43887.007	
10,000 l	43887.010	
13,000 l	43887.013	
15,000 l	43887.015	
16,000 l	43887.016	
20,000 l	43887.020	
25,000 l	43887.025	
30,000 l	43887.030	
40,000 l	43887.040	
50,000 l	43887.050	
60,000 l	43887.060	
80,000 l	43887.080	
100,000 l	43887.100	

*Scope of delivery does not include accessories

Other tanks, cisterns, cesspits, etc. can also be sealed and converted to hygienic storage facilities by means of internal linings. Please enquire.

Inner lining for rainwater for rectangular tanks *

DG: H	Part no.	**Price €**
3,000 l	43888.003	
4,000 l	43888.004	
5,000 l	43888.005	
6,000 l	43888.006	
7,000 l	43888.007	
8,000 l	43888.008	
9,000 l	43888.009	
10,000 l	43888.010	
11,000 l	43888.011	
12,000 l	43888.012	
13,000 l	43888.013	
14,000 l	43888.014	
15,000 l	43888.015	
16,000 l	43888.016	
17,000 l	43888.017	
18,000 l	43888.018	
19,000 l	43888.019	
20,000 l	43888.020	
21,000 l	43888.021	
22,000 l	43888.022	
23,000 l	43888.023	
24,000 l	43888.024	
25,000 l	43888.025	
26,000 l	43888.026	
27,000 l	43888.027	
28,000 l	43888.028	
29,000 l	43888.029	
30,000 l	43888.030	

*Scope of delivery does not include accessories

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See page 89 for accessories, see page 222 for plastic manhole cover.

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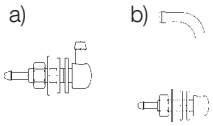
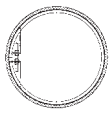
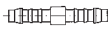
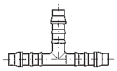
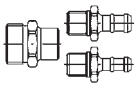
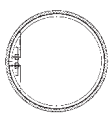
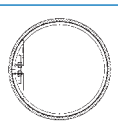
Mounting accessories for inner linings

DG: H	Designation	Specification			Part no.	Price €
a) b)	a) Condensate bar	Connections 4/6 mm	1	-	43692	
	b) Liquid barrier with condensate trap and fastening bracket	Connections 4/6 mm	1	-	43646	
	Angled nipple with spacer	6 x 4 mm	1	-	43904	
		6 x 6 mm	1	-	43905	
a) b) 	a) Angled nipple short	6 x 4 mm	1	25	43906	
		6 x 6 mm	1	10	43907	
	b) Angled nipple long	6 x 4 mm	1	10	43908	
		6 x 6 mm	1	10	43909	
a) b)	a) Suction line perforated (roll of 100 m)	6 x 3 mm	1	-	43910	
	b) Suction line not perforated (roll of 100 m)	6 x 3 mm	1	-	43911	
	Fastening ring with round seal, foam rubber	Ø 500 mm	1	-	43900A	
		Ø 550 mm	1	-	43900B	
		Ø 600 mm	1	-	43900C	
		Ø 620 mm	1	-	43900D	
	Hose connector for suction hose	4 x 4 mm	1	25	43945	
		6 x 6 mm	1	25	43912	
	T piece for suction hose	4 x 4 x 4 mm	1	25	43944	
		6 x 6 x 6 mm	1	25	43913	
	Hose connector kit ND 4/6, G⅜ x G⅛	ND 4 x G⅛ ND 6 x G⅛ G⅜ x G⅛	1	25	43914	
	Plate holder	with plate and clamp	1	-	43918	
	PVC hose red 100 m	4 x 2 mm	1	-	43648	
		6 x 2 mm	1	-	43662	
	PVC hose green 100 m	4 x 2 mm	1	-	43649	
		6 x 2 mm	1	-	43663	
	PVC hose transparent 100 m	4 x 2 mm	1	-	43650	
		6 x 2 mm	1	-	43664	
	Sealing material 1 kg Glue 0.9 kg	Epple 28	1	-	43919	
		Epple 4851	1	-	43920	
	Overpressure device	G1½ opening pressure approx. 25 mbar	1	-	20466	
	Stainless steel fastening ring	V2A flat steel (without seal), 40 x 8 mm, glass bead blasted, 500 mm diameter.	1	-	43900N	
	Stainless steel fastening ring	V2A flat steel (without seal), 40 x 8 mm, glass bead blasted, 600 mm diameter.	1	-	43900O	
	Foam rubber roll 10 m	50 x 5 mm	1	-	43926	
	Foam rubber roll 10 m	50 x 8 mm	1	-	43942	
	Mipoplast bottom plate	800 x 800 mm	1	-	43928	

Tank room lining for fuel oil and diesel fuel storage

- **Special film for all tank types and sizes**
- **No extensive preparation work in the tank room**
- **Fast mounting without interruption of the heating system**

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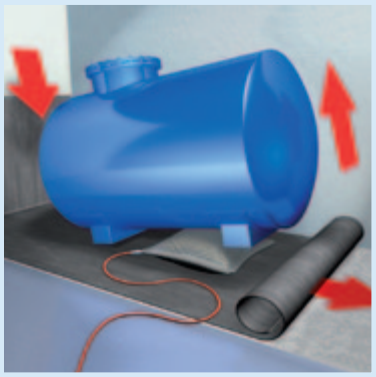

4

Application

For lining of drip pans and rooms in facilities for the storage of water-polluting liquids. Cost-effective, environmentally friendly and permanently safe protection of the tank room in new installations and renovation projects.

Description

The lining is precisely made to the tank room dimensions. The protective film covers minor cracks and adapts to slightly uneven surfaces. The AFRISO tank room lining consists of polyester film, aluminium tape for fastening the film at the upper edge, geotextiles and nail dowels.
Legislation such as the German Water Act and the German Ordinance on Installations for Handling Water-Polluting Substances contains stringent requirements concerning the safety and tightness of storage rooms and drip pans for aboveground tanks to ensure the protection of the ground water. Many older tank rooms no longer provide the required safety levels due to cracks in the walls or floors, inadequate coating or other damages.

Mounting

The lining can be installed during any season since the heating is not interrupted. The tank contents are pumped into an intermediate storage facility. The empty tanks are lifted (e.g. with air cushions). The lining which is manufactured to the tank room dimensions is laid out in the tank room. The film is fixed to the wall by means of a fastening bar. Hard rubber disks are placed below the tanks to protect the film before the tanks are refilled. Extensive preparation work in the tank room is not required. Optional leak detectors can be installed.

Technical specifications

Media
Fuel oil EL and diesel fuel

Dimensions
Tank room film: thickness 1.5 mm
Synthetic geotextiles, white:
width 2 m x running metre
Aluminium tape: 30 x 2.5 mm x running metre

Technical Approval of the German Institute for Building Technology
Z-59.21-81

i
The tank room lining is delivered as a complete package. Please specify exact room dimensions and tank volume when ordering.

DG: H	Part no.	Price €
Tank room lining, per m²	43868	
Synthetic geotextiles, white per m²	**43965**	
Aluminium tape, per running metre	**43934**	
Nail dowel, per piece (5 pieces per running metre)	**43617**	

Pressure type leak detector Europress

(as per German WHG, VAwS and BetrSichV)

- **With visual/audible alarm, Acknowledge button and switching output**
- **Pump operating time can be displayed**
- **Service indicator for annual maintenance**
- **With power failure monitoring**

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Europress in protective housing

Application

Pressure type leak detector according to EN 13160 (class I) for safe monitoring of unpressurised double-walled tanks for the storage of inflammable liquids with a flash point of less than 55 °C, AdBlue® (urea solution 32.5 %) and non-inflammable, water-polluting liquids. The broad voltage range (AC 100–240 V) allows for application in a large variety of countries.

Description

Compact leak detector in a robust wall mounting housing with audible and visual alarms. The audible alarm can be muted with the Acknowledge button. Europress indicates the pump operating time and features a switching output for additional equipment (such as EMS event reporting system) or integration into building control systems. The pump operating time can be displayed.
Three hose connections (red, white, green) for the pneumatic connection to the interstitial space of the tank. The universal connection pieces can be used for 4 mm and 6 mm hoses.
The sintered plastic filter in the condensate trap indicates the current degree of pollution and can easily be replaced from the outside, if necessary. Electrical connection from the top or from the bottom. An optional 9 V battery can be connected so that an alarm is triggered in the case of power failure. For outdoor applications, Europress is available in a protective housing (IP 55).

Technical specifications

Operating temperature range
Ambient: -5/+50 °C

Supply voltage
AC 100–240 V

Nominal power
< 10 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Contact rating
Max. 250 V, 2 A, resistive load

Operating pressure
Interstitial space: approx. 530 mbar

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 202 x 230 x 70 mm
Degree of protection: IP 30 (EN 60259)

Alarm sound
Min. 70 dB(A)

Technical Approval of the German Institute for Building Technology
Z-65.23-3

Drying filter TF 220

DG: H	Part no.	Price €
Europress	43790	
Europress in protective housing (IP 55)	43795	
Europress in protective housing (IP 55) with heating	43796	
Europress with filter, bracket and drying beads	**43701**	
Mounting kit	**43704**	
Drying filter TF 220 with fastening bracket	**43688**	
Drying beads 850 ml	**69226**	
Connection piece G1 x NW 4/6 mm	**43698**	

Pressure type leak detector Europress LAD-R (as per German WHG, VAwS and BetrSichV)

- For double-walled pipes
- With visual/audible alarms and switching output
- Leak monitoring without stationary supply cylinder
- Optional protective housing for outdoor applications

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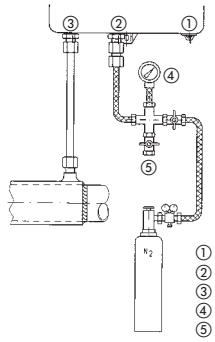


4

Application

Leak detector for safe monitoring of double-walled pipes using pressure with inert gas. Suitable for pipes carrying non-inflammable, water-polluting liquids and inflammable liquids of danger classes A I, A II, A III and B (according to former classification VbF).

Description

Leak detector in a robust wall mounting housing with pressure gauge with contacts, audible and visual alarms. The audible alarm can be muted with a toggle switch. The monitoring pressures for "Alarm On" and "Alarm Off" can be adjusted via the two contacts of the integrated pressure gauge. The pressure gauge continuously measures the pressure in the interstitial space of the pipe. The double-walled pipes must be suitable for the following pressures:

- In the interstitial space: ≤ 21 bar
- In the inner pipe: ≤ 16 bar

If the total interstitial space volume does not exceed 1,200 l, several interstitial spaces of a pipeline can be connected to one leak detector via a manifold. A nitrogen cylinder with pressure reducer is connected to the test coupling of the leak detector via a filling and test fitting (please order separately) to fill the interstitial space with inert gas.

Technical specifications

Operating temperature range
Ambient: -25/+60 °C

Supply voltage
AC 230 V

Nominal power
< 7 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Contact rating
Max. 250 V, 2 A, resistive load

Operating pressure
Factory setting
"Alarm on" = 2 bar (adjustable from 0/24 bar)
"Alarm off" = 6 bar (adjustable from 0/24 bar)

Housing
Wall mounting housing made of impact-resistant plastic (ABS) according to IEC 60695
W x H x D: 215 x 165 x 100 mm
Degree of protection: IP 30 (EN 60529)

Alarm sound
Min. 70 dB(A)

Connection pressure line
Copper pipe Ø 6 x 1 mm

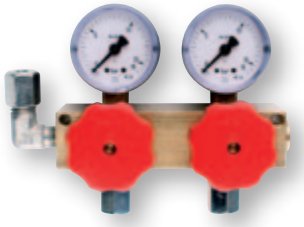
Filling line
Plug connection DN 5

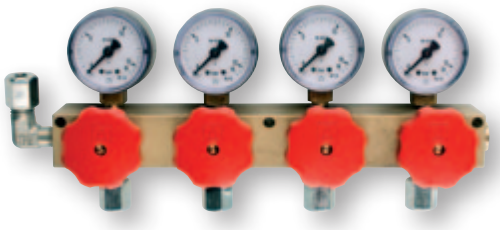
Technical Approval of the German Institute for Building Technology:
Z-65.26-257

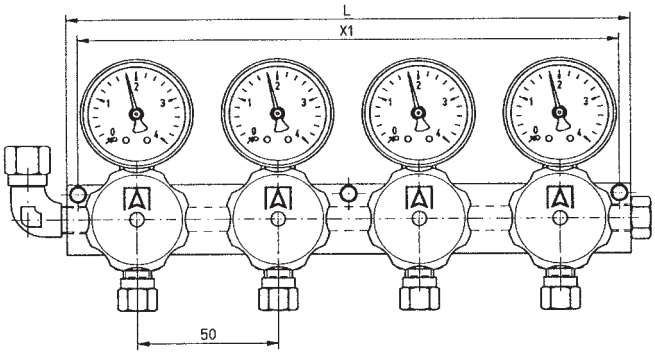
DG: H, PU 1	Part no.	Price €
Europress LAD-R	**43684**	
Filling and test fitting	**43691**	
Pressure reducer with safety valve, reducer unit for nitrogen cylinders	**43695**	
LAD-R in protective housing, pre-assembled and ready to be connected, with horn HPW 2. Degree of protection IP 55	43694	

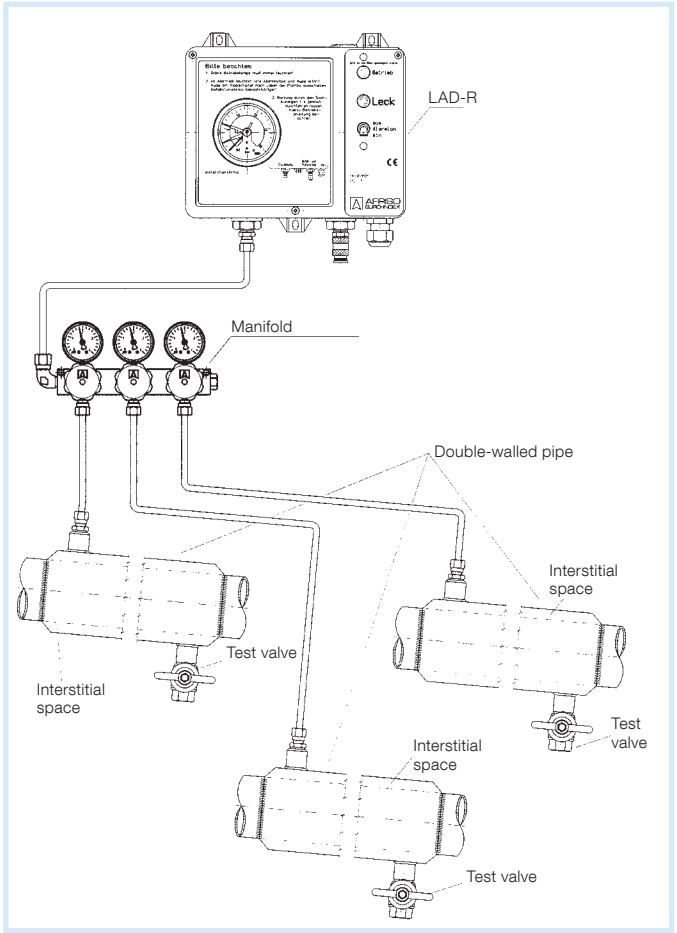
i Please enquire for heated protective housing!

Manifolds for Europress LAD-R









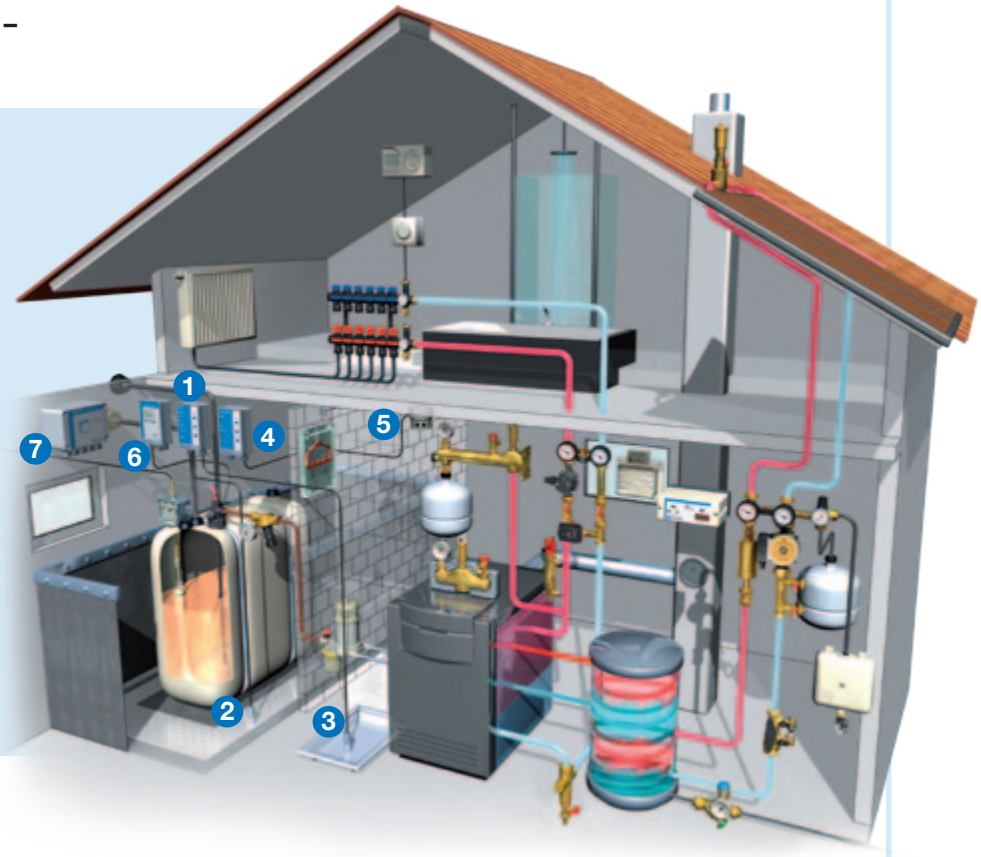
Description Manifolds for Europress LAD-R are made of brass and feature a shut-off valve. Available with or without a pressure gauge (accuracy class 1.6). The distributors are suitable for monitoring several double-walled pipelines simultaneously by means of pressure with inert gas (e.g. nitrogen) with a single leak detector. The total interstitial space volume must not exceed 1,200 l. Connection pressure line with copper pipe Ø 6 x 1 mm. The pressure gauge is installed between the shut-off valve and the interstitial space. In a test situation or in the event of a leak, the shut-off valves can be closed so that the leaking pipe can be identified by the pressure drop indicated by the corresponding pressure gauge.

DG: H	Pressure	X1	L			Part no.	**Price €**
Manifold 4 outlets	25 bar	192	200	1	-	43834	
Manifold 4 outlets	16 bar	192	200	1	-	43833	
Manifold 4 outlets	without	192	200	1	-	43830	
Manifold 3 outlets	25 bar	142	150	1	-	43829	
Manifold 3 outlets	16 bar	142	150	1	-	43828	
Manifold 3 outlets	without	142	150	1	-	43825	
Manifold 2 outlets	25 bar	92	100	1	-	43824	
Manifold 2 outlets	16 bar	92	100	1	-	43823	
Manifold 2 outlets	without	92	100	1	-	43820	

Alarm units for fast detection of levels, accumulations of liquids, leaks, gases or smoke

AFRISO-WATCHDOG – for maximum safety

1. Oil/water alarm unit
2. Probe for tank room monitoring
3. PTC thermistor probe with drip pan
4. Gas and smoke detector GRM
5. Smoke sensor
6. Level indicator TankControl with reserve level alarm
7. Event reporting system EMS for reporting dangers such as leaks, backpressure, flooding, smoke and fire as well as tank contents via SMS text messages or AFRISO Net Webservice

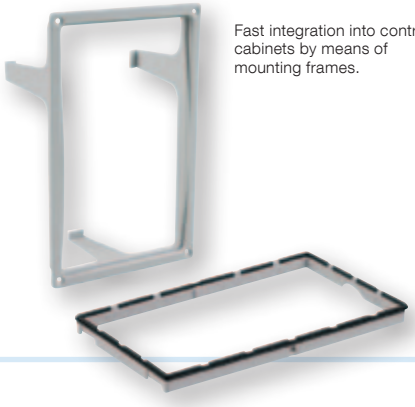


In the building technology sector there are many risks which should be considered and kept under control to avoid annoyance to home owners, janitors, property managers or maintenance personnel and to avert extensive damage.

AFRISO WATCHDOG alarm units report undesirable events, danger and emergency conditions early so that immediate measures can be taken.
AFRISO WATCHDOG units excel with easy and intuitive operation.

A large variety of probes and sensors enable instant detection of liquid levels, leaks and accumulations of liquids, gases or smoke. Integrated visual and audible alarms provide the appropriate signals in danger conditions – this way, residential buildings, factories and facilities can be protected and monitored reliably. From standard wall mounting to integration into control cabinets using mounting frames – AFRISO WATCHDOG units are easy and quick to install. With very little effort, the units can also be retrofitted with sealing kits for use under rough application conditions (IP 54).

DIN rail clips for fast and easy mounting of the alarm units.



Fast integration into control cabinets by means of mounting frames.

With sealing kit IP 54 for rough application conditions.

AFRISO WATCHDOG alarm units

- **Audible and visual alarms for maximum safety**
- **Additional signal equipment (EMS, horn, warning light) can be connected**
- **Units are ready to be connected for easy installation and commissioning**
- **High reliability and long service life**

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Typical application areas

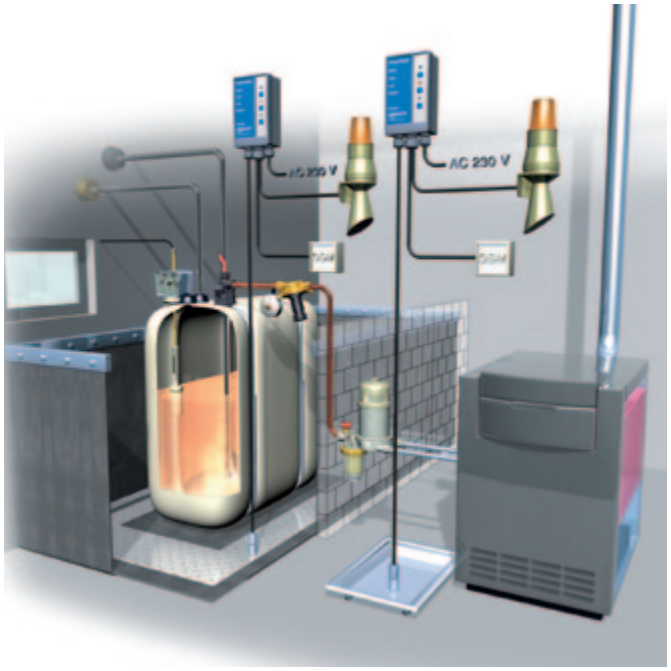
- Catchment areas below oil and water consuming equipment
- Drip pans below storage tanks, burners or motors in buildings or outdoors
- Containers, barrels and tanks/double-walled tanks
- Sewage tanks
- Cisterns and water storage tanks
- Oil depots, boiler rooms and rooms with mains water connection
- Heating installations
- Cable and pipe ducts
- Canal shafts, manholes and inspection ducts
- Cellars, kitchens, laundry rooms
- Warehouses and storage areas
- Machinery rooms
- Museums, archives, office buildings
- Lift shafts
- High-tech equipment rooms and server rooms
- Pumping stations and control rooms
- Catchment and overflow basins
- Flood risk areas
- For oil, petrol and grease separators
- Protective pipes and pipelines

Detectable media

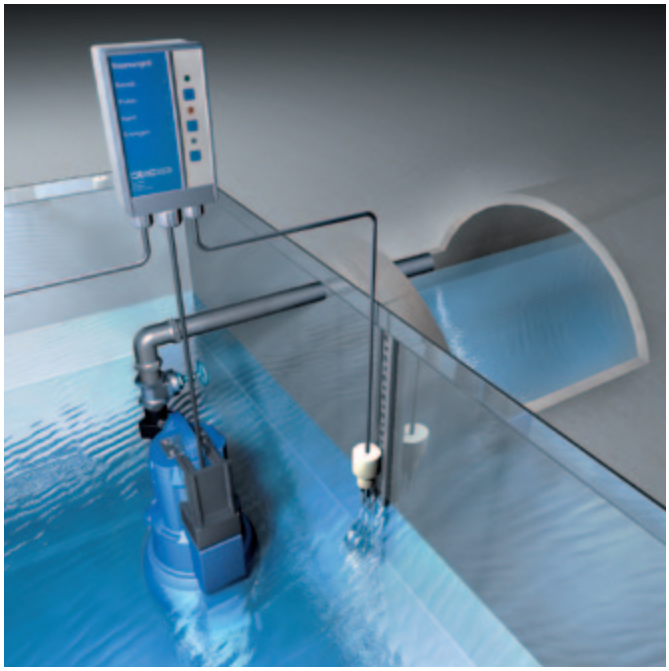
- Water, waste water, ground water
- Heating system water
- Cooling water
- Rainwater
- Fuel oil EL, L, M
- Diesel fuels or low-viscosity lubricating oils Class A III (according to former classification VbF)
- Motor oils, gearbox oils and hydraulic oils
- Vegetable oils and transformer oils
- Antifreeze liquids and fertilisers
- Emulsions
- Sludge, sand
- Oil, petrol and grease layers
- Conductive water mixtures and liquids
- Gases, vapours, smoke

In conjunction with the AFRISO EMS event reporting system, the alarm units report events such as low level messages, error messages, level information, malfunctions and accidents via text messages, all around the globe, 24/7.

Application examples AFRISO-WATCHDOG alarm units



Leak monitoring in tank and heating rooms with ÖWWG 3.



When the maximum level in the catchment basin is reached, the WWG alarm unit controls the draining process by means of a connected pump.

Monitoring of laundry rooms and cellars for water.

Warning system for complete buildings with central alarm CoFox®.

Oil/water alarm unit ÖWWG 3

- For storage rooms, manholes, drip pans
- With visual/audible alarms, Test/Acknowledge buttons and relay output
- Self-monitoring probe

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Applications

For visual and audible alarms in the event of accumulations of liquids in, for example, oil storage rooms, drip pans, inspection ducts, ducts, protective pipes, manholes, pipes and cellars. Suitable for the following media: water, fuel oil EL, L or M, diesel fuel or low-viscosity lubricating oils of danger class A III (according to former classification VbF), motor oils, gearbox oils or hydraulic oils, vegetable oils and transformer oils, antifreeze agents, oil-water mixtures and emulsions.

Description

The oil/water alarm unit in a wall mounting housing triggers visual and audible alarms in the event of accumulations of liquids which can be caused by tank leaks, backpressure, flooding, etc. ÖWWG 3 consists of a control unit with visual/audible alarm, Test and Acknowledge buttons as well as a flexible PTC thermistor probe. The probe is mounted at the lowest point of the area to be monitored. The alarm is triggered when the probe comes into contact with liquid. The audible alarm can be muted with the Acknowledge button. The visual alarm remains active after the leak has been fixed until the unit is reset by means of the "Unlock" button. The Test button allows you to simulate an alarm condition in order to perform a function check. The self-monitoring probe triggers an alarm if it is damaged. The voltage-free relay contact is provided for connection of additional external alarm equipment (such as a horn) or event reporting systems. ÖWWG 3 is suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions.

Technical specifications

Operating temperature range
Ambient: -5/+40 °C

Probe
L x Ø: 57 x 14 mm
Cable length: 3.2 m

Supply voltage
AC 230 V

Nominal power
10 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Alarm sound
Min. 70 dB (A)

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

Technical Approval of the German Institute for Building Technology
Z-65.40-339

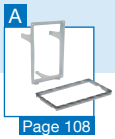
Scope of delivery
- Control unit
- PTC thermistor probe (3.2 m)

DG: G	Part no.	Price €
Oil/water alarm unit ÖWWG 3	**44510**	
Spare parts		
Spare probe ÖWWG 3	**44516**	
Probe fuse	**44495**	
Mains fuse	**10820**	

Oil/water alarm unit ÖWWG 3 with burner connection kit

NEW

- Connections pre-wired
- With visual/audible alarms, Test and Acknowledge buttons
- Automatic switching off of the burner in alarm conditions



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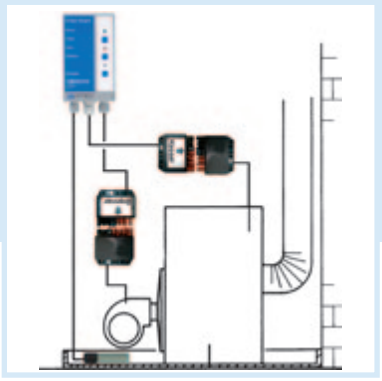

4

Application

For visual and audible alarms in the event of accumulations of liquids below the burner of an oil fuelled system and for switching off the burner in alarm conditions. Suitable for the following media: water, fuel oil EL, L M and diesel fuel.

Description

The ÖWWG 3 oil/water alarm unit consists of a control unit with visual/audible alarm, Test and Acknowledge buttons as well as a flexible PTC thermistor probe. Cables and connectors are wired and ready to be connected to the burner and boiler. In the event of an alarm, the unit triggers visual and audible alarms and switches off the burner. The audible alarm can be muted with the Acknowledge button. The visual alarm remains active after the leak has been fixed until the unit is reset by means of the "Unlock" button. The burner then resumes operation. The Test button allows you to simulate an alarm condition in order to perform a function check.

Technical specifications

Operating temperature range
Ambient: -5/+40 °C

Probe
Stainless steel encapsulated PTC thermistor
L x Ø: 57 x 14 mm
Cable length: 3.2 m

Connector
Burner: 7-pin, female with 1 m cable
Boiler: 7-pin, male, with 1 m cable

Supply voltage
AC 230 V

Nominal power
10 VA

Alarm sound
Min. 70 dB(A)

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

Technical Approval of the German Institute for Building Technology
Z-65.40-339

Scope of delivery
- Control unit
- 1 connected PTC thermistor probe
- One connected plug each for burner and boiler connection

DG: G	Part no.	Price €
Oil/water alarm unit ÖWWG 3 with burner connection kit	44490	

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Oil alarm unit OM 5 / water alarm unit WM 5

- **For storage rooms, manholes, drip pans, double-walled tanks**
- **With visual/audible alarms, Test/ Acknowledge buttons and relay output**
- **Self-monitoring probe**

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Monitors up to 5 tanks

Application

For visual and audible alarms in the event of accumulations of liquids. OM 5 is suitable for the following media: fuel oil EL, L or M, diesel fuel or low-viscosity lubricating oils of danger class A III (according to former VbF), motor oils, gearbox oils or hydraulic oils, vegetable oils and transformer oils. WM 5 is only suitable for the detection of water.

Description

The alarm unit in a wall mounting housing triggers visual and audible alarms in the event of accumulations of liquids which can be caused by tank leaks, backpressure, flooding, etc. OM 5 and WM 5 consist of a control unit with visual/audible alarm, Test and Acknowledge buttons as well as a relay output. Up to five photoelectric probes can be connected. The probes are mounted at the lowest point of the object to be monitored. The alarm is triggered when the probe comes into contact with liquid. The audible alarm can be muted with the Acknowledge button.
The voltage-free relay contact is provided for connection of additional external alarm equipment (such as a horn) or event reporting systems. The alarm units are suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions.

OM 5/1 with additional probe for detection of minimum levels, e.g. in fuel oil tanks.

Technical specifications

Operating temperature range
Ambient: -10/+60 °C

Probe
L x Ø: 33 x 10 mm
Cable length: 10 m

Supply voltage
AC 230 V

Nominal power
5 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Alarm sound
Min. 70 dB(A)

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

Technical Approval of the German Institute for Building Technology
OM 5: Z-65.40-214
WM 5: without

Scope of delivery
OM 5/WM 5:
- control unit without probe

OM 5/1:
- control unit
- 1 photoelectric probe
- 1 minimum level probe

i Please order the photoelectric probes separately.

DG: G	Part no.	Price €
Oil alarm unit OM 5	**44502**	
Oil alarm unit OM 5/1	**44517**	
Water alarm unit WM 5	**44508**	
Photoelectric probe 10 m	**44503**	

Water alarm unit ÖWU for separate detection of oil and water

- For storage rooms, manholes, drip pans, pumps and inspection ducts
- With visual/audible alarms, Test/ Acknowledge buttons and relay output
- Combination probe for determination of leaking medium

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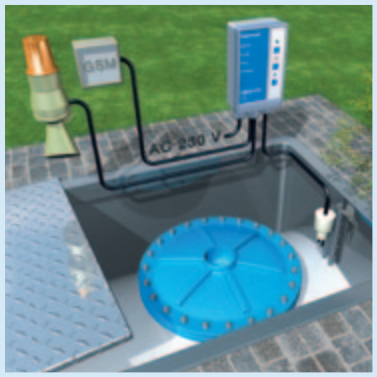

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Application

For visual and audible alarms in the event of accumulations of liquids. Suitable for the following media: water, fuel oil EL, L or M, diesel fuel or low-viscosity lubricating oils of danger class A III (former VbF), motor oils, gearbox oils or hydraulic oils, vegetable oils and transformer oils.

Description

Alarm unit in wall mounting housing for early detection of accumulations of liquids. ÖWU consists of a control unit with visual/audible alarm, Test and Acknowledge buttons, two relay outputs as well as a combination probe with photoelectric and conductivity sensors. An integrated microprocessor determines whether the detected medium is oil or water. The probe is mounted at the lowest point of the object to be monitored. The alarm is triggered when the probe comes into contact with liquid. The audible alarm can be muted with the Acknowledge button. The visual alarm is cleared once the leak has been fixed. The Test button allows you to simulate an alarm condition in order to perform a function check.
The two voltage-free relay contacts are provided for connection of additional external alarm equipment or event reporting systems. One relay can be acknowledged (e.g. for an external horn), the other relay cannot (e.g. for an external lamp, a solenoid valve, a pump). The alarm units are suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions.

Technical specifications

Operating temperature range
Medium: 5/50 °C
Ambient: -10/+60 °C

Wall mounting rail probe:
W x H x D: 40 x 300 x 55 mm
Standard probe cable: 1.5 m

Supply voltage
AC 230 V

Nominal power
5 VA

Switching output
1 changeover
1 normally open contact (can be acknowledged)

Contact rating
Max. AC 250 V, 2 A

Alarm sound
Min. 70 dB(A)

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

Scope of delivery
- Control unit
- Wall mounting rail probe WSS

DG: G	Part no.	Price €
Oil/water alarm unit ÖWU	**40028**	

Oil-on-water detector ÖAWD

- For the detection of oil layers on water
- Alarm unit on conductivity principle
- With visual alarm, Test and Unlock buttons
- Relay output for additional alarms

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Application

For visual and audible alarms in the event of oil layers on water. Especially suitable for catchment basins, floods and inspection ducts.

Technical specifications

Alarm unit in wall mounting housing for the detection of oil layers on water. ÖAWD consists of a control unit with visual/audible alarm, Test/Unlock buttons as well as a relay output. ÖAWD is based on the conductivity principle. The floating probe SWS is used for detection. If an oil layer (of at least 2 mm) is detected, the alarm unit triggers a visual alarm and stores the alarm condition. Once the reason for the alarm condition has been fixed, press the Unlock button to reset ÖAWD. The visual alarm goes off. The Test button allows you to simulate an alarm condition in order to perform a function check. The voltage-free relay contact is provided for connection of additional signal equipment (such as AQ 220), actuators (pumps, valves) or event reporting systems. The alarm units are suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions. The version ÖAWD-8 is available for applications with turbulent surfaces; this version features a delay of approx. 8 s which helps to avoid false alarms.

Technical specifications

Operating temperature range
Medium: 0/50 °C
Ambient: 0/55 °C

Probe SWS
2-rod electrode, potted cable connection
W x H x D: 200 x 140 x 200 mm
Cable length: 10 m
Adjustment range: 2/10 mm oil layer thickness
Also suitable for changing levels

Supply voltage
AC 230 V

Nominal power
5 VA

Switching output
Relay output: 1 voltage-free changeover contact

Contact rating
AC 250 V, 2 A

Response delay
ÖAWD-1: 1 s
ÖAWD-8: 8 s

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

Scope of delivery
- Control unit without probe

DG: E			Part no.	Price €
Oil-on-water detector ÖAWD-8	1	-	**55105**	
Oil-on-water detector ÖAWD-1	1	-	**55104**	
Floating probe SWS	1	-	**55100**	

WWG water alarm unit

- **Ideal for laundry rooms, cellars/storage rooms, pump and inspection ducts**
- **With visual/audible alarms, Test and Acknowledge buttons and 2 relay outputs**
- **With floor probe or wall mounting rail probe**

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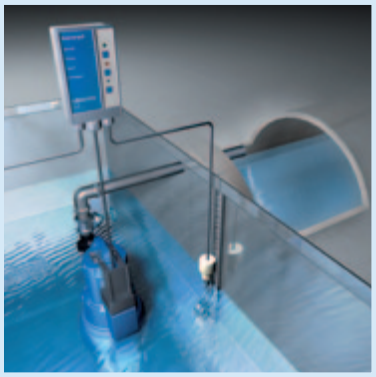

4

Application

For visual and audible alarms in the event of accumulations of electrically conductive liquids such as rainwater, tap water, fresh water, waste water, cooling water and heating water.

Description

Alarm unit in wall mounting housing for the detection of even the smallest amounts of water caused by, for example, backpressure, clogged water pipes, water ingress from outdoors, broken pipes or failure of a waste water pump. WWG1 consists of a control unit with visual/audible alarm, Test and Acknowledge buttons, two relay outputs as well as a special floor probe. The probe is mounted at the lowest point of the object to be monitored. The alarm is triggered when the probe comes into contact with liquid. The audible alarm can be muted with the Acknowledge button. The visual alarm is cleared once the leak has been fixed. The Test button allows you to simulate an alarm condition in order to perform a function check.
The two voltage-free relay contacts are provided for connection of additional external alarm equipment or event reporting systems. One relay can be acknowledged (e.g. for an external horn), the other relay cannot (e.g. for an external lamp, a solenoid valve, a pump). The alarm units are suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions.

Water alarm unit WWG 2 like WWG 1, but with height-adjustable wall mounting rail probe.

Technical specifications

Operating temperature range
Ambient: -5/+55 °C

Floor probe BWS 11
Response height approx. 2–3 mm
Dimensions Ø x L: 75 x 40 mm

Wall mounting rail probe WSS
Height-adjustable by approx. 200 mm
W x H x D: 37 x 320 x 55 mm

Standard probe cables
1.5 m, max. length 50 m (shielded)

Function principle
Conductivity measurement

Supply voltage
AC 230 V

Nominal power
2.5 VA

Switching output
1 changeover
1 normally open contact (can be acknowledged)

Contact rating
Max. AC 250 V, 2 A

Alarm sound
Min. 70 dB(A)

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

Scope of delivery
- Control unit
- Floor probe BWS 11 (for WWG 1)
- Wall mounting rail probe WWS (for WWG 2)

DG: G	Part no.	Price €
Water alarm unit WWG1	**40029**	
Water alarm unit WWG 2	**40031**	

Fuel oil alarm HMS in connector housing

NEW

- **Immediate switching off of monitored devices in the event of a leak alarm**
- **With visual alarm**
- **Unit is ready to be connected for fast and easy installation**

Application

For the detection of oil in drip pans below oil-consuming systems, oil pumps, pumping or control stations. Suitable for the following media: water, fuel oil EL, L M, diesel fuel, motor oils, machine oils, hydraulic oils and similar liquids.

Description

The HMS fuel oil alarm unit consists of a transducer and a photoelectric probe. Devices to be monitored are connected directly to the socket of the transducer. If there is no leak, the green lamp is on. If the probe detects unwanted liquid, the alarm unit triggers a visual alarm (red lamp) and the socket in the transducer is automatically switched off.

Technical specifications

Operating temperature range
Ambient: -10/+60 °C

Photoelectric probe
Probe head: polyamide
Cable: 2 m

Supply voltage
AC 230 V

Visual indication
Green lamp Operation
Red lamp Alarm

Housing
Connector housing
W x H x D: 67 x 50 x 125 mm
Degree of protection: IP 20 (EN 60529)

Technical Approval of the German Institute for Building Technology
Z-65.40-214

Scope of delivery
- Transducer
- Photoelectric probe with 2 m probe cable

DG: G	Part no.	**Price €**
Fuel oil alarm unit HMS	**44513**	

Leak detectors CoFox®
ELT 500/ELT 8

4

Alarm unit CoFox® ELT 500/4

Application

For the detection of electrically conductive liquids such as polluted water or acids with a response threshold of 50 kOhm.

Description

Alarm unit in wall mounting housing with visual alarm, operation indicator, reset button and relay output for additional external signalling equipment (e.g. combined alarm light/horn) or the alarm reset unit AQ 220 for central alarm. The response sensitivity is adjustable. A total of 4 probes can be connected (e.g. wall mounting rail probe WSS or floor probe BWS 11). Leak location by means of LEDs with fields that can be labelled on the unit. The alarm is triggered when the probe comes into contact with liquid and ELT 500/4 activates the connected alarm equipment. The alarm can be acknowledged with the Reset button. ELT 500/4 features four channels for separate probe circuits so that several probes can be operated in parallel or cascading for large-area monitoring is possible. Various standard and special probes are available; the probes are selected to meet the appropriate operating conditions.

Technical specifications

Operating temperature range
Ambient: -10/+50 °C

Supply voltage
AC 230 V

Nominal power
3 VA

Switching output
Relay contact: 1 voltage-free changeover contact

Response threshold
50 kOhm

Contact rating
Max. AC 250 V, 2 A

Housing
Plastic wall mounting housing
W x H x D: 53 x 113 x 108 mm
Degree of protection: IP 30 (EN 60529)

Water alarm unit CoFox® ELT 8

Application

For the detection of electrically conductive liquids such as water.

Description

Water alarm unit in wall mounting housing with visual alarm, operation indicator as well as two relay outputs for additional external signalling equipment (e.g. combined alarm light/horn) or the alarm acknowledge unit AQ 220. The response sensitivity is adjustable for different media. A total of 2 probes can be connected (e.g. wall mounting rail probe WSS or floor probe BWS 11). The probe is mounted at the lowest point of the object to be monitored. The alarm is triggered when the probe comes into contact with liquid and ELT 8 activates the connected alarm equipment. The visual alarm is cleared once the leak has been fixed. ELT 8 enables parallel operation of several probes. Various standard and special probes are available; the probes are selected to meet the appropriate operating conditions.

Technical specifications

Operating temperature range
Ambient: -10/+60 °C

Supply voltage
AC 230 V

Nominal power
4 VA

Switching output
Relay contact: 2 voltage-free changeover contacts

Contact rating
Max. AC 250 V, 2 A

Housing
W x H x D: 53 x 113 x 108 mm
Degree of protection: IP 30 (EN 60529)

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Accessories for CoFox®:
- See page 106 for probes.
- See page 65 for alarm acknowledge unit.

DG: E	Part no.	Price €
Alarm unit CoFox® ELT 500/4	53505	
Water alarm unit CoFox® ELT 8	53503	

*Please order probes separately.

AFRISO EURO-INDEX

Radio remote alarm unit WGL 01 W for conductive liquids

NEW

- For sewage tanks, inspection ducts, gutters and flood areas
- Wireless transmission of the alarm signal from the probe to the control unit
- With visual/audible alarms and Acknowledge button
- Relay output for additional alarms

4

Application

For visual and audible alarms in the event of maximum levels, e.g. in sewage tanks, waters, inspection ducts or open gutters. Suitable for all conductive liquids such as rainwater, tap water, fresh water, waste water and cooling water.

Description

WGL 01 W consists of a control unit with visual/audible alarm, Acknowledge button and output relay as well as a battery-operated transmitter and a probe. The control unit controls and monitors operation. The integrated transmitter is used for wireless transmission of the alarm signal from the probe to the control unit. Visual and audible alarm are triggered when the probe comes into contact with liquid. The audible alarm can be muted with the Acknowledge button. The visual alarm is automatically reset once the reason for the alarm has been fixed. WGL 01 W is self-monitoring and triggers an alarm if the transmitter has no power or when the battery must be replaced.

Technical specifications

Control unit
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 130 x 80 x 35 mm
Degree of protection: IP 54 (EN 60529)

Supply voltage
AC 230 V

Nominal power
1 VA

Relay output
1 voltage-free switching contact

Transmitter

Dimensions
H x Ø: 75 x 95 mm

Function principle
Wireless transmitter, 433 MHz

Operating radius
150 m, max. transmission distance 650 m

Operating temperature range
-30/+60 °C

Supply voltage
3 V battery, CR 123A

Degree of protection
IP 67 (EN 60529)

Probe

Dimensions
H x Ø: 250 x 20 mm
Stainless steel with plastic coating

Scope of delivery
- Control unit
- Transmitter with battery
- Probe

DG: H	Part no.	Price €
WGL 01 W	**53520**	

Probes for alarm units

Floor water probe BWS 11

Application
For the detection of conductive liquids such as rainwater, tap water, fresh water, waste water, cooling water and heating water.

Description
Floor probe suitable for WWG 1, ELT 8, ELT 680 and ELT 500/4. The probe is mounted at the lowest point of the object to be monitored. The alarm is triggered by the alarm unit when the probe comes into contact with liquid.

Probe diameter: 75 mm
Cable length: 1.5 m
Response height: approx. 2–3 mm

Floor water probe BWS 11

Wall mounting rail probe WSS

Application
For the detection of conductive liquids such as rainwater, tap water, fresh water, waste water, cooling water and heating water.

Description
Height-adjustable wall mounting rail probe suitable for WWG 2, ELT 8, ELT 680 and ELT 500/4. The probe is mounted to the wall at the object to be monitored. The desired response height (distance from probe to floor) is adjusted via the wall mounting rail. The alarm is triggered by the connected alarm unit when the probe comes into contact with liquid.

Dimensions: 37 x 320 x 55 mm
Cable length: 1.5 m
Height-adjustable by approx. 200 mm

Wall mounting rail probe WSS

Floating probe SWS

Application
For the detection of oil layers, emulsions or foam on water. Also suitable for changing levels (e.g. flowing waters)

Description
Floating probe suitable for ÖAWD-1, ÖAWD-8, ELT 8 and ELT 680. The probe floats on the water surface. The oil layer thickness (at least 2 mm) is set via the height-adjustable 2-rod probe. The alarm is triggered by the connected alarm unit when the probe comes into contact with the oil layer.

Dimensions
W x H x D 200 x 140 x 200 mm

Cable
Potted cable connection
Length: 10 m

Adjustment range
2/10 mm oil layer thickness

Floating probe SWS

DG: E			Part no.	Price €
Floor water probe BWS 11	1	-	**55111**	
Wall mounting rail probe WSS	1	-	**55050**	
Floating probe SWS	1	-	**55100**	

i
Many probe versions are available. Please enquire.

Probes and accessories for alarm units

PTC thermistor probe

Application

For the detection of liquids. Suitable for the following media: water, fuel oil EL, L or M, diesel fuel or low-viscosity lubricating oils of danger class A III (according to former classification VbF), motor oils, gearbox oils or hydraulic oils, vegetable oils and transformer oils, antifreeze agents, oil-water mixtures and emulsions.

Description

Suitable for ÖWWG 3. The probe is mounted at the lowest point of the object to be monitored or in the drip pan. The alarm is triggered by the alarm unit when the probe comes into contact with liquid.

Probe diameter: 14 mm
Cable length: 3.2 m
Response height: 17 mm

PTC thermistor probe

Photoelectric probe

Application

For the detection of liquids. Suitable for the following media: water, fuel oil EL, L or M, diesel fuel or low-viscosity lubricating oils of danger class A III (former classification VbF), motor oils, gearbox oils or hydraulic oils, vegetable oils and transformer oils.

Description

Floor probe suitable for OM 5 and WM 5. The probe is mounted at the lowest point of the object to be monitored. The alarm is triggered by the alarm unit when the probe comes into contact with liquid.

Probe diameter: 10 mm
Cable length: 10 m
Response height: 5 mm

Photoelectric probe

Drip pan

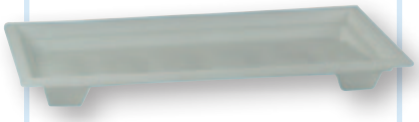
Application

For the collection of escaping oil. Drip pans should be mounted below all oil fittings such as filters, oil vents, burners, etc. in order to avoid damages resulting from escaping oil and in order to detect leaks as early as possible.

Description

Drip pan made of white plastic (PE). The drip pans are cascadable (in a line or at 90° angles). At the lowest part of the drip pan, the sensor of an oil alarm can be installed. If the drip pan cannot be checked on a daily basis, oil alarms with audible and visual alarms are required. Several cascaded drip pans can be monitored with a single probe. Several independent drip pans can be monitored, e.g. with a single oil alarm OM 5 and several probes. A mounting clamp for the sensor is supplied with the drip pan.

Dimensions (W x D): 600 x 300 mm



Drip pan

DG: G			Part no.	**Price €**
PTC thermistor probe	1	-	**44516**	
Photoelectric probe	1	-	**44503**	
Drip pan	1	-	**44512**	

Accessories for alarm units

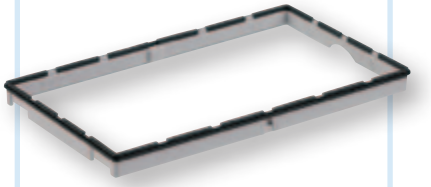
Mounting frame

Description Mounting frame for wall mounting housings 100 x 188 x 65 mm (W x H x D) of the AFRISO WATCHDOG series (alarm units).
For fast integration in control cabinets

Mounting frame

Sealing kit (IP 54)

Description Sealing kit for rough application conditions. Suitable for all wall mounting housings of the AFRISO WATCHDOG series (alarm units). The sealing kit is easy to mount between the housing cover and base. This increases the degree of protection of the alarm unit to IP 54.



Sealing kit (IP54)

DIN rail clip

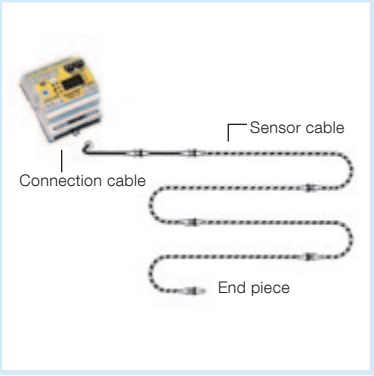
Description DIN rail clip for fast and easy mounting of AFRISO WATCHDOG alarm units in the control cabinet or for side-by-side mounting of several units on the wall. The clip is mounted by means of screws so that the alarm unit can be clipped onto standard DIN rails.

DIN rail clip

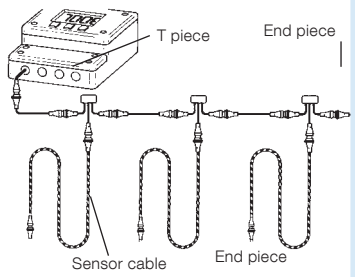
DG: G			Part no.	**Price €**
Mounting frame	1	-	**43521**	
Sealing kit (IP 54)	1	-	**43416**	
DIN rail clip	1	-	**43100**	

Leak alarm system for conductive liquids

Installation example: long line



Installation example: zones



Alarm unit TTSIM

Location unit TTDM-128

Application

For the early detection of conductive liquids such as water, acids or lyes. Suitable for monitoring individual zones and system components; TTDM is also suitable for large area monitoring or for precise locating of leaks. The sensor cable is mounted directly on the floor or in a double floor.

Technical specifications

Alarm unit for DIN rail mounting with a relay output and LED for visual alarm. Different TT sensor cables with a total length of up to 150 m can be connected. The alarm is triggered and the relay switched when the sensor cable comes into contact with liquid. The voltage-free relay contact is provided for connection of additional alarm equipment (such as a horn) or event reporting systems. Various alarm units and sensor cables are available. See ordering table.

Locating unit with display, visual/audible alarm, three relay outputs and an RS232/RS485 interface. A TT sensor cable with a total length of up to 1,500 m can be connected. The visual and audible alarms are triggered and the relay is switched when the sensor cable comes into contact with liquid or in the event of a cable defect. The display shows the distance to the leak in metres or feet. The relay is provided for connection of additional alarm equipment (such as a horn). All status and event information can also be transmitted to a building control system via the RS232/RS485 interface. Various sensor cables are available. See ordering table.

DG: E	Part no.	**Price €**
Alarm unit TTSIM-1A-230	43810	
Alarm unit TTSIM-2-230 with display for location of leaks		
Alarm unit TTA-SIM-1A-230 with horn in wall mounting housing	43812	
Alarm unit TTA-SIM-2-230 with horn/display in wall mounting housing		
Location unit TTDM-128, degree of protection IP 54	43811	
Sensor cable TT-1000-1M-PC (length 1 m, ready for connection, detection water)	43706	
Sensor cable TT-1000-3M-PC (length 3 m, ready for connection, detection water)	43707	
Sensor cable TT-1000-7.5M-PC (length 7.5 m, ready for connection, detection water)	43708	
Sensor cable TT-1000-15M-PC (length 15 m, ready for connection, detection water)	43705	
Sensor cable TT-3000-0.3M-PC (length 0.3 m, ready for connection, detection chemicals)	43712	
Sensor cable TT-3000-1.5M-PC (length 1.5 m, ready for connection, detection chemicals)	43713	
Sensor cable TT-3000-7.5M-PC (length 7.5 m, ready for connection, detection chemicals)	43714	
Sensor cable TT-3000-15M-PC (length 15 m, ready for connection, detection chemicals)	43715	
Connection cable TT-MLC-PC, 3.5 m for water	43765	
Connection cable TT-MLC-MC, 3.5 m for chemicals	43760	
Sensor cable end piece TT-MET-PC, for water	43770	
Sensor cable end piece TT-MET-MC, for chemicals	43775	
Connection/extension cable TT-MIC (length 15 m, please enquire for other lengths)	43709	

Gas alarm units
(private home)

Gas and smoke detectors
(building technology)

Gas alarm units
(industrial)

Gas alarm units
(building technology)

CHAPTER 5

Gas alarm units

BUILDING TECHNOLOGY

Gas alarm units GS 1.1, GS 2.1 112

External gas sensor GS 4.1 and gas alarm unit 3.1 CO 113

Gas and smoke detector GRM 114

Gas and smoke sensors for GRM 115

BUILDING TECHNOLOGY/INDUSTRY

Gas alarm unit in wall mounting housing GW-S 116

Gas alarm system in DIN rail housing GW-SK 117

Gas sensors 400 ST, 500 ST, 510 Ex-2, 600 ST, 700 ST and 800 ST 118

ACCESSORIES

Test gas unit, mounting frame, sealing kit, test gas 120

Gas alarm units for the private home

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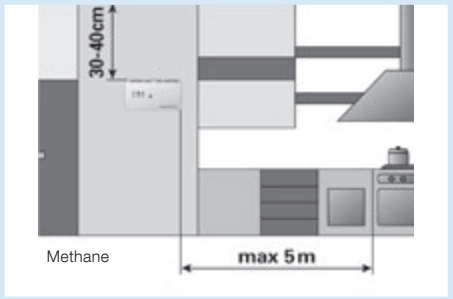
Gas alarm unit GS 1.1

Application

For the detection of inflammable gases such as methane, propane, butane in ambient air in residential buildings.

Description

Gas alarm unit with integrated semiconductor sensor and alarm buzzer. LEDs for operation (green), alarm (red), error (yellow), the Test button and the Reset button are located at the front side of the housing. The alarm is triggered when approx. 20 % of the LEL (lower explosive limit) is reached. The audible alarm can be muted with the Reset button. The visual alarm remains active until the alarm condition no longer exists (reset).



Technical specifications

Supply voltage: AC 230 V

Housing
W x H x D 158 x 90 x 44 mm
Degree of protection: IP 20 (EN 60529)

Operating temperature range
Ambient: 0/50 °C; max. 75 % rH

Alarm value: Approx. 20 % LEL

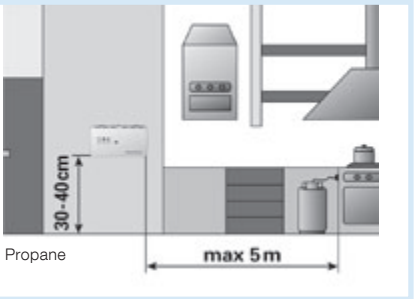
Audible alarm: Internal buzzer, min. 50 dB(A)

Service life: Approx. 5 years

Gas alarm unit GS 2.1

For the detection of inflammable gases such as methane, propane, butane in ambient air in residential buildings.

Gas alarm unit with integrated semiconductor sensor, alarm buzzer and relay output for connection of additional external alarm equipment (e.g. horn). LEDs for operation (green), alarm (red), error (yellow), the Test button and the Reset button are located at the front side of the housing. The alarm is triggered when approx. 20 % of the LEL (lower explosive limit) is reached. The audible alarm can be muted with the Reset button. The visual alarm remains active until the alarm condition no longer exists (reset). The unit features an additional input for connection of an external gas sensor GS 4.1 as a second measuring point for monitoring different rooms.



Supply voltage: AC 230 V

Housing
W x H x D 158 x 90 x 44 mm
Degree of protection: IP 20 (EN 60529)

Operating temperature range
Ambient: 0/50 °C; max. 75 % rH

Alarm value: Approx. 20 % LEL

Audible alarm: Internal buzzer, min. 50 dB(A)

Service life: Approx. 5 years

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GS gas alarm units are cross-sensitive to hydrocarbons, lacquers, solvents, alcohols and similar media.

DG: M			Part no.	Price €
Gas alarm unit GS 1.1 Methane	1	-	**61184**	
Gas alarm unit GS 1.1 Propane/Butane	1	-	**61186**	
Gas alarm unit GS 2.1 Methane	1	-	**61185**	
Gas alarm unit GS 2.1 Propane/Butane	1	-	**61187**	

Gas alarm units for the private home

External gas sensor GS 4.1

Application

Additional gas sensor to be used with the gas alarm unit GS 2.1. Enables monitoring at two points in different rooms.

Description

Remote sensor for gas alarm unit GS 2.1. LEDs for operation (green), alarm (red), error (yellow) are located at the front side of the housing. Audible alarm is triggered by the gas alarm GS 2.1.

Technical specifications

Supply voltage: Via GS 2.1

Housing
W x H x D 80 x 80 x 36 mm
Degree of protection: IP 20 (EN 60529)

Operating temperature range
Ambient: 0/50 °C
max. 75 % rH

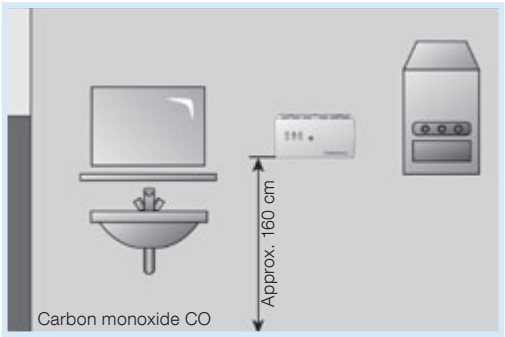
Alarm value: Approx. 20 % LEL

Service life: Approx. 5 years

Gas alarm unit GS 3.1 CO

For the detection of dangerous CO gas concentrations in residential buildings. GS 3.1 is installed close to the heating or hot water boiler.

Gas alarm unit with integrated semiconductor sensor and alarm buzzer. LEDs for operation (green), alarm (red), error (yellow), the Test button and the Reset button are located at the front side of the housing. The alarm is triggered when approx. 300 ppm CO are reached. The audible alarm can be muted with the Reset button. The visual alarm remains active until the alarm condition no longer exists (reset). Standard setting is CO.



Supply voltage: AC 230 V

Housing
W x H x D 158 x 90 x 44 mm
Degree of protection: IP 20 (EN 60529)

Operating temperature range
Ambient: 0/50 °C
max. 75 % rH

Alarm value: 300 ppm CO

Audible alarm: Internal buzzer, min. 50 dB(A)

Service life: Approx. 5 years

i

GS gas alarm units are cross-sensitive to hydrocarbons, lacquers, solvents, alcohols and similar media.

DG: M			Part no.	Price €
Gas sensor GS 4.1 Methane	1	-	**61188**	
Gas sensor GS 4.1 Propane/Butane	1	-	**61189**	
Gas alarm unit GS 3.1 CO	1	-	**61190**	

Gas and smoke detector GRM

- For natural gas and liquid gas (gas detector)
- For early detection of smoke (smoke detector)
- Audible and visual alarms; Acknowledge button and relay output
- Self-monitoring for line interruption, short circuit and sensor defect

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5

Application

For continuous monitoring of explosive gases, vapours and smoke and for generating alarms in conjunction with the appropriate sensors. GRM is installed in heating rooms and basements, storage, office and residential buildings as well as public facilities to increase safety. Not suitable for installation in hazardous areas (EX areas).

Description

Alarm unit in a wall mounting housing with audible and visual alarms. GRM features an alarm threshold and is equipped with a relay contact. If the threshold value is exceeded, the unit generates an alarm. The red LED lights up, the audible alarm goes on and the alarm relay switches. The audible alarm can be muted with the Acknowledge button. When the alarm condition no longer exists, you press the Acknowledge button again to clear the visual alarm (alarm memory). The alarm can only be cleared with the Acknowledge button if the reason for the alarm has been removed. If the concentration still exceeds the alarm threshold, pressing the Acknowledge button does not clear the alarm. The voltage-free relay contact allows you to switch additional external signalling equipment such as the event reporting system EMS, horns, lamps, fans or fan controllers in the case of alarm or fault conditions. GRM is suitable for panel mounting with a mounting frame. A sealing kit (IP 54) is available for rough application conditions.

The following sensor combinations are possible with GRM:
1. 1 gas sensor and 1 smoke sensor
2. 2 gas sensors
3. 2 smoke sensors
4. 1 gas sensor
5. 1 smoke sensor

Technical specifications

Inputs
2 sensors
Connection cable 3 wires
Wire cross section > 0.5 mm²

Distance control unit – sensor
Max. 150 m

Alarm threshold
1 permanently installed alarm threshold for alarm at 20 % LEL (for gases) with alarm memory

Display
1 green LED: Operation
1 red LED: Flashing: fault
Steady on: alarm

Audible alarm
Piezo buzzer approx. 70 dB(A), can be acknowledged

Switching outputs
Relay contacts: 1 voltage-free changeover contact
Contact rating: AC 250 V, 2 A

Supply voltage
AC 230 V

Power input
15 VA

Operating temperature range
Ambient: 0/40 °C

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Weight: 0.55 kg
Degree of protection: IP 40 (EN 60529)

i Please order sensors and calibration separately.

DG: H	Part no.	Price €
Gas and smoke detector GRM	61150	

Gas and smoke sensors for GRM

Gas sensor

Description

Semiconductor gas sensor in plastic housing for connection to gas and smoke detector GRM. For use in dry rooms (e.g. heating installations). Detectable media: methane, propane, butane. LEDs at the sensor indicate the operating and alarm state of the gas alarm system:

- LED green: Operation
- LED yellow: Fault
- LED red: Gas alarm

When ordering, please specify the gas to be monitored since the sensors must be calibrated for the desired gas.

Technical specifications

Measured gases
Inflammable gases and vapours in ambient air. Gas sensors are cross-sensitive to hydrocarbons, lacquers, solvents, alcohols, etc.).

Measuring range
0–50 % LEL

Measuring principle
Semiconductor (service life approx. 5 years, depending on the operating conditions)

Operating temperature range
Ambient: 0/40 °C

Humidity
Max. 75 % rH

Housing
Wall mounting plastic housing
W x H x D: 80 x 80 x 35 mm
Weight: Approx. 100 g

Smoke sensor

Photoelectronic smoke sensor in plastic housing for connection to gas and smoke detector GRM. For use primarily in residential buildings (living rooms, bedrooms, halls, staircases, corridors, etc.). The operating and alarm state is indicated at the sensor:

- Visual: LED red/red
- Audible: Internal piezo buzzer

Sensor
Photoelectronic

Measuring principle
Scattered light principle

Alarm tone
85 dB(A) (at a distance of 3 m)

Test button
For sensitivity, audible alarm

Operating temperature range
Ambient: 5/39 °C

Humidity
Max. 80 % rH

Housing
Wall mounting plastic housing
Outside dimensions (Ø x H): 155 x 38 mm
Weight: Approx. 195 g

Electrical connections
Screw terminal strip

i

Gas sensor calibration
Prior to shipment, the gas sensors are calibrated to the gas specified by the customer. Therefore, please always indicate the gas type when ordering. Please order sensors and calibration separately.

DG: H			Part no.	Price €
Gas sensor for methane	1	-	**61188A**	
Gas sensor for propane, butane	1	-	**61189A**	
Gas sensor calibration	1	-	61177	
Smoke sensor	1	-	**61151**	

Gas alarm unit GW-S in wall mounting housing

- **For two or four gas sensors (measuring points)**
- **Digital display for concentration, programming and calibration data**
- **Alarms: memory mode or volatile mode (1–2)**
- **Self-monitoring for line interruption, short circuit and power failure**

5

Application

For continuous monitoring of inflammable or toxic gases as well as oxygen in ambient air. Ideal for industrial and building technology applications. Not suitable for use in hazardous areas (EX areas).

Description

Freely programmable gas alarm unit in a compact wall mounting housing for the connection of one or two gas sensors. The control unit can monitor various types of gases. GW-S can be operated in single-stage or dual-stage mode. Limit values can be set as required.
Four integrated relays can be assigned as required (1 relay is used for general alarm and 1 relay for the audible alarm signal (horn). The other relays are available for control outputs.

The gas alarm system features a display with alternating indication of measured values and three operating levels:
1. Measurement level: Displays measured values, faults, alarms
2. Parameter level: Displays measuring ranges, limit values, alarm groups
3. Service level: Displays limit values, performs function checks of the relays, setting of parameters (such as alarm group and limit value settings)

GW-S alternately displays the concentration of the gas in the ambient air. If a sensor exceeds alarm level 1 or alarm level 2, the visual alarm and the alarm relay are activated. When the concentration falls below the alarm level, the alarm is cleared. It is also possible to program GW-S in such a way that alarm level 2 remains stored until a manual reset. The activation of the relay for the horn can also be programmed for each alarm level. Stop mode allows for permanent indication of the concentration at a given measuring point. GW-S is self-monitoring (line interruption, short circuit and power failure) and signals faults via LED and fault relay. In addition, the display shows an "E". The alarm function can be tested without test gas.
Version GW-S4 for connection of up to four gas sensors.

Technical specifications

Sensor inputs
4–20 mA
GW-S: 2 gas sensors can be connected
GW-S4: 4 gas sensors can be connected

Alarm thresholds
Max. 2, adjustable, memory mode or volatile mode

Switching outputs
4 voltage-free relay contacts

Controls
Keypad for alarm and horn reset, edit, menu selection, confirmation

Display
Digital display for: concentration value, menu
LEDs for:
- Alarm and fault for each measuring point
- Operational, horn and indicated measuring point

Supply voltage: AC 230 V

Power input: Max. 20 VA

Operating temperature range
Ambient: -10/+40 °C

Housing
Wall mounting housing
W x H x D: 195 x 160 x 137 mm
Weight: 1.3 kg
Degree of protection: IP 54 (EN 60529)

Connectable sensors
Series 400, 500, 600, 700 and 800

Option

- Data logger

DG: H	Part no.	Price €
GW-S	**61146**	
GW-S4	**61145**	
Version with data logger		

i Suitable gas sensors (series 400–800) see page 118–119.

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Gas alarm system GW-SK in DIN rail housing

- **For up to six gas sensors (measuring points)**
- **Digital display for concentration, programming and calibration data**
- **Alarms: memory mode or volatile mode (1–4)**
- **Self-monitoring for line interruption, short circuit and power failure**

Application

For continuous monitoring of inflammable or toxic gases as well as oxygen in ambient air. Ideal for industrial and building technology applications. Not suitable for use in hazardous areas (EX areas).

Description

Freely programmable gas alarm system in a compact DIN rail housing for the connection of up to six gas sensors. The control unit can monitor various types of gases. GW-S can be operated in single-stage or dual-stage mode. Limit values can be set as required. 6 integrated relays can be assigned as required (1 relay is used for general alarm and 1 relay for the audible alarm signal (horn). The other relays are available for control outputs.
Among others, the following combinations are possible:
- 1 alarm threshold, 6 sensors, 4 alarm groups
- 2 alarm thresholds, 6 sensors, 2 alarm groups
- 3 alarm thresholds, 6 sensors, 1 alarm group

The gas alarm system features a display with alternating indication of measured values and three operating levels:
1. Measurement level: Displays measured values, faults, alarms
2. Parameter level: Displays measuring ranges, limit values, alarm groups
3. Service level: Displays limit values, performs function checks of the relays, setting of parameters (such as alarm group and limit value settings)

GW-SK alternately displays the concentration at each measuring point. If a sensor exceeds alarm level 1 or alarm level 2, the visual alarm and the alarm relay are activated. When the concentration falls below the alarm level, the alarm is cleared. It is also possible to program GW-SK in such a way that alarm level 2 remains stored until a manual reset. The activation of the relay for the horn can also be programmed for each alarm level. Stop mode allows of permanent indication of the concentration at a given measuring point. GW-SK is self-monitoring (line interruption, short circuit and power failure) and signals faults via LED and fault relay. In addition, the display shows an "E". The alarm function can be tested without test gas.

Technical specifications

Sensor inputs
4–20 mA
Up to six gas sensors can be connected

Alarm thresholds
Max. 4, adjustable, memory mode or volatile mode

Switching outputs
6 voltage-free relay contacts

Controls
Keypad for alarm and horn reset, edit, menu selection, Enter

Display
Digital display for concentration values, menu
LEDs for:
- Alarm and fault for each measuring point
- Operational, horn and indicated measuring point

Supply voltage
24 V DC

Power input
24 V max. 30 W

Electrical connections
35-pin screw terminals

Operating temperature range
Ambient: -10/+40 °C

Housing
DIN rail housing (DIN 43880)
can be clipped onto 35 mm DIN rails
W x H x D: 105 x 75 x 90 mm
Weight: 650 g
Degree of Protection: IP 30 (EN 60529)

Options

- Serial interface
- Data logger
- Uninterrupted power supply

DG: H; PU 1	Part no.	Price €
GW-SK	**61163**	
Options		
Connection kit AC 230 V operation	**69114**	
Uninterrupted power supply	69115	
Version with data logger		

i Suitable gas sensors (series 400–800) see page 118–119.

Gas sensors for GW-S/GW-S4/GW-SK

Description

For the detection of inflammable, explosive, toxic gases or oxygen. Can also be used in dusty and dirty environments. For connection to the gas alarm units GW-S, GW-S4 and GW-SK. Aluminium wall mounting design. Connection cable (shielded) 3 x 1.5 mm² Cu+ protective conductor, signal and return conductor (max. 100 Ohm line resistance).

Technical specifications

400 ST

Measuring range
0–100 % LEL
(measurement signal is only linear in the range of 0–50 % LEL)

Measuring principle
Semiconductor
(service life approx. 5 years)

Supply voltage
DC 18–28 V

Ambient temperature
-10/+40 °C

Humidity
40/50 % rH

Housing
W x H x D: 90 x 85 x 65 mm
Weight: approx. 0.4 kg
Degree of protection:
IP 40 (EN 60529)

Output: 4–20 mA

500 ST

Measuring range
0/99 % LEL

Measuring principle
Heat tone
(service life approx. 3 years)

Supply voltage
DC 18–28 V

Ambient temperature:
-20/+40 °C

Humidity
15/95 % rH

Atmospheric pressure
900/1100 hPa

Housing
W x H x D: 90 x 85 x 65 mm
Weight: Approx. 0.4 kg
Degree of protection:
IP 40 (EN 60529)

Output: 4–20 mA

Option: RS 232 interface

510 Ex-2

Measuring range
0/99 % LEL

Measuring principle
Heat tone
(service life approx. 3 years)

Supply voltage
DC 18–28 V

Ambient temperature:
-20/+40 °C

Humidity: 15/95 % rH

Atmospheric pressure
700/1300 hPa

Housing
Ø x H: 108 x 100 mm
Weight: Approx. 0.4 kg
Degree of protection:
IP 40 (EN 60529)

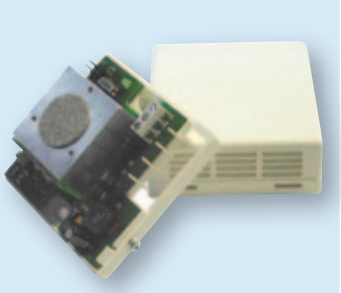
Output: 4–20 mA

Option: RS 232 interface

EC Type Exam. Certificate
As per directive 94/9/EU
(ATEX 100a) with certificate
TPS 09 ATEX 1 421 X
Ex IIG Ex d II C T6

DG: H	Part no.			Price €
Gas sensor 400 ST for detecting explosive gases and vapours, semiconductor	**69145**	1	1	
Gas sensor 400 ST for special gases, semiconductor	69145S	1	1	
Gas sensor 500 ST for detecting explosive gases and vapours, heat tone principle	69109	1	1	
Gas sensor 500 ST for special gases, heat tone principle	69109S	1	1	
Gas sensor 510 Ex-2 (MF420-Ex-2) with digital display, for detecting explosive gases and vapours, heat tone principle, Ex version	69111	1	1	
Gas sensor 510 Ex-2 (MF420-Ex-2) with digital display, for detecting special gases	69111S	1	1	
Calibration calibration/programming costs for the alarm thresholds for standard gases (methane, propane/butane, O_2, Co, Co_2, hydrogen) per sensor	61177	1	1	
Calibration calibration/programming costs for the alarm thresholds for special gases per sensor	61183	1	1	

Gas sensors for GW-S/GW-S4/GW-SK



Description

For monitoring the oxygen concentration. Can also be used in dusty and dirty environments. For connection to the gas alarm units GW-S, GW-S4 and GW-SK. Aluminium wall mounting design. Connection cable (shielded) 3 x 1.5 mm² Cu+ protective conductor, signal and return conductor (max. 100 Ohm line resistance).

Technical specifications

700 ST

Measuring ranges
700 ST-CO_2: 0/5 % by volume
700 ST-CO_2 LG: 0/3000 ppm

Measuring principle
Infrared

Supply voltage
DC 18–28 V

Ambient temperature
-10/+40 °C

Humidity
Max. 95 % rH

Atmospheric pressure
900/1100 hPa

Housing
W x H x D: 90 x 85 x 65 mm
Weight: Approx. 0.4 kg
Degree of protection:
IP 30 (EN 60529)

Output
4–20 mA

600 ST

Measuring ranges
0/21 % O_2 by volume

Measuring principle
Electrochemical,
service life 1–2 years

Supply voltage
DC 18–28 V

Ambient temperature
10/40 °C

Humidity
15/50% rH

Atmospheric pressure
900/1100 hPa

Housing
W x H x D: 90 x 85 x 65 mm
Weight: Approx. 0.4 kg
Degree of protection:
IP 40 (EN 60529)

Output
4–20 mA

800 ST

Measuring ranges
0.1/21 % O_2 by volume

Measuring principle
Zirconium dioxide

Supply voltage
DC 18–28 V

Ambient temperature
-10/+50 °C

Humidity
Max. 95 % rH

Atmospheric pressure:
900/1100 hPa

Housing
W x H x D: 90 x 85 x 65 mm
Weight: Approx. 0.4 kg
Degree of protection:
IP 40 (EN 60529)

Output
4–20 mA

Options

700 ST: RS 232 interface

600 ST: RS 232 interface

800 ST: RS 232 interface

	Part no.			DG	Price €
Gas sensor 600 ST-O_2 for detecting oxygen concentrations (0–21 O_2 by volume) electrochemical	61179	1	-	H	
Gas sensor 600 ST-CO for detecting carbon monoxide concentrations (0–300 ppm CO) electrochemical	61180	1	-	H	
Gas sensor 700 ST-CO_2 for detecting carbon dioxide concentrations, infrared (0–5 % by volume)	69112	1	-	H	
Gas sensor 700 ST-CO_2 LG (without analogue output) Application area: e.g. monitoring the air quality in low energy houses	69104	1	-	H	
Gas sensor 800 ST-O_2 for detecting oxygen concentrations (0.1–25 % by volume), zirconium dioxide; temperature range -10/+50 °C	69113	1	-	H	
Calibration calibration/programming costs for the alarm thresholds for standard gases (methane, propane/butane, O_2, CO, CO_2, hydrogen) per sensor	61177	1	-	---	
Calibration calibration/programming costs for the alarm thresholds for special gases per sensor	61183	1	-	---	

Accessories for gas alarm units/gas sensors

Test gas unit

Application For checking, servicing and repairing gas alarm systems.

Description Plastic case with test gas cap and withdrawal unit (valve, flow meter with stainless steel float for gas flow regulation from 0.5–1.5 l/min and test gas tube). Can accommodate 1 to 2 test gas cylinders.

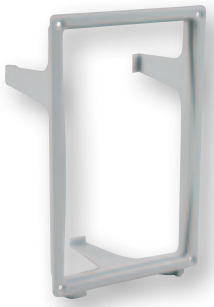
Test gas not included in scope of delivery; please order separately.

Test gas unit

5

Mounting frame

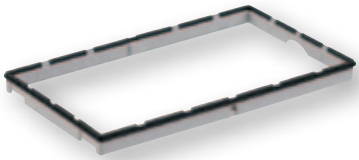
Description Mounting frame suitable for all wall mounting housings of the AFRISO WATCHDOG series (alarm units). For fast integration into control cabinet.



Mounting frame

Sealing kit (IP 54)

Description Sealing kit for rough application conditions. Suitable for all wall mounting housings of the AFRISO WATCHDOG series (alarm units). The sealing kit is easy to mount between the housing cover and base. This increases the degree of protection of the alarm unit to IP 54.



Sealing kit

	Part no.			DG	Price €
Test gas unit (without gas cylinder)	61100	1	-	E	
Withdrawal unit MiniFlo Brass valve and Perspex flow meter with stainless steel float for gas flow regulation from 0.5 to 1.5 l/min, test gas hose	**69050**	1	-	E	
Test gas methane 20 % LEL, non-recyclable cylinder containing 12 l	69060	1	-	E	
Test gas methane 40 % LEL, non-recyclable cylinder containing 12 l	69061	1	-	E	
Test gas propane 20 % LEL, non-recyclable cylinder containing 12 l	69062	1	-	E	
Test gas propane 40 % LEL, non-recyclable cylinder containing 12 l	69063	1	-	E	
Test gas carbon monoxide (300 ppm), non-recyclable cylinder containing 12 l	69064	1	-	E	
Synthetic air for zero point calibration, non-recyclable cylinder containing 12 l	69065	1	-	E	
Mounting frame	**43521**	1	-	G	
Sealing frame	**43416**	1	-	G	

i

Upon request, we design and build complete gas alarm systems for you and service them at regular intervals.

Tank withdrawal systems

Automatic
fuel oil de-aerators

Fuel oil filters

Anti-siphon valves

CHAPTER 6

Equipment for fuel oil storage tanks and oil carrying pipes

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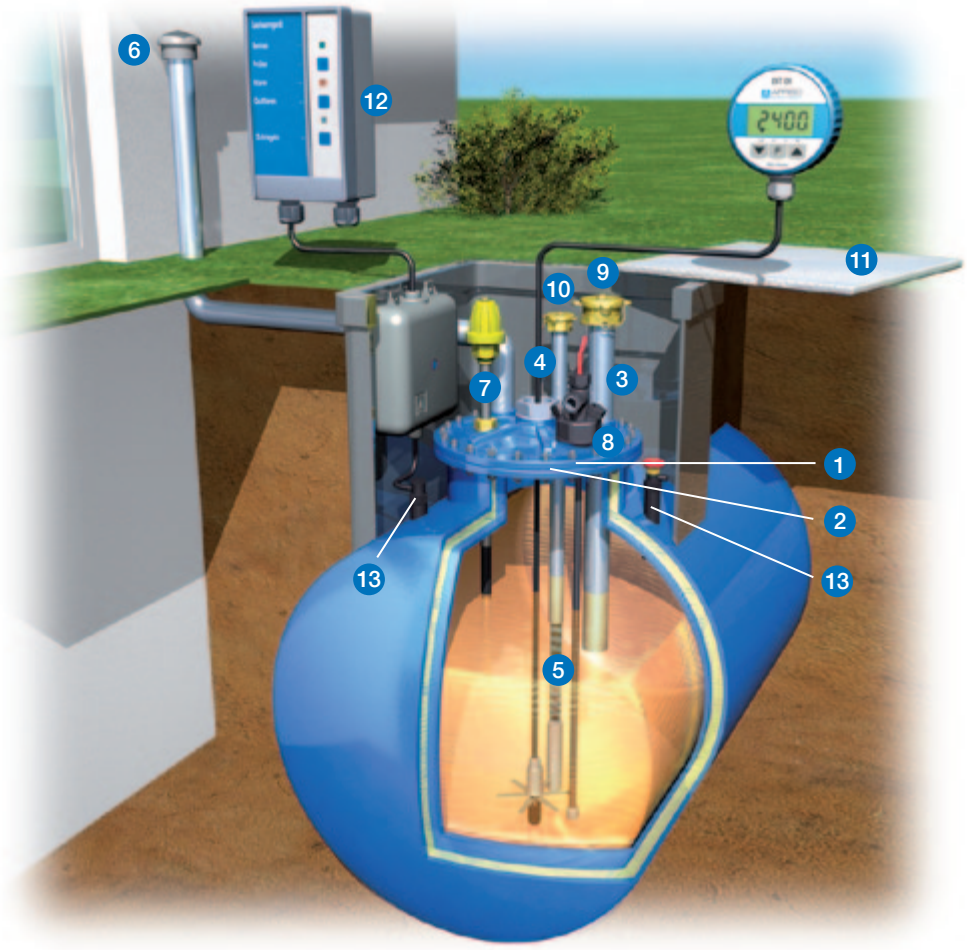
Equipment for double-walled underground tanks

Leak monitoring with leak detection fluid

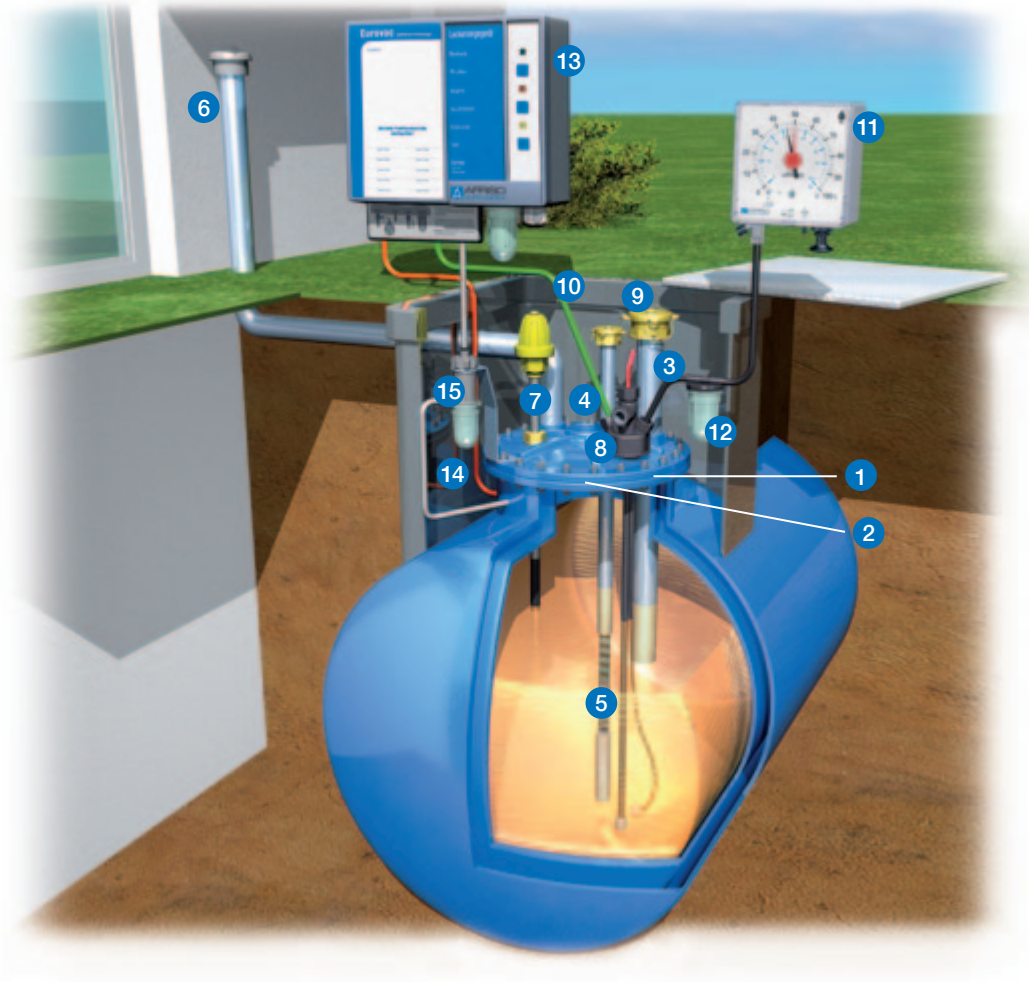


1. Manhole cover
2. Seal
3. Filling pipe with immersion pipe
4. Pipe for dipstick with protective sleeve
5. Dipstick
6. Vent cap
7. Level sensor GWG 23
8. Withdrawal system Euroflex 3 made of plastic, also acts as an isolating piece
9. Filler cap
10. Cap for dipstick pipe
11. Level indicator DIT 01
12. Leak detector
13. LAG mounting kit

Our product portfolio for the safe operation of fuel oil tanks reduces operating costs, helps make optimum use of fuels, provides timely warnings if hazardous situations arise and contributes to the protection of the environment. Irrespective of the tank size or the fuel to be stored.

Equipment for double-walled underground tanks

Leak monitoring with vacuum



1. Manhole cover
2. Seal
3. Filling pipe with immersion pipe
4. Pipe for dipstick with protective sleeve
5. Dipstick
6. Vent cap
7. Level sensor GWG 23
8. Combination fitting made of plastic, also acts as isolating piece
9. Filler cap
10. Cap for dipstick pipe
11. Level indicator
12. Condensate trap
13. Leak detector
14. LAZ mounting kit
15. Liquid barrier

Safety and protection of the oil storage system are the basis of our product development. Continuous adaptation to current standards and directives as well as intelligent new products such as the piston type anti-siphon valve approved for outdoor use up to –25 °C ensure optimum safety concepts.

Application areas
- Cylindrical steel or plastic (glass-fibre reinforced plastic) tanks
- Double-walled steel tanks
- Steel tanks welded in basements
- Spherical tanks
- Oil storage rooms/collection facilities
- Containers, cisterns, cesspits

Media
- Fuel oil EL
- Diesel fuel
- Biofuel with up to 100 % FAME
- Biodiesel with up to 100 % FAME
- Petrols, fuels
- Water

GWG filler caps

GWG filler cap

Application

The filler cap without colour code may only be used with systems which are exclusively used with fuel oil EL standard, diesel fuel and biodiesel.

Description

GWG filler cap with bayonet connection G2 as per EN 14420-6 with integrated level sensor connection fitting. Male coupling made of brass. Cap made of oil- and weather-resistant plastic. Lockable with standard padlock.

GWG filler cap – green

The green filler cap may only be used with systems which are exclusively operated with low-sulphur fuel oil EL. Together with the red plate "Also for fuel oil EL standard", the filler cap may also be used with systems which are operated with low-sulphur fuel oil EL and with fuel oil EL standard, diesel fuel and biodiesel.

Green GWG filler cap with red plate "Also for fuel oil EL standard". Bayonet connection G2 according to EN 14420-6 with integrated level sensor connection fitting. Male coupling made of brass. Filler cap made of oil- and weather-resistant plastic. Lockable with standard padlock.

6

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GWG filler caps are also used in building renovation projects since the existing GWG wall fitting can no longer be fixed to the outside insulation.

DG: G			Part no.	**Price €**
GWG filler cap	1	10	**20430**	
GWG filler cap – green	1	10	**20443**	

Overpressure device, vent cap

Vent cap

Application To cover the vent line.

Description Cap for vent line.

Metal version: ZAMAG alloy, thread G1½ or G2.
Plastic version: Plug-in type with fixing by means of screw or G2 male thread

Overpressure device

To avoid overpressure of storage tanks during filling.

Overpressure device with male connection thread G1½. Opening pressure approx. 25 mbar.
Two or more overpressure devices must be installed for filling rates of more than 300 l/min.

6

Filler caps and caps for pipes for dipsticks.

DG: G			Part no.	Price €
Overpressure device	1	-	**20466**	
Vent cap 2", plastic – plug-in version	1	25	**20460**	
Vent cap 1½" plastic – plug-in version	1	25	**20450**	
Vent cap G2, plastic – male thread	-	200	20462	
Vent cap G2 metal – female thread	1	25	**20463**	
Vent cap G1½ metal – female thread	1	25	**20455**	
Cap for pipe for dipstick G1 x G1¼	1	25	**20464**	
Filler cap G2 x G2½ Heavy duty version, fuel oil EL standard	1	55	**20445**	
Filler cap — green G2 x 2½" Heavy duty version, low-sulphur fuel oil EL	1	25	**20452**	

i See page 6 for pipes for dipsticks.

Tank withdrawal system Euroflex

Quick-action shut-off valve with lever for fast shutting off of the oil supply. Remote operation from outside of the tank room possible with pull cord.

Version Euroflex 3 with direct connection for pneumatic tank contents gauges. Ideal for retrofitting or for applications involving tanks with few connections.

Floating withdrawal as per DIN 4755 recommendations. Makes it possible to withdraw fuel oil in the clean area and thus supports optimum functionality of the downstream fittings (e.g. oil filters).

Version with special G1 screw connection to avoid twisting. Ideal for use with Euroflex with heating band for fast, simple mounting.

Fitting made of high-impact, weather-resistant plastic. Approved as an isolating piece.

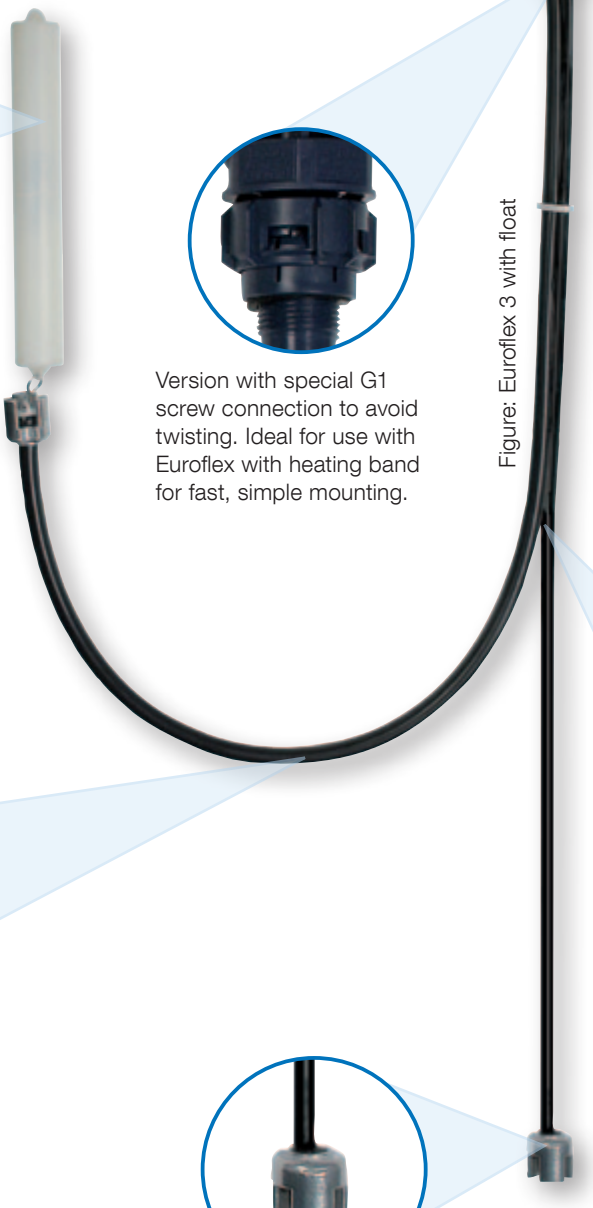

Figure: Euroflex 3 with float

Flexible suction line for maximum variability – also in terms of hose length. The standard lengths 2.15 m and 3.15 m can be shortened as required without any problems.

Measuring line with balance chamber.

All materials resistant to biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME (fatty acid methyl ester).

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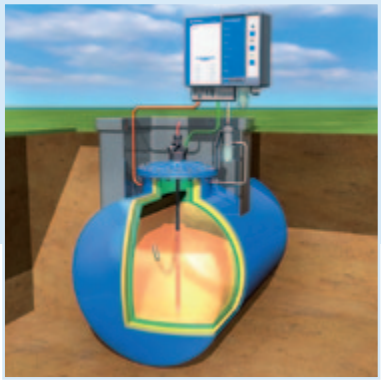
Tank withdrawal system Euroflex

- Combination fitting made of high-impact plastic
- Integrated, TÜV-tested isolating piece
- Silent check valve
- Euroflex 3 for floating withdrawal
- Many customised versions available



Application

For withdrawal of fuel oil from underground and aboveground tanks in single-line or dual-line mode. Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME.

Description

Combination fitting made of plastic as a withdrawal system with measuring line and TÜV-tested isolating piece for that screws into the tank. G⅜ stainless steel threaded female connections for suction and return lines. Universal compression fittings for pipes with 8 and 10 mm outside diameters. The integrated check valve with elastic valve seat keeps the oil column in the suction line from being interrupted when the burner is off. Quick-action shut-off valve with lever for remote closing in emergency situations. Pressure- and vacuum-tight up to 1 bar.

Euroflex 3 with float and special G1 screw connection for withdrawing oil in the clean area. Measuring line connection for hose or pipe with an outside diameter of 6 mm. Suction hose length 2.15 m or 3.15 m with additional float at the suction hose end.

Euroflex 312 (GWG 12K/1C), combination of level sensor and withdrawal system. With measuring line connection for hose or pipe with 6 mm outside diameter. For battery tanks as per DIN 6620 and tanks as per DIN 6625 manufactured on site. Specially useful if there is no connection socket at the tank. Connection G1½.

Technical specifications

Connection
Tank: G1 male thread
(Euroflex 312: G1½ male thread)
Suction/return line: G⅜ female thread
Measuring line: 6 mm

Length
Suction hose: 2.15 m or 3.15 m
Measuring hose: 2.15 m or 3.15 m

Test pressure
Max. 6 bar

Flow rate
Max. 150 l/h

Material

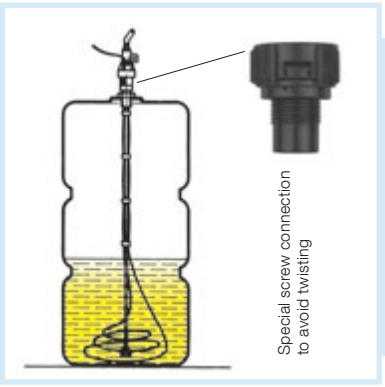
Screw fitting:	Plastic (POM), blue
Suction hose:	NBR
Balance chamber:	Zamak (ZnAl4Cu1)

Approvals
Type approval 01/BAM/3.10/1/1/85
TÜV report no. S218 2005 Z1

DG: G			Part no.	Price €
Euroflex 2 (2.15), suction hose 2.15 m, without measuring line connection	1	25	20162	
Euroflex 3 (2.15), suction hose 2.15 m	1	25	20160	
Euroflex 3 (3.15), suction hose 3.15 m	1	25	20164	
Euroflex 3 with float, suction hose 2.15 m	1	25	20130	
Euroflex 3 with float, suction hose 3.15 m	1	20	20131	
Euroflex 312 (GWG 12 K/1C), suction hose 2.15 m	1	10	20190	
Accessories				
Conversion kit float kit G1 for Euroflex and Miniflex	1	25	20125	
Conversion kit float kit G1½ for single tanks and communicating withdrawal systems	1	-	20120	
Conversion kit shut-off valve for Euroflex (10/98 and later), Miniflex and AFRISO withdrawal systems for battery tanks for conversion to automatically safeguarding suction lines	1	-	74305	

i Pull cord for remote closing see page 131.

Euroflex with heating band, Miniflex



Euroflex TH

Miniflex

Application

For withdrawal of fuel oil EL or diesel fuel in single-line mode from tanks that may be subjected to temperatures of less than 5 °C (cloud point, paraffin).

For withdrawal of fuel oil from underground and aboveground tanks in single-line or dual-line mode. Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME.

Description

Combination fitting Euroflex 2 as a withdrawal system with heating band that screws into the tank. A heating band is attached to the suction line; at the bottom of the tank the band forms a spiral around the suction point. The required length depends on the tank type and size as well as the installation site. The self-controlling heating band is designed to avoid overheating and burning out. The band is connected to AC 230 V via a connection cable (2 m) and a residual current device. Adaptation to the tanks with special screw connection to avoid twisting.

Combination fitting made of brass as a withdrawal system with measuring line that screws into the tank. Threaded female connection for suction and return lines. Universal compression fittings for pipes with 8 and 10 mm outside diameters. Measuring line connection for hose or pipe with 6 mm outside diameter. The integrated check valve with elastic valve seat keeps the oil column in the suction line from being interrupted when the burner is off. Quick-action shut-off valve with lever for remote closing in emergency situations. Pressure- and vacuum-tight up to 1 bar.

Technical specifications

Connection
Tank: G1 male thread
Suction/return line: G⅜ female thread

Length
Heating band: 5 m, 7.5 m or 10 m
Suction hose: 2.15 m or 3.15 m

Heating capacity
At 10 °C: 25 W/m

Special screw connection to avoid twisting of hose and heating band.

Connection
Tank: G1 male thread
Suction/return line: G⅜ female thread
Measuring line: 6 mm

Length
Suction hose: 2.15 m or 3.15 m
Measuring hose: 2.15 m or 3.15 m

Test pressure
Max. 6 bar

Flow rate
Max. 150 l/h

Material
Screw fitting: brass
Suction hose: NBR
Balance chamber: Zamak (ZnAl4Cu1)

DG: G			Part no.	Price €
Euroflex TH, suction hose 2.15 m, 5 m heating band	1	-	21010	
Euroflex TH, suction hose 2.15 m, 7.5 m heating band	1	-	21011	
Euroflex TH, suction hose 2.15 m, 10 m heating band	1	-	21012	
Miniflex 2, suction hose 2.15 m, without measuring line connection	1	25	74200	
Miniflex 3, suction hose 2.15 m	1	25	74300	

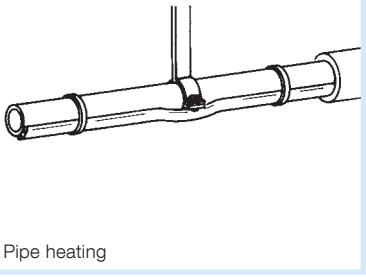
i See Euroflex ordering table for conversion kit for Miniflex.

Pipe heating, residual current device, pull cord, pressure compensation unit

Pipe heating

Application For heating of pipes carrying fuel oil or water. Helps prevent the oil line from freezing and avoids flocculation of paraffin below the cloud point of 5 °C.

Description Electrical pipe heating consisting of self-controlling heating band with connection cable (2 m). See ordering table for standard lengths. Connection to AC 230 V by means of residual current device.



Pipe heating

Residual current device/ outdoor temperature sensor

Versions

Residual current device in protective housing IP 65 with connection facility for remote sensor (outdoor or pipe temperature sensor).

Residual current device TS 5 in protective housing IP 65 with integrated temperature switch (5 °C).

Outdoor temperature sensor with temperature switch (5 °C) for connection to residual current device part no. 21025.

Pipe temperature sensor with temperature switch (5 °C) for connection to residual current device part no. 21025.

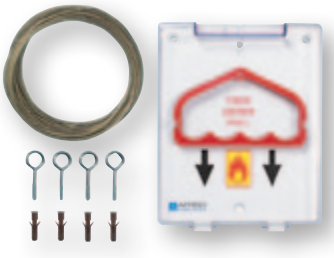
Residual current device TS 5

Outdoor temperature sensor

Pull cord

Description Pull cord handle and a sealable case for the remote activation of quick-action shut-off valves (e.g. Euroflex or Miniflex). TÜV-tested. Consisting of:

- Pull cord (steel, plastic-coated), 10 m long
- Handle
- 4 eyelet screws for deflecting the pull cord
- Sealable case with wire and lead seal
- Dowels and screws



Pull cord

Pressure compensation unit DAE

Application Used to limit pressure increases in closed pipe sections resulting from expansion caused by temperature changes. Suitable for fuel oil pipe sections which are closed at both ends (e.g. by means of solenoid valves or check valves) and which are subject to considerable temperature differences (e.g. due to pipe heating).

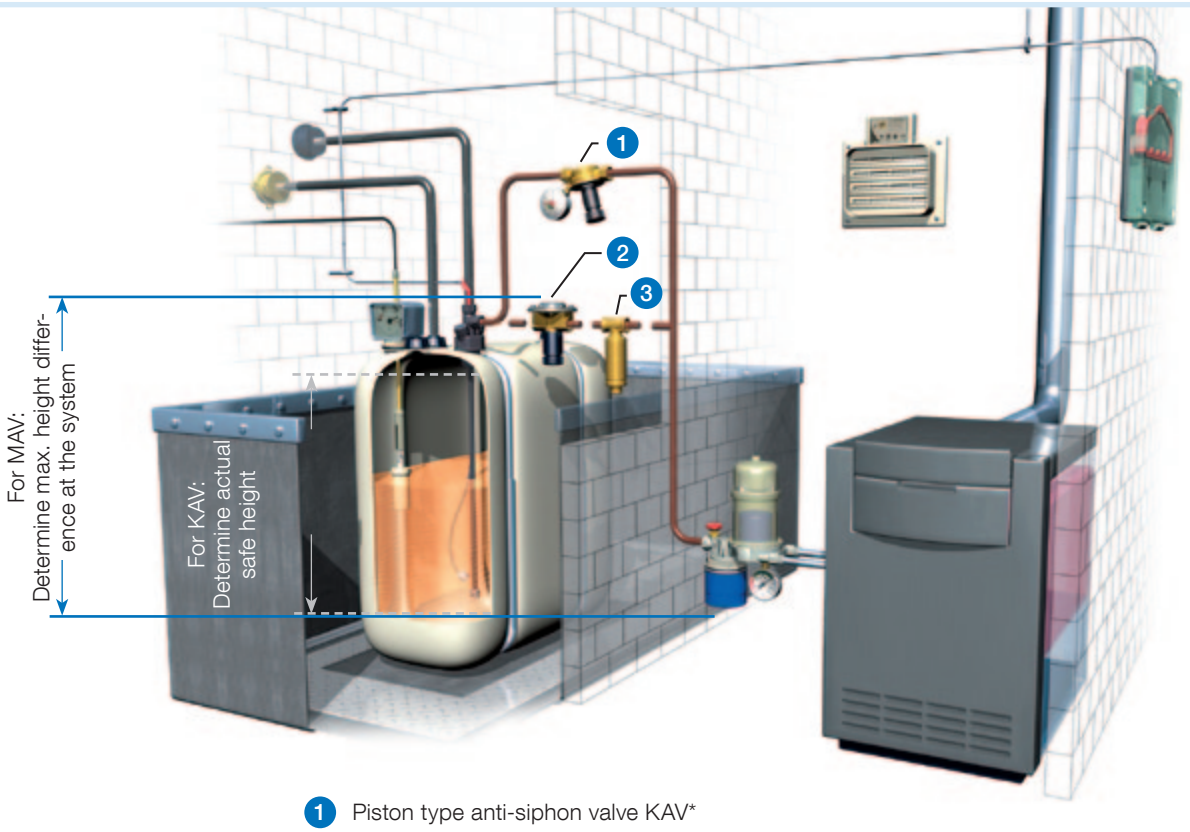
Description G⅜ female thread connections at both ends. A pipe volume of 725 cm^3 can be buffered at a temperature difference of 40 °C. This corresponds to the following max. line lengths (depending on the line diameter):

- 25.5 m ≥ Ø 8 x 1
- 14 m ≥ Ø 10 x 1
- 9 m ≥ Ø 12 x 1

Pressure compensation unit DAE

DG: G	Part no.	Price €
Residual current device	**21025**	
Residual current device TS 5	**21026**	
Outdoor temperature sensor	**21027**	
Pipe temperature sensor	**21028**	
Pressure compensation unit DAE	**20800**	
Pipe heating 5 m	21015	
Pipe heating 7 m	21016	
Pipe heating 10 m	21017	
Pipe heating 15 m	21018	
Pipe heating 25 m	21019	
Pull cord	**20475**	

Anti-siphon valves



1 Piston type anti-siphon valve KAV*

2 Diaphragm type anti-siphon valve MAV*

3 Pressure compensation unit DAE

* Mounting position (example), arrangement is variable and must be adapted to suit local conditions.

Applicable directives for tank facilities for fuel oil

Depending on national and local legislation and directives, tank installations for fuel oil and the corresponding pipes are subject to certain approvals. The objective is to prevent water pollution.

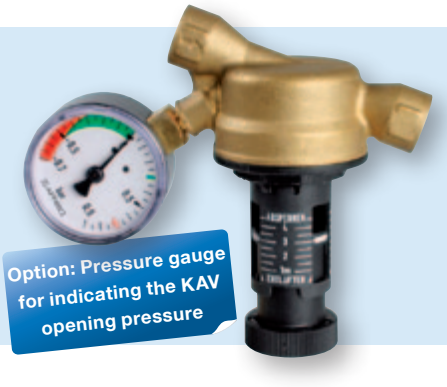
If the maximum oil level in the storage tank is higher than the lowest point of the suction line (see installation example), fuel oil can be siphoned out of the tank in the case of leaks. Therefore, suitable protection equipment must be installed. Solenoid valves as well as diaphragm type and piston type anti-siphon valves are used for this purpose. In Germany and many other countries, all types of valves require approval.

Notes on installation

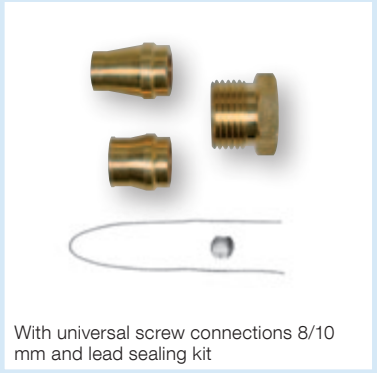
It must be ensured that the vacuum at the suction end at the burner pump does not exceed 0.4 bar.

Factors to be considered include:
- The maximum suction lift at minimum oil level
- The suction line length
- The viscosity of the oil in the storage tank at extreme winter temperatures
- Additional pressure losses caused by fittings (such as oil filters, shut-off valves, etc.) and lines

Piston type anti-siphon valve KAV



- **Piston instead of diaphragm – for maximum safety even in case of pollution, ice or system overpressure**
- **Adjusted value corresponds to the safe height (reduced line resistance)**
- **Also for outdoor use (manhole)**
- **Closed system for error-free operation**



With universal screw connections 8/10 mm and lead sealing kit

Application

For oil carrying pipes in oil fired systems as per DIN 4755 where a pipe section is below the maximum tank level. KAV keeps fuel oil from being siphoned out of the tank in the case of leaks in the suction line. Suitable for the following media: fuel oil (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with up to 100 % FAME.

Description

Vacuum-controlled shut-off system with a completely new function principle. KAV is closed when the burner pump is not in operation. When the burner pump starts, a vacuum is generated in the suction line. This opens the KAV and fuel oil is pumped from the tank. If the suction line has a leak or if the burner pump stops, KAV closes and the suction line between the tank and the burner pump is shut off. KAV features a pressure relief mechanism, i.e. if the fuel oil contained in the suction line heats up and therefore expands, KAV opens. The fuel oil can flow back into the tank (provided that a tank withdrawal fitting without backflow preventer is installed). The pressure relief is independent of the adjusted safe height and operates reliably at a response pressure as low as 300 mbar. KAV is continuously adjustable from 1–4 m. The adjusted value corresponds to the actual safe height (= max. liquid level) and not the installation height (as in the case of diaphragm type anti-siphon valves). This results in reduced line resistance, which has a positive effect on the service life of the burner and the pump. KAV is designed as a closed system. Therefore, no vent is required and water or dirt cannot get into the system. Since the sensitive diaphragm as the main actuating element has been replaced by a piston, malfunctions caused by pollution, ice or system overpressure (rupture of the diaphragm) are practically impossible.

Technical specifications

Adjustment of safe height
Corresponds to actual safe height 1–4 m, continuously adjustable

Connection thread
G⅜ female thread at both ends

Mounting position
Any

Oil flow rate
Max. 220 l/h

Operating temperature range
Medium: 6/40 °C
Ambient: -25/+60 °C (function range)

Vacuum-tight
Up to -1 bar

Test pressure
Max. 10 bar

Response pressure
300 mbar

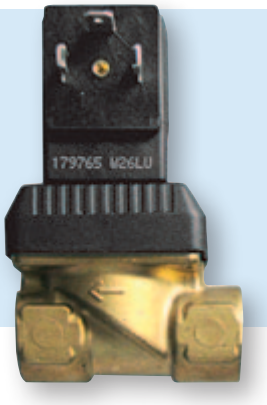
Housing material
Brass

Technical Approval of the German Institute for Building Technology
Z-65.50-415

Scope of delivery
Piston type anti-siphon valve with screw connector kit for pipes Ø 8 and 10 mm and lead sealing kit

DG:	Part no.	Price €
Piston type anti-siphon valve KAV	**20240**	
Pressure gauge (-0.7/+0.9 bar) for indicating the KAV opening pressure	**70030**	

Diaphragm type anti-siphon valve MAV
Solenoid valve Vakumat



Diaphragm type anti-siphon valve MAV

Application

For oil carrying pipes in oil fired systems as per DIN 4755 where a pipe section is below the maximum tank level. MAV keeps fuel oil from being siphoned out of the tank in the case of leaks. Suitable for the following media: fuel oil (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME.

Description

MAV is continuously adjustable to a safe height of 1–4 m for optimum adaptation to suit local conditions. The adjusted value corresponds to the installation height. The vacuum at the suction end of the oil burner pump is not unnecessarily increased. MAV-Universal shuts off under spring pressure and opens under the vacuum caused by the pump. Scope of delivery includes lead sealing kit.

Technical specifications

Adjustment of safe height
1–4 m (corresponds to installation height), continuously adjustable

Connection thread
⅜ female thread at both ends

Mounting position: Any

Oil flow rate: Max. 220 l/h

Operating temperature range
Medium: 6/40 °C

Vacuum-tight: Up to -1 bar

Test pressure: Max. 6 bar

Housing material: Brass

Technical Approval of the German Institute for Building Technology
Z-65.50-415

Solenoid valve Vakumat

Vakumat is installed in the suction line of oil fired systems as per DIN 4755 between the fuel oil tank and the burner if the burner is located below the upper edge of the tank. Vakumat keeps fuel oil from being siphoned out of the tank in the case of leaks in the suction line. Suitable for fuel oil EL (DIN 51603-1)

Vakumat safeguards suction lines at full throughput regardless of height differences between the highest and lowest points of the suction line. The solenoid valve only opens when the burner is in operation. When the burner is off, the valve shuts off the pipe. TÜV-tested.

Function: Closed when de-energised

Pressure: -0.9/+4 bar

Operating temperature range
Medium: 0/90 °C
Ambient: Max. 55° C

Valve housing: Brass

Supply voltage: AC 230 V

Power input: 14 VA/8 W

Degree of protection: IP 65 (EN 60529)

Mounting position: Solenoid upright

Connection: G⅜ or G½

Flow coefficient
G½: 3.5 m³/h
G⅜: 1.8 m³/h

i

It is recommend to install a pressure compensation unit DAE (see page 131) in the line section between the solenoid valve and the burner to compensate for increased pressure caused by higher temperatures.

DG: G			Part no.	Price €
Diaphragm type anti-siphon valve MAV	1	-	**20139**	
Solenoid valve Vakumat G⅜	1	-	**20143**	
Solenoid valve Vakumat G½	1	-	**20144**	
Screw connections with Cu flat gasket G⅜ x 6 (dual)	1	-	**20507**	
Screw connections with Cu flat gasket G⅜ x 8 (dual)	1	-	**20504**	
Screw connections with Cu flat gasket G⅜ x 10 (dual)	1	-	**20505**	
Screw connections with Cu flat gasket G⅜ x 12 (dual)	1	-	**20506**	

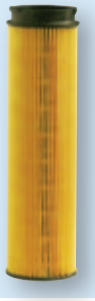
Comparison of fuel oil filters

Paper filters

- Optimum ultra-fine filtration
- Specially for small and very small burner capacities
- Preferably for single-line mode

Opticlean MC-7 ultra-fine filter
Optimum filter surface due to folded paper filter.

Mesh size: 5–20 µm
Filter surface: 700 cm²



Opticlean MC-18 ultra-fine filter
Optimum filter effectiveness and long service life.

Mesh size: 5–20 µm
Filter surface: 1850 cm²

Can be used with long filter cup.

Replaceable filter cartridge
Excellent filtration. Also suitable for pressure mode and temperatures of up to 80 °C.

Mesh size: 12–30 µm
Filter surface: 967 cm²

Can be used for all AFRISO filter types with additional adapter.

Sintered plastic sieves

- Excellent filtration.
- For small and medium burner capacities.
- Suitable for single- and dual-line modes.

Sintered plastic sieve, short
Star shape for large filter surface.

Mesh size: 50 µm
(colour code yellow)
Filter surface: 115 cm²

Sintered plastic sieve, long
Excellent filtration and long service life.

Mesh size: 35 µm
(colour code white)
Filter surface: 200 cm²

Can be used with long filter cup, preferably for single-line mode.

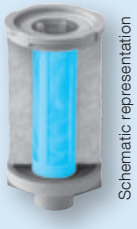
Filter cup, long
Extra long filter cup provides for sedimentation volume and space for all standard, long filter inserts.

Felt and stainless steel sieves

- Proven filtration technology

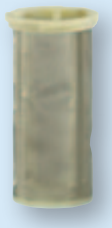
Felt sieve
Excellent filtration. Suitable for medium and high burner capacities. Suitable for single- and dual-line mode.

Mesh size: 50–75 µm



Tubular sieve
Filter surface 15.3 cm² below the felt rings.

Disadvantage: Filter fibres may come loose and get into the burner nozzles.

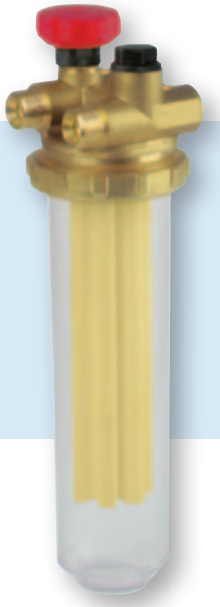


Stainless steel sieve
Good filtration, pollution visible. For medium and high burner capacities. Suitable for single- and dual-line mode.

Mesh size: 100 µm,
Filter surface: 48 cm²
Disadvantage: Air may collect in the filter cup.

6

Fuel oil filters Optimum/Opticlean



- **Complete range of filters – the right filter for each application**
- **Version Optimum with extra long filter cup as a sedimentation chamber for dirt particles Opticlean for ultra-fine filtration at very small burner capacities**
- **TÜV-tested**

OptiClean paper filter with outstanding filtration quality and long service life.

Application

For single-line and dual-line systems as well as single-line systems with return line. Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME.

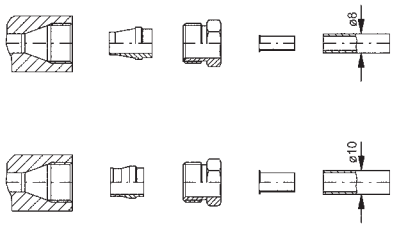
Description

Fuel oil filter with brass filter housing and filter cup made of transparent, impact-resistant plastic. All filters have a shut-off valve in the supply line. Filters with G⅜ connection thread are delivered with universal compression fittings for pipes with 8 and 10 mm outside diameters. Optimum + Opticlean ensure optimum protection of the burner nozzle and excel with a long service life. All AFRISO fuel oil filters are TÜV-tested and have the Ü label. Replaceable filter inserts as paper, stainless steel, felt or sintered plastic sieves with standard bayonet connection are available for all versions.

Versions

- **Dual-line filters** are equipped with a check valve in the return line.
- **Single-line filters** with return line are equipped with a vent valve with hose connector.
- **Optimum** with extra long filter cup as sedimentation chamber for dirt particles. Long, star-shaped, yellow sintered plastic filter insert with mesh size 50 µm.
- **Paper filter Opticlean** with a mesh size of 5–20 µm for ultra-fine filtration. Specially for very small burner capacities. Paper filter MC-18 with maximum filtration quality (filter surface 1850 cm²) and long filter service life.

Universal screw connections for pipes with outside diameters of 8/10 mm are included with filters with G⅜ connection.



DG: G			Part no.	Price €
Dual-line filter Z Optimum	1	20	**20413**	
Single-line filter R Optimum (return)	1	20	**20276**	
Single-line filter V Optimum	1	20	**20284**	
Dual-line filter Z ½ – Optimum	1	20	**20411**	
Single-line filter V ½ – Optimum	1	20	**20285**	
Sintered plastic sieve Optimum 50 µm yellow	1	10	**20053**	
Sintered plastic sieve Optimum 35 µm white	1	10	**20049**	
Service box Optimum in cardboard box, 4 x sealing rings each and part no. 20053, 20258	1	-	**20260**	
Opticlean MC-18 ultra-fine filter 5–20 µm, long	1	120	**20318**	
Plastic filter cup Optimum	1	-	**20258**	
Universal screw connections 8+10 mm	1	-	**20685**	
Universal screw connections 8+10+12 mm	1	-	**20409**	

Single-line/dual-line filters for fuel oil

Z 500 Si/Fi/St

Application

For dual-line systems as well as single-line systems with return line. Suitable for fuel oil EL (DIN 51603-1) and diesel fuel (EN 590).

Description

Dual-line filter with brass filter housing and filter cup made of transparent, impact-resistant plastic. With check valve in the return line and shut-off valve in the supply line. Filters with ⅜ connection thread are delivered with universal compression fittings for pipes with 8 and 10 mm outside diameters. Registration number 2Y107/08

R 500 Si/Fi/St

For single-line systems with return line. Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME.

Single-line filter with brass filter housing and filter cup made of transparent, impact-resistant plastic. With shut-off valve in the supply line as well as vent valve with hose connector. Scope of delivery includes universal compression fittings for pipes with 8 and 10 mm outside diameters. Registration number 2Y106/08

V 500 Si/Fi/St

For single-line systems. Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME.

Single-line filter with brass filter housing and filter cup made of transparent, impact-resistant plastic. With shut-off valve in the supply line. Scope of delivery includes universal compression fittings for pipes with 8 and 10 mm outside diameters. Registration number 2Y103/08

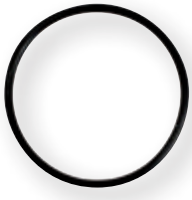
6

DG: G	Connection		Universal screw connection	Filters	*Oil throughput Δp = 100 mbar			Part no.	**Price €**
	Tank	Burner							
Dual-line filter Z 500 Si	2 x G⅜ female	2 x G⅜ male	2 x 8/10	Sintered plastic	200 l/h	1	25	**20429**	
Dual-line filter Z 500 Fi	2 x G⅜ female	2 x G⅜ male	2 x 8/10	Felt	200 l/h	1	25	**20428**	
Dual-line filter Z 500 St	2 x G⅜ female	2 x G⅜ male	2 x 8/10	Steel	220 l/h	1	25	**20425**	
Single-line filter R 500 Si (return)	1 x G⅜ female	2 x G⅜ male	1 x 8/10	Sintered plastic	210 l/h	1	25	**20281**	
Single-line filter R 500 Fi (return)	1 x G⅜ female	2 x G⅜ male	1 x 8/10	Felt	240 l/h	1	25	**20282**	
Single-line filter R 500 St (return)	1 x G⅜ female	2 x G⅜ male	1 x 8/10	Steel	250 l/h	1	25	**20283**	
Single-line filter V 500 Si	1 x G⅜ female	1 x G⅜ male	1 x 8/10	Sintered plastic	250 l/h	1	25	**20292**	
Single-line filter V 500 Fi	1 x G⅜ female	1 x G⅜ male	1 x 8/10	Felt	290 l/h	1	25	**20293**	
Single-line filter V 500 St	1 x G⅜ female	1 x G⅜ male	1 x 8/10	Steel	320 l/h	1	25	**20294**	
Dual-line filter Z ½-500 Si	2 x G½ female	2 x G½ female	---	Sintered plastic	310 l/h	1	25	20480	
Dual-line filter Z ½-500 Fi	2 x G½ female	2 x G½ female	---	Felt	400 l/h	1	25	20481	
Dual-line filter Z ½-500 St	2 x G½ female	2 x G½ female	---	Steel	500 l/h	1	25	20482	
Single-line filter V ½-500 Si	1 x G½ female	1 x G½ female	---	Sintered plastic	390 l/h	1	25	20485	
Single-line filter V ½-500 Fi	1 x G1½ female	1 x G½ female	---	Felt	470 l/h	1	25	20486	
Single-line filter V ½-500 St	1 x G½ female	1 x G½ female	---	Steel	560 l/h	1	25	20487	

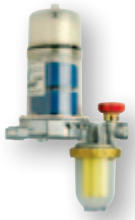
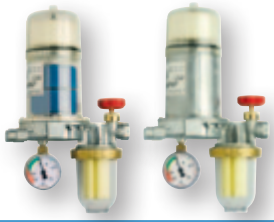
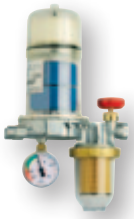
* At filter insert pollution degree of 50 %

Spare parts for filters

DG: G

Version	Description			Part no.	Price €
	Opticlean MC-7 Ultra-fine filter 5–20 µm, short	1	240	**20319**	
	Opticlean MC-18 Ultra-fine filter 5–20 µm, long	1	120	**20318**	
	Sintered plastic sieve short, 50–70 µm yellow Box of 25 pieces	-	25	**20038**	
	Sintered plastic sieve short, 50–70 µm yellow Box of 100 pieces	-	100	**20045**	
	Sintered plastic sieve long, 50–70 µm yellow	1	-	**20053**	
	Sintered plastic sieve short, 35 µm white Box of 25 pieces	-	25	**20035**	
	Sintered plastic sieve short, 35 µm white Box of 250 pieces	-	250	**20027**	
	Sintered plastic sieve long, 35 µm white	1	-	**20049**	
	Felt sieve Box of 25 pieces	-	25	**20031**	
	Felt sieve Individually packed in re-sealable bag, in box of 100 pieces	-	100	**20034**	
	Stainless steel sieve 100 µm	1	250	**20032**	
	Filter cup short Plastic, for suction mode	1	-	**20254**	
	Filter cup long Plastic, for suction mode	1	-	**20258**	
	Filter cup (without union nut) Brass, for pressure mode	1	-	**20261**	
	**O ring** For filter cup	-	10	**20422**	

Automatic fuel oil de-aerator comparison

	Automatic fuel oil de-aerators		Automatic fuel oil de-aerators with filter		
					
Version	Flow-Control 3/K-1	Flow-Control 3/M	FloCo-TOP-1K/1M	FloCo-TOP-1KM/MM	FloCo-TOP-1KM Optimum MC
Catalogue page	See page 140.	See page 141.	See page 142.	See page 143.	See page 144.
Application area	Single-line systems with return line				
Media	▪ Fuel oil EL ▪ Diesel fuel ▪ Biofuel or biodiesel with up to 20 % FAME	▪ Fuel oil EL ▪ Diesel fuel ▪ Biofuel or biodiesel with up to 100 % FAME ▪ Vegetable oils (colza oil)	▪ Fuel oil EL ▪ Diesel fuel ▪ Biofuel or biodiesel with up to 20 % FAME	▪ Fuel oil EL ▪ Diesel fuel ▪ Biofuel or biodiesel with up to 20 % FAME (FloCo-TOP-1MM up to 100 % FAME)	▪ Fuel oil EL ▪ Diesel fuel ▪ Biofuel or biodiesel with up to 20 % FAME
Function	Continuous de-aeration		Continuous de-aeration and oil filtration		
Filters	-	-	Sintered plastic filter	Sintered plastic filter or replaceable fine filter cartridge	Opticlean ultra-fine filter
Vacuum gauge	-	-	-	-0.7/+0.9 bar	-0.7/+0.9 bar

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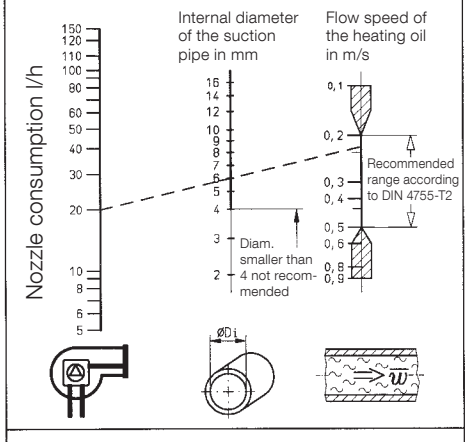
Our tip
Only installation by expert companies ensures optimum operation of the automatic de-aerators. For optimum combustion, longer nozzle and filter service life and reliable function, the expert determines the following prior to installation and compares the values with the nomograph:

- Oil throughput per hour at burner nozzle
- Inside diameter of the (installed) oil suction line
- Vacuum (overpressure) in the oil carrying pipe upstream of the burner

The oil suction line is often too large. The flow rates of 0.2/0.5 m/s, required according to DIN 4755-2, are often not reached in systems converted from dual-line to single-line mode. The nomograph shows the proper values for sizing the suction line.

Nomograph for determining the internal pipe diameter (NW) of the heating oil suction pipe in order to prevent gas from accumulating in higher pipe sections and sections with downward gradients, or gas formation resulting from high flow speeds.



Example: A pipe with a diameter of 8 x 1 mm (NW6) is required for a volume of 20 l/h and an average flow rate of approx. 0.23 m/s.

Automatic fuel oil de-aerator Flow-Control 3/K-1 TÜV-tested

- **Automatic operation eliminates malfunctions**
- **No unnoticed leakage in the return line**
- **Considerably increased fuel oil filter service life – the amount of oil drawn from the tank corresponds exactly to the oil burnt**
- **The suction line can usually have a smaller diameter**

"PROOFED BARRIER" if installed with vent hose

6

Application

For single-line systems with return line in oil fired systems for continuous de-aeration. Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME.
The danger of a leak in the return line going unnoticed is removed with Flow-Control. It is no longer necessary to regularly check the return line for leaks.

Description

Automatic fuel oil de-aerator consisting of a diecast zinc housing with female G¼ connection thread at the tank end and male G⅜ connection threads with 60° cone at the burner end for connection of the burner hoses. De-aerator hood made of transparent plastic. An oil hose with ball-shaped sealing for 60° cone and a G⅜ union nut is supplied for connection to the fuel oil filter. All Flow-Control versions are TÜV-tested.

Flow-Control 3/K-1 with G¼ female thread at burner end instead of G⅜ male thread.

Technical specifications

Burner connection
G⅜ male with 60° cone for burner hose or G¼ female (part no. 69978)

Tank connection
G¼ female and oil hose G¼male x G3/8 union nut for connection to filter

Nozzle capacity
Max. 100 l/h

Return flow
Max. 120 l/h

Separating capacity air/gas
Approx. 4 l/h

Mounting position
Float housing vertical to the top

Operating temperature range
Medium: Max. 60 °C
Ambient: Max. 60 °C

Operating overpressure
Max. 0.7 bar
corresponds to static oil column of approx. 8 m.

Test pressure
6 bar

Dimensions
W x H x D: 95 x 150 x 95 mm

Test
TÜV-tested (V132 2007 V1)

i

The devices must not be subjected to undiluted additives, alcohol and acids.

DG: G			Part no.	**Price €**
Flow-Control 3/K-1	1	25	**69930**	
Flow-Control 3/K-1 (G¼)	1	25	69978	

Automatic fuel oil de-aerator Flow-Control 3/M TÜV-tested

- 2 separate float chambers for increased system safety
- Automatic operation eliminates malfunctions
- No unnoticed leakage in the return line
- Considerably increased fuel oil filter service life – the amount of filtered oil drawn from the tank corresponds exactly to the oil burnt

"PROOFED BARRIER" if installed with vent hose

Application

For single-line systems with return line in oil fired systems for continuous de-aeration. Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with up to 100 % FAME as well as vegetable oils (colza oil). Flow Control 3/M is recommended for mounting below the max. fuel oil level in the tank and for any application requiring particular safety.

Description

Automatic fuel oil de-aerator consisting of a diecast zinc housing with female G¼ connection thread at the tank end and male G⅜ connection threads with 60° cone at the burner end for connection of the burner hoses. An oil hose with ball-shaped sealing for 60° cone and a G⅜ union nut is supplied for connection to the fuel oil filter. Flow-Control 3/M is equipped with two separate float chambers. The first one consists of a metal de-aerator hood with operating and de-aerating float. The second one is a transparent plastic safety float chamber. It keeps oil foam from escaping via the vent opening (e.g. during commissioning/filter exchange) and indicates malfunctions of the vent valve. The danger of a leak in the return line going unnoticed is removed with the single-line system. It is no longer necessary to regularly check the return line for leaks. Also suitable for pressure mode up to 0.7 bar.

Technical specifications

Burner connection
G⅜ male with 60° cone for burner hose or G¼ female (part no. 70014)

Tank connection
G¼ female and oil hose G¼ male x G⅜ union nut for connection to filter

Nozzle capacity
Max. 100 l/h

Return flow
Max. 120 l/h

Separating capacity air/gas
Approx. 4 l/h

Mounting position
Float housing vertical to the top

Operating temperature range
Medium: Max. 60 °C (80 °C)
Ambient: Max. 60 °C

Operating overpressure
Max. 0.7 bar
(corresponds to static oil column of approx. 8 m)

Test pressure
6 bar

Dimensions
W x H x D: 95 x 200 x 95 mm

Tested
TÜV-tested (V132 2007 V1)

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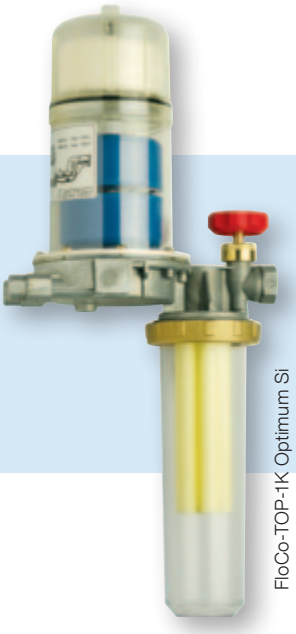
The devices must not be subjected to undiluted additives, alcohol and acids.

DG: G			Part no.	**Price €**
Flow-Control 3/M	1	25	**69929**	
Flow-Control 3/M (G¼)	1	25	70014	

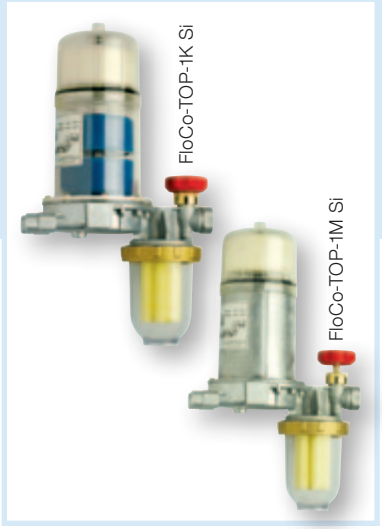
Automatic fuel oil de-aerator FloCo-TOP-1K/1M TÜV-tested



- **Fuel oil de-aerator, filter and shut-off valve in a single, compact unit**
- **Safety system keeps oil foam from escaping**
- **Safety version with metal hood for universal application**

A Page 145

A Page 138



Application

For single-line systems with return line in oil fired systems.
For continuous de-aeration.
Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME. Version with metal de-aerator hood also for biofuel and biodiesel up to 100 % FAME.

Description

Automatic fuel oil de-aerator, safety version, with integrated filter and shut-off valve. Metal housing with G⅜ connection thread at the tank end and male G⅜ connection threads at the burner end with female cone to connect the burner hoses. Plastic or metal de-aerator hood. With additional transparent hood and safety float to keep oil foam from escaping via the vent opening. In addition, it is possible to detect malfunctions in the de-aeration system.

Technical specifications

Burner connection
G⅜ male with 60° cone for burner hoses

Tank connection
G⅜ female

Nozzle capacity
Max. 100 l/h

Return flow
Max. 120 l/h

Separating capacity air/gas
Approx. 4 l/h

Mounting position
Float housing vertical to the top

Operating temperature range
Medium: Max. 60 °C
Ambient: Max. 60 °C

Operating overpressure
Max. 0.7 bar
corresponds to static oil column of approx. 8 m

Test pressure
6 bar

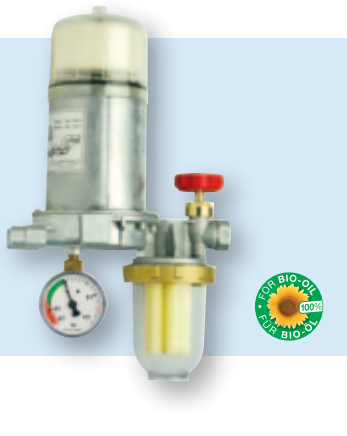
Dimensions
FloCo-Top-1K/1M
W x H x D: 165 x 272 x 95 mm

FloCo-Top-1K/1M Optimum
W x H x D: 165 x 366 x 95 mm

Test
TÜV-tested (S 8 2009V3)

DG: G	De-aerator hood	Filters	Filter cup	Part no.	**Price €**
FloCo-TOP-1K Si	Plastic	Sintered plastic sieve short, 50 µm	Short	**69960**	
FloCo-TOP-1M Si	Metal	Sintered plastic sieve short, 50 µm	Short	**69959**	
FloCo-TOP-1K Optimum Si	Plastic	Sintered plastic sieve long, 50 µm	Long	**69997**	
FloCo-TOP-1M Optimum Si	Metal	Sintered plastic sieve long, 50 µm	Long	**69957**	

Automatic fuel oil de-aerators with integrated filter and vacuum gauge



Application

For single-line systems with return line in oil fired systems for continuous de-aeration. Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME. FloCo-TOP-MM up to 100 % FAME.

Description

FloCo-TOP-1KM Si

Automatic fuel oil de-aerator, safety version, with integrated filter and shut-off valve and vacuum gauge for indication of filter pollution or a possible static inlet pressure. The shut-off valve can be closed to check the suction capacity of the burner pump. Metal housing with G⅜ connection thread at the tank end and male G⅜ connection threads at the burner end with female cone to connect the burner hoses. De-aerator hood made of transparent plastic. With additional transparent hood and safety float.

FloCo-TOP-1KM WF

Automatic fuel oil de-aerator, safety version, with integrated fine filter cartridge and shut-off valve and vacuum gauge for indication of filter pollution or a possible static inlet pressure. The shut-off valve can be closed to check the suction capacity of the burner pump. The replacement system fine filter cartridge is especially suited for smaller burner capacities due to the large filter surface (967 cm^2) and small mesh size (12–30 µm). Metal housing with G⅜ connection thread at the tank end and male G⅜ connection threads at the burner end with female cone to connect the burner hoses. De-aerator hood made of transparent plastic. With additional transparent hood and safety float.

FloCo-TOP-1MM Si

Automatic fuel oil de-aerator, safety version, with integrated filter and shut-off valve and vacuum gauge for indication of filter pollution or a possible static inlet pressure. The shut-off valve can be closed to check the suction capacity of the burner pump. Metal housing with G⅜ connection thread at the tank end and male G⅜ connection threads at the burner end with female cone at the burner end to connect the burner hoses. Metal de-aerator hood. With additional transparent hood and safety float.

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DG: G	De-aerator hood	Insert	Filter cup	Pressure gauges	Part no.	**Price €**
FloCo-TOP-1KM Si	Plastic	Sintered plastic sieve short, 50 µm	Short	-0.7/+0.9 bar	**69980**	
FloCo-TOP-1KM WF	Plastic	Fine filter cartridge, 12-30 µm	-	-0.7/+0.9 bar	**69999**	
FloCo-TOP-1MM Si	Metal	Sintered plastic sieve short, 50 µm	Short	-0.7/+0.9 bar	**70013**	
Spare parts						
Vacuum gauge				-0.7/+0.9 bar	**70030**	
Spare replacement system fine filter cartridge					**70010**	

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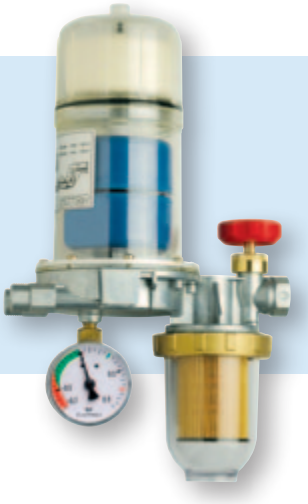
Technical specifications see page 142.
See page 145 for accessories.

Automatic fuel oil de-aerator FloCo-TOP-1KM Optimum



- **Fuel oil de-aerator, filter and shut-off valve in a single, compact unit.**
- **Opticlean ultra-fine filter for maximum degree of filtration of dirt particles**
- **Safety system keeps oil foam from escaping**
- **"PROOFED BARRIER" if installed with vent hose**

6

Application

For single-line systems with return line in oil fired systems. For continuous de-aeration. Suitable for the following media: fuel oil EL (DIN 51603-1) and diesel fuel (EN 590) as well as biofuel (EN 14213) and biodiesel (EN 14214) with max. 20 % FAME.

Description

Automatic fuel oil de-aerator, safety version, with integrated Opticlean ultra-fine filter insert, shut-off valve and vacuum gauge (-0.7/+0.9 bar) for indication of filter pollution or a possible static inlet pressure. Metal housing with G⅜ connection thread at the tank end and male G⅜ connection threads at the burner end with female cone at the burner end to connect the burner hoses. De-aerator hood made of transparent plastic. With additional transparent hood and safety float to keep oil foam from escaping via the vent opening. In addition, it is possible to detect malfunctions in the de-aeration system.

Opticlean ultra-fine filters

Opticlean MC-7 (short)

Opticlean MC-18 (long)

New low-energy houses as well as existing buildings with optimised heat insulation require burners with minimum oil throughput. Proper operation of, for example, oil fired condensing systems presupposes high-grade fuels and correct filtration technologies. The filter surface of Opticlean ultra-fine filters is up to 37 times greater than that of conventional filter inserts; they excel with an extremely high degree of filtration. Filter fineness of nominal 5 µm (absolute 20 µm) separation are possible. Even the smallest drops of water and emulsion are retained with high reliability. Opticlean filter cartridges can be used in any standard fuel oil filter, they are metal-free and can be recycled in an environmentally protective way.

DG: G			Part no.	**Price €**
FloCo-TOP-1KM Optimum MC-7	1	-	**70005**	
FloCo-TOP-1KM Optimum MC-18	1	-	**70008**	
Opticlean MC-7 ultra-fine filter 5–20 µm, short	1	240	**20319**	
Opticlean MC-18 ultra-fine filter 5–20 µm, long	1	120	**20318**	

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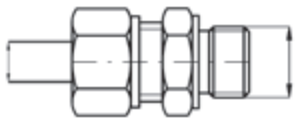
Technical specifications see page 142.
See page 145 for accessories.

Accessories for fuel oil de-aerators/ oil filters

Screw connections

Description For installation in the oil pipe. See ordering table for versions. Use cylindrical screw connections with flat gaskets at the tank end.



Screw connection

Vacuum gauge

Description For indication of the filter condition. Available for direct mounting to standard fuel oil filters. G⅜ union nut at filter end, G⅜ male thread with sealing cone 60° at burner end for burner hose. Or with G⅜ female thread x G⅜ male thread for mounting to filter with G⅜ female thread at tank end.

Vacuum gauge

Replaceable filter adapter

Description The replaceable fine filter cartridge can be fitted to all AFRISO filter types (except Z ½-500 and V ½-500) by means of an adapter and can then be operated both in pressure and suction mode.

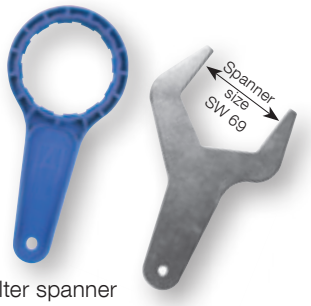
Replaceable filter adapter

Oil filter spanner

Description To loosen the union nut of the filter cup and the replacement system fine filter cartridge of automatic fuel oil de-aerators and fuel oil filters

Open end spanner

Description For easy and fast operation of the replaceable filter adapter.



Oil filter spanner

Open end spanner

Hand-held suction pump for fuel oil

Description For commissioning and after faults in the suction line system. With check valve/vent valve.

Hand-held suction pump for fuel oil

DG: G			Part no.	**Price €**
Screw connection G⅜ x 6 mm	1	-	**20509**	
Screw connection G⅜ x 8 mm	1	-	**20508**	
Screw connection G⅜ x 10 mm	1	-	**20510**	
Screw connection G⅜ x 12 mm	1	-	**20512**	
Vacuum gauge G⅜ with 60° cone, -0.7/+0.9 bar	1	-	**20400**	
Vacuum gauge G⅜ female / G⅜ male, -0.7/+0.9 bar	1	-	**20404**	
Hand-held suction pump for fuel oil	1	-	**70050**	
Connection hose for hand-held suction pump	1	-	**70055**	
Replaceable filter adapter	1	10	**70020**	
Open end spanner for replaceable filter adapter	1	-	**70065**	
Oil filter spanner	1	25	**70060**	

Pump assemblies
for heating and solar
thermal systems

Boiler safety group
assemblies

Safety equipment
for heating systems

Boiler room vent

CHAPTER 7

Equipment for heating systems, boiler rooms and chimneys

OVERVIEW

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Draft stabiliser WZB-1 151

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ACCESSORIES

Boiler filling and drain valves KFE, filling fittings FA, FAM 166

Equipment for safe operation of heating systems

AFRISO offers a broad range of products for the safe operation of heating systems. Irrespective of whether the heating system uses renewable energy or fossil fuels.

Anti-siphon valves, withdrawal systems, level sensors, leak detectors, tank room linings and overfill prevention systems increase the safety of fuel oil storage facilities. Boiler safety group assemblies, solar and heating pump assemblies, connection assemblies for expansion vessels, anti-tamper cap valves, boiler safety group assemblies, diaphragm safety valves, control thermostats, thermal safety valves and boiler water low level alarms are provided as equipment for heating systems.

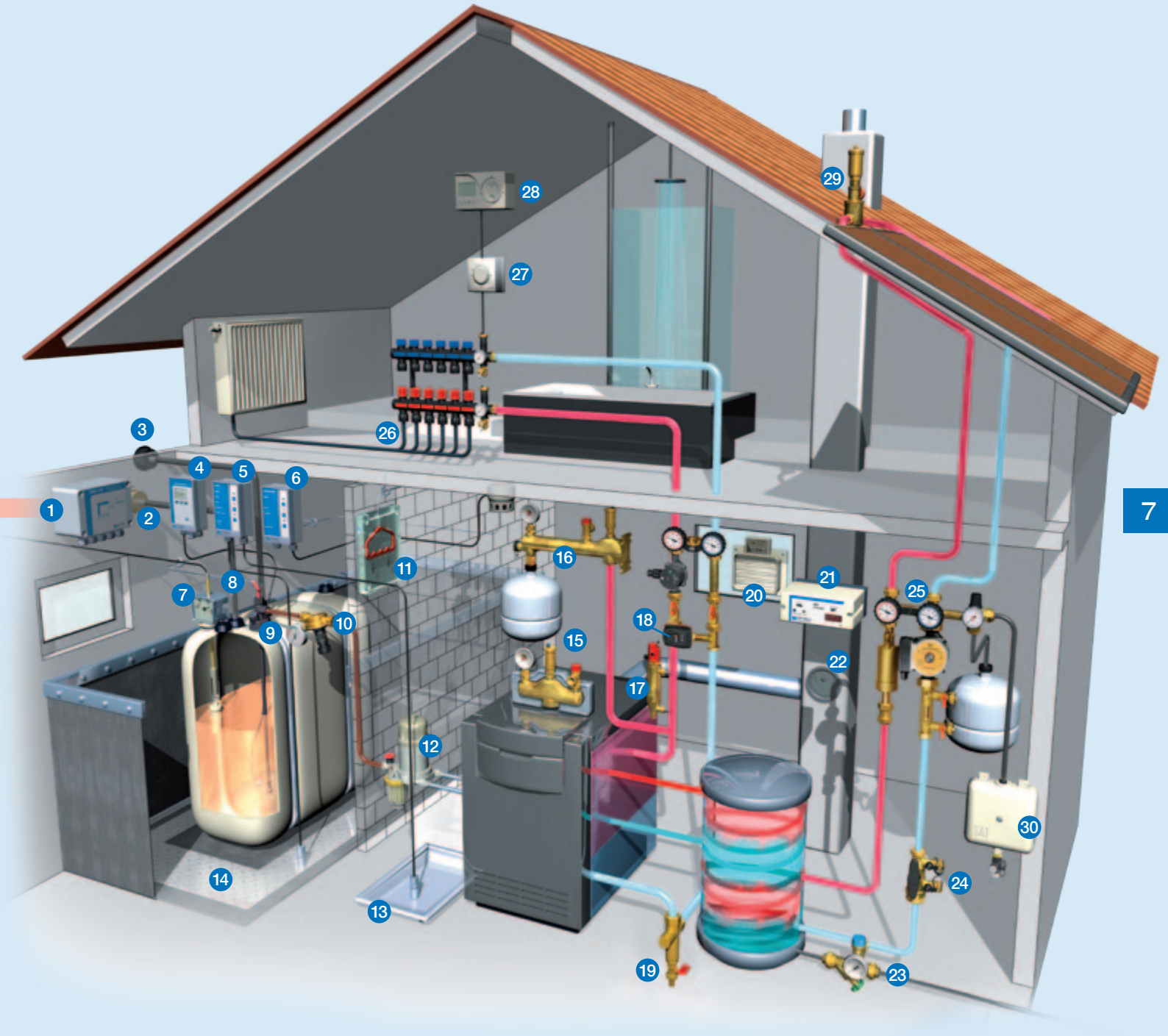
AFRISO products in a heating system with oil burner and solar thermal system

Outside of the storage and boiler rooms

1. Event reporting systems EMS
2. Level sensor filler cap
3. Vent cap
4. Digital level indicator TankControl TankControl
5. Oil/water alarm unit ÖWWG 3
6. Gas and smoke detector GRM
11. Pull cord

In the storage room

7. Tank contents gauge MT-Profil
8. Level sensor GWG
9. Withdrawal system Euroflex
10. Piston type anti-siphon valve KAV
14. Tank room lining



In the boiler room

12 Automatic fuel oil de-aerator FloCo-TOP series
13 Drip pan
15 Boiler safety group assembly KSG
16 Connection assembly for expansion vessel GAK
17 Boiler water low level alarm WMS-WP6
18 Heating pump assembly PrimoTherm®
19 Flow filter
20 Boiler room vent Air-Control
22 Draft stabiliser WZB-1
23 Boiler safety group assembly

Solar

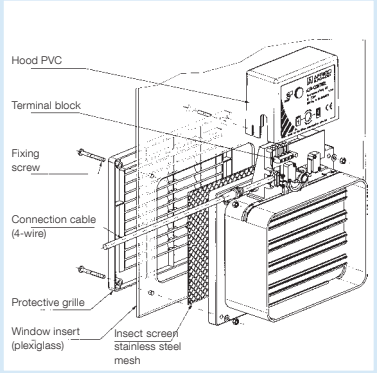
21 Solar controller
24 Filling and flushing unit
25 Solar pump assembly PrimoSol®
29 Air separator solar
30 Collector tank for solar liquid

In the living area

26 Manifold for underfloor heating systems and radiators
27 Room thermostat
28 Thermostat with timer

Motorised boiler room vent Air-Control

- **Saves heating costs, is reliable and silent**
- **System or room cannot cool down**
- **Sturdy, impact-resistant plastic**
- **Complete with accessories for easy installation**



Application

Suitable for installation in basement windows or ventilation ducts for burner-controlled oxygen supply of boiler rooms with oil and gas fired burners of up to 50 kW. System or room cannot cool down.

Description

Burner-controlled motorised boiler room vent, consisting of a robust, impact-resistant plastic housing with injection-moulded mounting flange, a mating flange with a protective grille and a gear motor for actuating the slide. Can also be operated manually; with function indication.
Boiler rooms which are equipped with oil or gas fired burners must be supplied with a sufficient amount of oxygen (e.g. in accordance with the German FeuVo). This is often achieved by constantly open boiler room windows or by air ducts. The cold air which constantly flows into the boiler room causes the boiler and the water supply as well as the pipes to cool down. As a result, the burner is switched on more frequently and consumes unnecessarily high amounts of fuel.
The boiler room window pane (or part of it) is removed and replaced with an acrylic panel with pre-cut openings for Air-Control. The panel is cut to size and then fitted into the frame. Air-Control is mounted onto the pane and is electrically connected to the boiler thermostat. Air-Control can also be mounted onto air ducts. The window remains closed and keeps the warmth inside. As soon as the boiler temperature drops, the boiler thermostat switches on Air-Control. Opening the vent activates a microswitch which closes the burner circuit. The burner starts to operate only when Air-Control is open and is supplied with pre-warmed room air in the ignition phase. The boiler room vent remains open during the entire combustion process and provides the boiler room with enough fresh air. The burner switches off when the preset temperature is reached. Air-Control closes automatically.

Technical specifications

Housing
Plastic (ABS)
W x H x D: 260 x 300 x 115 mm
Weight 1.0 kg
Degree of protection IP 20 (EN 60529)

Installation opening
216 x 166 mm

Cross section fresh air supply
150 cm^2

Supply voltage
AC 230 V

Contact rating
AC 250 V, 2 A

Burner capacity
Max. 50 kW. For larger installations, several Air-Control units can be installed.

Test
DVGW reg. no.: DG-4609AO0753

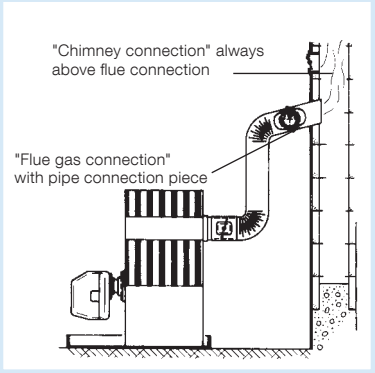
Options

- Acrylic glass window pane for cost-effective installation of Air-Control, with openings cut to size
  W x H: 500 x 500 mm

DG: G			Part no.	Price €
Air-Control	1	5	**69964**	
Acrylic glass window pane	1	5	**69961**	

Draft stabiliser WZB-1

- **Saves heating costs, optimises combustion and keeps the chimney draft constant**
- **Stabilises the chimney draft**
- **For oil, gas or solid fuel systems**



Application

The draft stabiliser for oil, gas or solid fuel systems keeps chimney draft constant and the chimney dry. Suitable for connection to flue gas pipes with Ø 120 to 200 mm by means of pipe connection pieces or to brickwork chimneys or chimneys with several walls by means of special connection pieces. Draft stabiliser made of galvanised sheet steel with flap. The flap is set by means of a rotary knob acting on a weight for precise adjustment. Depending on the adjustment of the weight, the flap admits more or less secondary air into the chimney when the vacuum gets too high.

Description

The natural chimney draft is approx. 20 to 50 Pa, depending on the height and the cross section of the chimney as well as the weather conditions. These values increase when the temperature increases. The draft stabiliser allows for setting the vacuum required by the manufacturer of the heating system (oil or gas burner/boiler combination, oil or gas furnace, etc.) and keeps this vacuum almost constant. Correct chimney draft is a prerequisite for an optimum combustion process and contributes to a reduction in heating costs.

The draft stabiliser performs the following functions:
- It limits the vacuum to the required value.
- It keeps the chimney dry and prevents soot deposits.

Technical specifications

Adjustment range (draft requirements):
10/26 Pa

Application area
Heights of up to 20 m and chimney group I/II up to 400 cm^2, chimney group III up to 500 cm^2

Operating temperature range
Flue gas: Max. 400 °C

Mounting position
Flap axis horizontal
Flap vertical

Tightness at Δp 10 Pa
< 3 m^3/h

DG: G			Part no.	**Price €**
Draft stabiliser WZB-1	1	10	**69760**	
WZB-1 with chimney sleeve	1	10	**69768**	
Mounting sleeves				
Chimney sleeve for WZB-1	1	-	**69761**	
Pipe connection piece Ø 120/130 mm	1	-	**69762**	
Pipe connection piece Ø 150/160 mm	1	-	**69764**	
Pipe connection piece Ø 180 mm	1	-	**69765**	
Pipe connection piece Ø 200 mm	1	-	**69766**	

Boiler water low level alarm WMS-WP6 – mechanical

- For protection of the boiler when the water level is too low
- TÜV-tested as a water level switch.
- Direct mounting via welding socket or connection thread
- With test button for function check

Application

For sealed heating systems to protect the boiler as per EN 12828 in the case of low water levels. Also suitable for protection against overheating of the heating circuit water as a result of insufficient flow.

Description

Mechanical boiler water low level alarm with float. Consisting of a cast brass body with welding sockets and a float mechanism, an electrical switch, test and unlock buttons. TÜV-tested as a water level switch. If the water level in the boiler drops below a minimum level, a float activates a switch. The power supply to the boiler is interrupted. A locking mechanism keeps the burner from switching back on automatically. The test button allows the float to be lowered to simulate a low water alarm condition.

Version WMS-WP6-R2 with male connection thread R2 for direct installation in the boiler.

7

Technical specifications

Operating temperature range
Medium: Max. 120 °C
Ambient: Max. 120 °C

Housing
Cast brass
Height: 358 mm
Degree of protection: IP 54 (EN 60529)

Float
Plastic

Connection
Welding socket DN 20
or male thread R2

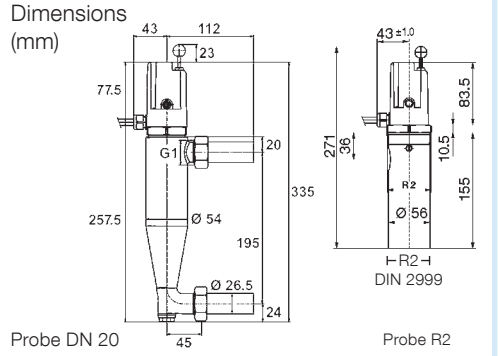
Operating pressure
Max. 10 bar

Test pressure
15 bar

Contact rating
AC 250 V, 6 (2) A

TÜV test mark
TÜV.HWB.07-232

Dimensions (mm)



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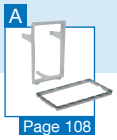
According to EN 12828, sealed heating systems with capacities of more than 300 kW must be equipped with a TÜV-tested boiler water low level alarm.

DG: G			Part no.	Price €
WMS-WP6 with welding socket DN 20	1	15	42300	
WMS-WP6 without locking, with welding socket DN 20	1	15	42305	
WMS-WP6-R2 with connection thread R2 male	1	-	42319	
Spare parts				
Upper part WMS-WP6 with locking	1	-	42310	
Upper part WMS-WP6 without locking	1	-	42311	
Probe body for WMS-WP6	1	-	42368	

Boiler water low level alarm WMS 2-1/3-1 – electronic

- For protection of the boiler when the water level is too low
- Electronic version with visual alarm and power failure lock
- TÜV-tested as a water level switch
- Direct mounting via welding socket



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Application

For sealed heating systems to protect the boiler as per EN 12828 and VdTÜV sheet "Water Level 100" (edition 07, 2006) in the case of low water levels. Also suitable for protection against overheating of the heating circuit water as a result of insufficient flow.

Description

This self-monitoring electronic boiler water low level alarm with integrated power failure lock operates on the basis of the conductivity principle (resonant circuit). Consisting of control unit in wall mounting housing with test and unlock buttons, visual alarm, angled probe with welding sockets, electrode and electrode test facility. TÜV-tested as a water level switch.
If the water level in the boiler drops below a minimum level, the electrode is no longer submerged. The electronic system de-energises a relay which switches off the power supply for the burner and activates the alarm lamp. The electrical locking mechanism keeps the burner from switching back on automatically. The test button allows you to simulate a low water alarm condition.

Version WMS 3-1 for external power failure locking.

Technical specifications

Operating temperature range
Medium: Max. 120 °C
Ambient: 0/55 °C

Supply voltage
AC 230 V

Switching output
Relay contact: 1 x changeover contact
Contact rating: AC 250 V, 2 A

Housing control unit
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

Housing probe
Probe body: Cast brass
Housing: Thermoplast GV
Electrode rod: Stainless steel 1.4571
Degree of protection: IP 54 (EN 60529)

Probe cable
H0 5 RN-F 2 x 1 mm²;
length: 1.5 m

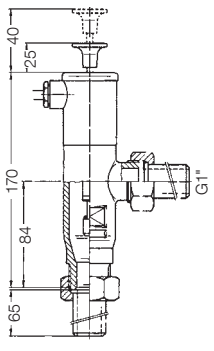
Connection
Welding sockets, steel, DN 20
W x H x D: 130 x 270 x 44 mm

Pressure range: Max. 10 bar

Probe voltage: Max. 12 V

Mark of conformity
WMS 2-1: TÜV HWB 09-345
WMS 3-1: TÜV HWB 09-348

Dimensions (mm)



DG: G			Part no.	Price €
WMS 2-1, brass with welding socket DN 20	1	5	42351	
WMS 3-1, brass with welding socket DN 20	1	5	42352	
Spare parts				
Control unit for WMS 2-1	1	1	42356	
Control unit for WMS 3-1	1	1	42357	
Probe WMS brass with welding socket DN 20	1	1	42362	

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According to EN 12828, sealed heating systems with capacities of more than 300 kW must be equipped with a TÜV-tested boiler water low level alarm.

Thermal safety valves
Combustion controllers

Thermal safety valve TSK

Application

To protect sealed or open solid fuel heating systems as per EN 12828 with a heating capacity of up to 80,000 kcal. Also required for dual-fuel boilers which can be operated with solid fuels.

Description

Thermal safety valve with two independent sensor systems. TSK consists of a valve housing, a valve, two independent bellow type displacement probes with liquid-filled temperature probes and a pocket. The capillary tube is protected by a flexible metal hose. TSK is connected to the water outlet of the water heater or to the inlet of the safety heat exchanger. If the response temperature is exceeded, the valve is opened by the thermal probe and cooling water is supplied to keep the system from exceeding the maximum operating temperature.

Technical specifications

Operating pressure: Max. 10 bar

Operating temperature range
Capillary tube/probe: Max. 130 °C
Bellows: Max. 110 °C

Response temperature: 95 °C

Blow-off capacity
at 110 °C and Δp = 1 bar: 3,700 kg/h

Connections: 2 x G¾ female thread

Connection stem: R½ male thread

Dimensions
Stem length: 200 mm
Capillary tube length: 1,300 mm

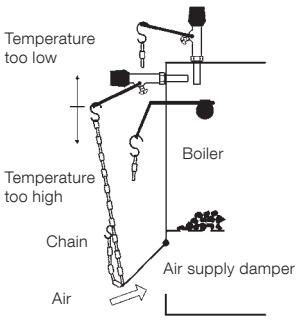
Housing: Hot-pressed brass

i See chapter 12 for the complete range of temperature measuring instruments and controllers.

Combustion controller FR 1

For temperature-dependent adjustment of the air supply damper of solid fuel and dual-fuel boilers. Controls correct air supply for optimum combustion.

Installation possibilities FR 1



The FR 1 combustion controller controls the combustion air supply. The temperature in the heat generator is detected by an integrated thermostat. The thermostat is connected to the air supply damper by means of a lever and a chain. The air supply is controlled by means of opening or closing the air supply damper, depending on the boiler flow temperature.

Operating temperature range
Medium: Max. 115 °C
Ambient: Max. 70 °C
(at switching button)

Connection: G¾

Dimensions
Stem length: 53 mm
Chain length: 1.2 m

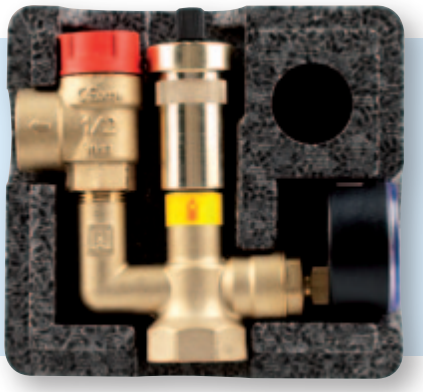
Chain load: 100 to 600 g

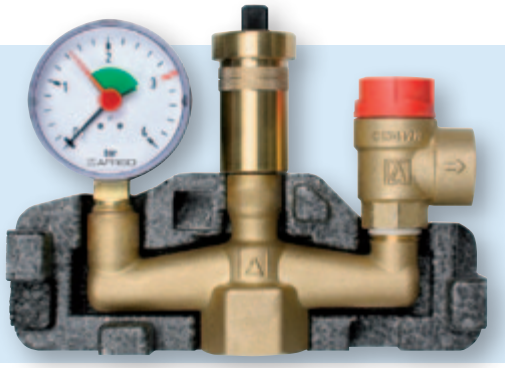
Mounting position: Horizontal or vertical

Materials
Housing: Plastic
Stem: Brass
Lever/chain: Galvanised steel

DG: G			Part no.	Price €
Thermal safety valve TSK	1	10	42370	
Combustion controller FR 1	1	10	42294	

Boiler safety group assemblies KSG





KSG Mini – 3 bar

Application
For sealed heating systems as per EN 12828 with a capacity of up to 50 kW.

Description
Complete, preassembled, tightness-tested boiler safety group assembly, lightweight design. Consisting of carrier, pressure gauge for indicating the system pressure, air vent and diaphragm safety valve MS, including form-fit insulation. With self-sealing mounting valves for easy replacement of pressure gauge and air vent.

Technical specifications

Boiler connection
G1 female thread

Operating temperature range
Max. 120 °C

Dimensions
W x H x D: 140 x 150 x 75 mm

Insulation
Polystrene EPS

Carrier
Brass

Diaphragm safety valve MS
Inlet x outlet: G½ x G¾
Seal: PTFE sealing ring, can be rotated
Response pressure: 3 bar

Pressure gauge for heating installations
Range: 0/4 bar
Diameter: 50 mm – G¼ bottom back

Air vent
Inlet: G⅜
Nominal pressure: 12 bar

KSG – 3 bar

Application
For sealed heating systems as per EN 12828 with a capacity of up to 50 kW.

Description
Complete, preassembled, tightness-tested boiler safety group assembly. Consisting of carrier, pressure gauge for indicating the system pressure, air vent and diaphragm safety valve MS, including form-fit insulation. With self-sealing mounting valves for easy replacement of pressure gauge and air vent.

Technical specifications

Boiler connection
G1 female thread

Operating temperature range
Max. 120 °C

Dimensions
W x H x D: 187 x 150 x 60 mm

Insulation
Polystrene EPS

Carrier
Brass

Diaphragm safety valve MS
Inlet x outlet: G½ x G¾
Seal: PTFE sealing ring, can be rotated
Response pressure: 3 bar

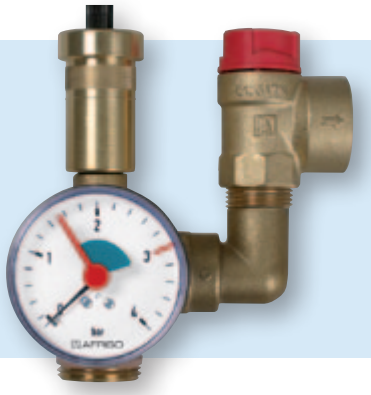
Pressure gauge for heating installations
Range: 0/4 bar
Diameter: 63 mm – G⅜ bottom

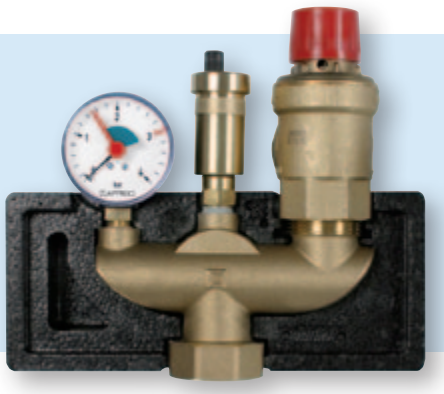
Air vent
Inlet: G⅜
Nominal pressure: 12 bar

7

DG: G	kW	bar	Connection	Insulation			Part no.	Price €
KSG Mini	Max. 50	3	G1	Yes	1	10	**77623**	
KSG	Max. 50	3	G1	Yes	1	10	**77938**	

Boiler safety group assemblies KSG





KSG Maxi – 3 bar

Application

For sealed heating systems as per EN 12828 with a capacity of up to 100 kW.

Description

Complete, preassembled, tightness-tested boiler safety group assembly. Consisting of carrier designed as multi-way union, pressure gauge for indicating the system pressure, air vent and diaphragm safety valve MS. With self-sealing mounting valves for easy replacement of pressure gauge and air vent. Without insulation.

Technical specifications

Boiler connection
G1 male thread

Operating temperature range
Max. 120 °C

Dimensions
W x H x D: 100 x 160 x 90 mm

Carrier
Brass

Diaphragm safety valve MS
Inlet x outlet: G¾ x G1
Seal: PTFE sealing ring, can be rotated
Response pressure: 3 bar

Pressure gauge for heating installations
Range: 0/4 bar
Diameter: 63 mm – G⅜centre back

Air vent
Inlet: G⅜
Nominal pressure: 12 bar

KSG Magnum – 3 bar

For sealed heating systems as per EN 12828 with a capacity of up to 200 / 350 kW.

Complete, preassembled, tightness-tested boiler safety group assembly. Consisting of carrier designed as multi-way union, pressure gauge for indicating the system pressure, air vent and diaphragm safety valve MS. With self-sealing mounting valves for easy replacement of pressure gauge and air vent. The form-fit insulation is also used to package the product for safe transport.

Boiler connection
Up to 200 kW: G1¼ female thread
Up to 350 kW: G1½ female thread

Operating temperature range
Max. 120 °C

Dimensions
W x H x D 230 x 175 x 104 mm

Insulation
Polypropylene EPP

Carrier
Brass

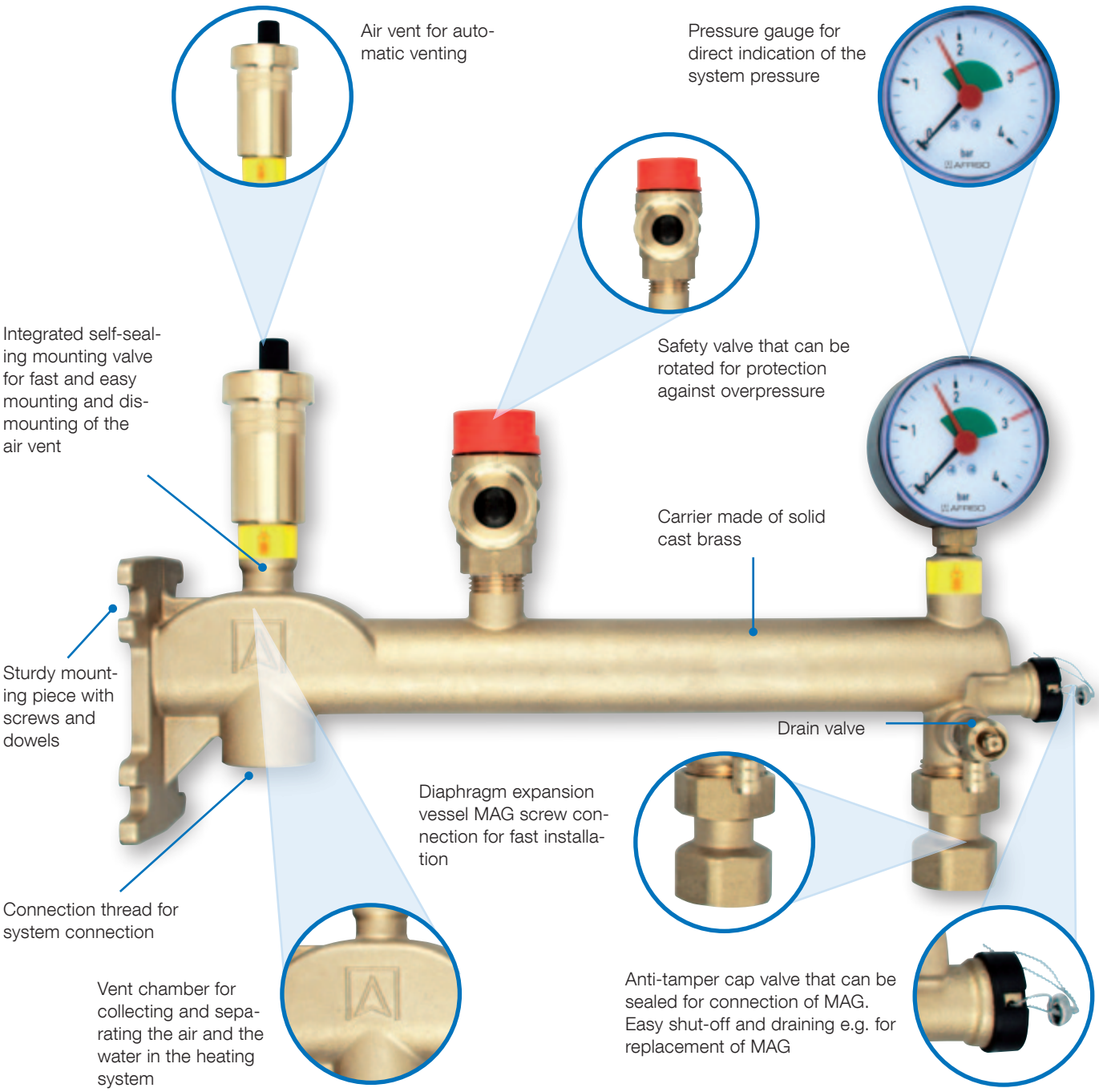
Diaphragm safety valve MS
Up to 200 kW (inlet x outlet): G1 x G1¼
Up to 350 kW (inlet x outlet): G1¼ x G1½
Seal: PTFE sealing ring, can be rotated
Response pressure: 3 bar

Pressure gauge for heating installations
Range: 0/4 bar
Diameter: 63 mm – G⅜ bottom

Air vent
Inlet: G⅜
Nominal pressure: 12 bar

DG: G	kW	bar	Connection	Insulation			Part no.	**Price €**
KSG Maxi	Max. 100	3	G1	-	1	10	**77625**	
KSG Magnum	Max. 200	3	G1 x G1¼	Yes	1	10	**77627**	
KSG Magnum	Max. 350	3	G1¼ x G1½	Yes	1	10	**77628**	

Connection assembly for expansion vessels GAK



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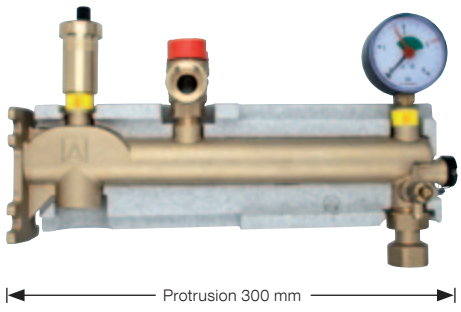
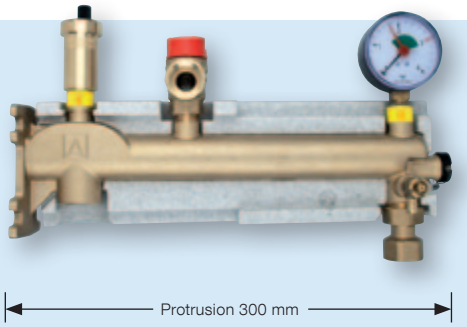
Advantages – your benefits

- **Time-saving installation with preassembled, tightness-tested assembly**
- **Service-friendly: Pressure gauge, air vent and expansion vessel can be replaced without draining**
- **Safe venting due to top-mounted connection for air vent**



Environmentally friendly: The packing material is also used for insulation purposes.

Connection assembly for expansion vessels GAK Anti-tamper cap valve



GAK 3 bar with insulation

Application

For connection of diaphragm expansion vessels with up to 50 l for sealed heating installations as per EN 12828 with a capacity of up to 50 kW.

Description

Preassembled combination fitting consisting of:

- Carrier made of solid cast brass, protrusion 300 mm, with G¾ female boiler connection and integrated anti-tamper cap valve for connection of the diaphragm expansion vessel
- Approved safety valve G½ x G¾, can be rotated after sealing with Teflon ring (response pressure 3 bar, heat capacity 50 kW)
- Pressure gauge for heating installations RF Ø 63–G⅜ bottom, range 0/4 bar with red reference pointer, mounted via self-sealing mounting valve
- Air vent G⅜, 12 bar, mounted via self-sealing mounting valve
- Two form-fit insulation shells

The insulation is also used to package the product for safe transport.

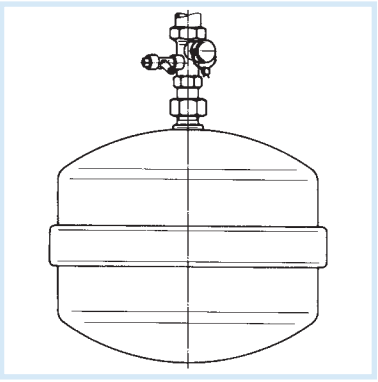
Anti-tamper cap valve

For diaphragm expansion vessel in heating systems as per EN 12828. To be installed at the water inlet of the expansion vessel.

Anti-tamper cap valve G¾ x G¾ or G1 x G1. The shut-off valve is secured against inadvertent closing by means of a cap and a lead seal. The expansion vessel can be shut off from the heating system and drained via the drain valve for the required function check or for replacement.

Nominal pressure PN 10

Max. operating temperature 120 °C



DG: G			Part no.	**Price €**
GAK 3 bar with insulation	1		**77932**	
Anti-tamper cap valve G¾ x G¾	1	25	**77924**	
Anti-tamper cap valve G1 x G1	1	25	**77934**	

Air vents

Air vent 12 bar

Application
For automatic venting of sealed heating systems as per EN 12828. Suitable for up to 12 bar/110 °C for water and water/glycol mixtures with up to 50 % glycol.

Description
Automatic air vent with mounting valve. Perfect design in terms of appearance and function (high, narrow shape). Self-sealing connection thread.

Technical specifications

Connection
G⅜ or G½

Operating temperature range
Max. 110 °C

Nominal pressure
Max. 12 bar

Housing
Brass

Cover
Glass-fibre reinforced plastic

Union ring
Brass

Plastic air vent

For automatic venting of sealed heating systems as per EN 12828. Suitable for water and water/glycol mixtures with up to 50 % glycol.

Automatic air vent. Perfect design in terms of appearance and function (high, narrow shape). Self-sealing connection thread. Mounting valves available as accessories.

Connection
G⅜

Operating temperature range
Depending on nominal pressure
Max. 95/120 °C see operating instructions

Nominal pressure
At 95 °C: Max. 6 bar
At 120 °C: Max. 3.5 bar

Housing
Glass-fibre reinforced plastic

Cover
Glass-fibre reinforced plastic

Union ring
Glass-fibre reinforced plastic

Angled air vent 12 bar

For automatic venting of radiators. Suitable for up to 12 bar/110 °C for water and water/glycol mixtures with up to 50 % glycol.

Automatic air vent with aqua stop. The vent cap does not have to be removed during operation of the air vent, not even for initial filling or servicing.

Connection
R½

Operating temperature range
Max. 110 °C

Nominal pressure
Max. 12 bar

Housing
Brass, nickel-plated

Cover
Glass-fibre reinforced plastic

Union ring
Brass, nickel-plated

7

DG: G	Mounting valve			Part no.	Price €
Air vent G⅜	R⅜	–	25	**77700**	
Air vent G⅜, individually packaged	R⅜	1	100	**77713**	
Air vent G⅜	R½	–	25	**77706**	
Air vent G⅜	Without	–	25	**77710**	
Air vent G½	Without	–	25	**77752**	
Plastic air vent G⅜	Without	–	25	77766	
Angled air vent G½, with aqua stop	Without	1	10	**77753**	
Accessories					
Mounting valve R⅜ x G⅜		–	25	77720	
Mounting valve R½ x G⅜		–	25	77723	

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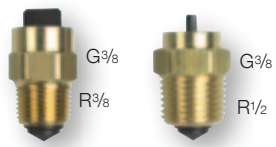
Mounting valves as accessories for air vents:



Diaphragm safety valves MS, MSM

- For protection against overpressure in heating systems
- For water, water/glycol mixtures, liquids of fluid groups 1 and 2
- MSM with pressure gauge for indication of the system pressure

MSM with pressure gauge for heating systems

Application

For sealed heating systems as per TRD 721; VdTÜV sheet Safety Valve 100 and 100/4 sheet 1; EN 12828. Also for water heating systems as per DIN 4751-2 with flow temperatures up to 120 °C and DIN 4751-3 with flow temperatures up to 95 °C. Suitable for water, water/glycol mixtures and liquids of fluid groups 1 and 2 (Pressure Equipment Directive, Art. 9).

Description

Safety valve with factory-adjusted opening pressure. MSM with pressure gauge for indicating the system pressure. The size of the valve inlet determines the unit type, the outlet is ¼" larger.

7

Technical specifications

Connection
See selection table

Operating temperature range
-10/+120 °C

Opening pressure
See selection table

Dimensions
W x H x D: 35 x 60 x 45 mm

Housing
Brass

Cap
PA6, red

Pressure gauge for heating installations (for MSM)
Diameter: 50 mm–G¼ back
Range: 0/4 bar
Connection: bottom back

DG: G	Opening pressure	Pressure gauge			Part no.	Price €
MS Rp½ x Rp¾	2.5 bar	–	1	84	**42385**	
MS Rp½ x Rp¾	3.0 bar	–	1	84	**42390**	
MS Rp¾ x Rp1	2.5 bar	–	1	84	**42386**	
MS Rp¾ x Rp1	3.0 bar	–	1	84	**42391**	
MS Rp1 x Rp1¼	2.5 bar	–	1	-	42383	
MS Rp1 x Rp1¼	3.0 bar	–	1	-	42378	
MSM Rp½ x Rp¾	3.0 bar	0/4 bar	1	-	**42382**	

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See page 198/206 for safety valves for solar liquid and drinking water.

Differential pressure bypass valves DÜ

- For constant pump pressure in heating systems
- Reduction of flow noise
- With adjustment scale
- Differential pressure fully adjustable
- Either space-saving angled version or straight version

Differential pressure bypass valve straight version

Application

For keeping the pump pressure in sealed heating systems as per EN 12828 constant and for reducing flow noise in the heating system.

Description

Differential pressure bypass valve with directly readable adjustment scale. Housing made of brass. Available as straight version or angled version for space-saving installation.
The differential pressure in the heating system at full load is set directly at the bypass valve. If the volume flow is reduced, the valve opens to keep the head of the circulation pump constant.

Technical specifications

Operating temperature range
Max. 95 °C (temporary 120 °C)

Operating pressure
Max. 6 bar

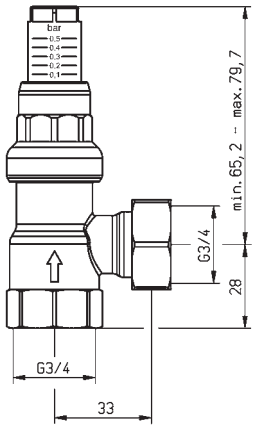
Differential pressure
Fully adjustable 0.1/0.5 bar

Housing
Angled version or straight version
Material: Brass

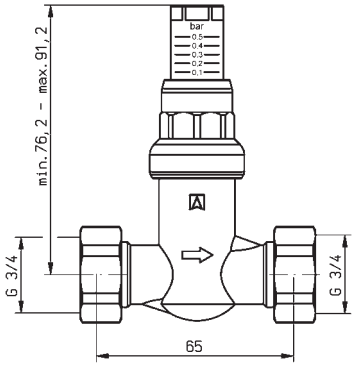
Connection angled version
Inlet: G¾ female thread
Outlet: Screw connection, flat-sealing with union nut G¾

Connection straight version
Screw connection at both sides, flat-sealing with union nut G¾

Differential pressure bypass valve angled version

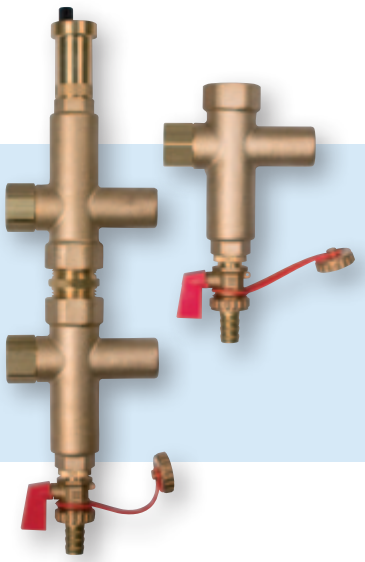


Differential pressure bypass valve straight version



DG: G			Part no.	**Price €**
DÜ with screw connection, angled version	1	10	**42379**	
DÜ with screw connection, straight version	1	-	42384	

Flow filters, combined air/flow filters



- Dirt particle separator
- Suitable for open and sealed circuits
- Flushing possible during operation of the system
- Cost savings due to fewer malfunctions and longer service life of the installation
- Energy savings due to improved heat transfer at clean system components

Application

Flow filters and combined air/flow filters remove lime, rust, sludge, dirt and gas from heating systems to provide clean water and trouble-free operation. Suitable for hot water heating systems, underfloor heating systems, solar systems (special versions, please enquire), fuel cells and renovation of system components (sludge removal). Also suitable for removing lime in the circulation circuit of drinking water facilities.

7

Description

Most advanced heating systems use water for heat transmission. This water may also transport unwanted substances such as lime, calcium, magnesium, oxide, carbonates as well as larger particles such as welding or soldering residue, metal chips and dirt. These substances may cause malfunctions in fittings and control units. A compact flow filter (particle separator) removes these particles from the water. The particles settle in the collection chamber of the filter and can be flushed out via a valve with small amounts of water. Clean water supports trouble-free operation of systems and reduces the fuel and maintenance costs.

Clean system components have better thermal conduction, they provide for faster heating up and thus contribute to reduced fuel consumption and emissions.

The combined air/flow filter was developed for heating systems which are subject to problems caused by oxygen or other gases. The vent valve automatically removes the gases.

In the case of drinking water systems, the flow filter is installed in the circulation circuit. Lime particles settle in the flow filter and can be flushed out. This reduces the deposits in pipes and fittings. Special materials which are suitable for drinking water are used for this application.

Technical specifications

Housing
Brass

Operating pressure
Max. 10 bar

Operating temperature range
Max. 95 °C

Dimensions (W x H x D)
Flow filter: 120 x 194 x 60 mm
Combined air/flow filter: 120 x 394 x 60 mm

Connections
Flow filter: Inlet G¾
Outlet G1
Combined air/flow filter: 2 x G¾

Scope of delivery
Flow filters and combined air/flow filters are delivered with form-fit insulation.

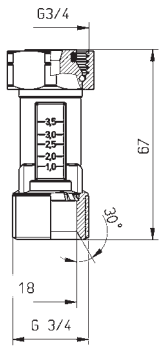
DG: G				Part no.	Price €
Flow filter – heating	28 kW	1	5	**78210**	
Flow filter – heating	50 kW	1	5	**78211**	
Combined air/flow filter – heating	28 kW	1	5	**78212**	
Combined air/flow filter – heating	50 kW	1	5	**78213**	
Flow filter – drinking water	---	1	5	**78214**	

Flow meter DFM 10-1M

NEW

- **Direct indication of the flow rate in l/min**
- **Compact design**

Dimensions (mm)



Application

For monitoring the flow in heating/cooling systems. Specially for direct mounting to heating circuit manifolds. Suitable for heating and cooling water as well as water mixtures with standard corrosion protection and antifreeze agents.

Description

Compact flow meter with scale. The flow meter can be installed in pipes in a horizontal, tilted or vertical position. The reading mark corresponds to the lower edge of the rotameter/float.

7

Technical specifications

Operating temperature range
Max. 100 °C

Operating pressure
Max. 10 bar

Measuring principle
Rotameter type with counter spring

Measuring range
1–3.5 l/min

Nominal diameter
DN 10

Housing
Brass

Connection
G¾ x G¾ (eurocone)
male thread x union nut

Mounting position
Horizontal, tilted or vertical

i Please enquire for other versions.

DG: G			Part no.	**Price €**
DFM 10-1M	-	10	**78619**	

Flow meters
DFM 15-2M / DFM 20-2M

NEW

- **Integrated ball valve for adjustment and shutting off**
- **Direct indication of the flow rate in l/min**
- **Adjustment without diagram, table or measuring instrument**
- **Available with numerous connection versions**

Application

For hydraulic adjustment and flow monitoring in heating/cooling systems, air conditioning systems, solar systems and geothermal systems. DFM allows for fast hydraulic adjustment of the system or of system components without diagrams, tables or measuring instruments. Suitable for heating and cooling water as well as water mixtures with standard corrosion protection and antifreeze agents.

7

Description

Compact flow meter with scale and ball valve for shutting off and adjustment. The flow meter can be installed in pipes in a horizontal, tilted or vertical position. Adjustments are made by means of a screwdriver via the adjustment screw. The reading mark corresponds to the lower edge of the rotameter/float.
Systems with correct hydraulic adjustment provide for optimum energy distribution and cost-efficient operation.

Technical specifications

Operating temperature range
120 °C, short-term 160 °C

Operating pressure
Max. 10 bar

Measuring principle
Rotameter type with counter spring

Measuring range
See ordering table

Nominal diameter
DN 15, DN 20

Housing
Brass

System connections
G¾ x G¾, G1 x G1, G1¼ x G1¼, G1½ x G1½
Male thread x male thread,
Male thread x union nut or
compression fitting for CU pipe Ø 22 mm

Mounting position
Horizontal, tilted or vertical

Options

- Other nominal diameters
- Other connections
- Other measuring ranges

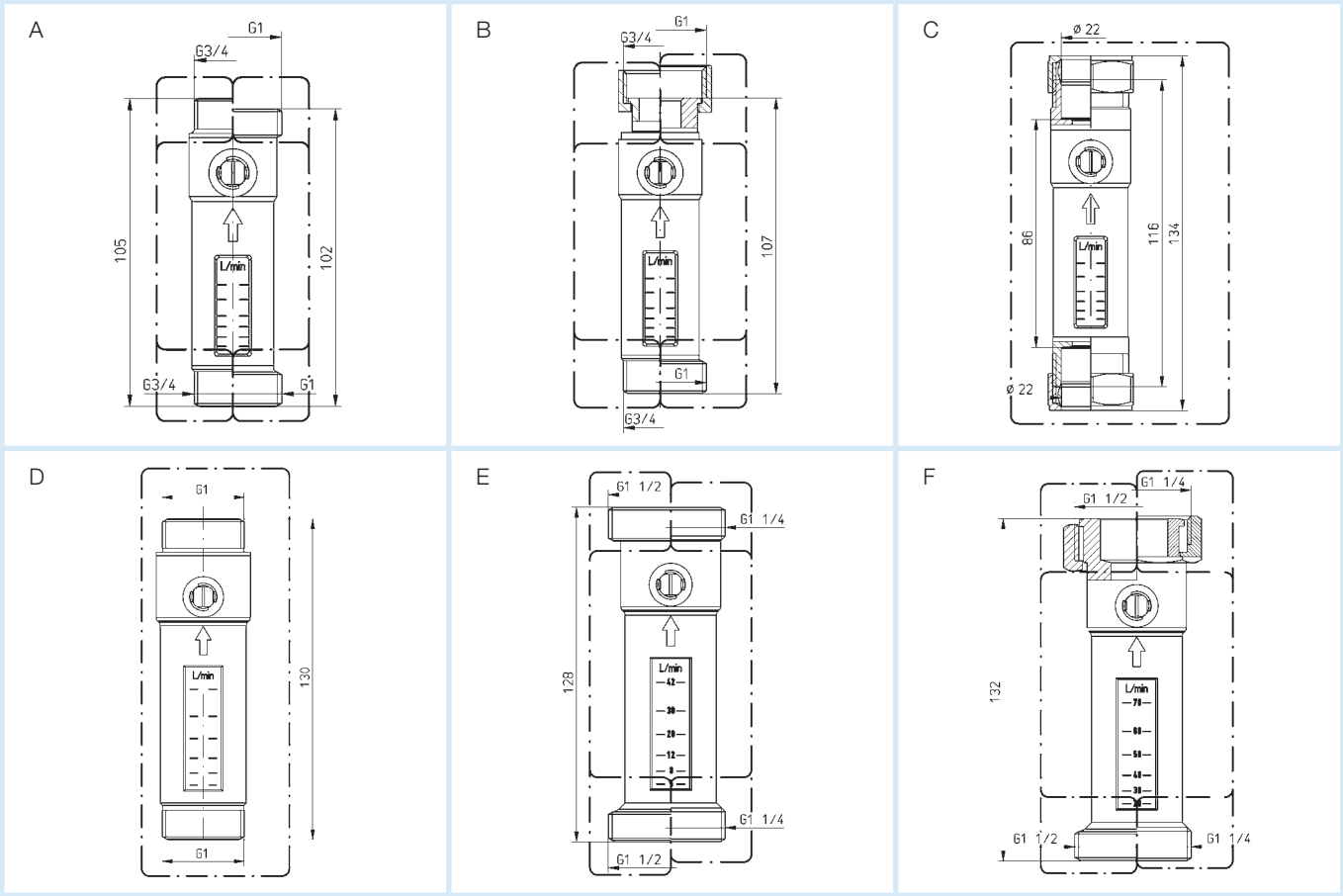
i
Please enquire for other versions.

AFRISO EURO-INDEX

Flow meters DFM 15-2M/DFM 20-2M

NEW

Types and dimensions (mm)



7

DG: G **Male thread x male thread**

Type	Nominal diameter	Connections	Measuring range	Part no.	Price €
DFM 15-2M					
A	DN 15	G¾ x G¾	1–6 l/min	80958	
	DN 15		2–12 l/min	**80963**	
	DN 15		8–28 l/min	80968	
	DN 15		8–38 l/min	80973	
	DN 15	G1 x G1	1–6 l/min	80959	
	DN 15		2–12 l/min	80964	
	DN 15		8–28 l/min	**80969**	
	DN 15		8–38 l/min	80974	
C	DN 15	Compression fitting for CU pipe Ø 22 mm	1–6 l/min	80962	
	DN 15		2–12 l/min	80967	
	DN 15		8–28 l/min	80972	
	DN 15		8–38 l/min	80977	
DFM 20-2M					
D	DN 20	G1 x G1	5–42 l/min	**80978**	
	DN 20		20–70 l/min	80983	
E	DN 20	G1¼ x G1¼	5–42 l/min	80979	
	DN 20		20–70 l/min	**80984**	
	DN 20	G1½ x G1½	5–42 l/min	80980	
	DN 20		20–70 l/min	80985	

Male thread x union nut

Type	Nominal diameter	Connections	Measuring range	Part no.	Price €
DFM 15-2M					
B	DN 15	G¾ x G¾	1–6 l/min	80960	
	DN 15		2–12 l/min	80965	
	DN 15		8–28 l/min	80970	
	DN 15		8–38 l/min	80975	
	DN 15	G1 x G1	1–6 l/min	80961	
	DN 15		2–12 l/min	80966	
	DN 15		8–28 l/min	80971	
	DN 15		8–38 l/min	80976	
DFM 20-2M					
F	DN 20	G1¼ x G1¼	5–42 l/min	80981	
	DN 20		20–70 l/min	80986	
	DN 20	G1½ x G1½	5–42 l/min	80982	
	DN 20		20–70 l/min	80987	

Filling and drain fittings

Filling fitting FAM

Filling fittings FA/FAM

Application For sealed heating systems as per EN 12828.

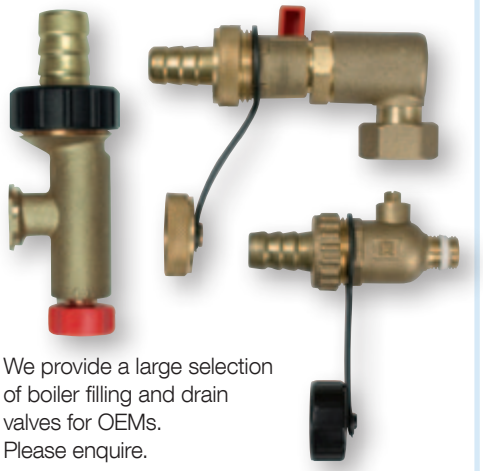
Description Filling fitting with housing and spring cap made of brass. Outlet for inner hose diameter 12 mm, inlet G½ female thread. With G¼ connection for pressure gauge for heating installations. With pressure reducer, shut-off valve and backflow preventer. Inlet pressure 6 up to 10 bar, outlet pressure adjustable between 0.5 and 3 bar.
Version FAM with pressure gauge for heating installations Ø 50 mm, 0/4 bar, G¼ bottom.

Boiler filling and drain valve brass KFE, nickel-plated
Boiler filling and drain valve brass KFE, plain

For sealed heating systems as per EN 12828.

Boiler filling and drain valve. Ball valve version made of brass. One side G½ male thread with PTFE sealing ring, other side ½" hose connector with G¾ union nut and blind cap with chain or strap. Available in plain brass (drinking water) or nickel-plated brass (heating circuit water).

Filling fitting FA

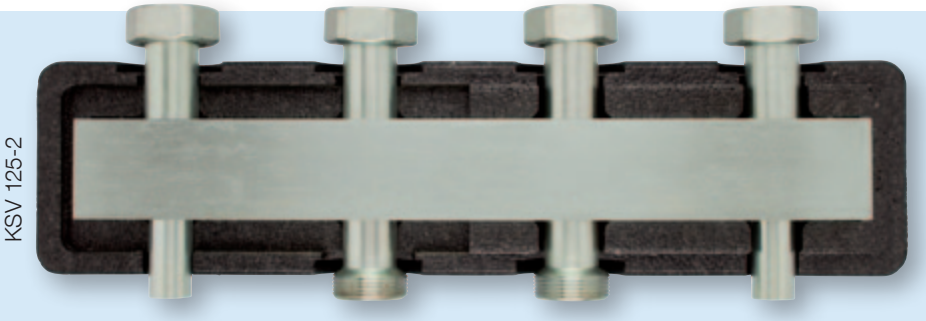


We provide a large selection of boiler filling and drain valves for OEMs. Please enquire.

DG: G			Part no.	Price €
Filling fitting FA	1	5	**42405**	
Filling fitting FAM	1	5	**42406**	
Boiler filling and drain valve KFE, brass plain, in cardboard box	12	72	**42401**	
Boiler filling and drain valve KFE, brass nickel-plated, in cardboard box	12	72	**42407**	

Boiler manifold for heating pump assemblies PrimoTherm®

NEW


KSV 125-2

Wall mounting bracket

For distribution of the heating circuit water in sealed heating systems as per EN 12828 from the boiler to the heating pump assemblies PrimoTherm®.

KSV 125-2/3

Description

Boiler manifold as combination supply and return manifold for two or three heating pump assemblies. Connection to boiler via G1½ threaded sockets, bottom. Connection to heating pump assembly via flat-sealing union nut G1½.
AFRISO boiler manifolds are tightness-tested in the factory. The insulation is also used to package the product for safe transport.

Technical specifications

System connections
Boiler side: Threaded socket G1½
Pump assembly: Union nut G1½, flat-sealing

Axis distance
125 mm

Operating temperature range
Medium: Max. 110°C

Flow
3.0 m³/h

System pressure
Max. 4 bar

Insulation
Polypropylene EPP

Scope of delivery
Boiler manifold with 2 x wall mounting bracket and insulation

KSV 125-2/3 HW

Boiler manifold as combination supply and return manifold for two or three heating pump assemblies. With integrated hydraulic separator for separation of circuits. Connection to boiler via G1½ threaded sockets, bottom, two connections G½ for drain/temperature probe. Connection to heating pump assembly via flat-sealing union nut G1½.
AFRISO boiler manifolds are tightness-tested in the factory. The insulation is also used to package the product for safe transport.

System connections
Boiler side: Threaded socket G1½
Pump assembly: Union nut G1½, flat-sealing

Axis distance
125 mm

Operating temperature range
Medium: Max. 110°C

Flow
3.0 m³/h

System pressure
Max. 4 bar

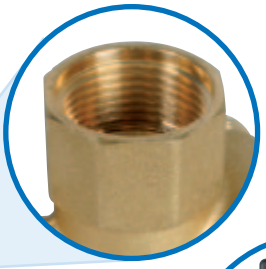
Insulation
Polypropylene EPP

Scope of delivery
Boiler manifold with 2 x wall mounting bracket and insulation

DG: G	Heating circuits	Hydraulic separator	Part. no.	Price €
KSV 125-2	2	No	**77608**	
KSV 125-3	3	No	**77609**	
KSV 125-2 HW	2	Yes	**77621**	
KSV 125-3 HW	3	Yes	**77622**	

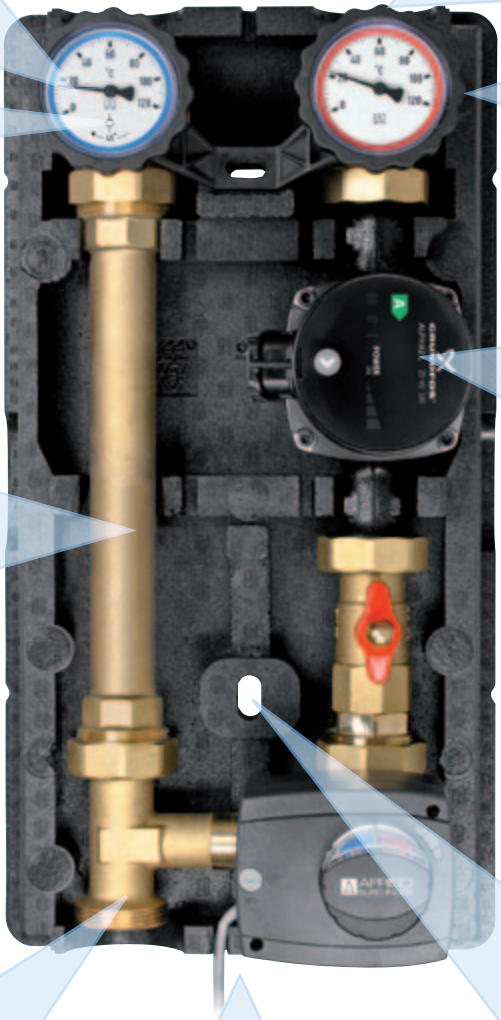
Heating pump assembly PrimoTherm®

Combination valves with thermometer in the hand wheel, range 0/120 °C. Red/blue marking for easy identification of flow and return lines and function checks by owner.



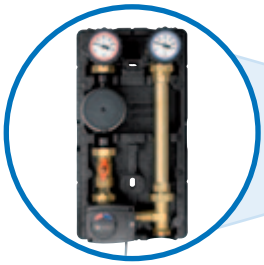
System connection G1 female for rapid mounting in the heating circuit.

Integrated adjustable gravity brake.



Preassembled, tightness-tested and heat-insulated assembly.

Available with high energy efficiency pumps class A (Grundfos or Laing).



Modular system with pump and return line left or right.

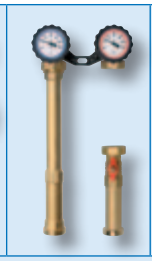
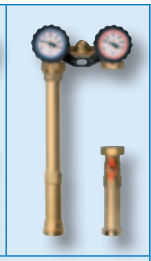
Virtually any standard pump can be installed without reworking of the insulation.

System connection G1½ male for fast mounting to the boiler supply/return by means of flange and union nut. Suitable for KSV.

Cable routing in the insulation for professional installation of pump and actuator cables.

Sophisticated wall mounting kit for easy, fast installation.

Overview of versions
Heating pump assemblies PrimoTherm®

	PrimoTherm® 180 with pump length 180 mm							
								
Version	**PrimoTherm® 180-1**				**PrimoTherm® 180-2**			
Catalogue page	**170**	**172**	**174**	**176**	**178**	**180**	**182**	**184**
Part no.	**77645**	**77646**	**77643**	**77644**	**77641**	**77614**	**77615**	**77642**
Circulation pump	Grundfos	Laing	---	---	Grundfos	Laing	---	---
Ball valve with gravity brake, thermometer (blue)	•	•	•	•	•	•	•	•
Ball valve, thermometer (red)	•	•	•	•	•	•	•	•
Ball valve in flow line	•	•	•	•	•	•	•	•
3-way mixer					•	•	•	•
Actuator					•	•	•	•
Bypass valve				•				•
Insulation	•	•	•	•	•	•	•	•
Wall mounting and connection kit	•	•	•	•	•	•	•	•

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We provide a great variety of customer-specific pump assemblies for OEMs.
Please enquire.

The heating pump assembly PrimoTherm® excels with its versatility and great number of possible combinations. The system assembly for the heating circuit is preassembled, tightness-tested, heat-insulated and available in eight versions. AFRISO offers Grundfos and Laing high energy efficiency pumps class A. However, the universal insulation allows for the installation of virtually any standard pump without reworking of the insulation. In addition, the system is modular so that the flow line can be mounted at the left or the right side; due to the slim design, it is also possible to mount several pump assemblies next to each other on AFRISO boiler manifolds.

Heating pump assembly PrimoTherm® 180-1 DN 25 OM GP04 G1½ x 1 female

NEW

- **Preassembled, tightness-tested and heat-insulated assembly**
- **Modular system with flow at left or right**
- **Class A high energy efficiency pump**
- **Easy and fast installation:**
  - **Sophisticated wall mounting kit**
  - **Cable routing integrated in insulation**

Application Heating pump assembly for connection of boiler and pipe systems.

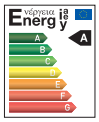
Description Complete, preassembled and tightness-tested heating pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (flow/hot) consists of:
- Circulation pump
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- System connection G1½ male (boiler), G1 female (heating circuit)
- Ball valve
- Pipe for length compensation with screw connection

The return line consists of:
- Combination valve with gravity brake, thermometer in the hand wheel (blue mark, range 0/120 °C)
- 2 pipes for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

The insulation is also used to package the product for safe transport.
A mixer and an actuator can be retrofitted.

Technical specifications



Axis distance
125 mm

System connections
Boiler G1½ male
Heating circuit G1 female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 6 bar

Insulation
Polypropylene EPP

Circulation pump
Grundfos ALPHA2 L 25–60
Length 180 mm
Degree of protection IP 42

Supply voltage
AC 230 V, 50 Hz

Energy efficiency class
A

Power input
5–45 W

Pumping head/rate

Stage 1:	1.0 m/ 1.6 m³/h
Stage 2:	3.1 m/ 2.7 m³/h
Stage 3:	6.2 m/ 3.1 m³/h

Options
- Other circulation pumps

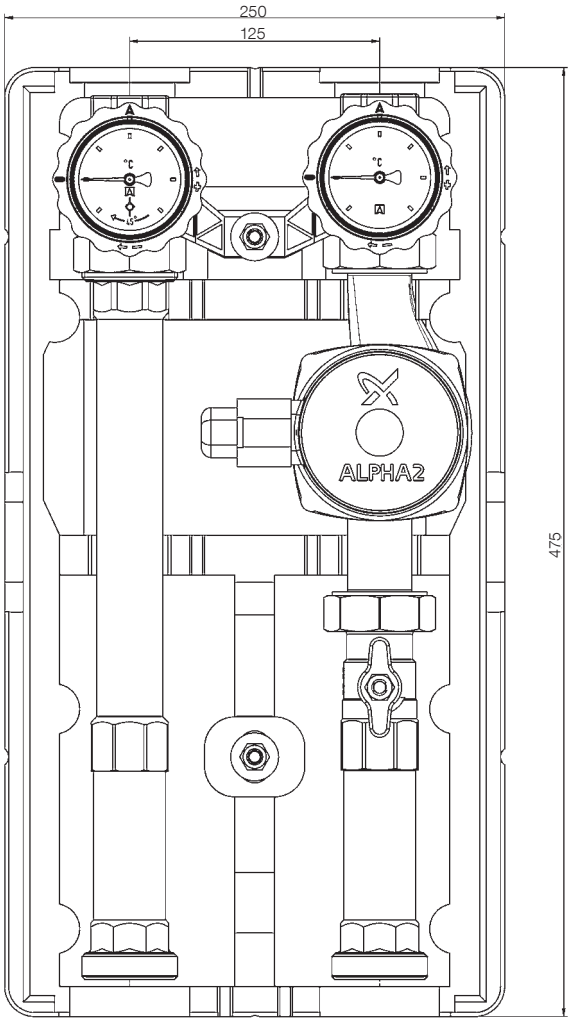
i See page 167 for boiler manifolds for installation of several pump assemblies next to each other.

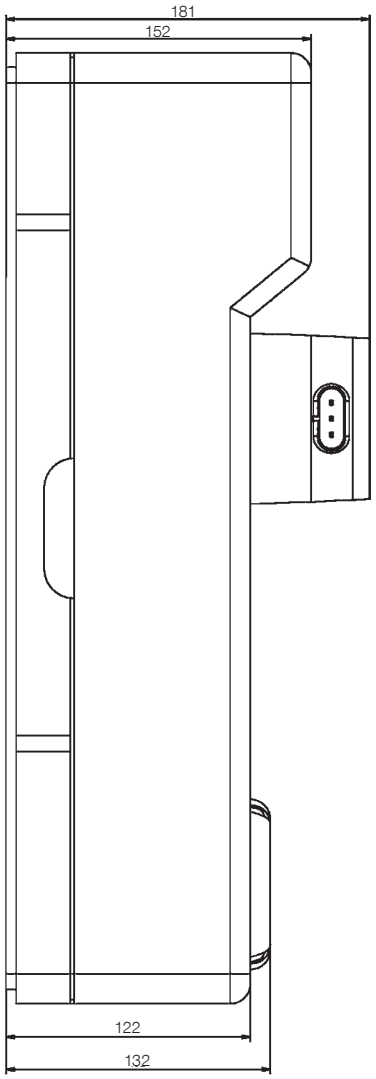
DG: G	Part no.	Price €
PrimoTherm® 180-1 DN 25 OM GP04 G1½ x 1 female	77645	

Heating pump assembly PrimoTherm® 180-1

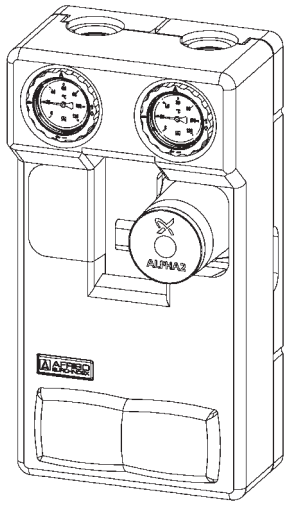
NEW

Dimensions (mm)

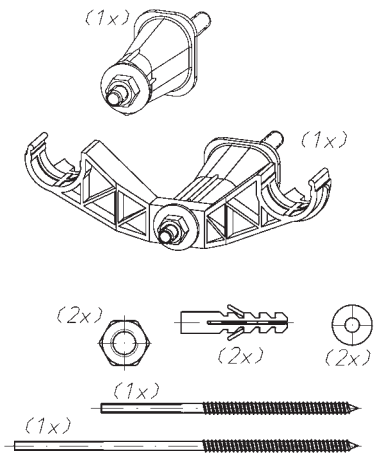




Insulation
The insulation is also used to package the product for safe transport.



Scope of delivery
Heating pump assembly completely assembled with circulation pump, connection and wall mounting kit.



Heating pump assembly PrimoTherm® 180-1 DN 25 OM LP01 G1½ x 1 female

NEW

- **Preassembled, tightness-tested and heat-insulated assembly**
- **Modular system with flow at left or right**
- **Class A high energy efficiency pump**
- **Easy and fast installation:**
  - **Sophisticated wall mounting kit**
  - **Cable routing integrated in insulation**

Application Heating pump assembly for connection of boiler and pipe systems.

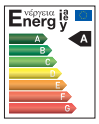
Description Complete, preassembled and tightness-tested heating pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (flow/hot) consists of:
- Circulation pump
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- System connection G1½ male (boiler), G1 female (heating circuit)
- Ball valve
- Pipe for length compensation with screw connection

The return line consists of:
- Combination valve with gravity brake, thermometer in the hand wheel (blue mark, range 0/120 °C)
- 2 pipes for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

The insulation is also used to package the product for safe transport.
A mixer and an actuator can be retrofitted.

Technical specifications



Axis distance
125 mm

System connections
Boiler G1½ male
Heating circuit G1 female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 6 bar

Insulation
Polypropylene EPP

Circulation pump
Laing pump E4vario-25/180G
Length 180 mm
Degree of protection IP 44

Supply voltage
AC 200–240 V, 50/60 Hz

Energy efficiency class
A

Power input
9–35 W

Pumping head/rate
3.7 m/2.5 m³/h

Options
- Other circulation pumps

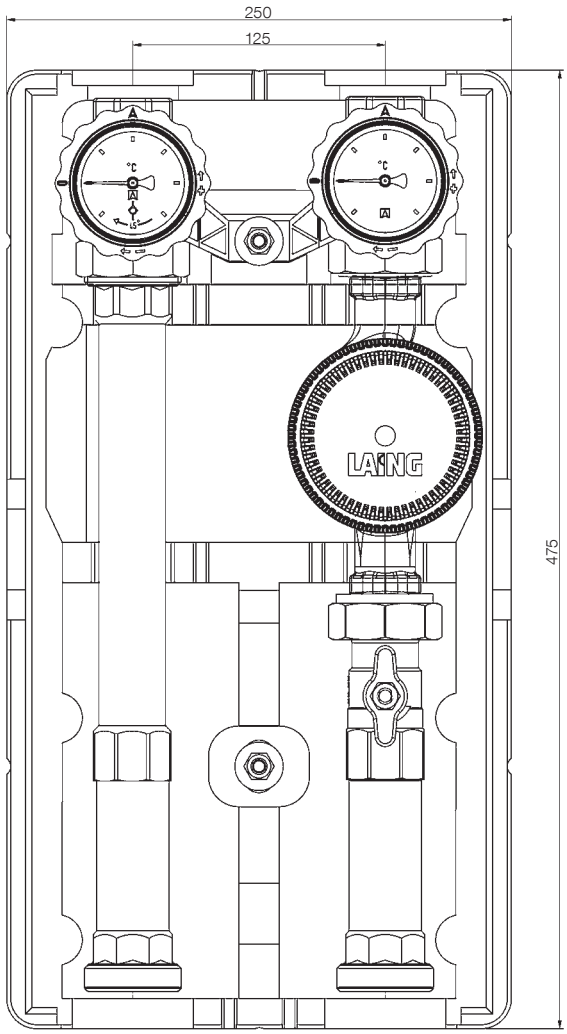
i
See page 167 for boiler manifolds for installation of several pump assemblies next to each other.

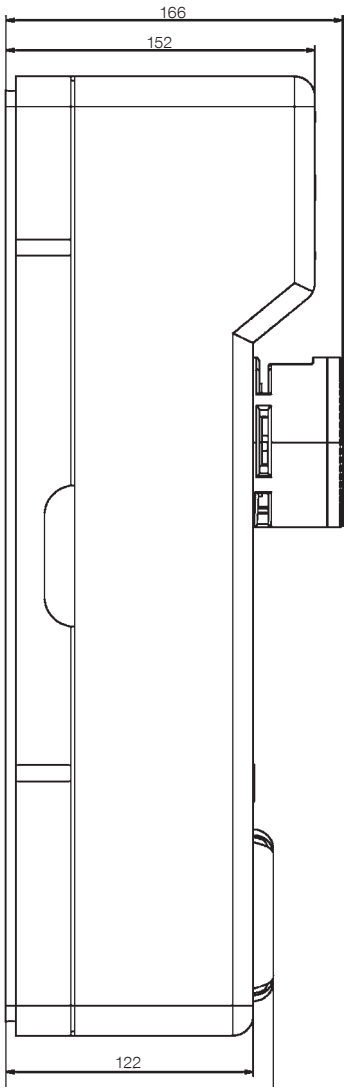
DG: G	Part no.	Price €
PrimoTherm® 180-1 DN 25 OM LP01 G1½ x 1 female	77646	

Heating pump assembly PrimoTherm® 180-1

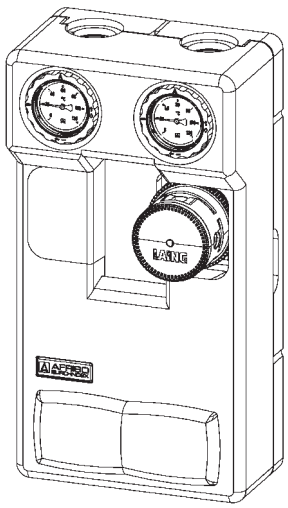
NEW

Dimensions (mm)

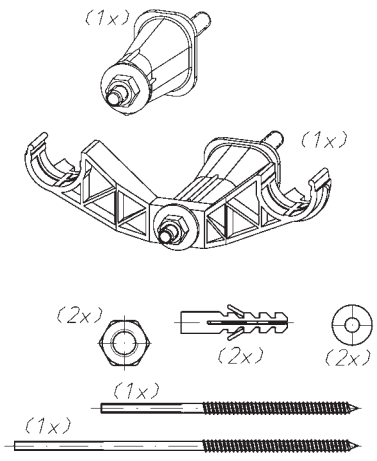




Insulation
The insulation is also used to package the product for safe transport.



Scope of delivery
Heating pump assembly completely assembled with circulation pump, connection and wall mounting kit.



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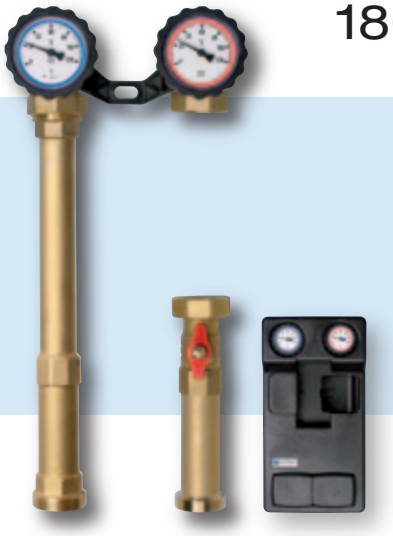
Heating pump assembly PrimoTherm® 180-1 DN 25 OM OP G1½ x 1 female



NEW

- Preassembled, tightness-tested and heat-insulated assembly
- Modular system with flow at left or right
- Virtually any standard pump can be installed without reworking of the insulation
- Easy and fast installation:
  - Sophisticated wall mounting kit
  - Cable routing integrated in insulation

Application

Heating pump assembly for connection of boiler and pipe systems.

Description

Complete, preassembled and tightness-tested heating pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (flow/hot) consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- System connection G1½ male (boiler), G1 female (heating circuit)
- Ball valve
- Pipe for length compensation with screw connection

The return line consists of:
- Combination valve with gravity brake, thermometer in the hand wheel (blue mark, range 0/120 °C)
- 2 pipes for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

The insulation is also used to package the product for safe transport.
A mixer and an actuator can be retrofitted.

Technical specifications

Axis distance
125 mm

System connections
Boiler G1½ male
Heating circuit G1 female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 6 bar

Insulation
Polypropylene EPP

Options

- Circulation pumps

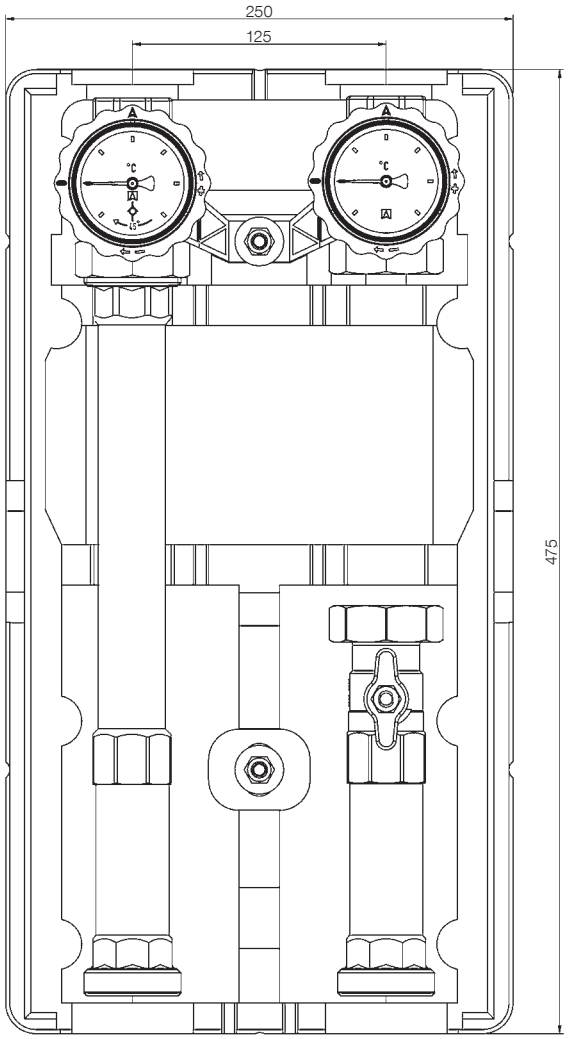
i
See page 167 for boiler manifolds for installation of several pump assemblies next to each other.

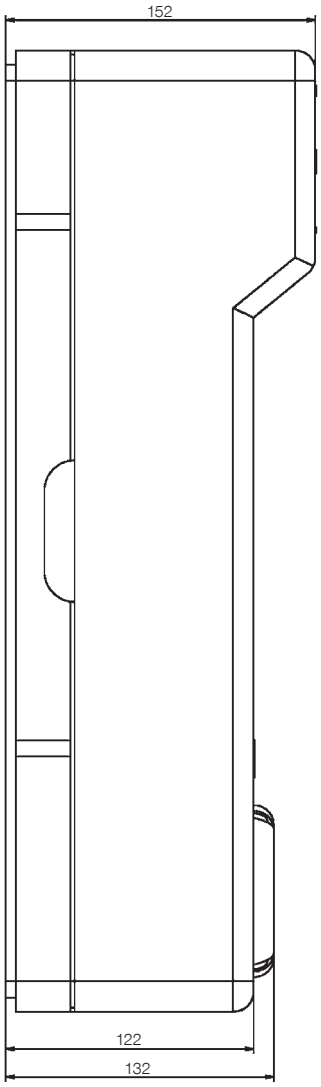
DG: G	Part no.	Price €
PrimoTherm® 180-1 DN 25 OM OP G1½ x 1 female	77643	

Heating pump assembly PrimoTherm® 180-1

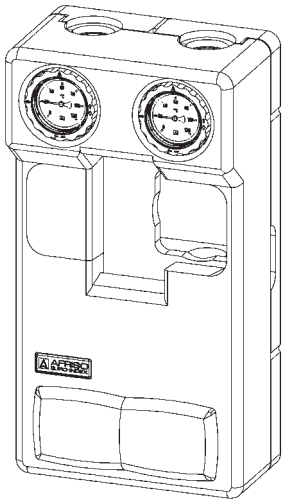
NEW

Dimensions (mm)

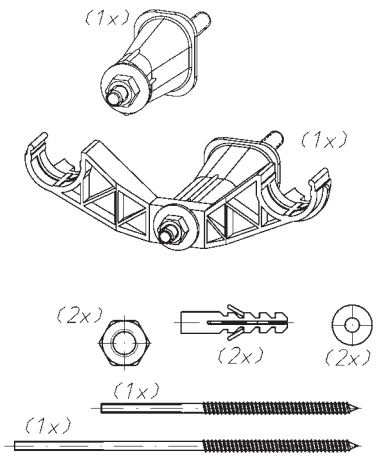




Insulation
The insulation is also used to package the product for safe transport.

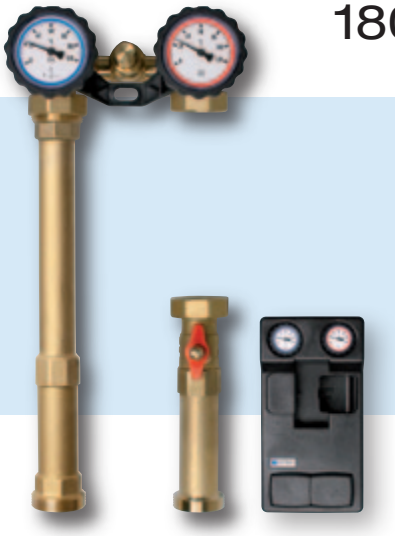


Scope of delivery
Heating pump assembly (without circulation pump) completely assembled with connection and wall mounting kit.



7

Heating pump assembly PrimoTherm® 180-1 DN 25 OM OP-UV G1½ x 1 female



NEW

- With integrated bypass valve
- Preassembled, tightness-tested and heat-insulated assembly
- Virtually any standard pump can be installed without reworking of the insulation
- Easy and fast installation:
  - Sophisticated wall mounting kit
  - Cable routing integrated in insulation

Application Heating pump assembly for connection of boiler and pipe systems.

Description Complete, preassembled and tightness-tested heating pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (flow/hot) consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- System connection G1½ male (boiler), G1 female (heating circuit)
- Bypass valve
- Ball valve
- Pipe for length compensation with screw connection

The return line consists of:
- Combination valve with gravity brake, thermometer in the hand wheel (blue mark, range 0/120 °C)
- 2 pipes for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

The insulation is also used to package the product for safe transport.
A mixer and an actuator can be retrofitted.

Technical specifications

Axis distance
125 mm

System connections
Boiler G1½ male
Heating circuit G1 female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 6 bar

Insulation
Polypropylene EPP

Options
- Circulation pumps

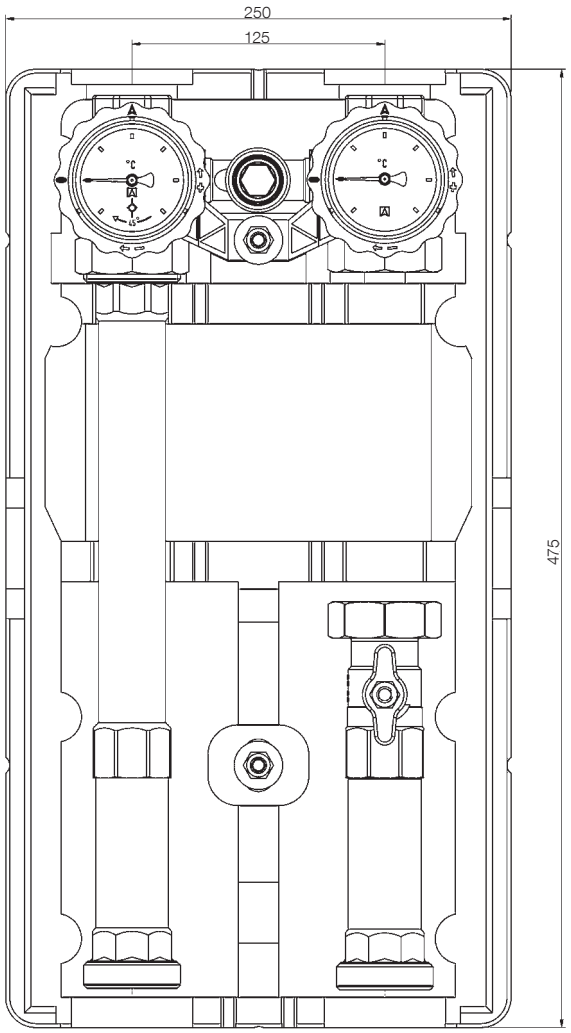
i
See page 167 for boiler manifolds for installation of several pump assemblies next to each other.

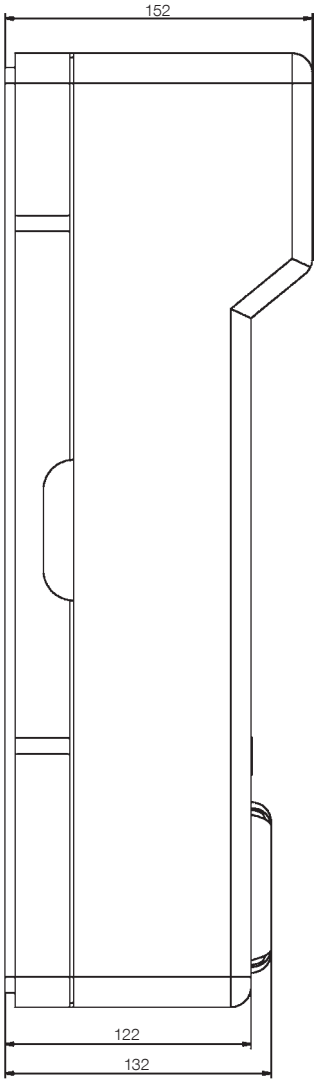
DG: G	Part no.	Price €
PrimoTherm® 180-1 DN 25 OM OP-UV G1½ x 1 female	77644	

Heating pump assembly PrimoTherm® 180-1

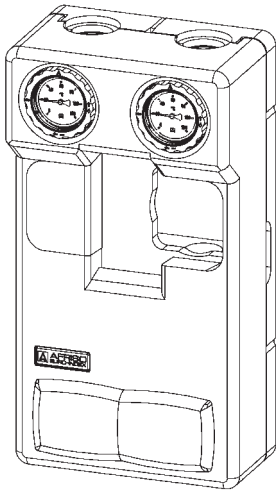
NEW

Dimensions (mm)

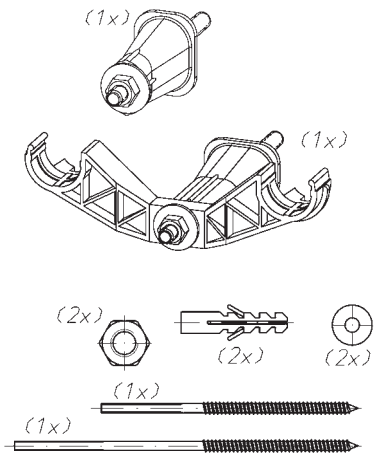




Insulation
The insulation is also used to package the product for safe transport.



Scope of delivery
Heating pump assembly (without circulation pump) completely assembled with connection and wall mounting kit.



Heating pump assembly PrimoTherm® 180-2 DN 25 3WM-SM GP04 G1½ x 1 female

NEW

- With integrated bypass valve
- Class A high energy efficiency pump
- High-grade, robust mixer with pre-adjustable bypass for maximum reliability
- Easy and fast installation:
  - Sophisticated wall mounting kit
  - Cable routing integrated in insulation

Application

Heating pump assembly for connection of boiler and pipe systems.

Description

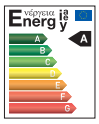
Complete, preassembled and tightness-tested heating pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (flow/hot) consists of:
- Circulation pump
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- System connection G1½ male (boiler), G1 female (heating circuit)
- Ball valve
- Pipe for length compensation with screw connection
- 3-way mixer with bypass and actuator

The return line consists of:
- Combination valve with gravity brake, thermometer in the hand wheel (blue mark, range 0/120 °C)
- 2 pipes for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

The insulation is also used to package the product for safe transport.

Technical specifications



Axis distance
125 mm

System connections
Boiler G1½ male
Heating circuit G1 female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 6 bar

Insulation
Polypropylene EPP

Circulation pump
Grundfos ALPHA2 L 25–60
Length 180 mm
Degree of protection IP 42

Supply voltage
AC 230 V, 50 Hz

Energy efficiency class
A

Power input
5–45 W

Pumping head/rate

Stage 1:	1.0 m/ 1.6 m³/h
Stage 2:	3.1 m/ 2.7 m³/h
Stage 3:	6.2 m/ 3.1 m³/h

Options

- Other circulation pumps

i

See page 167 for boiler manifolds for installation of several pump assemblies next to each other.

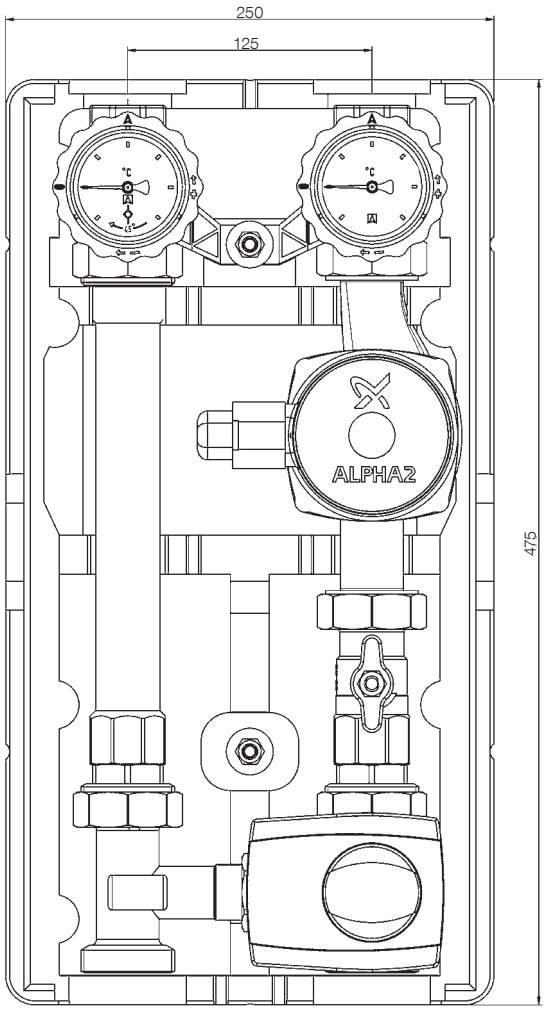
DG: G	Part no.	Price €
PrimoTherm® 180-2 DN 25 3WM-SM GP04 G1½ x 1 female	77641	

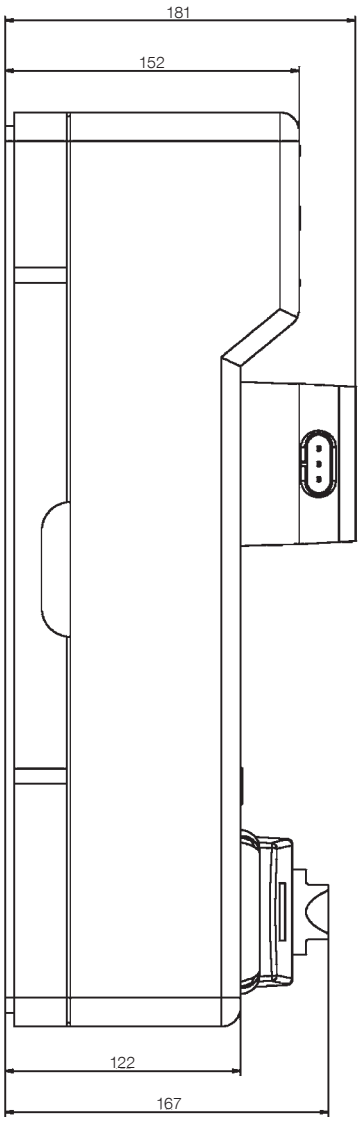
AFRISO EURO-INDEX

Heating pump assembly PrimoTherm® 180-2

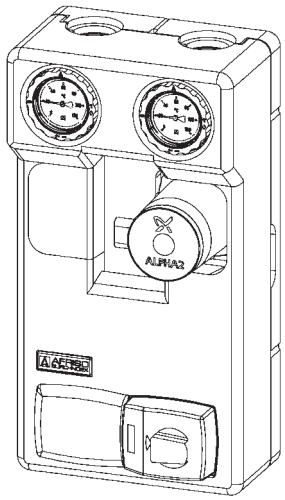
NEW

Dimensions (mm)

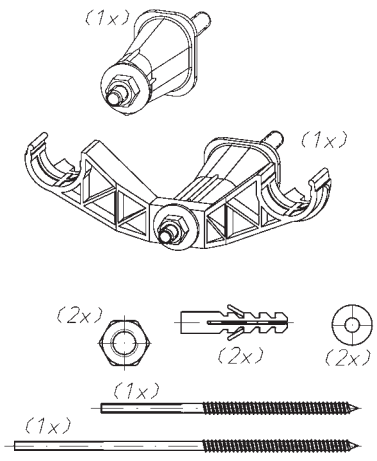




Insulation
The insulation is also used to package the product for safe transport.



Scope of delivery
Heating pump assembly completely assembled with circulation pump, connection and wall mounting kit.

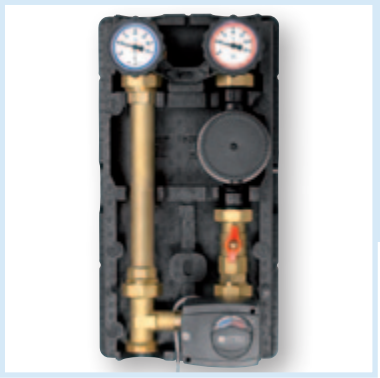


7

Heating pump assembly PrimoTherm® 180-2 DN 25 3WM-SM LP01 G1½ x 1 female

NEW

- **Preassembled, tightness-tested and heat-insulated assembly**
- **Modular system with flow at left or right**
- **Class A high energy efficiency pump**
- **High-grade, robust mixer**
- **Easy and fast installation:**
  - **Sophisticated wall mounting kit**
  - **Cable routing integrated in insulation**



Application

Heating pump assembly for connection of boiler and pipe systems.

Description

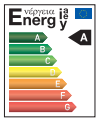
Complete, preassembled and tightness-tested heating pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (flow/hot) consists of:
- Circulation pump
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- System connection G1½ male (boiler), G1 female (heating circuit)
- Ball valve
- 3-way mixer with bypass and actuator

The return line consists of:
- Combination valve with gravity brake, thermometer in the hand wheel (blue mark, range 0/120 °C)
- Pipe for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

The insulation is also used to package the product for safe transport.

Technical specifications



Axis distance
125 mm

System connections
Boiler G1½ male
Heating circuit G1 female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 6 bar

Insulation
Polypropylene EPP

Circulation pump
Laing pump E4vario-25/180G
Length 180 mm

Supply voltage
AC 200–240 V, 50/60 Hz

Energy efficiency class
A

Power input
9–35 W

Pumping head/rate
3.7 m/2.5 m³/h

Options

- Other circulation pumps

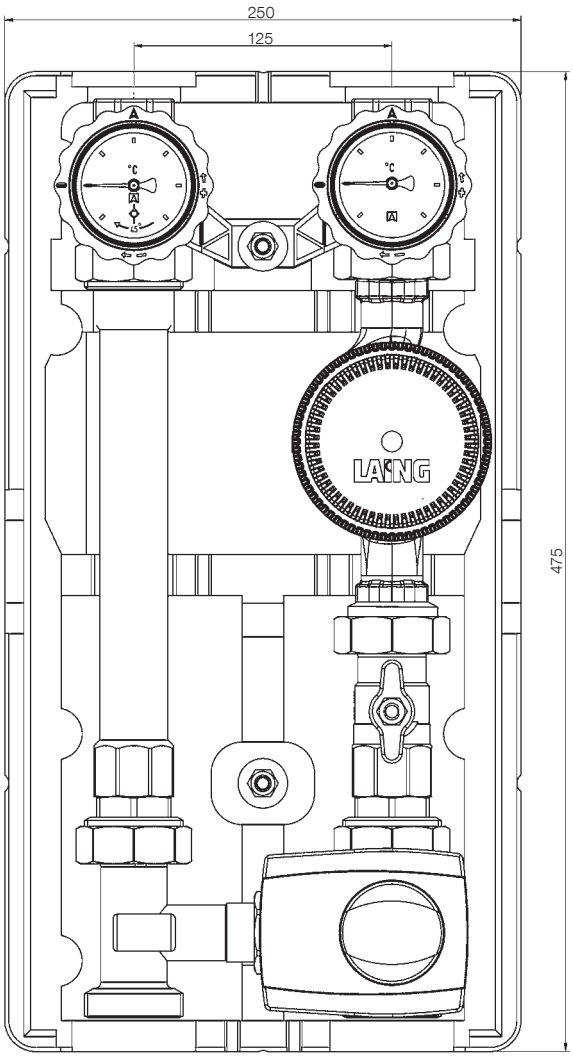
i
See page 167 for boiler manifolds for installation of several pump assemblies next to each other.

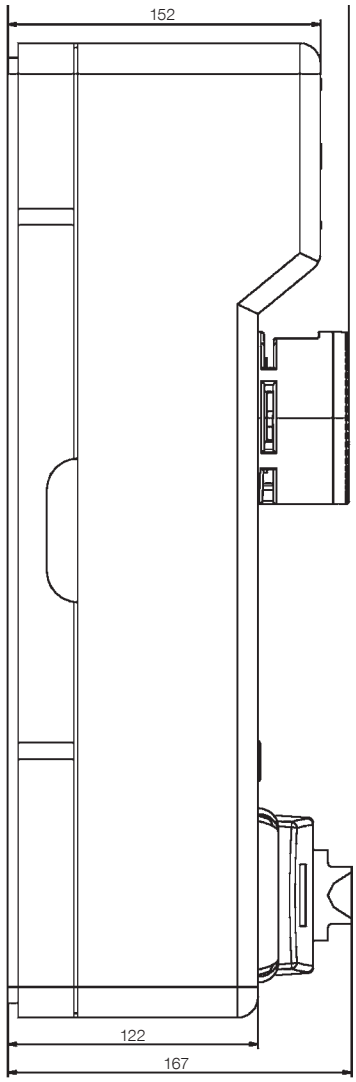
DG: G	Part no.	Price €
PrimoTherm® 180-2 DN 25 3WM-SM LP01 G1½ x 1 female	77614	

Heating pump assembly PrimoTherm® 180-2

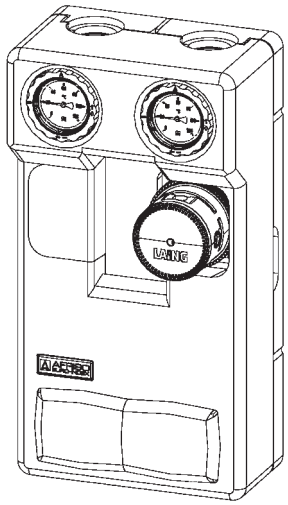
NEW

Dimensions (mm)

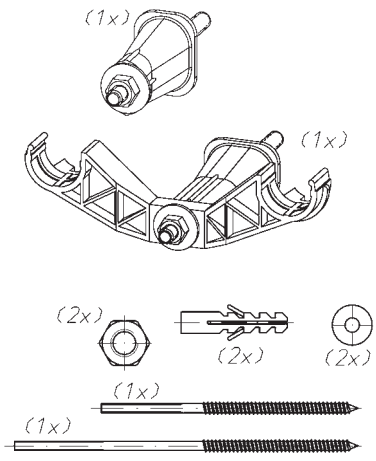




Insulation
The insulation is also used to package the product for safe transport.



Scope of delivery
Heating pump assembly completely assembled with circulation pump, connection and wall mounting kit.



7

Heating pump assembly PrimoTherm® 180-2 DN 25 3WM-SM OP G 1½ x 1 female

NEW

- **Preassembled, tightness-tested and heat-insulated assembly**
- **High-grade, robust mixer with pre-adjustable bypass for maximum reliability**
- **Virtually any standard pump can be installed without reworking of the insulation**
- **Easy and fast installation:**
  - **Sophisticated wall mounting kit**
  - **Cable routing integrated in insulation**

Application Heating pump assembly for connection of boiler and pipe systems.

Description Complete, preassembled and tightness-tested heating pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (flow/hot) consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- System connection G1½ male (boiler), G1 female (heating circuit)
- Ball valve
- 3-way mixer with bypass and actuator

The return line consists of:
- Combination valve with gravity brake, thermometer in the hand wheel (blue mark, range 0/120 °C)
- Pipe for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

The insulation is also used to package the product for safe transport.
A bypass valve can be retrofitted.

Technical specifications

Axis distance
125 mm

System connections
Boiler G1½ male
Heating circuit G1 female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 6 bar

Insulation
Polypropylene EPP

Options
- Circulation pumps

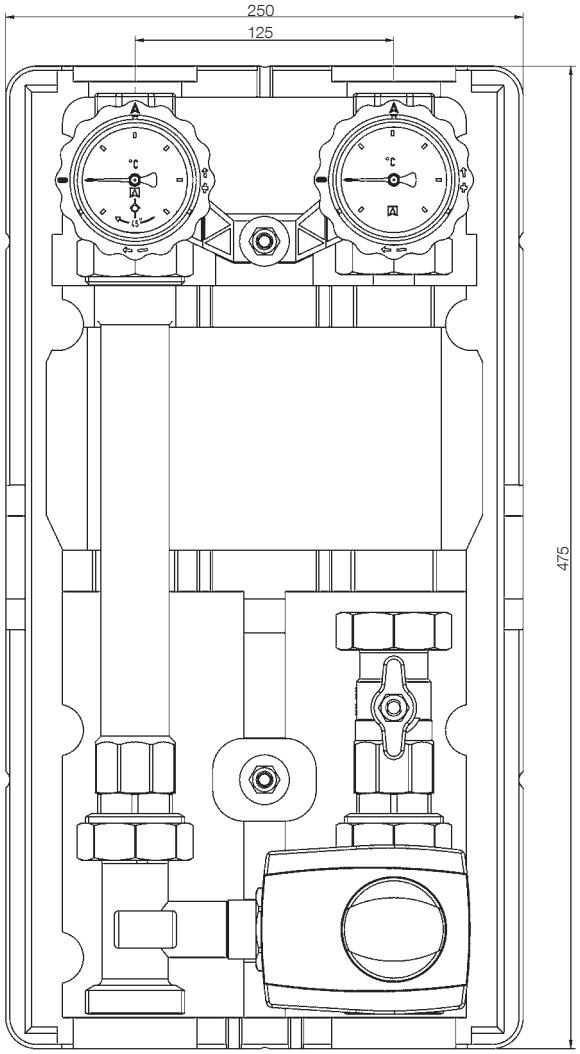
i
See page 167 for boiler manifolds for installation of several pump assemblies next to each other.

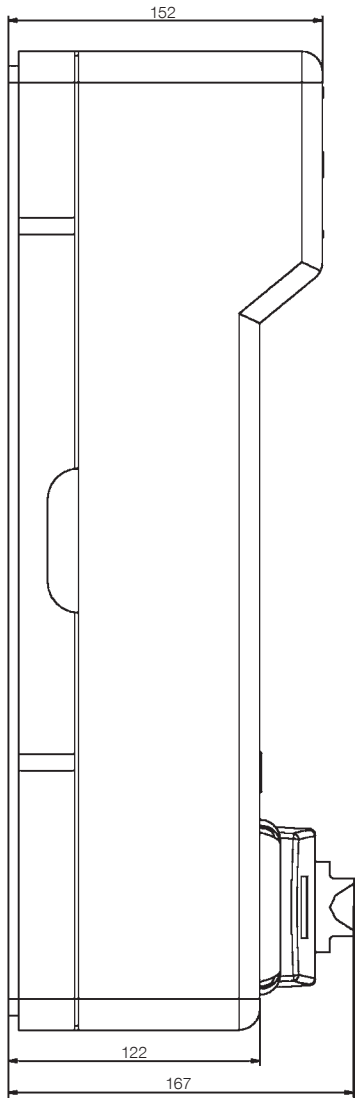
DG: G	Part no.	Price €
PrimoTherm® 180-2 DN 25 3WM-SM OP G1½ x 1 female	77615	

Heating pump assembly PrimoTherm® 180-2

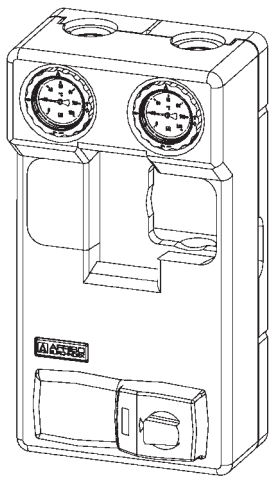
NEW

Dimensions (mm)

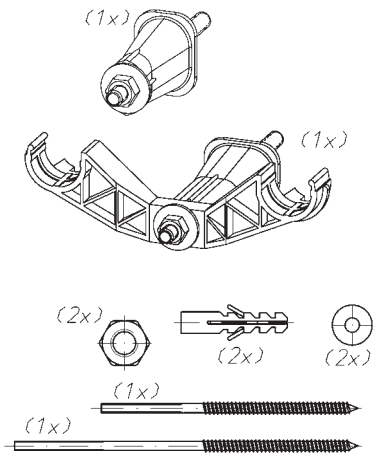




Insulation
The insulation is also used to package the product for safe transport.



Scope of delivery
Heating pump assembly (without circulation pump) completely assembled with connection and wall mounting kit.



Heating pump assembly PrimoTherm®
180-2 DN 25 3WM-SM OP-UV G1½ x 1 female

NEW

- With integrated bypass valve
- High-grade, robust mixer with pre-adjustable bypass for maximum reliability
- Virtually any standard pump can be installed without reworking of the insulation
- Easy and fast installation:
  - Sophisticated wall mounting kit
  - Cable routing integrated in insulation

Application

Heating pump assembly for connection of boiler and pipe systems.

Description

Complete, preassembled and tightness-tested heating pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (flow/hot) consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- System connection G1½ male (boiler), G1 female (heating circuit)
- Bypass valve
- Ball valve
- 3-way mixer with bypass and actuator

The return line consists of:
- Combination valve with gravity brake, thermometer in the hand wheel (blue mark, range 0/120 °C)
- Pipe for length compensation with screw connection
- System connection G1½ male (boiler), G1 female (heating circuit)

The insulation is also used to package the product for safe transport.

Technical specifications

Axis distance
125 mm

System connections
Boiler G1½ male
Heating circuit G1 female

Operating temperature range
Medium: T_{max} = 110 °C

System pressure
Max. 6 bar

Insulation
Polypropylene EPP

Options

- Circulation pumps

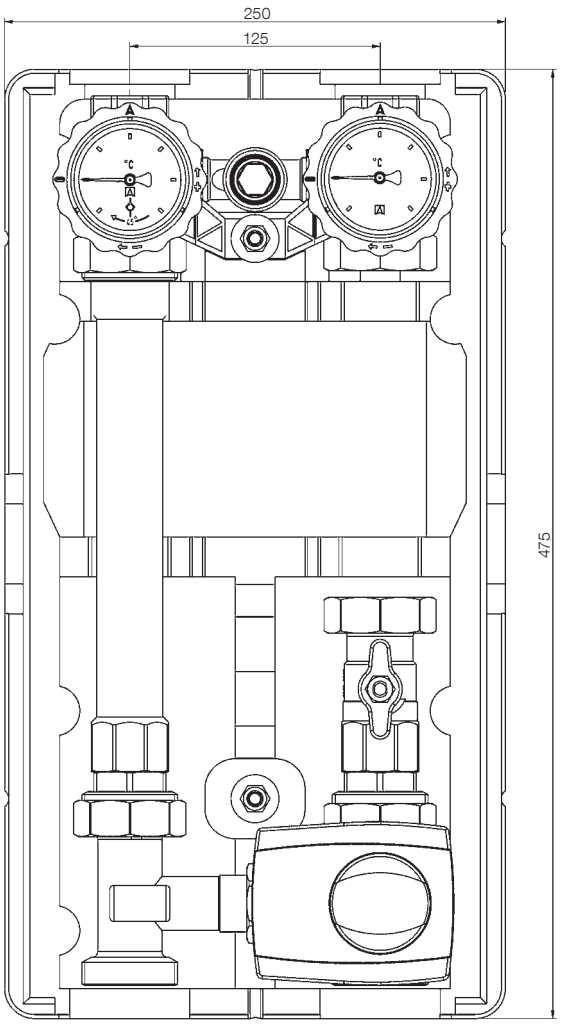
i
See page 167 for boiler manifolds for installation of several pump assemblies next to each other.

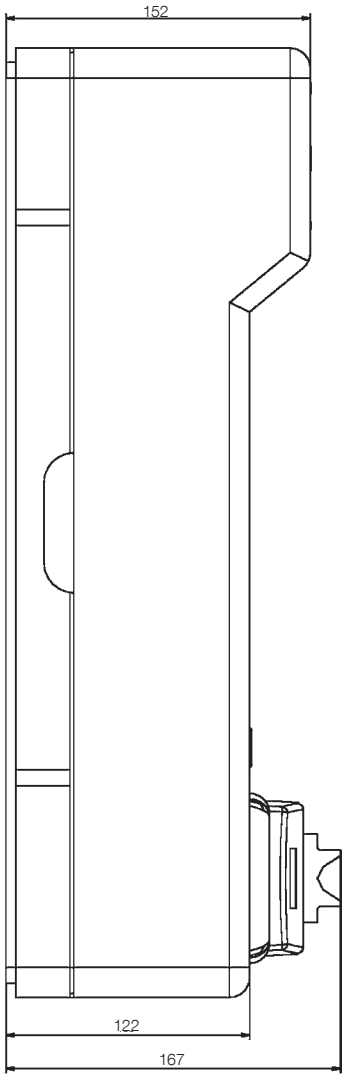
DG: G	Part no.	Price €
PrimoTherm® 180-2 DN 25 3WM-SM OP-UV G1½ x 1 female	77642	

Heating pump assembly PrimoTherm® 180-2

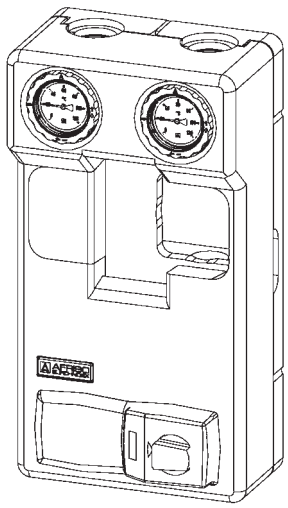
NEW

Dimensions (mm)

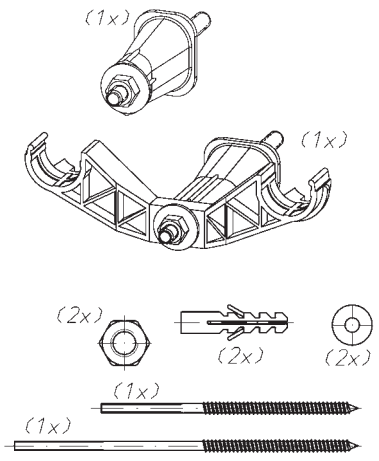




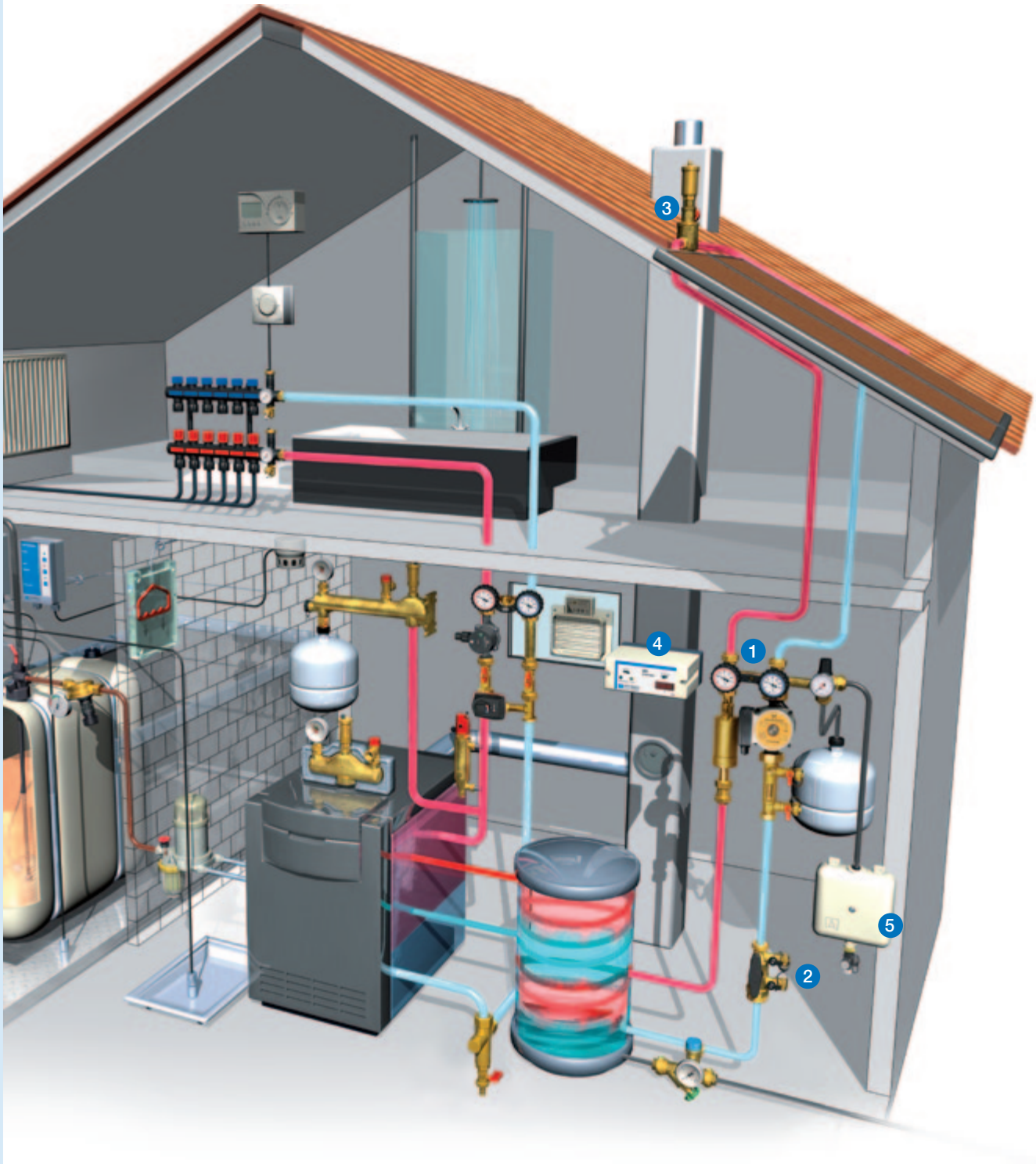
Insulation
The insulation is also used to package the product for safe transport.



Scope of delivery
Heating pump assembly (without circulation pump) completely assembled with connection and wall mounting kit.



Solar pump assemblies PrimoSol®



1. Solar pump assembly PrimoSol 130-4
2. Filling and flushing unit
3. Air separator combination Solar LKS
4. Solar controller
5. Collector tank for solar liquid

Overview of versions
Solar pump assemblies PrimoSol®

	PrimoSol® 130 with pump length 130 mm			
	Solar pump line	**Solar pump assemblies**		
Version	**PrimoSol® 130-1**	**PrimoSol® 130-2**	**PrimoSol® 130-3**	**PrimoSol® 130-4**
Catalogue page	**188**	**190**	**192**	**194**
Part no.	**77775**	**77776**	**77777**	**77778**
Circulation pump	•	•	•	•
Ball valve with gravity brake, thermometer (blue) and connection for safety group assembly	•	•	•	•
Ball valve with gravity brake, thermometer (red)	---	•	•	•
Flow meter with ball valve	•	•	•	•
Flow meter with filling and flushing unit	•	---	•	•
Vent pot in flow line	---	---	---	•
Safety group assembly with safety valve and pressure gauge	•	•	•	•
Insulation	•	•	•	•
Wall mounting	•	•	•	•

i

We provide a great variety of customer-specific solar pump assemblies for OEMs.

Please enquire.

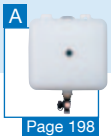
Efficient solar thermal systems are taking centre stage in heating system design as a result of rising energy costs, new legislation and, most important, increasing environmental awareness. Advanced solar thermal systems can be easily integrated into the heating system concepts for new buildings and for the conversion of existing systems.

AFRISO offers a comprehensive range of components for solar thermal systems for maximum reliability – all from a single supplier. The innovative solar pump assemblies PrimoSol® are made to meet the requirements of the solar systems available on the market.

The preassembled, tightness-tested and heat-insulated assemblies are extremely easy and fast to install. The offer is complemented by a comprehensive range of accessories.

Solar pump line PrimoSol® 130-1

- **Preassembled, tightness-tested and heat-insulated assembly**
- **Integrated filling and flushing unit**
- **Easy and fast installation**
- **Maximum reliability**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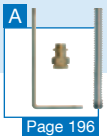
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Application

Solar pump line for connection of collector and storage tank in intrinsically safe, sealed solar thermal systems. PrimoSol® 130-1 circulates heat transfer fluids such as water/glycol mixtures in the system.

Description

Complete, preassembled and tightness-tested solar pump assembly with all required safety and functional components, including form-fit insulation.

PrimoSol® 130-1 consists of:
- Circulation pump
- Flow meter with ball valve for shut-off, pump side with flange and union nut G1½. Measuring range: 2–12 l/min. With integrated filling and flushing unit, system connection for Cu pipe Ø 22 mm.
- Combination valve with system connection for Cu pipe Ø 22 mm, pump side with flange and union nut G1½. With adjustable gravity brake and thermometer in the hand wheel (blue mark, range 0/120 °C).
- Safety group assembly for connection to expansion vessel. With solar safety valve 6 bar, outlet G¾ female thread, pressure gauge Ø 63 mm, 0/10 bar, hard-soldered, mounting valve.

The insulation is also used to package the product for safe transport. The safety valve of the safety group assembly complies with Pressure Equipment Directive 97/23/EC.

Technical specifications

System connections
Compression fittings for Cu pipe Ø 22 mm

Operating temperature range
Ambeint: T_{max} = 40 °C
Medium: T_{max} = 120 °C, short-term T_{max} = 160 °C

System pressure
Max. 6 bar

Flow meter
2–12 l/min

Insulation
Polypropylene EPP

Circulation pump
Grundfos Solar 25–65
Length: 130 mm
Degree of protection IP 42

Supply voltage
AC 230 V, 50 Hz

Power input/pumping head/rate
Stage I: 50 W/4.3 m/1.5 m³/h
Stage II: 52 W/5.5 m/2.0 m³/h

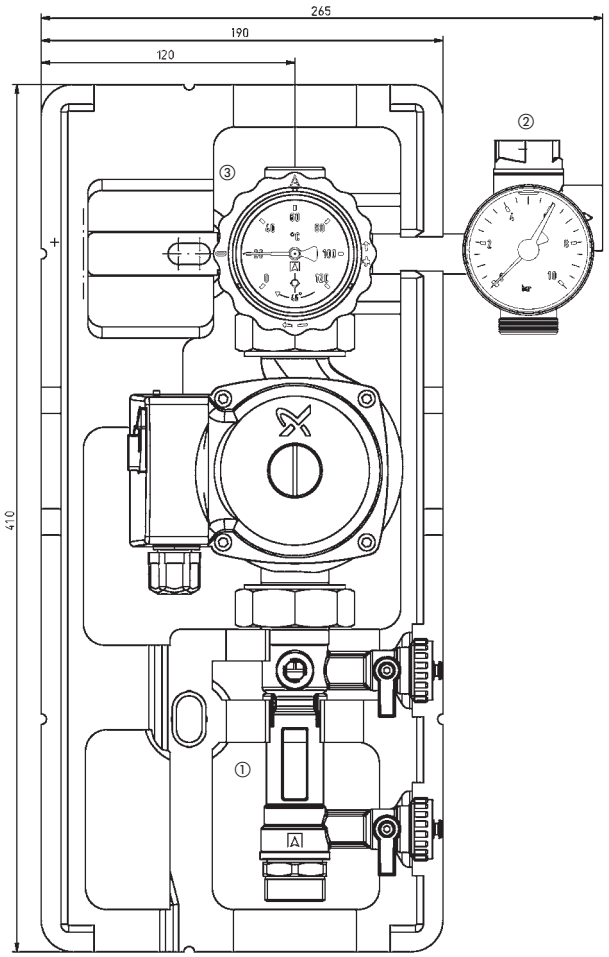
Options

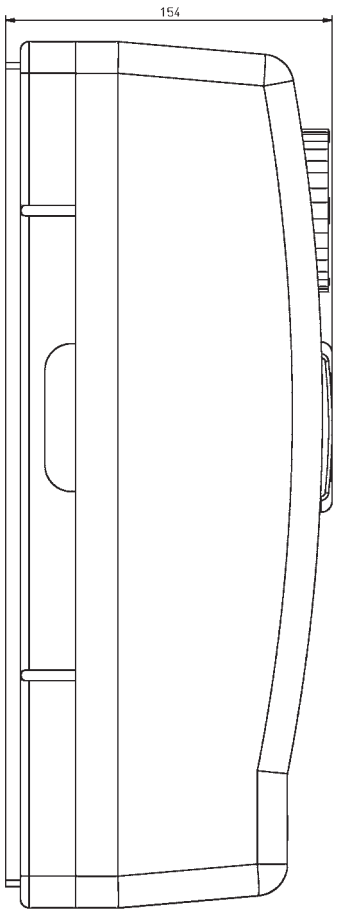
- Circulation pump UPS 25–80 with 8 m pumping head
- Flow meter 4–16, 8–28 and 8–38 l/min
- Other system connections

DG: G	Part no.	**Price €**
PrimoSol® 130-1	**77775**	

Solar pump line PrimoSol® 130-1

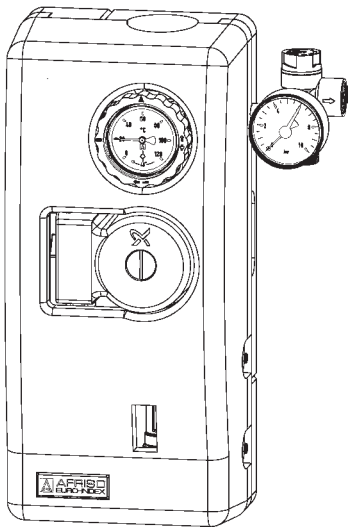
Dimensions (mm)



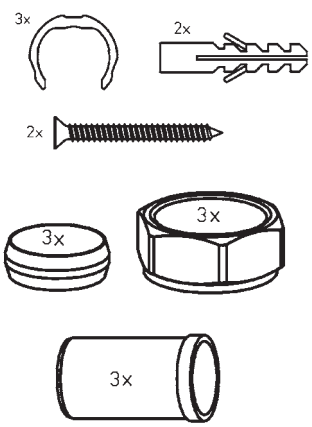


① Flow meter with ball valve as well as filling and flushing unit
② Safety group assembly
③ Combination valve with thermometer (return/cold)

Insulation
The insulation is also used to package the product for safe transport.

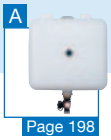


Scope of delivery
Solar pump line completely preassembled with circulation pump and mounting accessories



Solar pump assembly PrimoSol® 130-2

- **Preassembled, tightness-tested and heat-insulated assembly**
- **Ideal for cost-effective retrofitting of existing systems**
- **Easy and fast installation**
- **Maximum reliability**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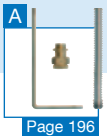
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Application

Solar pump assembly for connection of collector and storage tank in intrinsically safe, sealed solar thermal systems. PrimoSol® 130-2 circulates heat transfer fluids such as water/glycol mixtures in the system.

Description

Complete, preassembled and tightness-tested solar pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (return/cold) consists of:
- Circulation pump
- Flow meter with ball valve for shut-off, pump side with flange and union nut G1½. Measuring range: 2–12 l/min. System connection for Cu pipe Ø 22 mm.
- Combination valve with system connection for Cu pipe Ø 22 mm, pump side with flange and union nut G1½. With adjustable gravity brake and thermometer in the hand wheel (blue mark, range 0/120 °C)
- Safety group assembly with connection for expansion vessel. With solar safety valve 6 bar, outlet G¾ female thread, pressure gauge Ø 63 mm, 0/10 bar, hard-soldered, mounting valve.

The flow line consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- Pipe for length compensation with system connection for Cu pipe Ø 22 mm.

The insulation is also used to package the product for safe transport.
The safety valve of the safety group assembly complies with Pressure Equipment Directive 97/23/EC

Technical specifications

Axis distance
100 mm

System connections
Compression fittings for Cu pipe Ø 22 mm

Operating temperature range
Ambient: T_{max} = 40 °C
Medium: T_{max} = 120 °C, short-term T_{max} = 160 °C

System pressure
Max. 6 bar

Flow meter
2–12 l/min

Insulation
Polypropylene EPP

Circulation pump
Grundfos Solar 25–65
Length: 130 mm

Degree of protection IP 42

Supply voltage
AC 230 V, 50 Hz

Power input/pumping head/rate
Stage I: 50 W/4.3 m/1.5 m³/h
Stage II: 52 W/5.5 m/2.0 m³/h

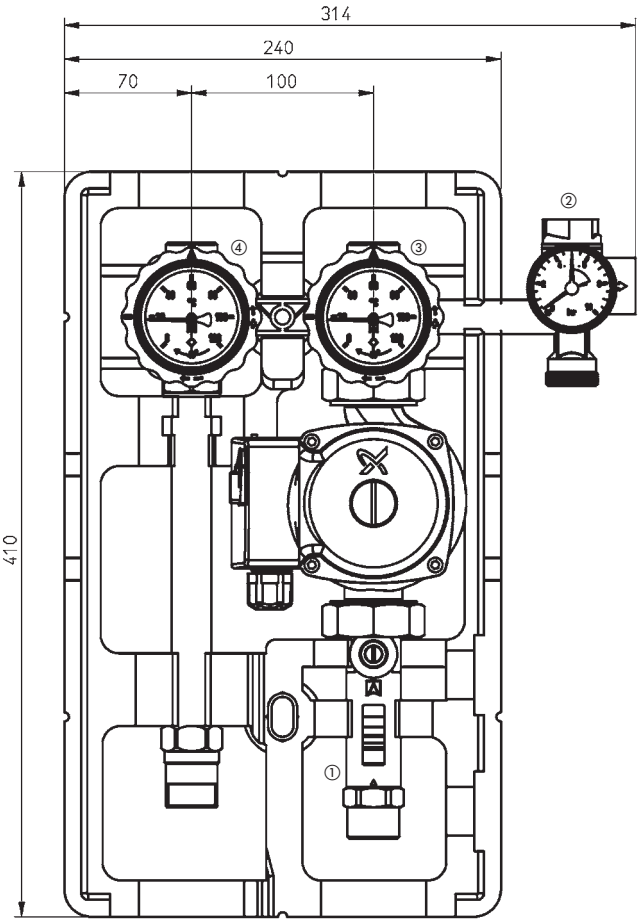
Options

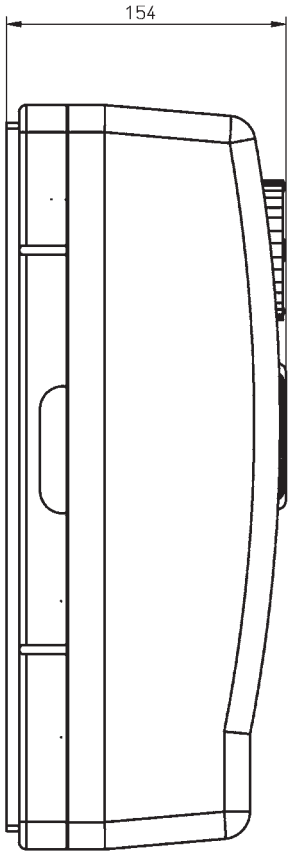
- Circulation pump UPS 25–80 with 8 m pumping head
- Flow meter 4–16, 8–28 and 8–38 l/min
- Other system connections

DG: G	Part no.	Price €
PrimoSol® 130-2	**77776**	

Solar pump assembly PrimoSol® 130-2

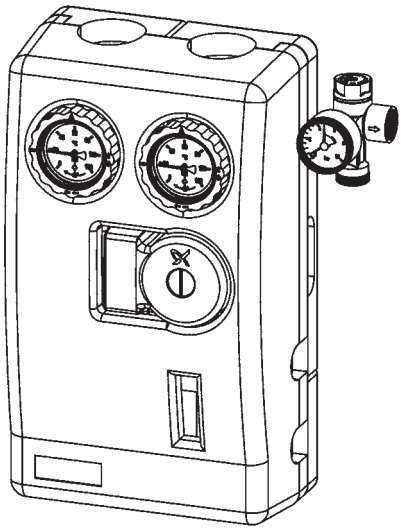
Dimensions (mm)



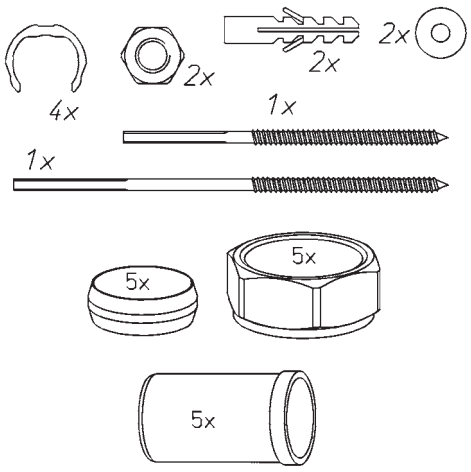


① Flow meter with ball valve
② Safety group assembly
③ Combination valve with thermometer (return/cold)
③ Combination valve with thermometer (flow)

Insulation
The insulation is also used to package the product for safe transport.

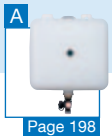


Scope of delivery
Solar pump line completely preassembled with circulation pump and mounting accessories



Solar pump assembly PrimoSol® 130-3

- **Preassembled, tightness-tested and heat-insulated assembly**
- **Integrated filling and flushing unit**
- **Easy and fast installation**
- **Maximum reliability**
- **Suitable accessories**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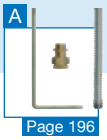
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Application

Solar pump assembly for connection of collector and storage tank in intrinsically safe, sealed solar thermal systems. PrimoSol® 130-3 circulates heat transfer fluids such as water/glycol mixtures in the system.

Description

Complete, preassembled and tightness-tested solar pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (return/cold) consists of:
- Circulation pump
- Flow meter with ball valve for shut-off, pump side with flange and union nut G1½. Measuring range: 2–12 l/min. With integrated filling and flushing unit, system connection for Cu pipe Ø 22 mm.
- Combination valve with system connection for Cu pipe Ø 22 mm, pump side with flange and union nut G1½. With adjustable gravity brake and thermometer in the hand wheel (blue mark, range 0/120 °C).
- Safety group assembly with connection for expansion vessel. With solar safety valve 6 bar, outlet G¾ female thread, pressure gauge Ø 63 mm, 0/10 bar, hard-soldered, mounting valve.

The flow line consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- Pipe for length compensation with system connection for Cu pipe Ø 22 mm.

The insulation is also used to package the product for safe transport.
The safety valve of the safety group assembly complies with Pressure Equipment Directive 97/23/EC

Technical specifications

Axis distance
100 mm

System connections
Compression fittings for
Cu pipe Ø 22 mm

Operating temperature range
Ambient: T_{max} = 40 °C
Medium: T_{max} = 120 °C,
short-term Tmax = 160 °C

System pressure
Max. 6 bar

Flow meter
2–12 l/min

Insulation
Polypropylene EPP

Circulation pump
Grundfos Solar 25–65
Length: 130 mm
Degree of protection IP 42

Supply voltage
AC 230 V, 50 Hz

Power input/pumping head/rate
Stage I: 50 W/4.3 m/1.5 m³/h
Stage II: 52 W/5.5 m/2.0 m³/h

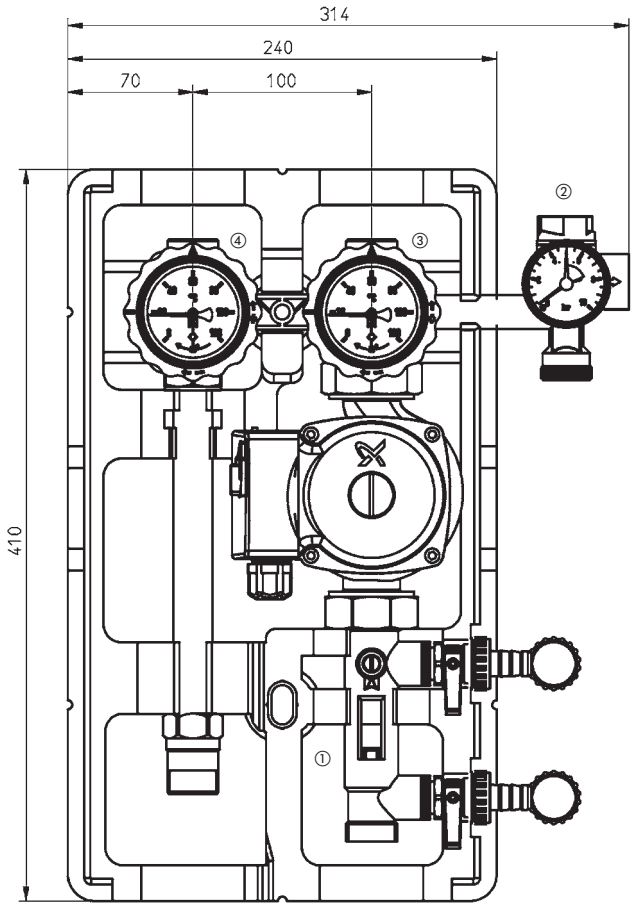
Options

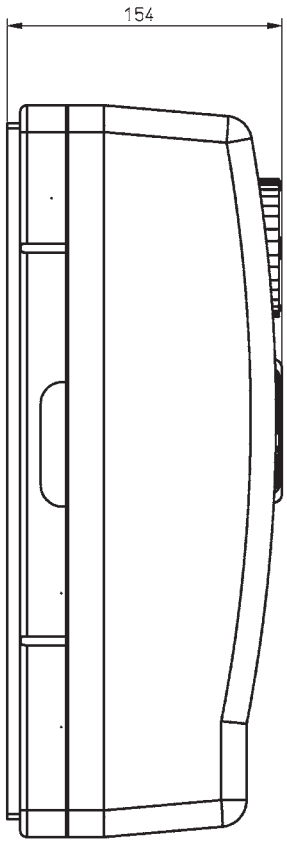
- Circulation pump UPS 25–80 with 8 m pumping head
- Flow meter 4–16, 8–28 and 8–38 l/min
- Other system connections

DG: G	Part no.	Price €
PrimoSol® 130-3	**77777**	

Solar pump assembly PrimoSol® 130-3

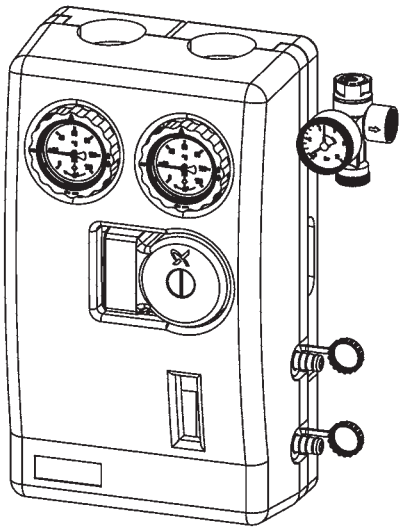
Dimensions (mm)



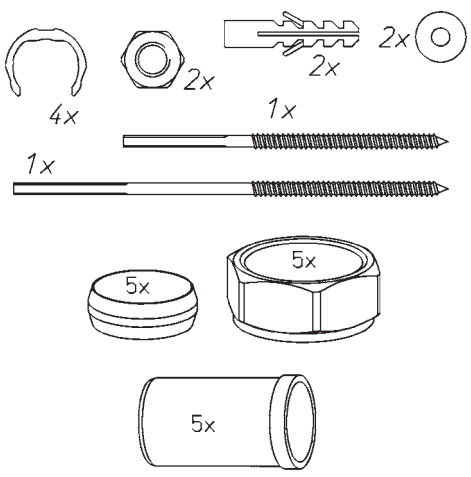


① Flow meter with ball valve as well as filling and flushing unit
② Safety group assembly
③ Combination valve with thermometer (return/cold)
③ Combination valve with thermometer (flow)

Insulation
The insulation is also used to package the product for safe transport.

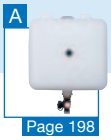


Scope of delivery
Solar pump line completely preassembled with circulation pump and mounting accessories



Solar pump assembly PrimoSol® 130-4

- **Preassembled, tightness-tested and heat-insulated assembly**
- **Flow meter with ball valve**
- **Integrated filling and flushing unit**
- **Vent pot to remove the gas from the heat transfer fluid in the flow line**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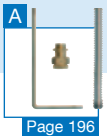
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Application

Solar pump assembly for connection of collector and storage tank in intrinsically safe, sealed solar thermal systems. PrimoSol® 130-4 circulates heat transfer fluids such as water/glycol mixtures in the system.

Description

Complete, preassembled and tightness-tested solar pump assembly with all required safety and functional components, including form-fit insulation.

The pump line (return/cold) consists of:
- Circulation pump
- Flow meter with ball valve for shut-off, pump side with flange and union nut G1½. Measuring range: 2–12 l/min. With integrated filling and flushing unit, system connection for Cu pipe Ø 22 mm.
- Combination valve with system connection for Cu pipe Ø 22 mm, pump side with flange and union nut G1½. With adjustable gravity brake and thermometer in the hand wheel (blue mark, range 0/120 °C).
- Safety group assembly with connection for expansion vessel. With solar safety valve 6 bar, outlet G¾ female thread, pressure gauge Ø 63 mm, 0/10 bar, hard-soldered, mounting valve.

The flow line consists of:
- Combination valve with thermometer in the hand wheel (red mark, range 0/120 °C)
- Pipe for length compensation with screw connection
- Vent pot to remove the gas from the heat transfer fluid with system connection for Cu pipe Ø 22 mm. Transparent hose 200 mm as venting aid.

The insulation is also used to package the product for safe transport.
The safety valve of the safety group assembly complies with Pressure Equipment Directive 97/23/EC

Technical specifications

Axis distance
100 mm

System connections
Compression fittings for
Cu pipe Ø 22 mm

Operating temperature range
Ambeint: T_{max} = 40 °C
Medium: T_{max} = 120 °C,
short-term T_{max} = 160 °C

System pressure
Max. 6 bar

Flow meter
2–12 l/min

Insulation
Polypropylene EPP

Circulation pump
Grundfos Solar 25–65
Length: 130 mm
Degree of protection IP 42

Supply voltage
AC 230 V, 50 Hz

Power input/pumping head/rate
Stage I: 50 W/4.3 m/1.5 m³/h
Stage II: 52 W/5.5 m/2.0 m³/h

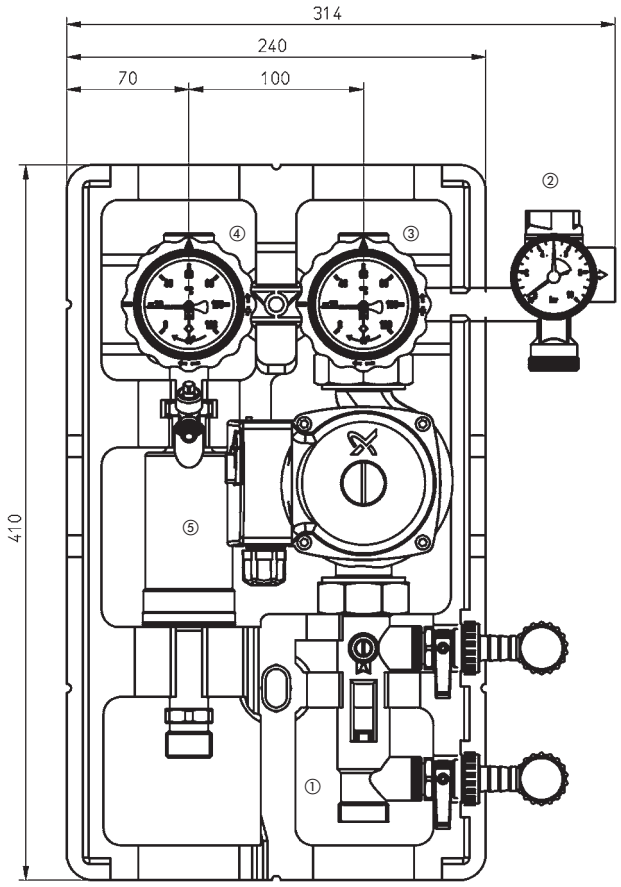
Options

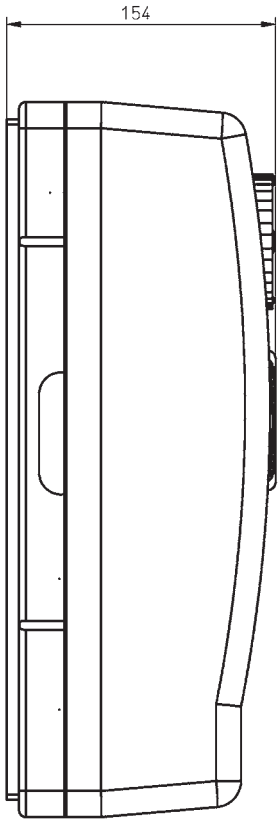
- Circulation pump UPS 25–80 with 8 m pumping head
- Flow meter 4–16, 8–28 and 8–38 l/min
- Other system connections

DG: G	Part no.	**Price €**
PrimoSol® 130-4	**77778**	

Solar pump assembly PrimoSol® 130-4

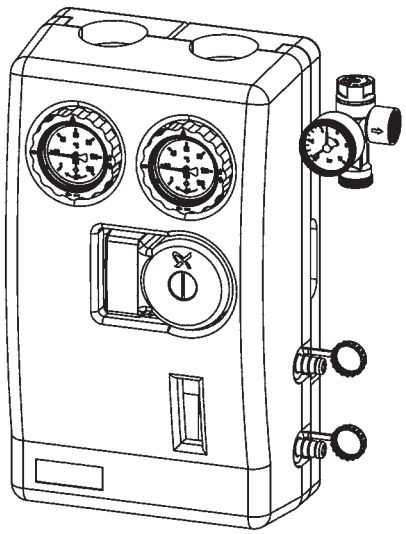
Dimensions (mm)



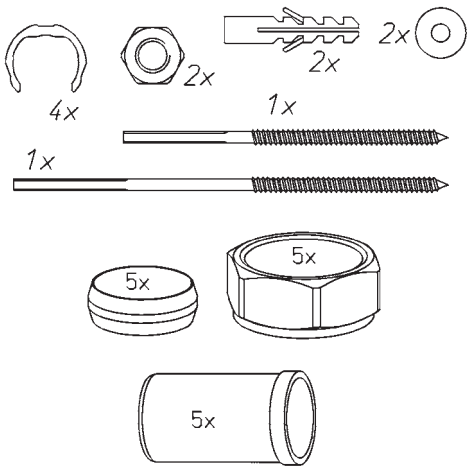


① Flow meter with ball valve as well as filling and flushing unit
② Safety group assembly
③ Combination valve with thermometer (return/cold)
③ Combination valve with thermometer (flow)
⑤ Vent pot for fast and easy venting, especially during filling of the system

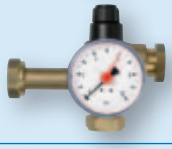
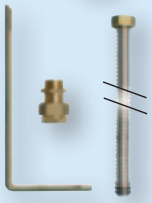
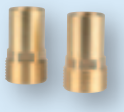
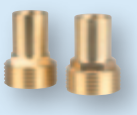
Insulation
The insulation is also used to package the product for safe transport.



Scope of delivery
Solar pump line completely preassembled with circulation pump and mounting accessories.



Spare parts and accessories for solar pump assemblies PrimoSol®

DG: G	Description	Specifications	Part no.	Price €
	Flow meter with filling and flushing unit Ball valve, flange with union nut G1½, compression fitting Ø 22 mm. Length 137 mm	Measuring range 2–12 l/min	77782	
	Flow meter With flange incl. union nut G1½, compression fitting Ø 22 mm. Length 100 mm	Measuring range 2–12 l/min	77783	
		Measuring range 8–28 l/min	77784	
		Measuring range 8–38 l/min	77785	
	Flow meter with ball valve Flange with union nut G1½, compression fitting Ø 22 mm. Length 120 mm	Measuring range 2–12 l/min	77786	
		Measuring range 4–16 l/min	77787	
		Measuring range 8–28 l/min	77788	
	Ball valve return (blue mark) With integrated adjustable gravity brake and connection for safety group assembly.	Thermometer in the hand wheel, range 0/120 °C.	77789	
	Ball valve flow (red mark) With integrated adjustable gravity brake.	Thermometer in the hand wheel, range 0/120 °C.	77790	
	**Safety group assembly** For PrimoSol®. Connection for expansion vessel with compression fitting Ø 22 mm.	Solar safety valve 6 bar, pressure gauge 0/10 bar, hard-soldered	77791	
	**Connection kit** For diaphragm expansion vessels (MAG) suitable for safety group assembly for PrimoSol®.	Consisting of: ▪ Bracket for wall mounting ▪ Flex pipe (500 mm, 1 union nut G¾ and seals) ▪ MAG mounting valve G¾ ▪ Mounting accessories	77792	
	MAG mounting valve To separate the expansion vessel from the system.	G¾ female thread x G¾ male thread	77793	
	Flex pipe For safety group assembly.	Length 500 mm	77794	
		Length 1000 mm	77795	
	**Adapter kit G¾** (2 pieces) For PrimoSol® compression fittings Ø 22 mm	Adapter ▪ G¾ male thread ▪ Ø 22 for compression fitting	**40433**	
	**Adapter kit G 1** (2 pieces) For PrimoSol® compression fittings Ø 22 mm	Adapter ▪ G1 male thread ▪ Ø 22 for compression fitting	**40434**	
	Screw connection kit Ø 15 (2 pieces) For PrimoSol® compression fittings Ø 22 mm	Compression adapter for Cu pipe Ø 15	**40435**	
	Screw connection kit Ø 18 (2 pieces) For PrimoSol® compression fittings Ø 22 mm	Compression adapter for Cu pipe Ø 18	**40436**	

Vents for solar thermal systems

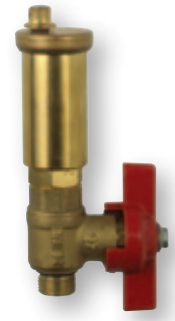
Air vents for solar systems

Description Air vent for use in solar thermal systems with operating temperatures of up to 150 °C and operating pressures of up to 6 bar. Housing made of high-precision turned brass, functional parts made of highly temperature-resistant plastic.
Connection G3/8 with O ring seal.

Air vents for solar systems

Air vents for solar systems with valve

Description Air vent for use in solar thermal systems with operating temperatures of up to 150 °C and operating pressures of up to 6 bar. Housing made of high-precision turned brass, functional parts made of highly temperature-resistant plastic.
Completely assembled with ball valve as shut-off unit.
Connection G3/8 with O ring seal.



Air vents
for solar systems with valve

Air separators

Description Air separator for use in solar thermal systems or in sealed heating systems as per EN 12828 with operating temperatures of up to 150 °C and operating pressures of up to 6 bar. The air separator removes the air from the heat transfer fluid. The air collects in the housing and can be released via a air vent or a manual vent valve connected at the G3/8 threaded connection.
Compression fitting connection for Cu pipes Ø 22 mm at both sides.

Air separator

Air separator combination Solar LKS

Description Air separator, completely preassembled with air vents for solar systems, for use in solar thermal systems with operating temperatures of up to 150 °C and operating pressures of up to 6 bar. The air separator removes the air from the heat transfer fluid. The air collects in the housing and can be released via the air vent for solar systems connected at the G3/8 connection by actuating the valve.
Compression fitting for Cu pipe Ø 22 mm at both ends.

Air separator combination
Solar LKS

DG: G	Connection			Part no.	**Price €**
Air vents for solar systems	G3/8	1	25	**77900**	
Air vents for solar systems with valve	G3/8	1	25	**77996**	
Air separator	Compression fitting Ø 22	1	-	**77851**	
Air separator combination Solar LKS	Compression fitting Ø 22	1	1	**77850**	

Accessories for solar thermal systems

Filling and flushing unit

Description

Filling and flushing unit for solar thermal systems.
With ball valve, two boiler filling and drain valves KFE G¾, process connection G1 with union nut and compression fittings at both ends Ø 22 mm. Length 108 m.

Filling and flushing unit

Diaphragm safety valve MSS

Description

For solar thermal systems to protect against overpressure. Suitable for water, water/Antifrogen mixtures, water/Tyfocor mixtures and liquids of fluid groups 1 and 2 (Pressure Equipment Directive, Art. 9).

Technical specifications

Connections
Inlet: Rp½
Outlet: Rp¾

Cap
PA6, black

Opening pressure
6 bar

Dimensions
W x H x D: 35 x 60 x 45 mm

Housing
Brass CW617 N

Operating temperature range
Medium: -20/+160 °C

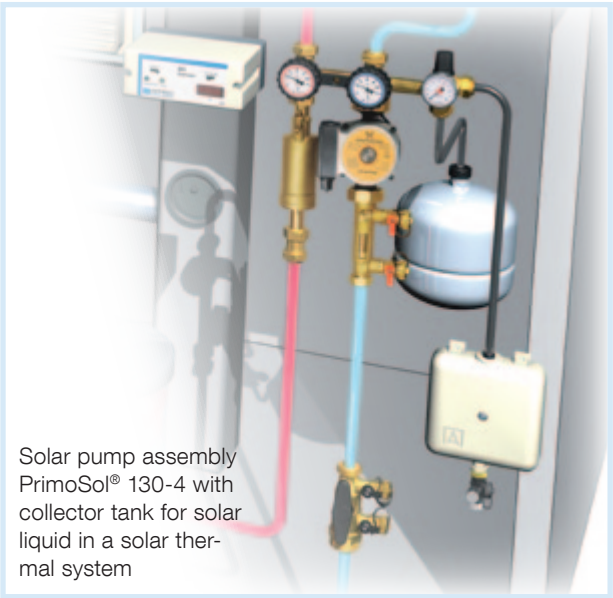
Diaphragm safety valve

Collector tank for solar liquid

Description

Collector tank for connection to, for example, diaphragm safety valve MSS or safety group assembly PrimoSol®. With integrated drain valve. Collects groundwater polluting solar liquid that may escape in the case of system overpressure. Volume 9 l.

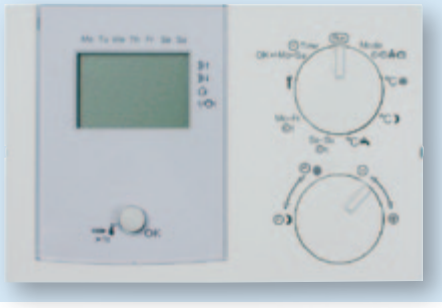
Collector tank for solar liquid



Solar pump assembly PrimoSol® 130-4 with collector tank for solar liquid in a solar thermal system

DG: G			Part no.	**Price €**
Filling and flushing unit	1	1	**77781**	
Diaphragm safety valve MSS	1	1	**42330**	
Collector tank for solar liquid	1	1	**77796**	

Outdoor temperature compensated heating controllers



Application

For optimised control of the heating system and a constant room temperature, independent of the outdoor temperature. The controllers compare all incoming measured values with the preset and the calculated setpoints for optimum interaction of all the individual components of a heating system. On the basis of these optimised values, the burner or the circulation pump are switched on or off and the mixer motor opens or closes as required. Ideal also for underfloor heating systems.

Description

AFRISO Control K1 HQN 2/K1

Outdoor temperature compensated digital controller for burner control, hot water temperature control or mixer control. The HQN heating controller features an analogue timer (day program). Outdoor temperature sensor AFS and flow temperature sensor VFAS are included. Remote control FBR1 with integrated room temperature sensor as well as tank sensor SPFS for hot water control are available as accessories.

LAGO 0321

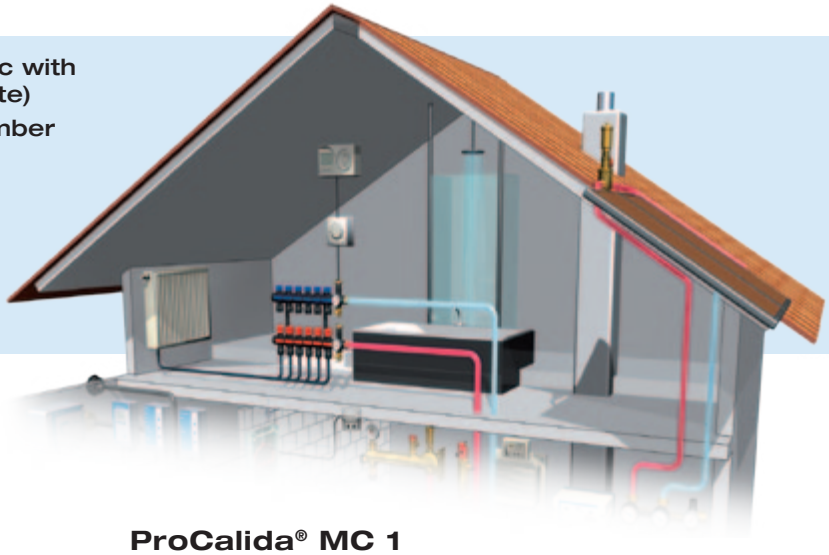
Outdoor and indoor (optional) temperature compensated controller in wall mounting housing, with digital timer.
LAGO 0321 contains the controller for a single-stage heat generator, for a drinking water system and for two heating circuits (one mixed heating circuit maximum). The pump relay of the direct heating circuit can be alternatively used for other functions such as circulation pump, return flow increase or collector pump. Electrical connection via screw terminals. Outdoor temperature sensor AF, surface sensor for flow line VF and boiler/tank sensor KF/SPF are included. Remote control FBR 2 (on request) with integrated room temperature sensor is available as an accessory.

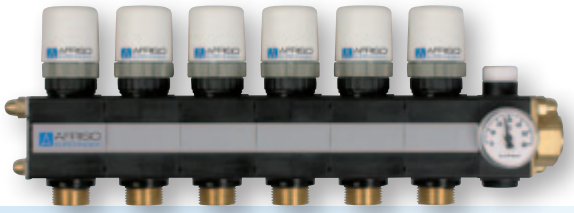
Remote control FBR 1 with integrated room sensor. With rotary knob for heating, timer, reduced temperature and rotary knob for changing the room temperature setpoint by ± 5 °C with reference to normal mode.

DG: G			Part no.	Price €
AFRISO Control HQN 2/K1 with sensors AFS and VFAS	1	-	69306	
LAGO 0321 with sensor AF, VF and KF/SPF	1	-	69292	
Spare parts/accessories				
Outdoor temperature sensor AFS, 1k for HQN	1	-	69249	
Outdoor temperature sensor AF, 5k for LAGO 0321	1	-	69327	
Surface sensor for flow line VFAS, 1k for HQN	1	-	69250	
Surface sensor for flow line VF, 5k for LAGO 0321	1	-	69325	
Boiler/tank sensor KFS/SPFS, 1k for HQN	1	-	69309	
Boiler/tank sensor KF/SPF, 5k for LAGO 0321	1	-	69326	

Distribution manifolds ProCalida® for heating/cooling and geothermal systems

- **Complex distribution manifolds made of plastic with excellent insulation characteristics (condensate)**
- **Can be combined to account for type and number of heating circuits**
- **Pre-assembled, ready to be connected and tightness-tested**
- **Great number of versions: Can be combined with thermometers, flow meters, thermo drives, connection valves and many other components.**





ProCalida® MC 1

ProCalida® MC 1

Modular, very short, robust plastic heating circuit or cooling circuit manifold with up to 12 heating circuits. Return with stroke valves for actuators, flow line either with shut-off valves or flow meters. Temperature indication at flow and return lines. Main connection with union nut G1. Manual vent, filling and drain valve or air vent can be mounted. With dovetail guide at both sides for fast mounting to the wall bracket and maximum installation flexibility.

Heating circuit
Distance: 50 mm
Connection: G¾ eurocone

Operating temperature range
Medium: Max. 60 °C at 6 bar
or max. 90 °C at 3 bar

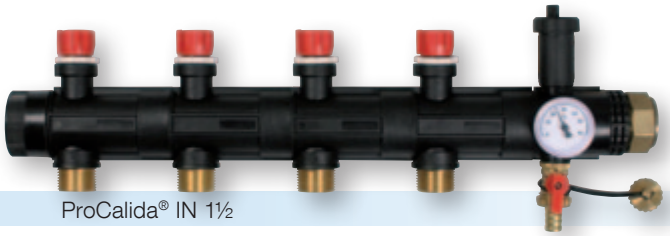
ProCalida® EF 1

ProCalida® EF 1

Modular, very short plastic heating circuit or cooling circuit manifold with up to 12 heating circuits. Return with stroke valves for actuators, flow line either with shut-off valves or flow meters. Temperature indication at flow and return lines. Main connection with union nut G1. Manual vent, filling and drain valve or air vent can be mounted. Flexible connection from left or right side or from the bottom by means of a bracket kit.

Heating circuit
Distance: 50 mm
Connection: G¾ eurocone

Operating temperature range
Medium: Max. 60 °C at 6 bar
or max. 90 °C at 3 bar



ProCalida® IN 1½

ProCalida® IN 1½/GT 1½

Modular plastic manifold for industrial or geothermal applications with up to 20 heating circuits. Return with stroke valves for actuators or shut-off valves, flow line either with shut-off valves or flow meters. Main connection with union nut G1½. Individual installation of filling and drain valve, air vent, pressure gauge and thermometer via multi-way union. Easy snap-on mounting of manifold on wall bracket.

Heating circuit
Distance: 70 or 100 mm
Connection: G1 flat-sealing, compression fitting for pipe Ø 25 x 2.3 and Ø 32 x 2.9 or G¾ eurocone

Operating temperature range
Medium: -20/+60 °C at 6 bar

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For many years, AFRISO has been supplying leading vendors of underfloor heating systems, heating/cooling systems, geothermal systems, drinking water distribution systems and tool cooling systems with a broad range of distribution manifolds.

Thermal actuators

Application

For setting the hot water valves in radiators or AFRISO distribution manifolds such as heating/cooling circuit manifolds ProCalida® MC and EF or industrial manifolds IN. Actuators convert the electrical signal received from room or timer thermostats into a valve stroke to adjust the set temperature.

	TSA-02	TSA-03
Description	Electro-thermal actuator with position indication, connection cable and union nut for direct connection to the valve or upper part of the valve. Closed when de/energised; available as 24 V or as 230 V version.	Electro-thermal actuator with position indication, limit switch, connection cable and union nut for direct connection to the valve or upper part of the valve. Closed when de-energised. TSA-03 can be used to switch off the pump via the integrated limit switch when all valves are closed.
Technical specifications	**Operating mode** Closed when de-energised **Stroke** 0/3.2 mm Indication via cams on hood **Opening time** < 5 min **Operating temperature range** Ambient: Max. 60 °C **Supply voltage** DC 24 V or AC 230 V **Connection** Union nut: M 30 x 1.5 mm Closing dimension: 10.8 mm Cable length: 1 m **Housing** Plastic Degree of protection: IP 54 (EN 60529)	**Operating mode** Closed when de-energised **Stroke** 0/3.2 mm Indication via cams on hood **Opening time** < 5 min **Operating temperature range** Ambient: Max. 60 °C **Supply voltage** DC 24 V or AC 230 V **Connection** Union nut: M 30 x 1.5 mm Closing dimension: 10.8 mm Cable length: 1 m **Housing** Plastic Degree of protection IP 40 (EN 60529)

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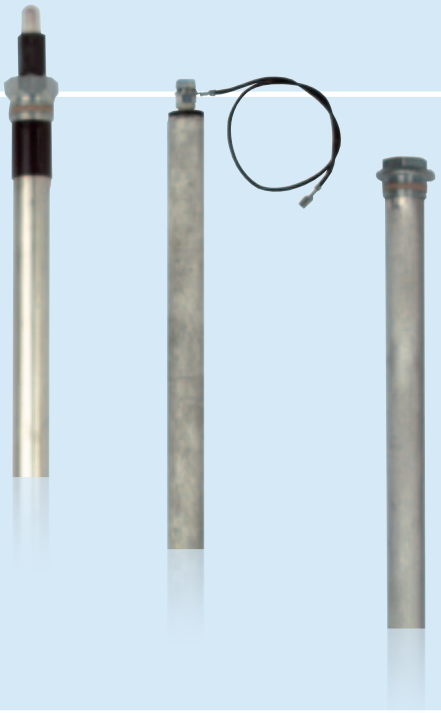
AFRISO offers customer-specific versions of the actuators for many valve upper parts for OEMs. We look forward to your enquiry.

DG: G			Part no.	Price €
TSA-02, 230 V	1	10	78882	
TSA-02, 24 V	1	10	78883	
TSA-03, 230 V with limit switch	1	10	78871	
TSA-03, 24 V with limit switch	1	10	78872	

Rainwater harvesting

Water filters WAF



Signal anodes and sacrificial anodes

Water treatment

CHAPTER 8

Equipment for drinking water supply, rainwater harvesting and water treatment

Overview

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Safety equipment

Filters, check valves, strainers 205

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Water treatment

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Equipment for drinking water supply, water treatment and rainwater harvesting

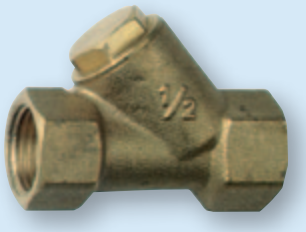
Quality water technology products

1. Backwashable water filter WAF 04 R
2. Boiler safety group assembly
3. Filter with stainless steel sieve
4. Signal anode U
5. Flow filter
6. Water alarm unit WM 5
7. Probe for WM 5
8. Event reporting systems EMS
9. Rainwater system centre RWSC
10. Rainwater disinfection system
11. Rainwater filter
12. Plastic manhole cover
13. Floating suction fitting
14. Level probe
15. Calmed inlet

Clean water

In the area of water technology, AFRISO offers professional equipment for drinking water supply, products for optimised rainwater harvesting and complex water treatment systems made to customer specifications. Our focus is the protection and cleanliness of the water, the supply pipes and the installations. AFRISO products are made to the most demanding hygienic requirements and the stringent demands of the German drinking water act as well as the recommendations of the leading associations and organisations.

Filters, check valves, strainers



Filter

Application

Filter made of hot-pressed brass with replaceable stainless steel sieve for direct installation in domestic drinking water installations.

Technical specifications

Operating pressure
Max. 16 bar

Connections
See ordering table

Check valve

Check valve made of brass for direct installation in domestic drinking water installations. Also suitable as a gravity brake. Nylon valve, seal seat NBR, spring stainless steel.

Operating temperature range
Medium: Max. 110 °C

Operating pressure
Up to size G1: 12 bar
Size G1¼ and greater: 10 bar

Connections
See ordering table

Strainer

Strainer for direct screw-mounting in check valve. Stainless steel sieve, nylon connection piece.

Operating temperature range
Medium: Max. 110 °C

Mesh size
1.7 mm²
16 holes per cm²

Connections
See ordering table

8

DG: G			Part no.	Price €
Filter G⅜	1	-	**42580**	
Filter G½	1	-	**42581**	
Filter G¾	1	-	**42582**	
Filter G1	1	-	**42583**	
Filter G1¼	1	-	**42584**	
Filter G1½	1	-	**42585**	
Filter G2	1	-	**42586**	
Check valve G⅜ – DN 10	1	-	**42540**	
Check valve G½ – DN 15	1	-	**42541**	
Check valve G¾ – DN 20	1	-	**42542**	
Check valve G1 – DN 25	1	-	**42543**	
Check valve G1¼ – DN 32	1	-	**42544**	
Check valve G1½ – DN 40	1	-	**42545**	
Check valve G2 – DN 50	1	-	**42546**	
Strainer G⅜ – DN 10	1	-	**20811**	
Strainer G½ – DN 15	1	-	**20812**	
Strainer G¾ – DN 20	1	-	**20813**	
Strainer G1 – DN 25	1	-	**20814**	
Strainer G1¼ – DN 32	1	-	**20815**	
Strainer G1½ – DN 40	1	-	**20816**	
Strainer G2 – DN 50	1	-	**20817**	

Pressure reducer, safety valves

Pressure reducer DMI

Application

Compact pressure reducer for reducing the system pressure in domestic drinking water installations. Housing and spring cap as well as all functional parts are made of brass; stainless steel seal seat. G¼ connection at both ends for pressure gauges.

Technical specifications

Inlet pressure: Max. 16 bar

Outlet pressure: 1.5 to 6 bar

Connections
Various screw connections female thread G½, G¾ at both ends or G1

Diaphragm safety valve MSW

For closed drinking water heaters as per DIN 1988 und DIN 4753-1 and for protection against overpressure. The response pressure is factory-set. The size of the valve inlet determines the unit type, the outlet is larger by one dimension.

Opening pressure: see ordering table

Connections: see ordering table

Dimensions
W x H x D: 35 x 60 x 45 mm

Material
Housing: brass CW617 N
Cap: PA6, blue

Operating temperature range
Medium: 0/60 °C

Approvals
Complies with Pressure Equipment Directive (97/23/EC)
Component code TÜV SV 08-2017.13.W.p.

DG: G			Part no.	**Price €**
DMI ¾	1	-	42699	
DMI 1	1	-	42698	
MSW Rp½ x Rp¾, 6 bar	1	10	**42421**	
MSW Rp½ x Rp¾, 8 bar	1	10	**42422**	
MSW Rp½ x Rp¾, 10 bar	1	10	**42423**	
MSW Rp¾ x Rp1, 6 bar	1	10	**42425**	
MSW Rp¾ x Rp1, 8 bar	1	10	**42426**	
MSW Rp¾ x Rp1, 10 bar	1	10	**42427**	
MSW Rp1 x Rp1¼, 6 bar	1	10	**42442**	
MSW Rp1 x Rp1¼, 8 bar	1	10	**42443**	
MSW Rp1 x Rp1¼, 10 bar	1	10	**42444**	
MSW Rp1¼ x Rp1½, 6 bar	1	10	**42446**	
MSW Rp1¼ x Rp1½, 8 bar	1	5	**42447**	
MSW Rp1¼ x Rp1½, 10 bar	1	5	**42448**	
MSW Rp1½ x Rp2, 6 bar	1	5	**42476**	
MSW Rp1½ x Rp2, 8 bar	1	5	**42477**	
MSW Rp1½ x Rp2, 10 bar	1	5	**42478**	
MSW Rp2 x Rp2½, 6 bar	1	1	42487	
MSW Rp2 x Rp2½, 8 bar	1	1	42488	
MSW Rp2 x Rp2½, 10 bar	1	1	42489	

Boiler safety group assemblies

Boiler safety group assembly BFK 12/10

Application
For closed heated drinking water installations or drinking water heaters as per DIN 1988 and DIN 4753-1 for protection against overpressure.

Description
Combination fitting with safety valve 10 bar, shut-off fitting, check valve and test screw. Noise characteristics as per DIN 4109 class 1.

Connections
Compression fitting Ø 15 mm at both ends

Safety valve
10 bar

Operating pressure
10 bar

Dimensions
W x H: 95 x 95 mm

Housing
Brass

Options
- Safety valve 6 or 8 bar
- Other connection types

Boiler safety group assembly DN 15

Application
For closed heated drinking water installations or drinking water heaters as per DIN 1988 and DIN 4753-1 for protection against overpressure.

Description
Combination fitting with rotatable safety valve 10 bar, Bourdon tube pressure gauge, shut-off fitting, check valve and test screw. Noise characteristics as per DIN 4109 class 1.

Connections
Soldered screw connection Ø 18 mm at both ends

Safety valve
10 bar, rotatable
Outlet thread G¾

Operating pressure
10 bar

Dimensions
W x H: 95 x 95 mm

Housing
Brass

Bourdon tube pressure gauges
0/16 bar, Ø 50 mm, connection G¼.

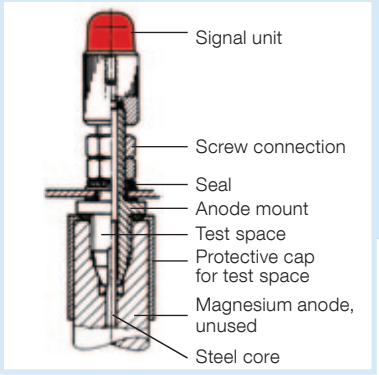
Options
- Safety valve 6 or 8 bar
- Pressure gauges with other pressure ranges
- Other connection types

8

DG: G			Part no.	Price €
Boiler safety group assembly BFK 12/10	1	-	**77988**	
Boiler safety group assembly DN 15	1	-	**77976**	

Signal anode U

- **Signal unit outside of the boiler indicates when it is time to replace the anode**
- **For enamelled boilers or tanks with passive protection layers**
- **Ideal for replacing conventional sacrificial anodes in hot water tanks (100 to 500 l)**
- **Choice of connection G¾, G1, G1¼**



Application

Protection against frequently unnoticed corrosion damage in water heaters. Primarily for use in enamelled boilers or hot water tanks with other types of passive protective coatings. Signal anodes replace consumed conventional sacrificial anodes primarily in hot water tanks with a capacity of 100 to 500 litres. Defective areas in enamel or other passive protective coatings are subject to corrosion; this causes a flow of current which is transformed into a protective current by the anode material. The anode material thus falls victim to electro-chemical corrosion. Since the protective function of the anode rod is not unlimited, consumed anodes have to be replaced.

Description

Universal, complete signal anode as per EN 12828, made of magnesium alloy. Version with screw fitting, signal unit and instruction label. The parts submerged in water are heat-resistant up to operating temperatures of 100 °C and comply with the German Food Act. When the anode material is used up, water penetrates the test space and causes a red discolouration of the signal unit to indicate that the anode is used up. In the case of conventional anodes, the boiler has to be opened for anode inspection.

8

Technical specifications

System pressure
Max. 15 bar

Operating temperature range
Medium: 0/100 °C

Connections
Female connection G¾, G1 or G1¼

Dimensions (L x Ø)
G¾: 500 x 22 mm
G1: 500 x 26 mm
G1¼: 500 x 33 mm

DG: G	Connection			Part no.	**Price €**
Signal anode U 22–¾	G¾	1	-	**69800**	
Signal anode U 26–1	G1	1	-	**69805**	
Signal anode U 33–1¼	G1¼	1	-	**69810**	

Sacrificial anodes

Application

Protection against frequently unnoticed corrosion damage in water heaters. Primarily for use in enamelled boilers or hot water tanks with other types of passive protective coatings. Defective areas in enamel or other passive protective coatings are subject to corrosion; this causes a flow of current which is transformed into a protective current by the anode material. The anode material thus falls victim to electro-chemical corrosion. Since the protective function of the anode rod is not unlimited, consumed anodes have to be replaced.

Description

Anode I

Sacrificial anode Ø 22, 26, 33 mm as per EN 12828, made of magnesium alloy, for isolated installation. With M8 male, threaded connection, isolating piece and earth cable. Consumption check with AT1 anode tester.

Sacrificial anode

Sacrificial anode Ø 22, 26 or 33 mm as per EN 12828, made of magnesium alloy, suitable for all standard tanks. With screw fitting G¾, G1 or G1¼, without signal. See the ordering table for various versions with different lengths, threads and diameters.

Chain anode

Flexible sacrificial anode Ø 22 mm as per EN 12828, made of magnesium alloy. A flexible anode is used if there is insufficient space to install a rigid anode. Consisting of five individual elements along a stainless steel rope and a G¾ screw fitting or M8 male threaded connection, without signal. Length approx. 800–900 mm.

Anode tester AT1

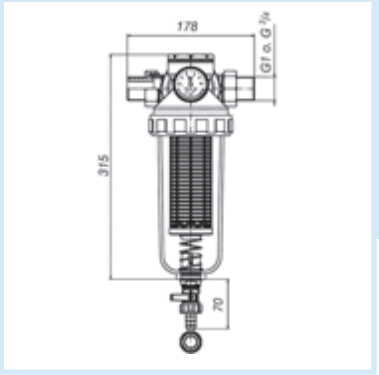
Tester for consumption check of anode I or isolated standard sacrificial anodes.

- Handheld tester with 4-level LED indication
- Fast and easy indication of the state of anodes
- Reliability of the water heater due to preventive maintenance – consumed anodes are replaced in good time

DG: G			Part no.	Price €
Anode I 22–500-M8	1	-	69806	
Anode I 26–500-M8	1	-	69811	
Anode I 33–500-M8	1	-	69808	
Sacrificial anode 22–500-¾	1	-	69815	
Sacrificial anode 22–700-¾	1	-	69817	
Sacrificial anode 26–500-1	1	-	69819	
Sacrificial anode 26–700-1	1	-	69821	
Sacrificial anode 33–550-1¼	1	-	69825	
Chain anode 22–800-¾	1	-	69829	
Chain anode I 22–900-M8	1	-	69804	
Accessories (DG: H)				
Anode tester AT1 for anode I	1	-	69842	

Water WAF 01 without pressure reducer, backwashable

- **Rotatable cover to indicate the next backwashing date**
- **Transparent filter cup shows degree of pollution of the filter**
- **Optional version with replaceable filter**



Application

For the protection of drinking water installations against corrosion as per DIN 1988. Water filters help to keep pollutants such as rust particles and sand grains from reaching the domestic water installation and thus protect valves, machines, flow heaters, etc. from malfunctions caused by pollution.
The filters are not DVGW-tested, but the materials are physiologically unobjectionable and comply with the German Drinking Water Act.

Description

Solid combination fitting with integrated pressure reducer and pressure gauge for the water pressure. The filter insert consists of a plastic filter carrier with a stainless steel filter element. The transparent filter cup made of impact-resistant plastic allows for easy detection of the degree of pollution. The filter cup with O ring seal is screwed to the filter head by means of a brass union nut. The backwashable filter has a 7" filter insert. The backwashable filter is backwashed manually via a drain valve. The direction of flow through the filter insert is reversed and the dirt particles are flushed out. The filter should be backwashed every 2 months.
An optional, rotatable brass connection piece enables installation in horizontal or vertical pipes, even if the pipe is very close to a wall.

Technical specifications

Medium
Drinking water

Inlet pressure
Max. 16 bar

Operating temperature range
Medium: Max. 30 °C

Mounting position
Vertical or horizontal with filter cup down

Connection: Either G¾ or G1, rotatable

Mesh size filter
100 µm

Material

Filter head:	Brass CuZn40Pb2
Connection parts:	Brass CuZn40Pb2
Filter cup:	Plastic
Filter sieve:	Stainless steel

Scope of delivery
Filter with pressure gauge 10 bar (alternatively 16 bar) with date indicator.

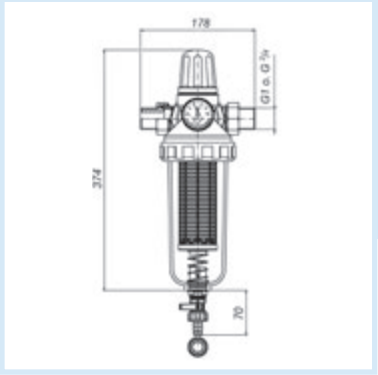
Option

- Water filter with replaceable filter insert

DG: G, PU 1	Connections	Part no.	**Price €**
WAF 01 R, backwashable 7"	G¾	42688	
WAF 01 R, backwashable 7"	G1	42693	
Spare parts			
Filter spanner		42701	
Spare pressure gauge 10 bar with date indicator	G¼ centre back	63544	
Spare pressure gauge 16 bar with date indicator	G¼ centre back	63545	

Water filter WAF 02 with pressure reducer, backwashable

- With integrated pressure reducer
- Rotatable cover to indicate the next backwashing date
- Transparent filter cup shows degree of pollution of the filter
- Optional version with replaceable filter and backflow preventer



Application

For the protection of drinking water installations against corrosion as per DIN 1988. The pressure reducer reduces the inlet pressure to an even, system-specific pressure in order to protect the installation and to ensure economical water consumption. Water filters help to keep pollutants such as rust particles and sand grains from reaching the domestic water installation and thus protect valves, machines, flow heaters, etc. from malfunctions caused by pollution. The backflow preventer keeps water from flowing from the private drinking water installation back into the water supply. The filters are not DVGW-tested, but the materials are physiologically unobjectionable and comply with the German Drinking Water Act.

Description

Solid combination fitting with integrated pressure reducer and pressure gauge for the outlet pressure. The filter insert consists of a plastic filter carrier with a stainless steel filter element. The transparent filter cup made of impact-resistant plastic allows for easy detection of the degree of pollution. The filter cup with O ring seal is screwed to the filter head by means of a brass union nut. The backwashable filter has a 7" filter insert. The backwashable filter is backwashed manually via a drain valve. The direction of flow through the filter insert is reversed and the dirt particles are flushed out. The filter should be backwashed every 2 months.
An optional, rotatable brass connection piece enables installation in horizontal or vertical pipes, even if the pipe is very close to a wall. The optional backflow preventer can be installed instead of the screw connection fitting.

8

Technical specifications

Medium
Drinking water

Inlet pressure
Max. 16 bar

Outlet pressure
Adjustable from 1.6 to 6 bar

Operating temperature range
Medium: Max. 30 °C

Mounting position
Vertical or horizontal with filter cup down

Connection: Either G¾ or G1, rotatable

Mesh size filter
100 µm

Material

Filter head:	Brass CuZn40Pb2
Connection parts:	Brass CuZn40Pb2
Filter cup:	Plastic
Filter sieve:	Stainless steel

Scope of delivery
Filter with pressure reducer and pressure gauge 10 bar (alternatively 16 bar) with date indicator.

Options

- Water filter with replaceable filter insert
- Backflow preventer

DG: G, PU 1	Connections	Part no.	**Price €**
WAF 02 R with pressure reducer (backwashable 7")	G¾	42681	
WAF 02 R with pressure reducer (backwashable 7")	G1	42686	
Backflow preventer	G¾	42705	
Backflow preventer	G1	42706	

Water filter WAF 03 without pressure reducer, backwashable

DVGW NEW

- **Rotatable cover to indicate the next backwashing date**
- **Transparent filter cup shows degree of pollution of the filter**
- **Innovative backwashing system – fast and thorough cleaning of the filter, low water consumption**
- **Valve insert and filter insert can be completely replaced**

Application

For the protection of drinking water installations against corrosion as per DIN 1988. Water filters help to keep pollutants such as rust particles and sand grains from reaching the domestic water installation and thus protect valves, machines, flow heaters, etc. from malfunctions caused by pollution.
Ideal for modernisation domestic water installations where an existing filter needs to be replaced.

Description

DVGW-tested water filter, compact plastic version with backwashable fine filter and pressure gauge for the outlet pressure. The fine filter consists of an upper part and a combined lower part. In the operating state "Filtration", the small upper filter is closed so that the water can only flow through the main filter from the outside to the inside. When the ball valve for "Backwashing" is opened, the filter is pressed down until the water supply to the outside of the main filter is interrupted. At the same time, the water flow through the upper filter is opened. The water required for cleaning the filter flows through the upper sieve, the rotating impeller and the main filter from the inside to the outside. This ensures effective cleaning of the filter across the entire surface of the sieve at full inlet pressure. When the ball valve is closed again, the filter automatically resumes normal operation.

Technical specifications

Medium
Drinking water

Inlet pressure
Max. 16 bar

Operating temperature range
Medium: Max. 30 °C

Mounting position
Vertical or horizontal with filter cup down

Connection
G¾, G1, G1¼ as required

Material
Housing: High-grade plastic
Fine filter: Stainless steel
Filter cup: Shock-resistant, transparent plastic

DVGW approval
NW-9301BO0224

DG: G	Part no.	Price €
WAF 03 R – G¾	**42711**	
WAF 03 R – G1	**42712**	
WAF 03 R – G1¼	**42713**	
Accessories		
Automatic backwashing unit RA 01 for WAF 03/04	42739	

Water filter WAF 04 with pressure reducer, backwashable

DVGW NEW

- With integrated pressure reducer
- Inlet pressure compensation for constant outlet pressure
- Rotatable cover to indicate the next backwashing date
- Transparent filter cup shows degree of pollution of the filter
- Innovative backwashing system – fast and thorough cleaning of the filter, low water consumption

Application

For the protection of drinking water installations against corrosion as per DIN 1988. The pressure reducer reduces the inlet pressure to an even, system-specific pressure in order to protect the installation and to ensure economical water consumption. Water filters help to keep pollutants such as rust particles and sand grains from reaching the domestic water installation and thus protect valves, machines, flow heaters, etc. from malfunctions caused by pollution.
Ideal for modernisation of domestic water installations where an existing filter needs to be replaced.

Description

DVGW-tested water filter, compact plastic version with backwashable fine filter, integrated pressure reducer and pressure gauge for the outlet pressure. The fine filter consists of an upper part and a combined lower part. In the operating state "Filtration", the small upper filter is closed so that the water can only flow through the main filter from the outside to the inside. When the ball valve for "Backwashing" is opened, the filter is pressed down until the water supply to the outside of the main filter is interrupted. At the same time, the water flow through the upper filter is opened. The water required for cleaning the filter flows through the upper sieve, the rotating impeller and the main filter from the inside to the outside. This ensures effective cleaning of the filter across the entire surface of the sieve at full inlet pressure. When the ball valve is closed again, the filter automatically resumes normal operation. The pressure reducer operates on the basis of a force comparison system, i.e. the force of a spring counteracts the force of a diaphragm. The input pressure neither acts in the opening nor in the closing direction. Therefore, pressure changes at the inlet pressure side do not affect the outlet pressure.

Technical specifications

Medium
Drinking water

Inlet pressure
Max. 16 bar

Outlet pressure
1.5 – 6 bar

Operating temperature range
Medium: Max. 30 °C

Mounting position
Vertical or horizontal with filter cup down

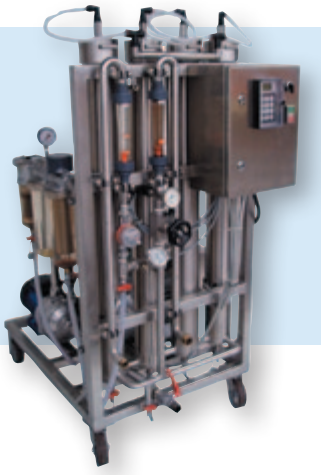
Connection
G¾, G1, G1¼ as required

Material
Housing: High-grade plastic
Fine filter: Stainless steel
Filter cup: Shock-resistant, transparent plastic

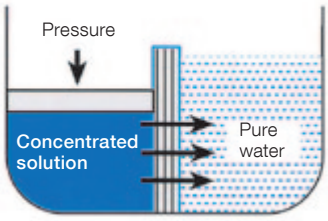
DVGW approval
NW-9311AT2316

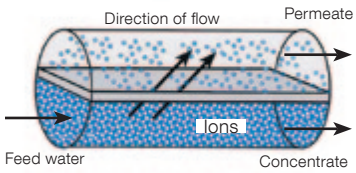
DG: G	Part no.	Price €
WAF 04 R – G¾	**42714**	
WAF 04 R – G1	**42715**	
WAF 04 R – G1¼	**42716**	
Accessories		
Automatic backwashing unit RA 01 for WAF 03/04	42739	

Water treatment systems with reverse osmosis



The environmentally friendly and economical process for demineralising water





Application

Reverse osmosis systems are used in all applications requiring a continuous supply of drinking water, industrial water or process water produced in an economical way.

Typical application areas:
- Drinking water treatment from well water
- Removal of nitrates from drinking water
- Food and beverages industries
- Manufacturing of electronics components/semiconductors
- Electroplating industry
- Cosmetics industry
- Steam generation, heating system
- Sea water desalination
- Clean room laundry

8

Description

What is osmosis?
Osmosis, a natural process, is the diffusion of water through a semipermeable membrane from a less concentrated solution to a more concentrated solution.

This diffusion through the membrane continues as long as there is a difference between the concentrations of the solutions at the two sides of the membrane.

Due to the size of their ions, dissolved salts cannot pass the membrane. Almost all natural metabolic processes are based on the principle of osmosis.

What is reverse osmosis?
When pressure is applied to the concentrated solution, the direction of flow through the membrane (referred to as a module in reverse osmosis systems) is reversed.
The raw water is first physically cleaned by means of a fine filter and then pumped by means of a high-pressure pump.

The membrane with its specific surface properties filters the substances in the water. These substances are discharged with the concentrate, while the permeate (chemically, physically and bacteriologically pure water) passes the module.

The recovery (percentage of pure water) can be adjusted. It depends on the type and size of the module, the concentration and composition of salts in the raw water as well as the required quality of the permeate.

How do the membranes work?
Reverse osmosis water treatment facilities use synthetic, spiral-wound membranes.
Water molecules can pass through these membranes by diffusion. The substances dissolved in the water are retained. The concentrated solution (e.g. drinking water or process water) passes these membranes at high pressure.
The solution is now separated into two partial flows: the permeate is pure water and the concentrate is water that contains the retained substances.

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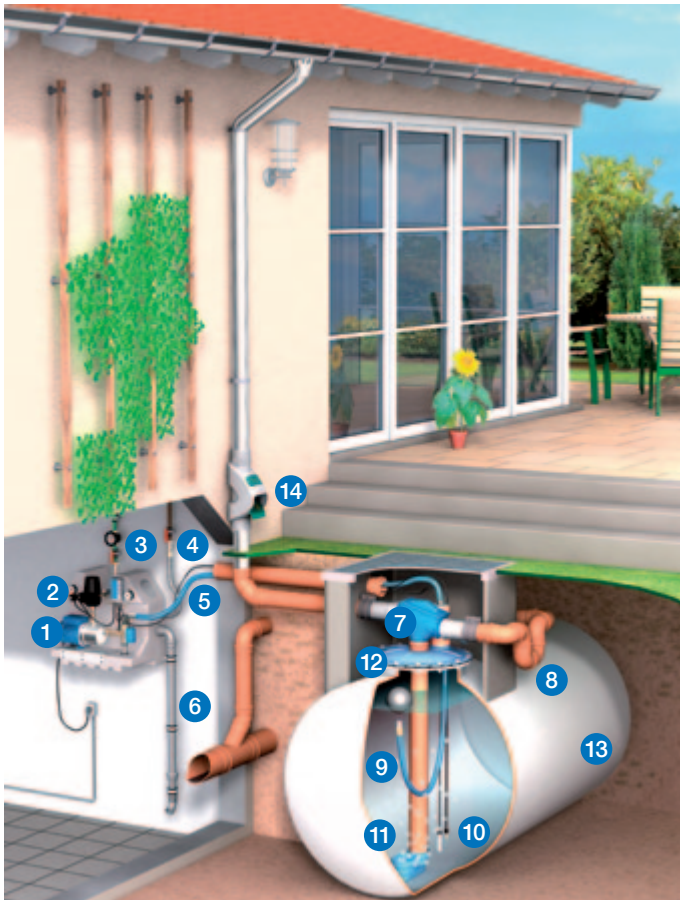
AFRISO designs and produces customised water treatment systems that meet your specific requirements. Please enquire.

Rainwater harvesting – an ecological necessity

AFRISO is member of fbr



75 percent of the surface of our planet is covered with water, but only 0.03 percent of all this water is potable. Almost 900 million people have no access to clean water – in Europe, however, toilets are still flushed primarily with drinking water. But even in Europe the call to save water is growing. The reasons include steadily rising prices for drinking water and waste water. The 1.5 million rainwater harvesting systems already installed in Germany are evidence of increasingly responsible use of this valuable resource. This figure grows by about 60,000 new systems every year. Approximately 20,000 new systems are installed in France, 6,000 in Great Britain, about 2,500 in Austria and just under 1,000 systems in Switzerland. A rainwater system reduces the annual consumption of drinking water by about half; it often pays for itself within a few years and contributes to sustainable environmental protection.

1. Rainwater system centre RWSC
2. Level indicator
3. Drinking water conduit (PE, PP or VA)
4. Mains drinking water supply
5. Rainwater suction pipe
6. Drinking water overflow
7. Rainwater filter with stainless steel sieve
8. Siphon
9. Floating suction fitting
10. Probe for minimum level
11. Calmed inlet
12. Plastic manhole cover Ø 500 for steel tank with inner lining
13. Rainwater storage tank
14. Downpipe filter Rainus

8

Benefits

There are a host of good reasons for harvesting rainwater:

- The supply of clean drinking water is limited. In the near future, ships will be used to tow huge icebergs, sealed in protective linings, to places all over the world.
- Drinking water is too valuable for watering gardens, flushing toilets, washing clothes.
- Rainwater harvesting helps to save energy (treatment and transport).
- Lime-free rainwater is better for horticultural purposes and requires less detergents.
- Rainwater tanks serve as retainers and protect the mains drainage system from overloads.
- Even in dry summers, there is usually a sufficient supply of rainwater.
- In some countries and regions, rainwater harvesting systems are subsidised.
- Rainwater harvesting saves money and protects the environment.

Application

The rainwater collected on the roof area is fed through a filter system to the rainwater storage tank. A pressure-controlled pump feeds the rainwater to the building's installation via a special pipe system. If the tank does not contain a sufficient supply of rainwater, drinking water from the mains water system is supplied. Rainwater tanks can be installed in the basement or underground in the garden. New installations normally use plastic or concrete tanks. However, it is also possible to convert existing cisterns, cesspits or oil tanks. For such purposes, AFRISO supplies special, customised linings made of plastic film as well as plastic manhole covers with all the required connections. The AFRISO rainwater product portfolio focuses on the measuring and control components as well as the complete range of accessories.

Rainwater system centre RWSC

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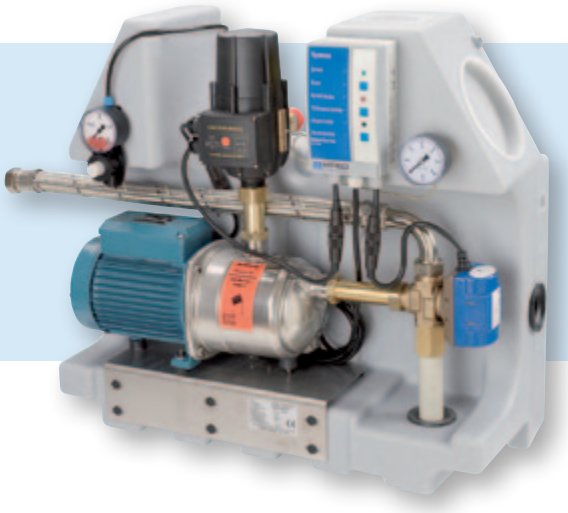

- **Suitable as a fully automatic rainwater harvesting system together with all standard rainwater storage tanks**
- **For single-family homes, apartment buildings as well as small and medium-sized businesses**
- **For garden watering, washing machine and toilet**
- **Complies with DIN 1988, DIN 1989, EN 12056, EN 1717 and DVGW directives**

Application

The compact rainwater system centre RWSC is a robust, reliable microprocessor-based control unit designed for a long service life which fully automatically controls the entire operation of rainwater harvesting systems. RWSC can be used as a rainwater harvesting system together with all standard rainwater storage tanks (plastic and concrete cisterns) as well as rainwater storage tanks converted from fuel oil tanks.

Description

The high-quality RWSC is designed for continuous operation. The pump, the processor units and the other functional components such as pressure switch or three-way valve are modular and arranged on top of the mains water backup tank, ready to be plugged in. This ensures easy accessibility for service and maintenance. RWSC primarily uses rainwater from the rainwater storage tank. If the water level in the rainwater storage tank falls below a preset level, RWSC switches over to mains water backup and uses mains water via the mains water backup tank (probe-controlled). A short rain shower is usually sufficient for RWSC to switch back to rainwater mode. The integrated level indicator TopFlex provides precise information on the water level in the rainwater cistern. For even more convenient measurements, it is possible to use the optional digital tank contents indicator DIT 02. If there is a danger of backwater from the sewage system, RWSC can be equipped or retrofitted with a backflow monitoring unit. In addition, it is possible to connect an AFRISO WATCHDOG alarm unit which generates audible and visual alarm signals if there is a problem with the mains water backup system or the drinking water mains supply. RWSC has been designed as per DIN 1988 and DIN 1989 and may be installed above and below the backwater level.

8

Technical specifications

Functions
Fully automatic control system for rainwater harvesting systems.
Power input max. 1,500 W, motor power max. 550 W, pumping head max. 40 m, suction lift max. 8 m, suction length max. 15 m.
Emergency overflow DN 50.
Easy and fast mounting. High reliability.

Medium
Drinking and rainwater

Pump capacity
Max. 4,500 l/h

Pressure
Max. 4.5 bar

Operating temperature range
Medium: 4/35 °C
Ambient: 4/40 °C

Supply voltage
AC 230 V

Dimensions
W x H x D 650 x 600 x 300 mm

Weight
27.5 kg without water
45.5 kg with water
18 litres of water in container

Degree of protection
IP 40 (EN 60529)

Scope of delivery

RWSC ready to be connected and function-tested, including:
- 1 RWSC, ready to be connected
- 1 fastening kit
- 1 operating instructions
- 1 drilling template
- 2 HT elbows DN 50 for emergency overflow
- 1 level indicator TopFlex
- 1 minimum level probe
- 1 emergency overflow funnel
- 2 armoured hoses pressure side
- 1 armoured hose suction side

i See page 15 for level indicator DIT 02.

DG: M			Part no.	Price €
Rainwater system centre RWSC	1	-	**53106**	

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Rainwater harvesting pump X-AJE 80

NEW

- **Universal application outdoors, in humid rooms, manholes, cisterns or water tanks as a dry/submersible pump**
- **Fully automatic start/stop function depending on water requirements**
- **With dry run protection and anti blocking system AS for maximum reliability**
- **Pump capacity: Max. 3,000 litres of water per hour, head 15 m**

Application

Fully automatic, self-priming jet pump system with electronic controller for water. Can be used in a wide variety for water supply applications such as rainwater harvesting systems, irrigation systems, for the supply of water tanks from wells, for fountains or water parks or for the draining of tanks and pools. The pump is suitable for water that does not contain abrasive or fibrous substances.

Description

X-AJE 80 is a robust, new generation pump system. The pump can be installed as a dry outdoor or indoor pump or as a submersible pump. UP/DOWN technology (pump installed outdoors or underwater), water-tight encapsulation, excellent motor cooling, integrated electronic control with dry run protection, anti blocking system AS and start/stop function stand for maximum reliability and flexibility. If the water runs low, the dry run protection switches off the system. The anti blocking system AS switches the pump on every 3 days; this avoids extended downtimes which might cause problems and means that the pump is always ready. The pump features an integrated flow sensor, a pressure sensor and an external check valve at the suction side (directly at the suction piece) so that additional equipment is not required. The pump switches the water supply on or off, depending on the requirements of the user/consumer. At the end of the pumping process, the pump is immediately ready to resume operation.

8

Technical specifications

Functions
Self-priming jet pump for water, dry or submerged installation (immersion depth up to 5 m), pumping head up to 40 m, fully automatic start/stop function, dry run protection, anti blocking system AS

Medium
Drinking and rainwater

Pump capacity
1,200 l/h to a height of 30 m
2,400 l/h to a height of 20 m
3,000 l/h to a height of 15 m

Pressure
Housing pressure: Max. 10 bar

Operating temperature range
Medium: 2/37 °C
Ambient: 2/45 °C
Storage: 2/45 °C

Cable
10 m connection cable H07RN-F with Schuko CEE plug

Supply voltage
AC 230 V

Housing
Pump housing: Stainless steel 304
Motor housing: Stainless steel 304
Cover: Stainless steel 304

Dimensions
W x H x D 477 x 226 x 200 mm

Weight
14.5 kg

Degree of protection
IP 68 (EN 60529)

Scope of delivery
- Pump X-AJE 80
- Check valve

i See page 220 for floating suction fitting.

DG: M			Part no.	Price €
Pump for rainwater harvesting X-AJE 80 for oil tank conversion kits II and III	1	-	53094	

Cleaning principle for rainwater harvesting

Cleaning stage 1

The filter is the first cleaning stage of the system. The water flows from the roof through the filter which then removes the dirt from the water. The cleaned water is fed to the cistern, the dirt is flushed into the sewage system along with a small amount of the rainwater or it is ejected or retained in a basket. Various principles of operation and connections provide for applications under a great variety of installation conditions.

Cleaning stage 2

The calmed inlet unit reduces turbulence in the tank during filling. Sedimentation of fine particles on the bottom of the tank is improved. Sedimentation layers are not stirred up; at the same time, lower layers in the tank are also supplied with oxygen. The oxygen reduces anaerobic processes in the cistern. The water remains fresh.

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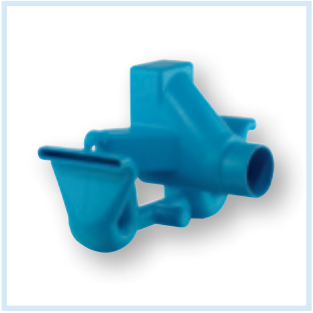
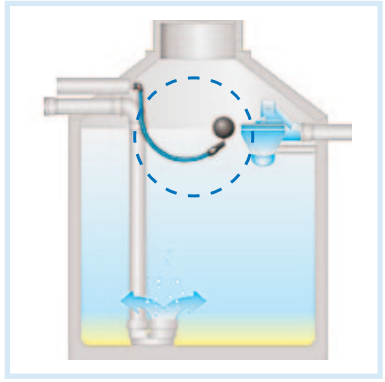


Cleaning stage 3

Particles that are lighter than water (e.g. pollen) slowly rise and float on the surface. This floating layer is removed from the cistern through a specially shaped overflow siphon when the cistern overflows. Regular overflows are important for a permanently high water quality in the cistern and to keep the water from "fouling". Otherwise, the floating layer might become so thick that it keeps oxygen from reaching the water.

Cleaning stage 4

The rainwater should not be withdrawn from the lowest point in the cistern as this would stir up the sedimentation layer and deliver particles along with the rainwater. Therefore, it is recommended to withdraw the water from a higher level in the cistern. A floating suction fitting ensures withdrawal from the cleanest water layer.



Rainwater downpipe filters

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Downpipe filter Rainus

Description

For roof areas of up to **75 m²**. Stainless steel filter sieve. The dirt is ejected to the front, the cleaned rainwater flows to its destination via the downpipe. Therefore, Rainus is ideal for retrofitting existing storage tanks or as a pre-filter for rainwater facilities with insufficient filtering capacities. Suitable for downpipes Ø 100 and optionally for downpipes Ø 80 and 110 mm.

Ideal:
- For seepage
- For retrofitting
- As a pond filter

Downpipe filter FF

For roof areas of up to **150 m²,** for pipe Ø 100 mm. Filters and collects the rainwater for rain barrels and cisterns. The rainwater is fed through the filter pipe to the inside of the filter cartridge and sucked in via a connection piece. The water flows from the inside to the outside and is cleaned. The cleaned water then flow via the gutter and the outlet piece to the rainwater storage tank. The dirt is flushed into the sewage system. The filter insert can be easily and quickly removed for cleaning. Available in copper and zinc.

Leaf filter

For roof areas of up to **80 m²,** for pipe Ø 100 mm, for coarse filtration of the rainwater. The leaf filter is a pre-filter for the fine filter and the basket filter. Coarse dirt such as leaves is ejected via the opening in the front. The filter also provides protection against the clogging of waste water pipes. In addition, it is no longer necessary to clean rain gutters. During the winter, the guide is removed and the green cover closed. Adapter for pipe Ø 80 mm included.

8

DG: M			Part no.	Price €
Downpipe filter Rainus	1	-	**53081**	
Downpipe filter FF, copper, DN 100	1	-	53082	
Reducer, copper, DN 80	1	-	53083	
Downpipe filter FF, zinc, DN 100	1	-	53084	
Reducer, zinc, DN 80	1	-	53085	
Leaf filter, grey	1	-	**53086**	
Leaf filter, brown	1	-	**53087**	

Rainwater filters

AFRISO is member of fbr

Volume filter VF 1

Sinus filter SF

Cartridge filter PF

8

Description

For roof areas of up to **350 m².** Preferably for underground installation. Height offset between inlet and outlet to the sewage system 300 mm. Due to the dual-stage filtering principle (coarse filtering first, then fine filtering), the volume filter VF 1 requires very little maintenance. Dirt is directly flushed into the sewage system by the rainwater. 85 to 95 % of the rainwater is cleaned and supplied to the rain water storage tank. The housing consists of high-grade polyethylene, the filter insert is made of stainless steel. The filter is easy to clean. Therefore, the filter does not have to be replaced.

For roof areas of up to **210 m²,** without height offset. Rainwater filter for installation in the storage tank or the manhole of the storage tank. The Sinus filter SF is referred to as the "problem solver" since it can be used to retrofit rainwater storage tanks without a height difference between the inlet and the outlet. The filter cartridge is inclined in the housing so that the efficiency is much greater than that of standard pipe filters. All connections DN 100. Maintenance intervals depend on degree of pollution, several times per year. With optional backwash kit for easy cleaning.

For roof areas up to **210 m²,** height offset 66 mm. Rainwater filter for installation in the tank or the manhole of the tank. Small, compact rainwater filter. Due to the slight inclination of the sieve cartridge, the filtered dirt is flushed into the drain. The sieve cartridge is made of stainless steel and coated with plastic. The filter housing has an opening that is covered with a cap. All connections DN 100. Maintenance intervals depends on degree of pollution, several times per year. With optional backwash kit for easy cleaning.

DG: M			Part no.	**Price €**
Volume filter VF 1	1	-	**53088**	
Sinus filter SF	1	-	**53090**	
Cartridge filter PF	1	-	**53091**	

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Accessories for rainwater harvesting

Telescopic extension

Description Robust plastic shaft made of polyethylene for connection of the volume filter VF to the ground level. A bayonet connection allows for easy mounting to the volume filter VF 1. If the upper edge of the telescopic extension is adjusted to be flush with the ground level, the cover is always easy to open. Height-adjustable from 250–750 mm. Accessible. Please order separately.

Telescopic extension

Backwash kit

Description Kit for easy and convenient cleaning of the filter cartridges of Sinus filter SF and cartridge filter PF. The backwash kit is connected to a water tap (service water) via a ½" PE pipe; the backwash kit is operated via the water pressure. The kit consists of special nozzles, a 1½" PE pipe with a length of 10 m, a ¾" connection piece for the water tap and a ½" elbow with female thread for connecting the backwash kit to the Sinus or cartridge filter. The backwash kit can also be retrofitted quickly and easily.

Backwash kit

Backwash kit with automatic flushing

Description For automatic cleaning of the rainwater filter. The backwash kit with automatic flushing can also be retrofitted between a water tap and a connection kit. A chip-controlled ball valve flushes once per week. Flushing once per week for three minutes is sufficient; however, it is also possible to set other flushing times. The unit is supplied via a 9 V alkaline battery (not included). The service life of the battery is approx. 1 year.

Backwash kit with automatic flushing

Wall duct

Description Wall duct, consisting of 30 mm rubber plate with 2 stainless steel plates, for conduit Ø 100 mm, seals lines at feedthrough points. With 2 x Ø 32 mm holes for PE pipe and suction pipe, 1 x Ø 16 mm hole for backwash kit, 2 cables (pumps, level measurement) and blind plugs. When the nuts are tightened, the 2 stainless steel plates press the rubber seal against the walls of the conduit to form a water-tight seal.

Wall duct

Pipe coupler for DN 100

Description For simple mounting of filters in tanks and pipes Ø 100 mm. Robust design.

Pipe coupler for DN 100

DG: M			Part no.	**Price €**
Telescopic extension	1	-	53089	
Backwash kit	1	-	53092	
Backwash kit with automatic flushing	1	-	53093	
Wall duct	1	-	**53097**	
Pipe coupler for DN 100	1	-	**53080**	

Accessories for rainwater harvesting

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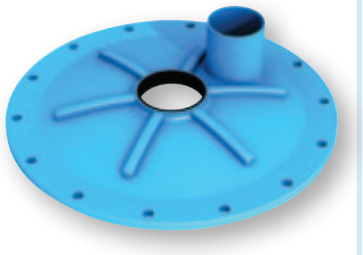
Plastic manhole cover Ø 500 mm

Description Plastic manhole cover Ø 500 mm specially designed for converting a fuel oil tank into a rainwater tank, with 2 connections for pipes Ø 100 mm. The manhole cover replaces the old, standardised manhole cover; it contains all the required connections (filter, inlet, suction pipe and level probes). The manhole cover considerably facilitates the conversion.



Plastic manhole cover

Overflow siphon with rodent stop

Description Made of high-grade PE, for the cistern overflow, with smell trap, rodent stop and connection for backwater alarm. Connection DN 100. With connection piece for support pipe.

Overflow siphon

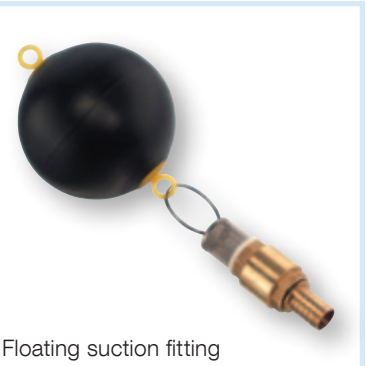
Calmed inlet

Description Supplies rainwater to the tank without turbulence. Keeps sediments from being stirred up Connection for pipe Ø 100 and pipe -Ø 125 mm.

Calmed inlet

Floating suction fitting

Description For withdrawing the rainwater from the storage tank. The floating ball ensures that the water is always removed from the cleanest layer; with check valve, dirt collector (mesh size 1.2 mm) and hose connector.



Floating suction fitting

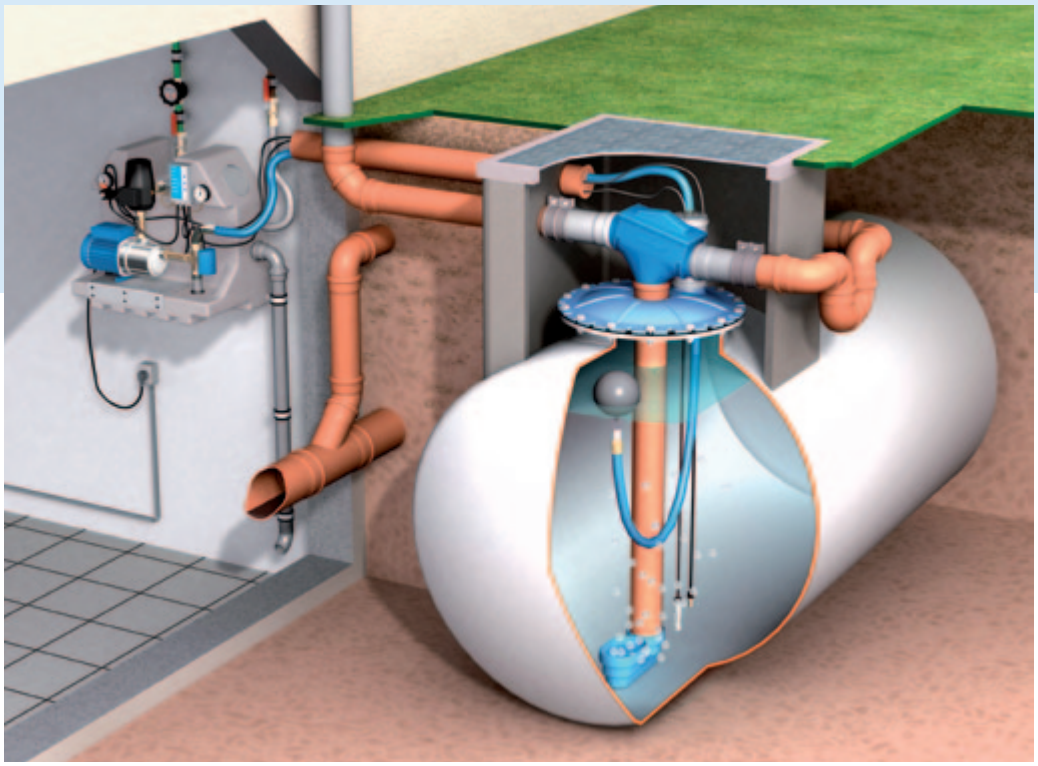
Flexible suction hose

Description Ø 36 mm, for 1" connections (e.g. floating suction fitting). Please specify length when ordering.

Flexible suction hose

DG: M			Part no.	**Price €**
Plastic manhole cover Ø 500 mm	1	-	**53099**	
Overflow siphon with rodent stop	1	-	**53113**	
Calmed inlet	1	-	**53111**	
Floating suction fitting	1	-	**53153**	
Flexible suction hose per metre	1	-	**53079**	

Oil tank conversion kit I for rainwater usage in homes and gardens



Application

If heating oil storage tanks can no longer be used, for example due to corrosion, or if the heating system is converted to other types of fuel, it is a good idea to use the existing tank to collect rainwater and to integrate it into a rainwater harvesting system. For this purpose, the tank is cleaned by a specialised company and then fitted with an inner lining suitable for water. The old, standardised manhole cover (Ø 500 mm) is replaced with a plastic cover specially designed for rainwater harvesting; this considerably facilitates the conversion. The manhole cover contains all the required connections (filter, inlet, suction pipe and level probes).

Description/ scope of delivery

Conversion kit I contains:

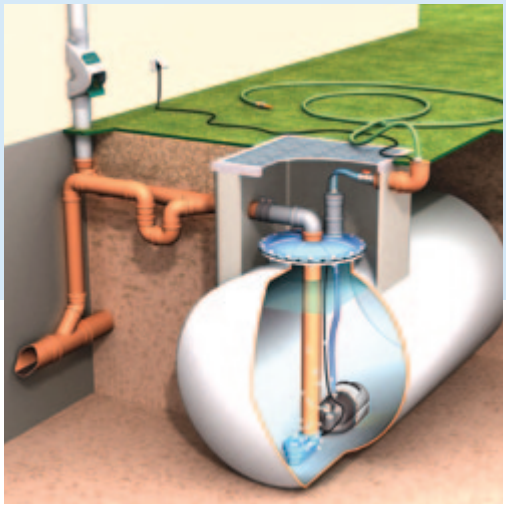
- Rainwater system centre RWSC
- Plastic manhole cover Ø 500 mm with 2 connections for pipes Ø 100 mm
- Cartridge filter PF for direct mounting to the manhole cover. Connections for inlet and outlet for pipes Ø 100 mm. Suitable for roof areas up to 210 m². Height offset inlet – outlet 60 mm.
- 2 pipe couplers for the inlet and outlet pipes.
- Floating suction fitting with 2.15 m long suction hose.
- Wall duct, conduit Ø 100 mm, for suction pipe and cables
- Calmed inlet

Please order the inner lining separately

i
See page 88 for inner linings for rainwater

DG: M			Part no.	Price €
Oil tank conversion kit I	1	-	**53075**	

Oil tank conversion kits II + III for rainwater usage in gardens



Application

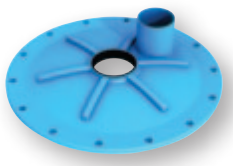
Oil tank conversion made easy. We supply a number of special rainwater components for quick and easy installation of rainwater harvesting systems. The tank cover is the most important component of the kit as it enables simple and clean piping through two openings. The pipe is routed from the downpipe to the tank top and connected to the filter system. Depending on the site conditions and the available space in the manhole, it is recommended to install a downpipe filter or a cartridge filter. Pipe couplers are used to connect the filter elements. The pipe to the sewage system must form a siphon using the drain pipe elbows. The X-AJE 80 rainwater harvesting pump with integrated pressure switch is ideally suited for water withdrawal.

8

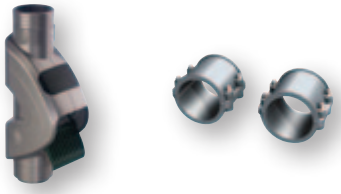
Scope of delivery

Oil tank conversion kit II for rainwater usage in gardens (up to 75 m² roof area):

- Plastic manhole cover Ø 500 mm



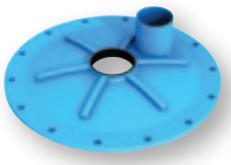
- Rainus downpipe filter with 2 pipe couplers



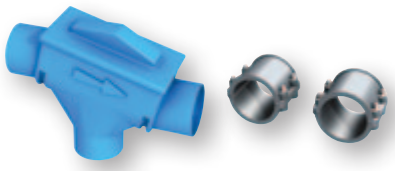
- Calmed inlet

Oil tank conversion kit III for rainwater usage in gardens (up to 210 m² roof area):

- Plastic manhole cover Ø 500 mm



- Cartridge filter PF with 2 pipe couplers



- Calmed inlet

i

See page 217 for rainwater harvesting X-AJE 80 for conversion kits II and III.

See page 88 for inner linings for rainwater.

See chapter 1 for level measurement.

DG: M			Part no.	**Price €**
Oil tank conversion kit II	1	-	**53076**	
Oil tank conversion kit III	1	-	**53077**	

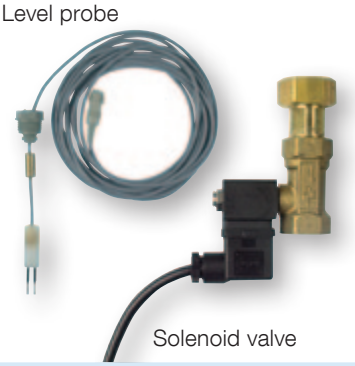
AFRISO EURO-INDEX

Backup controller for rainwater storage tanks

AFRISO is member of fbr

- **Microprocessor-controlled supply of drinking water to rainwater tanks with connected water station**
- **Dry run protection and safety shutdown**
- **2 programme times for normal or increased water consumption**
- **Easy handling – fast installation**

Level probe



Application

For monitoring rainwater tanks for sufficient water level. The backup controller RENA, consisting of control unit RENA, probe and solenoid valve, is designed for fully automatic supply of drinking water to rainwater tanks with connected water station. Continuous operation without frequent on and off cycles, two selectable programme times for normal or increased water consumption, with leak monitoring, dry run protection and protection against deposits.

Description

The complete backup controller kit consists of a control unit, indicators and controls and a Schuko CEE socket for connection of the water station, a probe for the water tank and a solenoid valve for connection to the water tap. If, as a result of insufficient precipitation or considerable water withdrawal, the level in the tank falls below a specific value, the solenoid valve is opened and fresh water from the drinking water mains system is supplied. 2 programme times are selectable, depending on the water consumption (e.g. garden watering, car wash). In order to avoid the formation of deposits at the solenoid valve, the valve is opened for one second and closed again three times in a row every week. RENA features a safety shutoff system that responds to leaks in the tank or the pipes.

8

Technical specifications

Functions
Fully automatic backup controller for supplying drinking water to rainwater tanks with connected water station, with leak monitoring, dry run protection and protection against deposits.

Control unit RENA
Control unit with microprocessor

Operating temperature range
Ambient: 0/40 °C

Schuko CEE socket
AC 230 V (fuse T 10 A)

Supply voltage
AC 230 V

Dimensions
W x H x D: 100 x 188 x 65 mm

Degree of protection
IP 20 (EN 60529)

Solenoid valve
For drinking water and rainwater
W x H x D: 95 x 80 x 100 mm
Connection: G½ x G¾
Flow rate: Max. 50 l/min
(inlet pressure 4 bar, open outlet)
Supply voltage: AC 230 V
Mains cable: 3 m
Degree of protection: IP 65 (EN 60529)

Level probe
For drinking water and rainwater
Supply voltage: AC 6 V

Scope of delivery RENA backup controller kit
- Control unit RENA
- Level probe RENA with 15 m probe cable
- Solenoid valve (½ x ¾) with 3 m mains cable
- Operating instructions

DG: H			Part no.	Price €
RENA backup controller kit, complete	1	-	**53100**	
Control unit RENA	1	-	**53101**	
Level probe RENA with 15 m probe cable	1	-	**53102**	
Level probe RENA with 20 m probe cable	1	-	**53121**	
Level probe RENA with 25 m probe cable	1	-	**53122**	
Solenoid valve G½ x G¾	1	-	**53134**	

Capsule pressure gauges

Pressure gauges for special applications

Diaphragm pressure gauges

Bourdon tube pressure gauges

CHAPTER 9

Mechanical pressure measuring instruments (pressure gauges)

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Mechanical pressure measuring instruments at a glance

		Standard capsule pressure gauges	Capsule pressure gauge for chemical applications	Standard Bourdon tube pressure gauges/ gauges for industrial applications	Bourdon tube pressure gauges for chemical applications / stainless steel pressure gauges
NG 40	Housing size			•	•
NG 50				•	•
NG 63		•	•	•	•
NG 80		•		•	•
NG 100		•	•	•	•
NG 160		•	•	•	•
NG 250				•	
Bottom process connection		•	•	•	•
Centre back process connection		•	•	•	•
Process connection both ends					
-25/0 mbar to -1000/0 mbar	Ranges	•	•		
0/25 mbar to 0/1000 mbar		•	•		
-600/0 mbar to -1000/0 mbar		•	•	•	•
0/0.6 bar to 0/1600 bar				•	•
0/2500 bar to 0/4000 bar					**Pressure gauges for high pressures**
0/40 mbar to 0/25 bar					
≥ Class 1.6	Accuracy	•	•	•	•
≥ Class 1.0				•	•
≥ Class 0.6				•	•
≥ Class 0.25				•	
Operating temperature range -20/+60 °C	Application areas	•		•	
Operating temperature range -20/+100 °C			•		
Operating temperature range -20/+150 °C					•
Relative pressure measurement	Application areas	•	•	•	•
Differential pressure measurement		•		•	
Measurement of gases		•	•	•	•
Measurement of liquids				•	•
Crystallising media				•*	•*
Thermal engineering/pneumatics		•	•	•	•
Process engineering		•	•	•	•
Housing filling (glycerine, paraffin)	Options/extra equipment		•**	•	•
Safety version					•
Electrical contacts				•	•
Overload safety 10 x FSD		•			
Hot-pressed brass housing				•	
Back flange		•	•	•	•
Clamp fixing		•	•	•	•
3-hole fixing, panel mounting bezel		•	•	•	•
Damping screw		•	•	•	•
Reference pointer		•	•	•	•
Max. pointer		**≥ 250 mbar**	**≥ 250 mbar**	•	•
Special scale		•	•	•	•
Bezel for panel mounting		•		•	
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*Only in connection with diaphragm seal
**Depending on version

i Precision pressure gauge is optionally possible for the individual pressure gauge versions.

Standard diaphragm pressure gauges	Diaphragm pressure gauges for chemical applications/ stainless steel diaphragm pressure gauges	Standard spring-diaphragm pressure gauges	Spring-diaphragm pressure gauges for chemical applications	Magnetic piston type pressure gauges
				•
•	•	•	•	**NG 115**
•	•			
•	•	•	•	
				•
				•
•	•	•**	•**	
•	•	**± 2.5 % FS**	**± 2.5 % FS**	**± 3 % FS**
		•	•	•
•	•			
•	•	•	•	
	•	•	•	•
•	•	•	•	•
•	•	•	•	•
•**	•**			
•	•	•	•	•
•	•	•	•	•
•	•	•		•
•**	•**			
•	•		•	•
•**	•**	**Up to 25 bar at both sides**		•**
		•	•	
				•
•	•	•	•	•
From page 359	From page 355/361	From page 378	From page 380	From page 370

9

Pressure gauges – Mechanical pressure measuring instruments with elastic measuring elements

Bourdon tube pressure gauges

The measuring element of a Bourdon tube pressure gauge is a C shaped or helical metal tube closed at one end. For pressure ranges up to 40 bar, the tube has an oval cross section and the shape of a C. For higher pressure ranges, the tube is bent into the shape of a helix. The oval cross section is obtained during bending. When pressure is applied, both types of bent tubes try to regain their original shapes, the straight tube. In this process, the radius increases and this displacement is converted into a circular movement by the movement. Bourdon tube pressure gauges are suitable for a wide variety of applications in measuring liquids and gases; they are the most commonly used pressure gauges. They are used for pressure measurements from 600 mbar up to several thousand bar.

Capsule pressure gauges

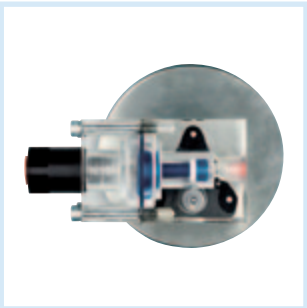
Capsule pressure gauges are used in gas technology applications for low pressure ranges. Two concentrically shaped diaphragms are connected at the outer edges by means of welding or soldering. One diaphragm has an opening in the centre through which the gas to be measured can flow in. The pressure in the capsule causes it to arch to the outside. A deflection lever at the opposite side of the inlet opening transmits the linear displacement to a movement and converts it into a rotary movement. In the 1920ies, AFRISO patented this system as the "fine pressure gauge".
Capsule pressure gauges are exclusively used for dry and clean gases at measuring ranges from 6 mbar to 1,000 mbar.

Diaphragm pressure gauges

Diaphragm pressure gauges use a concentrically shaped diaphragm which is directly connected to the process connection. The pressure is applied to the process side of the diaphragm. A rod at the opposite side which is fitted with a movement converts the displacement of the diaphragm into a rotary movement. Diaphragm pressure gauges are used for gaseous and liquid media within the range from 10 mbar to 25 bar; the media can even be viscous or crystallising if the process connection opening (open flange) is sufficiently large.
With a flush welded diaphragm, they are ideal for measurements in hygienic processes.

Spring-diaphragm pressure gauges

Spring-diaphragm pressure gauges are ideal for measuring low differential pressures at high static pressures. The pressures act on two pressure chambers separated by an elastic diaphragm. If there are different pressures in the chambers, the diaphragm is axially displaced against a compression spring. This displacement is transmitted to a movement by a rod and converted into a rotary movement. The differential pressure is directly indicated by a pointer. The diaphragm is held by a metallic support which results in an overpressure safety of up to 25 bar at both sides. Spring-diaphragm pressure gauges are used for liquids that are not highly viscous and for differential pressure from 250 mbar to 25 bar.



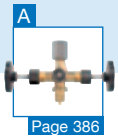
Magnetic piston and magnetic diaphragm gauges

Magnetic piston type pressure gauges and magnetic diaphragm pressure gauges are primarily used for measuring differential pressure at filters which are subject to high static pressures. The pressures act on two pressure chambers separated by a diaphragm and/or a piston. If there are different pressures in the chambers, a rod with a permanent magnet is axially displaced against a compression spring. The permanent magnet transmits this displacement to the pointer by means of a ring magnet mounted to the pointer hub. The pointer indicates the pressure difference. Magnetic piston pressure gauges and magnetic diaphragm pressure gauges are used for the measurement of differential pressure of gases from 2.5 mbar to 10 bar; a static pressure of up to 350 bar is permissible.

Standard capsule pressure gauges

EN 837-3

- With zero correction
- Ideal for low pressure ranges
- Optional overpressure or under-pressure safety 10 x FSD
- GOSSTANDART-certified



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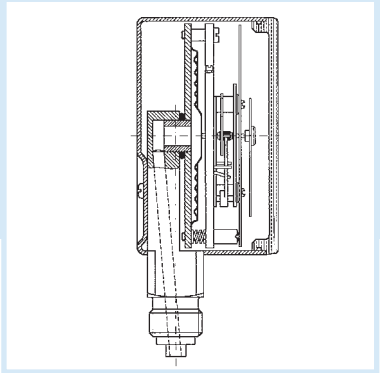


Application

For gaseous, dry media which do not attack copper alloys.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Types
D2 / D3

Nominal size
63 – 80 – 100

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
0/25 to 0/1000 mbar and all corresponding vacuum and compound ranges with overpressure protection

Application area
Static load: Full scale value
Dynamic load: 0.9 x full scale value
Overload safety: 1.3 x full scale value

Operating temperature range

Medium:	T_{max}	= +60 °C
Ambient:	T_{min}	= -20 °C
	T_{max}	= +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.6 %/10 K
Falling temperature approx. ±0.6 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or centre back
NG 63 G¼B – spanner size SW 14
NG 80–100 G½B – spanner size SW 22
(EN 837-3/7.3)

Measuring element
Capsule element, CuBe alloy

Movement
Brass

Zero correction
From the front

Seal
NBR (Perbunan)

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
D 2 – black sheet steel
D 3 – stainless steel 304

Window
Clip-in plastic

Options

- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Measuring system stainless steel (NG 100)
- Damping screw
- Reference pointer
- Special scales
- Other process connections

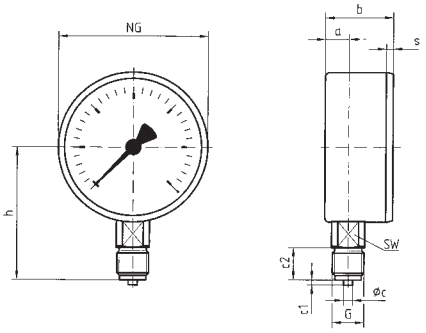
i
See page 237 for prices.

Standard capsule pressure gauges

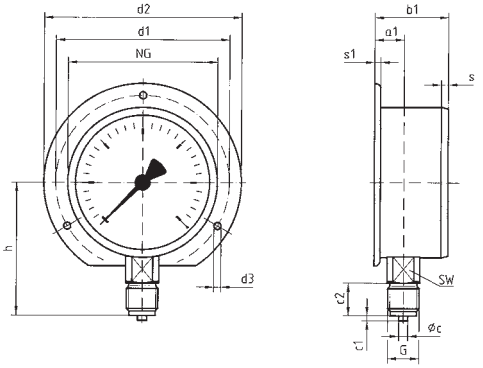
Type D 2/D 3 – NG 63/80/100

Housing types and dimensions

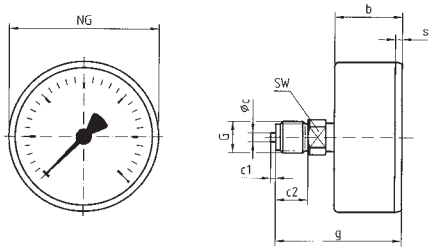
Bottom connection



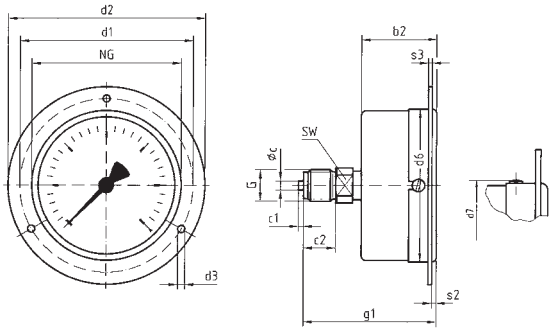
Bottom connection, back flange



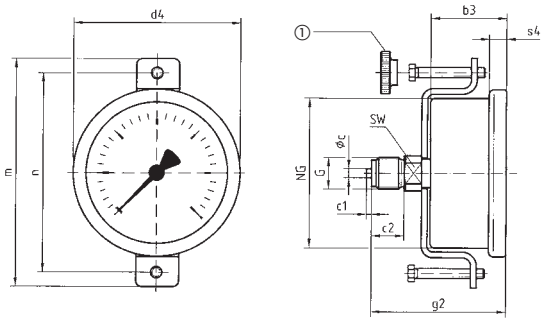
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel

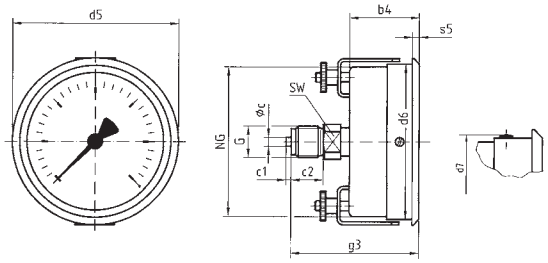


Centre back connection, crimped bezel housing with clamp fixing, NG 63, (version D 351)



① Turning knob

Centre back connection, panel mounting bezel for clamp fixing NG 80/100



Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	b4	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	d7	G	g	g1	g2
63	9.5	12	33.7	36.2	35.7	30.5	-	5	2	13	75	85	3.5	68	68	64	66	G¼B	56.7	58.7	53.5
80	14.8	17.8	43.3	46.3	44.6	-	46.5	6	3	20	95	110	4.8	-	86	81	83	G½B	75.3	76.6	-
100	15.6	19.1	44	47.5	45.6	-	47	6	3	20	116	132	4.8	-	107	101	105	G½B	76	77.6	-

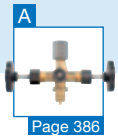
Nominal size (NG)	g3	h	m	n	s	s1	s2	s3	s4	s5	SW
63	-	52.7	94	82	3.7	5.5	3	2	7	4	14
80	78	69	-	-	3.8	5.5	3.5	2	-	4.5	22
100	79	87	-	-	3.5	5.5	3.5	2	-	4.5	22

* Dimensions for NG 100 according to DIN 16014

Standard capsule pressure gauges

EN 837-3

- With zero correction
- Optional overpressure or underpressure safety 10 x FSD
- Extremely low measuring range from 0/6 mbar
- GOSSTANDART-certified



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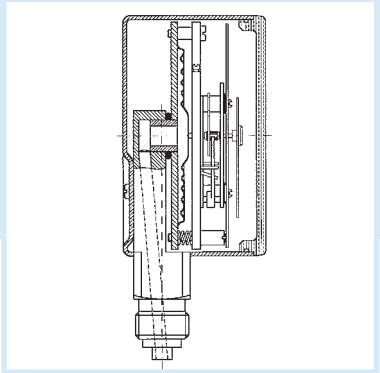


Application

For gaseous, dry media which do not attack copper alloys.
!For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
63 – 100 – 160

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
NG 63-100 0/25 to 0/1000 mbar
NG 160 0/6 to 0/1000 mbar
and all corresponding vacuum and compound ranges with overpressure protection

Application area
Static load: Full scale value
Dynamic load: 0.9 x full scale value
Overload safety: 1.3 x full scale value

Operating temperature range

Medium:	T_{max}	= +60 °C
Ambient:	T_{min}	= -20 °C
	T_{max}	= +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of +20 °C:
Rising temperature approx. ±0.6 %/10 K
Falling temperature approx. ±0.6 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or centre back
NG 63 G¼B – spanner size SW 14
NG 100 – 160 G½B – spanner size SW 22
(EN 837-3/7.3)

Measuring element
Capsule element, CuBe alloy

Movement
Brass

Zero correction
From the front

Seal
NBR (Perbunan)

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304

Bayonet bezel
Stainless steel 304

Window
Instrument glass

Options

- Overpressure safety 10 x FSD
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Damping screw
- Reference pointer
- Special scales
- Other process connections

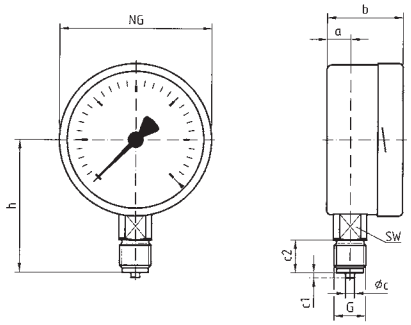
i
See page 237 for prices.

Standard capsule pressure gauges

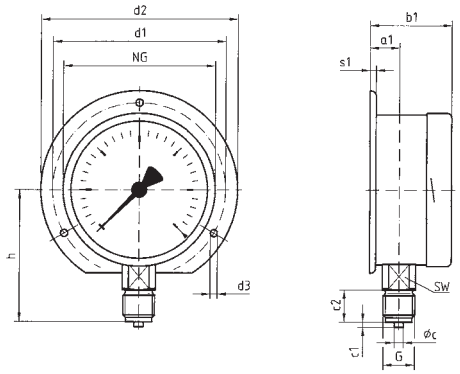
Type D 4 – NG 63/100/160

Housing types and dimensions

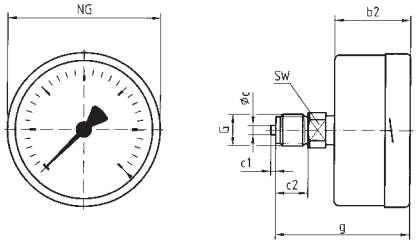
Bottom connection



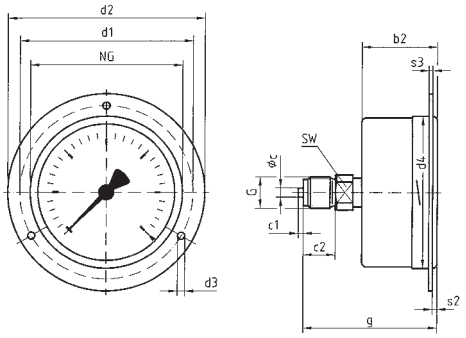
Bottom connection, back flange



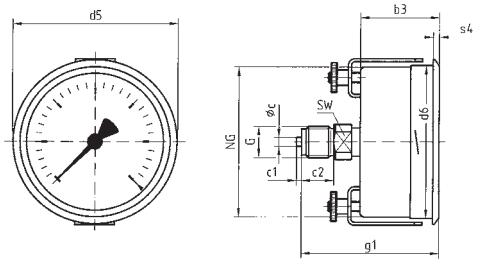
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel for clamp fixing



Dimensions (mm)

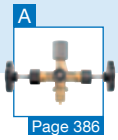
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	G	g	g1	h	s1	s2
63	10.8	13.4	40	42.1	37	37	5	2	13	75	85	3.5	64	68	64	G¼B	60	60	53	5.2	3
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	G½B	81	81	86	5.5	4
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	G½B	82	84	116	6	4

Nominal size (NG)	s3	s4	SW
63	2	3	14
100	2	4	22
160	2	4.5	22

* Dimensions for NG 100 according to DIN 16014

Capsule pressure gauge with square bezel for panel mounting

- For panel mounting
- With zero correction
- Ideal for low pressure ranges
- GOSSTANDART-certified



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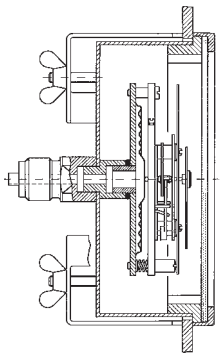

Application

For gaseous, dry media which do not attack copper alloys. For panel mounting.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Types
D 1/D 2/D 3

Nominal size
72 x 72, 96 x 96, 144 x 144

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
0/25 to 0/1000 mbar and all corresponding vacuum and compound ranges with overpressure protection

Application area
Static load: Full scale value
Dynamic load: 0.9 x full scale value
Overload safety: 1.3 x full scale value

Operating temperature range

Medium:	T_{max}	= +60 °C
Ambient:	T_{min}	= -20 °C
	T_{max}	= +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.6 %/10 K
Falling temperature approx. ±0.6 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Brass, centre back
NG 72 x 72, 96 x 96 G¼B – spanner size SW 14
NG 144 x 144 G½B – spanner size SW 22
(EN 837-3/7.3)

Measuring element
Capsule element, CuBe alloy

Movement
Brass

Zero correction
From the front

Seal
NBR (Perbunan)

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing

NG 72	D1 – plastic, black
NG 96	D3 – stainless steel 304
NG 144	D2 – sheet steel, black

Bezel
NG 72 – plastic, black
NG 96 – aluminium, black
NG 144 – sheet steel, black

Window
Plastic

Options

- Damping screw
- Reference pointer
- Special scales
- Other process connections

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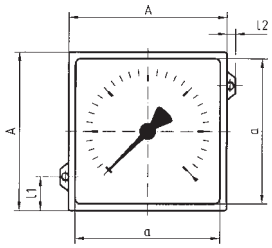
See page 237 for prices.

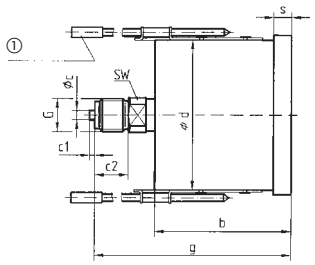
Capsule pressure gauge with square bezel for panel mounting NG 72 x 72 / 96 x 96 / 144 x 144

Housing types and dimensions

Type D1 – NG 72 x 72 (front)

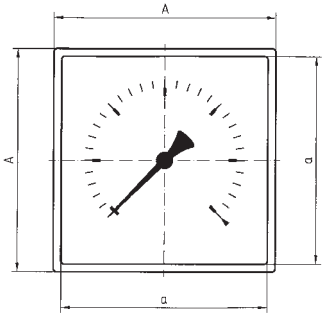


Type D1 – WG 72 x 72 (side)

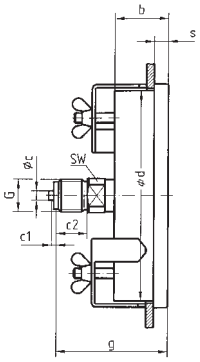


① 90° drawn staggered

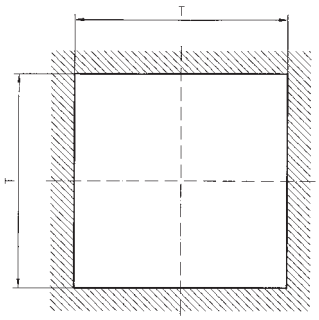
Type D3 / D2 – NG 96 x 96 / 144 x 144 (front)



Type D3/D2 – WG 96 x 96/144 x 144 (side)



Panel cut out



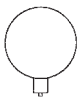
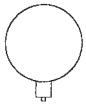
Dimensions (mm)

Nominal size (NG)	A	a	b	Øc	c1	c2	d	G	g	l1	l2	s	SW	T			
72 x 72	72	63	63.5	5	2	13	66	G¼B	86.5	17	6.5	8	14	68			
96 x 96	96	88	32	5	2	13	88	G¼B	55	-	-	6.5	14	90			
144 x 144	144	134	49	6	3	20	136	G½B	81	-	-	9	22	138			

Standard capsule pressure gauges

EN 837-3

DG: M

Type	KP63, D201	KP63, D211	KP80, D201
Version			
Housing Ø	63	63	80
Housing	Black sheet steel, plastic, clip-in window		
Measuring element	Capsule element, CuBe alloy		
Accuracy class	1.6	1.6	1.6
Connection	G¼B	G¼B	G½B
Range (mbar)	Part no.	Part no.	Part no.
Price €			
-25/0	35004201	35004211	35054201
-40/0	35005201	35005211	35055201
-60/0	35006201	35006211	35056201
-100/0	35007201	35007211	35057201
-160/0	35008201	35008211	35058201
-250/0	35009201	35009211	35059201
-400/0	35010201	35010211	35060201
-600/0	35011201	35011211	35061201
-1000/0	35012201	35012211	35062201
Price €			
0/25	**35016201**	35016211	**35066201**
0/40	**35017201**	35017211	**35067201**
0/60	**35018201**	35018211	**35068201**
0/100	**35019201**	35019211	**35069201**
0/160	**35020201**	35020211	**35070201**
0/250	**35021201**	35021211	**35071201**
0/400	**35022201**	35022211	**35072201**
0/600	**35023201**	35023211	**35073201**
0/1000	**35024201**	35024211	**35074201**

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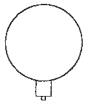
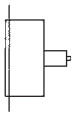
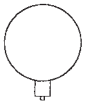
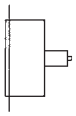
See page 248 for extra charges.

Standard capsule pressure gauges

EN 837-3

DG: M

Type	KP100, D201	KP100, D211	KP100, D221	KP63, D301	KP63, D311	KP63,D331	KP63, D351
Version							
Housing Ø	100	100	100	63	63	63	63
Housing	Black sheet steel, plastic, clip-in window			Stainless steel 304, plastic clip-in window			
Measuring element	Capsule element, CuBe alloy			Capsule element, CuBe alloy			
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G½B	G½B	G½B	G¼B	G¼B	G¼B	G¼B
			3-hole fixing, panel mounting bezel, black			3-hole fixing, panel mounting bezel, stainless steel 304, polished	Clamp fixing
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-25/0	35104201	35104211	35104221	35004301	35004311	35004331	35004351
-40/0	35105201	35105211	35105221	35005301	35005311	35005331	35005351
-60/0	35106201	35106211	35106221	35006301	35006311	35006331	35006351
-100/0	35107201	35107211	35107221	35007301	35007311	35007331	35007351
-160/0	35108201	35108211	35108221	35008301	35008311	35008331	35008351
-250/0	35109201	35109211	35109221	35009301	35009311	35009331	35009351
-400/0	35110201	35110211	35110221	35010301	35010311	35010331	35010351
-600/0	35111201	35111211	35111221	35011301	35011311	35011331	35011351
-1000/0	35112201	35112211	35112221	35012301	35012311	35012331	35012351
Price €							
0/25	**35116201**	35116211	35116221	**35016301**	35016311	35016331	35016351
0/40	**35117201**	35117211	35117221	**35017301**	35017311	35017331	35017351
0/60	**35118201**	35118211	35118221	**35018301**	35018311	35018331	35018351
0/100	**35119201**	35119211	35119221	**35019301**	35019311	35019331	35019351
0/160	**35120201**	35120211	35120221	**35020301**	35020311	35020331	35020351
0/250	**35121201**	35121211	35121221	**35021301**	35021311	35021331	35021351
0/400	**35122201**	35122211	35122221	**35022301**	35022311	35022331	35022351
0/600	**35123201**	35123211	35123221	**35023301**	35023311	35023331	35023351
0/1000	**35124201**	35124211	35124221	35024301	35024311	35024331	35024351

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See page 248 for extra charges.

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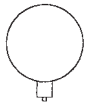
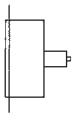
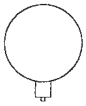
Standard capsule pressure gauges

EN 837-3

DG: M

Type	KP80, D301	KP80, D311	KP80, D331	KP80, D351	KP100, D301	KP100, D311
Version						
Housing Ø	80	80	80	80	100	100
Housing	Stainless steel 304, plastic clip-in window					
Measuring element	Capsule element, CuBe alloy					
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G½B	G½B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, chrome-plated	Panel mounting bezel, chrome plated, clamp fixing		
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
-25/0	35054301	35054311	35054331	35054351	35104301	35104311
-40/0	35055301	35055311	35055331	35055351	35105301	35105311
-60/0	35056301	35056311	35056331	35056351	35106301	35106311
-100/0	35057301	35057311	35057331	35057351	35107301	35107311
-160/0	35058301	35058311	35058331	35058351	35108301	35108311
-250/0	35059301	35059311	35059331	35059351	35109301	35109311
-400/0	35060301	35060311	35060331	35060351	35110301	35110311
-600/0	35061301	35061311	35061331	35061351	35111301	35111311
-1000/0	35062301	35062311	35062331	35062351	35112301	35112311
Price €						
0/25	**35066301**	35066311	35066331	35066351	**35116301**	35116311
0/40	**35067301**	35067311	35067331	35067351	**35117301**	35117311
0/60	**35068301**	35068311	35068331	35068351	**35118301**	35118311
0/100	**35069301**	35069311	35069331	35069351	**35119301**	35119311
0/160	**35070301**	35070311	35070331	35070351	**35120301**	35120311
0/250	**35071301**	35071311	35071331	35071351	**35121301**	35121311
0/400	**35072301**	35072311	35072331	35072351	**35122301**	35122311
0/600	**35073301**	35073311	35073331	35073351	**35123301**	35123311
0/1000	35074301	35074311	35074331	35074351	35124301	35124311

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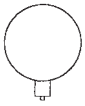
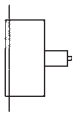
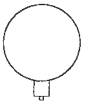
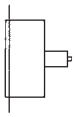
See page 248 for extra charges.

Standard capsule pressure gauges

EN 837-3

DG: M

Type	KP63, D401	KP63, D411	KP63, D431	KP63, D451	KP100, D401	KP100, D411	KP100, D431	KP100, D451
Version								
Housing Ø	63	63	63	63	100	100	100	100
Housing	Stainless steel 304 with bayonet bezel, instrument glass window							
Measuring element	Capsule element, CuBe alloy							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, clamp fixing			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, clamp fixing
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-25/0	35004401	35004411	35004431	35004451	35104401	35104411	35104431	35104451
-40/0	35005401	35005411	35005431	35005451	35105401	35105411	35105431	35105451
-60/0	35006401	35006411	35006431	35006451	35106401	35106411	35106431	35106451
-100/0	35007401	35007411	35007431	35007451	35107401	35107411	35107431	35107451
-160/0	35008401	35008411	35008431	35008451	35108401	35108411	35108431	35108451
-250/0	35009401	35009411	35009431	35009451	35109401	35109411	35109431	35109451
-400/0	35010401	35010411	35010431	35010451	35110401	35110411	35110431	35110451
-600/0	35011401	35011411	35011431	35011451	35111401	35111411	35111431	35111451
-1000/0	35012401	35012411	35012431	35012451	35112401	35112411	35112431	35112451
Price €								
0/25	35016401	35016411	35016431	35016451	35116401	35116411	35116431	35116451
0/40	35017401	35017411	35017431	35017451	**35117401**	35117411	35117431	35117451
0/60	35018401	35018411	35018431	35018451	**35118401**	35118411	35118431	35118451
0/100	35019401	35019411	35019431	35019451	**35119401**	35119411	35119431	35119451
0/160	35020401	35020411	35020431	35020451	**35120401**	35120411	35120431	35120451
0/250	35021401	35021411	35021431	35021451	**35121401**	35121411	35121431	35121451
0/400	35022401	35022411	35022431	35022451	**35122401**	35122411	35122431	35122451
0/600	35023401	35023411	35023431	35023451	35123401	35123411	35123431	35123451
0/1000	35024401	35024411	35024431	35024451	35124401	35124411	35124431	35124451

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See page 248 for extra charges.

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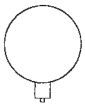
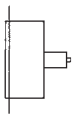
Capsule pressure gauges

EN 837-3

DG: M

	Standard version				Panel mounting version		
Type	KP160, D401	KP160, D411	KP160, D431	KP160, D451	KP72, D111	KP96, D311	KP144, D211
Version							
Housing Ø	160	160	160	160	72 x 72	96 x 96	144 x 144
Housing	Stainless steel 304 with bayonet bezel				Plastic	Stainless steel	Sheet steel
Measuring element	Capsule element, CuBe alloy				Capsule element, CuBe alloy		
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G½B	G½B	G½B	G½B	G¼B	G¼B	G½B
			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, clamp fixing			
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-6/0	35151401	35151411	35151431	35151451	---	---	---
-10/0	35152401	35152411	35152431	35152451	---	---	---
-16/0	35153401	35153411	35153431	35153451	---	---	---
Price €							
-25/0	35154401	35154411	35154431	35154451	35304111	35354311	35404211
-40/0	35155401	35155411	35155431	35155451	35305111	35355311	35405211
-60/0	35156401	35156411	35156431	35156451	35306111	35356311	35406211
-100/0	35157401	35157411	35157431	35157451	35307111	35357311	35407211
-160/0	35158401	35158411	35158431	35158451	35308111	35358311	35408211
-250/0	35159401	35159411	35159431	35159451	35309111	35359311	35409211
-400/0	35160401	35160411	35160431	35160451	35310111	35360311	35410211
-600/0	35161401	35161411	35161431	35161451	35311111	35361311	35411211
-1000/0	35162401	35162411	35162431	35162451	35312111	35362311	35412211
Price €							
0/6	35163401	35163411	35163431	35163451	---	---	---
0/10	35164401	35164411	35164431	35164451	---	---	---
0/16	35165401	35165411	35165431	35165451	---	---	---
Price €							
0/25	35166401	35166411	35166431	35166451	35316111	35366311	35416211
0/40	35167401	35167411	35167431	35167451	35317111	35367311	35417211
0/60	35168401	35168411	35168431	35168451	35318111	35368311	35418211
0/100	35169401	35169411	35169431	35169451	35319111	35369311	35419211
0/160	35170401	35170411	35170431	35170451	35320111	35370311	35420211
0/250	35171401	35171411	35171431	35171451	35321111	35371311	35421211
0/400	35172401	35172411	35172431	35172451	35322111	35372311	35422211
0/600	35173401	35173411	35173431	35173451	35323111	35373311	35423211
0/1000	35174401	35174411	35174431	35174451	35324111	35374311	35424211

See page 248 for extra charges.

Capsule pressure gauges for chemical applications EN 837-3

- With zero correction
- Robust stainless steel housing (with bayonet bezel)
- Laminated safety glass window
- Wetted parts and movement made of stainless steel
- GOSSTANDART-certified

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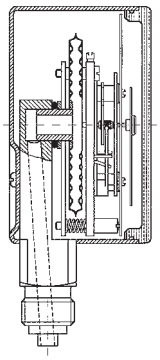


Application

For corrosive gaseous and dry media, also for use in corrosive environments.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
63 – 100 – 160

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
0/25 to 0/1000 mbar and all corresponding vacuum and compound ranges with overpressure protection

Application area
Static load: Full scale value
Dynamic load: 0.9 x full scale value
Overload safety: 1.3 x full scale value

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.6 %/10 K
Falling temperature approx. ±0.6 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Stainless steel 316 Ti/316 L,
bottom or centre back
NG 63 G¼B – spanner size SW 14
NG 100 – 100 G½B – spanner size SW 22
(EN 837-3/7.3)

Measuring element
Capsule element, stainless steel 316 Ti/316 L

Movement
Stainless steel

Zero correction
From the front

Seal
FKM (Viton)

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Options

- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Damping screw
- Special scales
- Other process connections

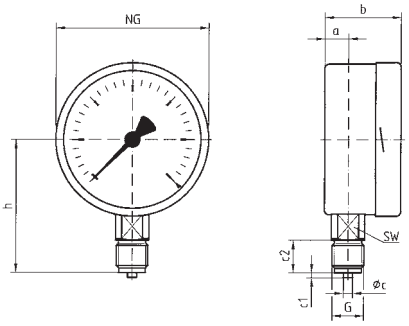
See page 246 for prices.

Capsule pressure gauges for chemical applications

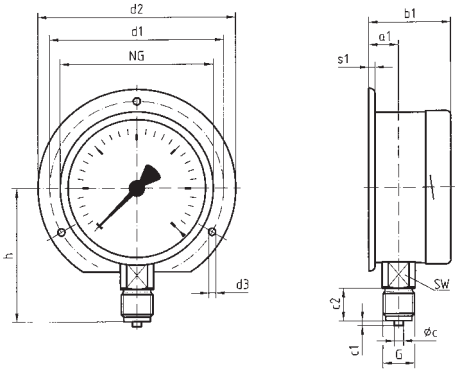
Type D 4 – NG 63/100/160

Housing types and dimensions

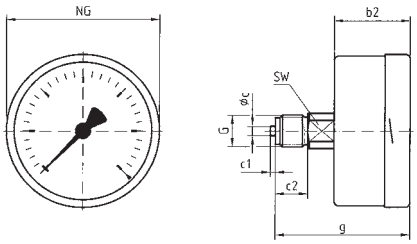
Bottom connection



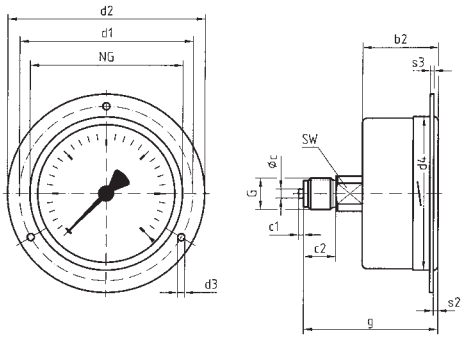
Bottom connection, back flange



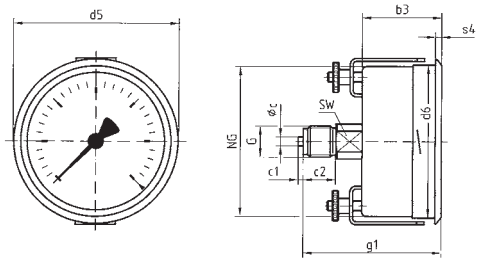
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel for clamp fixing



Dimensions (mm)

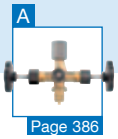
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	G	g	g1	h	s1	s2
63	10.8	13.4	40	42.1	37	37	5	2	13	75	85	3.5	64	68	64	G¼B	60	60	53	5.2	3
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	G½B	81	81	86	5.5	4
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	G½B	82	84	116	6	4

Nominal size (NG)	s3	s4	SW
63	2	3	14
100	2	4	22
160	2	4.5	22

* Dimensions for NG 100 according to DIN 16014

Precision capsule pressure gauges class 0.6

- With zero correction
- Outstanding readability due to fine graduation of the dial
- With serial number for use as QA measuring equipment
- GOSSTANDART-certified



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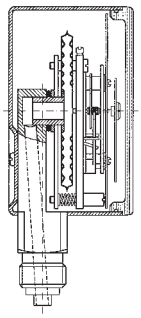


Application

For gaseous, dry media which do not attack copper alloys. For high measuring accuracy.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
160

Accuracy class (EN 837-3/6)
0.6

Ranges (EN 837-3/5)
0/40 to 0/1000 mbar and all corresponding vacuum and compound ranges with overpressure protection

Calibration medium
Air

Application area
Static load: Full scale value
Dynamic load: 0.9 x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.6 %/10 K
Falling temperature approx. ±0.6 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or centre back
G½B – spanner size SW 22
(EN 837-3/7.3)

Measuring element
Capsule element, CuBe alloy

Movement
Brass

Zero correction
From the front

Seal
NBR (Perbunan)

Dial
Aluminium, white
Dial marking black

Pointer
Knife edge pointer aluminium, black

Housing
Stainless steel 304

Bayonet bezel
Stainless steel 304

Window
Plastic (PMMA)

Options

- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Damping screw
- Special scales
- Other process connections

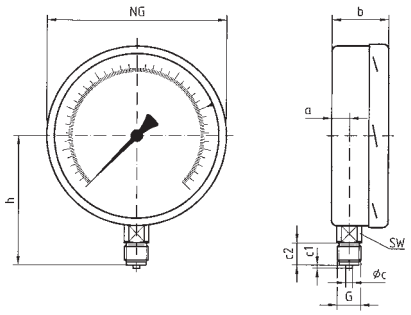
See page 246 for prices.

Precision capsule pressure gauges class 0.6

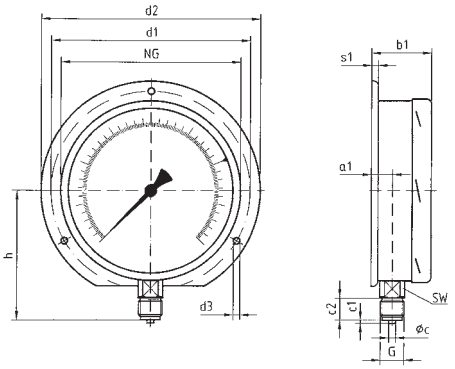
Type D 4 – NG 160

Housing types and dimensions

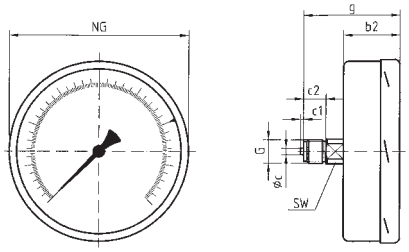
Bottom connection



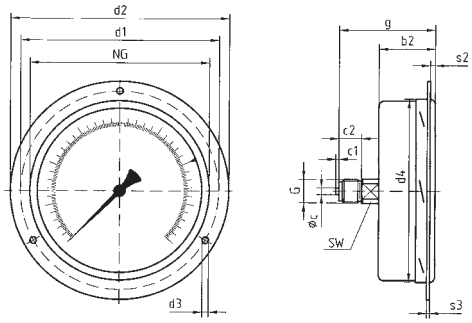
Bottom connection, back flange



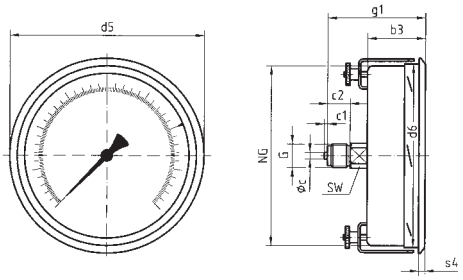
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel for clamp fixing



Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1	d2	d3	d4	d5	d6	G	g	g1	h	s1	s2
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	G½B	82	84	116	6	4

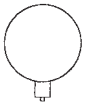
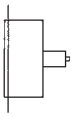
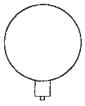
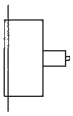
Nominal size (NG)	s3	s4	SW
160	2	4.5	22

* Dimensions for NG 100 according to DIN 16014

Capsule pressure gauges for chemical applications

EN 837-3

DG: M

Type	KP63Ch, D402	KP63Ch, D412	KP63Ch, D432	KP63Ch, D452	KP100Ch, D402	KP100Ch, D412	KP100Ch, D432	KP100Ch, D452
Version								
Housing Ø	63	63	63	63	100	100	100	100
Housing	Stainless steel 304 with bayonet bezel, laminated safety glass window							
Measuring element	Capsule element, stainless steel 316 Ti/316 L							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel 304, clamp fixing			3-hole fixing, panel mounting bezel 304 polished	Panel mounting bezel 304, clamp fixing
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-25/0	35004402	35004412	35004432	35004452	35104402	35104412	35104432	35104452
-40/0	35005402	35005412	35005432	35005452	35105402	35105412	35105432	35105452
-60/0	35006402	35006412	35006432	35006452	35106402	35106412	35106432	35106452
-100/0	35007402	35007412	35007432	35007452	35107402	35107412	35107432	35107452
-160/0	35008402	35008412	35008432	35008452	35108402	35108412	35108432	35108452
-250/0	35009402	35009412	35009432	35009452	35109402	35109412	35109432	35109452
-400/0	35010402	35010412	35010432	35010452	35110402	35110412	35110432	35110452
-600/0	35011402	35011412	35011432	35011452	35111402	35111412	35111432	35111452
-1000/0	35012402	35012412	35012432	35012452	35112402	35112412	35112432	35112452
Price €								
0/25	35016402	35016412	35016432	35016452	35116402	35116412	35116432	35116452
0/40	35017402	35017412	35017432	35017452	35117402	35117412	35117432	35117452
0/60	35018402	35018412	35018432	35018452	35118402	35118412	35118432	35118452
0/100	35019402	35019412	35019432	35019452	35119402	35119412	35119432	35119452
0/160	35020402	35020412	35020432	35020452	35120402	35120412	35120432	35120452
0/250	35021402	35021412	35021432	35021452	35121402	35121412	35121432	35121452
0/400	35022402	35022412	35022432	35022452	35122402	35122412	35122432	35122452
0/600	35023402	35023412	35023432	35023452	35123402	35123412	35123432	35123452
0/1000	35024402	35024412	35024432	35024452	35124402	35124412	35124432	35124452

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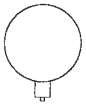
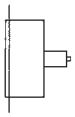
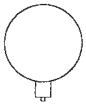
See page 248 for extra charges.

Capsule pressure gauges for chemical applications EN 837-3

DG: M

Precision capsule pressure gauges

Type	KP160Ch, D402	KP160Ch, D412	KP160Ch, D432	KP160Ch, D452	KP160F, D401	KP160F, D411
Version						
Housing Ø	160	160	160	160	160	160
Housing	Stainless steel 304 with bayonet bezel				Stainless steel 304 with bayonet bezel	
Measuring element	Capsule element, stainless steel 316 Ti/316 L				Capsule element, CuBe alloy	
Accuracy class	1.6	1.6	1.6	1.6	0.6	0.6
Connection	G½B	G½B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel 304, with clamp fixing		
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
-25/0	35154402	35154412	35154432	35154452	---	---
-40/0	35155402	35155412	35155432	35155452	35205401	35205411
-60/0	35156402	35156412	35156432	35156452	35206401	35206411
-100/0	35157402	35157412	35157432	35157452	35207401	35207411
-160/0	35158402	35158412	35158432	35158452	35208401	35208411
-250/0	35159402	35159412	35159432	35159452	35209401	35209411
-400/0	35160402	35160412	35160432	35160452	35210401	35210411
-600/0	35161402	35161412	35161432	35161452	35211401	35211411
-1000/0	35162402	35162412	35162432	35162452	35212401	35212411
Price €						
0/25	35166402	35166412	35166432	35166452	---	---
0/40	35167402	35167412	35167432	35167452	35217401	35217411
0/60	35168402	35168412	35168432	35168452	35218401	35218411
0/100	35169402	35169412	35169432	35169452	35219401	35219411
0/160	35170402	35170412	35170432	35170452	35220401	35220411
0/250	35171402	35171412	35171432	35171452	35221401	35221411
0/400	35172402	35172412	35172432	35172452	35222401	35222411
0/600	35173402	35173412	35173432	35173452	35223401	35223411
0/1000	35174402	35174412	35174432	35174452	35224401	35224411

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See page 248 for extra charges.

Extra charges for capsule pressure gauges

DG: M

Housing diameter (mm)	**63**	**80**	**100**	**160**
Description	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Overpressure safety 10 x FSD for ranges > 25 mbar (only for measuring system brass/CuBe, only for instruments with bayonet bezel)	38192	---	38194	38195
Overpressure and underpressure safety 10 x FSD for ranges > 25 mbar (only for measuring system brass/CuBe, only for gauges with bayonet bezel)	38197	---	38199	38200
Accuracy class 1.0	---	---	38180	38181
3-hole fixing, panel mounting bezel, stainless steel 304 (only for gauges with bayonet bezel, also for bottom connection)	37608	---	37609	37610
Back flange, stainless steel 304, bare metal surface (only for gauges with stainless steel housing)	38048	38049	38050	38051
Housing gloss polished (only stainless steel housing)	37611	37612	37613	37614
Bayonet bezel gloss polished	38052		38053	38055
Laminated safety glass window (only for gauges with bayonet bezel)	38072		38074	38075
Connection socket nickel-plated/chrome-plated	38084	38085	38086	38087
Connection socket with special thread	On request	On request	On request	On request
Damping screw brass – hole 0.3 – 0.5 – 0.7 mm (please specify)	38097	38098	38099	38100
Damping screw stainless steel – hole 0.3 – 0.5 – 0.7 mm (please specify)	38103	38104	38105	38106
Red mark on dial	38184	38185	38186	38187
1 reference pointer red – external screwdriver adjustment (window = plastic)	38115	38116	38117	---
1 reference pointer red – external knob adjustment (window = plastic)	38188	38189	38190	38191
Max pointer – for ranges > 0/250 mbar (only for gauges without filling, not possible for overpressure safety 10 x FSD or overpressure/ underpressure safety 10 x FSD as well as negative ranges)	38127	38128	38129	38130
Knife edge pointer	38133	38134	38135	38136
Special mounting position	38147	38148	38149	38150
Oil and grease removed from wetted parts (not for oxygen!), label "Oil and grease free" (only for stainless steel measuring system)	37615	37616	37617	37618
Glycerine filling (only for pressure gauges for chemical applications, for range >0/60, accuracy class 2.5)	37619	---	37620	37621
Higher degree of protection IP 54 (only for gauges with bayonet bezel)	---	---	38160	---
Printing block costs per scale and colour (scale design as per EN 837-3, others on request)	38153	38154	38155	38156
Printing costs per additional colour	38165	38166	38167	38168

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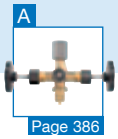
See the overview "Accessories for panel mounting and wall mounting"“ on page 385.

Bourdon tube pressure gauges for heating/plumbing applications

- With self-sealing connection thread for fast installation
- Red maximum mark on dial (version HZ)
- Adjustable red reference pointer and green operation segment on dial (version HZ)
- Corrosion-resistant housing



Page 386

Mounting valves
with self-sealing coating, automatically close during replacement of gauge to enable fast and cost-effective servicing (see page 390 "Accessories for pressure gauges").

Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Nominal size
50 – 63 – 80 – 100

Accuracy class (EN 837-1/6)
NG 50-80: 2.5
NG 100: 1.6

Ranges (EN 837-1/5)
0/0.6 to 0/25 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Self-sealing thread with PTFE ring
for safe and fast installation
(Attention: 60° chamfer required at female thread!)
Brass, bottom or centre back
NG 50–63 G¼B – spanner size SW 14
NG 80–100 G½B – spanner size SW 22

Measuring element
Bourdon tube, copper alloy; "C" type tube

Movement
Brass

Dial
Plastic, white
Dial marking black

Pointer
Plastic, black

Housing
Black ABS, highly impact-resistant
and corrosion-resistant

Window
Clip-in plastic NG 80–100 with adjustable red reference pointer

Special versions

Pressure gauge for heating installations NG 50-63-80
For sealed heating systems
Range: 0/4 bar
Connection: NG 50 G¼B bottom back
NG 63 G¼B or G⅜B bottom or centre back
NG 80 G½B bottom or G¼B centre back
(with valve G¼ x G½)
Dial with red mark at 3 bar and green sector from 1.5 to 3 bar, window with adjustable red reference pointer and green flag

Hydrometer NG 100
Water level indicator for open heating systems
Ranges: 0/0.6 to 0/10 bar
Connection: G½B bottom
Dual scale: bar outer scale black
metres water column inner scale black.
Window with adjustable red reference pointer

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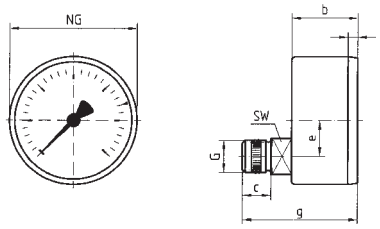
See page 251 for prices.

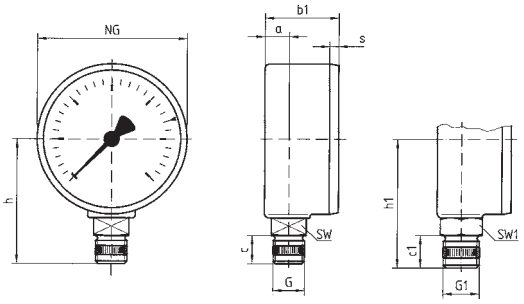
Bourdon tube pressure gauges for heating/ plumbing applications

Housing types and dimensions

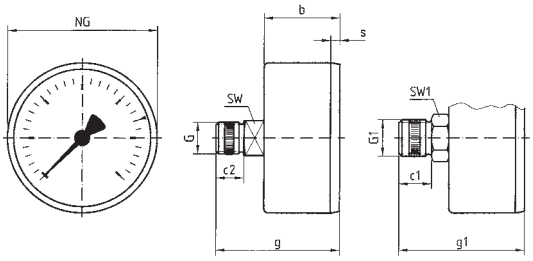
HZ 50 – lower back connection



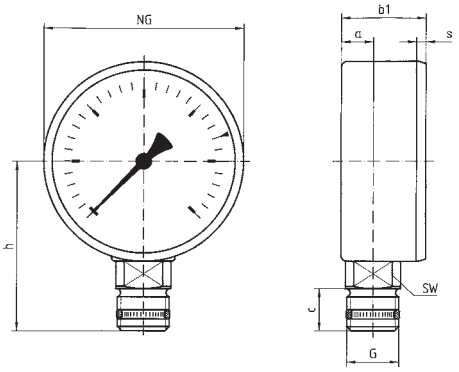
RF/HZ 63 – bottom connection



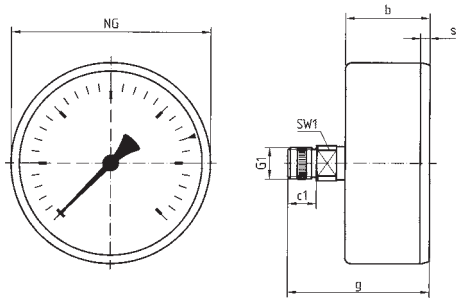
RF/HZ 63 – centre back connection



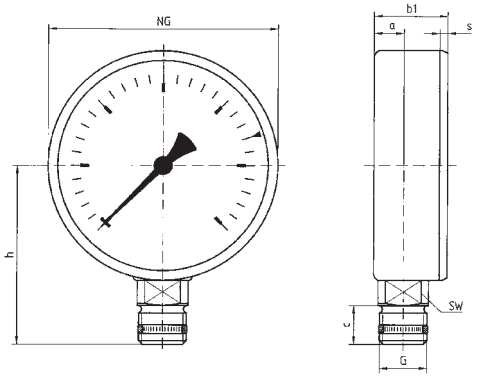
RF 80/HZ 80 – bottom connection



RF 80/HZ 80 – centre back connection



RF 100/HY 100 – bottom connection

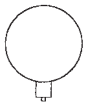
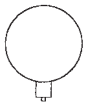
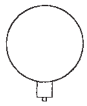
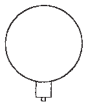
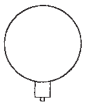
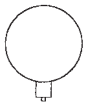


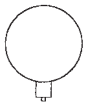
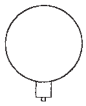
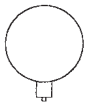
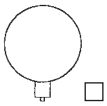
Dimensions (mm)

Nominal size (NG)	a	b	b_1	c	c_1	c_2	e	g	g_1	G	G_1	h	h_1	s	SW	1
50	-	25.8	-	11.2	-	-	14	43	-	G¼B	-	-	-	3.8	14	-
63	9.8	30.4	29.7	11.2	13	11.5	-	49.9	50.4	G¼B	G¾B	49	51.5	3.7	14	17
80	12.8	32.8	32.8	17	11.5	-	-	55.8	-	G½B	G¼B	68	-	2.8	22	14
100	15.5	34.5	-	17	-	-	-	-	-	G½B	-	78	-	3.5	22	-

Bourdon tube pressure gauges for heating/ plumbing applications

DG: G

Type	RF 50 rad	RF 50 ax	RF 63 rad	RF 63 ax	RF 80 rad	HY 80 rad	RF 100 rad	HY 100 rad
Version								
Housing Ø	50	50	63	63	80	80	100	100
Housing	Black ABS, highly impact-resistant and corrosion-resistant							
Measuring element	Bourdon tube, copper alloy							
Accuracy class	2.5	2.5	2.5	2.5	2.5	2.5	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B	G½B	G½B	G½B	G½B
Thread	Self-sealing with PTFE sealing ring							
					With adjustable red reference pointer			Dual scale bar/mWC
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	-	-	-	-	-	-	**63601**	-
0/0.6	-	-	-	-	-	-	-	**63281**
0/1	-	-	-	-	**63559**	**63570**	**63609**	**63282**
0/1.6	-	-	-	-	63560	63571	**63610**	**63283**
0/2.5	-	-	**63511**	**63536**	**63561**	63572	**63611**	**63284**
0/4	-	-	**63512**	**63537**	**63562**	63573	**63612**	**63285**
0/6	**63122**	**63127**	**63513**	**63538**	**63563**	**63574**	**63613**	**63286**
0/10	**63123**	**63128**	**63514**	**63539**	**63564**	**63575**	**63614**	**63287**
0/16	**63124**	**63129**	**63515**	**63540**	**63565**	-	**63615**	-
0/25	-	-	-	-	**63566**	-	**63616**	-

Type	HZ 50 ax	HZ 63 rad	HZ 63 ax	HZ 63 rad	HZ 63 ax	HZ 80 rad	HZ 80 rad	HZ 80 ax
Version								
Housing Ø	50	63	63	63	63	80	80	80
Housing	Black ABS, highly impact-resistant and corrosion-resistant							
Measuring element	Bourdon tube, copper alloy							
Range	0/4 bar							
Dial	With red mark at 3 bar and green sector from 1.5 to 3 bar							
Window	Plastic, with adjustable reference pointer and green flag							
Accuracy class	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Connection	G¼B	G⅜B	G⅜B	G¼B	G¼B	G½B	G¼ with valve G¼ x G½	G¼ with valve G¼ x G½
Thread	Self-sealing with PTFE sealing ring							
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
Part no.	**63927**	**63910**	**63914**	**63911**	**63915**	**63918**	**63913**	**63919**
Dial	With red mark at 2.5 bar and green sector from 1.5 to 2.5 bar							
Price €								
Part no.	-	**63908**	**63909**	-	-	-	-	-

Combined thermometer/pressure gauges / thermo-hydrometers

- **Pressure and temperature measurement with a single gauge**
- **With self-sealing connection thread for fast mounting**
- **With mounting valve for easy replacement without downtime**

Application

For liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
For combined measurement of pressure and temperature, especially in heating systems and heating boilers.

Description

The combined thermometer/pressure gauge / thermo-hydrometer consists of a Bourdon tube measuring system for pressure measurement and a bimetal measuring system for simultaneous temperature measurement. Both values are measured and displayed by a single gauge. A self-closing mounting valve enables easy replacement of the gauge without the necessity to drain the system.
An optional M 18 x 1 to G¼ adapter is available if the combined thermometer/pressure gauge has to be mounted into an existing thermowell with M 18 x 1 female thread.

9

Technical specifications

Type
D 1/D 2

Nominal size
63 – 80

Accuracy class
Pressure gauge/hydrometer: 2.5 (EN 837-1/6)

Application area
Pressure gauge/hydrometer:
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value
Thermometer: 20/120 °C

Ranges
Pressure gauge/hydrometer:
0/4 bar and 0/6 mWC to 0/60 mWC
Thermometer: 20/120 °C

Operating temperature range
Medium: T_{max} = +120 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Pressure gauge/hydrometer:
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, centre back G¼B
with mounting valve G¼ to R½

Measuring element
Pressure: Bourdon tube, copper alloy
Temperature: Bimetal element

Dial
Plastic, white
Dial marking black with red/blue circular arcs

Pointer
Pressure gauge/hydrometer: Plastic, black
Thermometer: Plastic, red

Housing
D1 – plastic
D2 – sheet steel black

Window
Clip-in plastic with adjustable red mark

Options

- Adapter M 18 x 1 to G¼
- Special scales
- Other process connections

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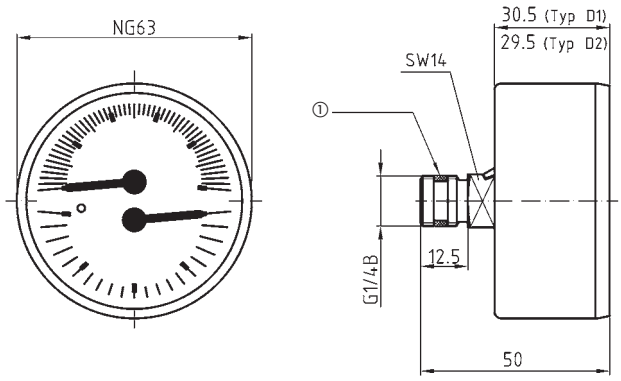
See page 254 for prices.

Combined thermometer/pressure gauges / thermometer-hydrometers

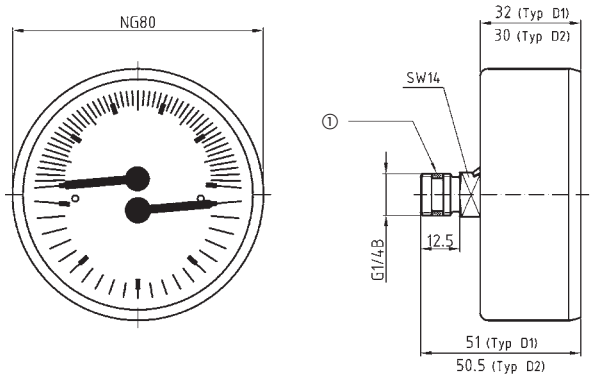
Housing types and dimensions (mm)

TM 63



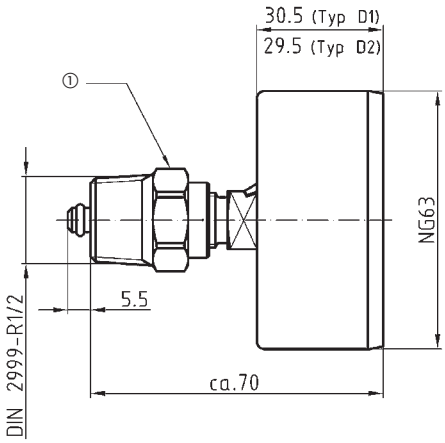
① PTFE sealing ring

TM 80



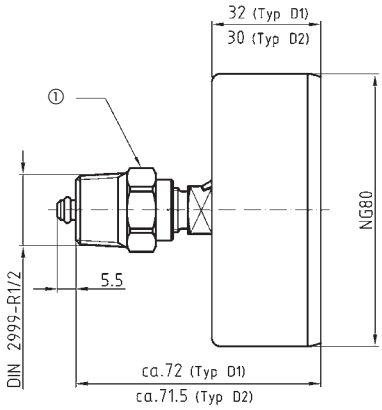
① PTFE sealing ring

TM 63 with mounting valve



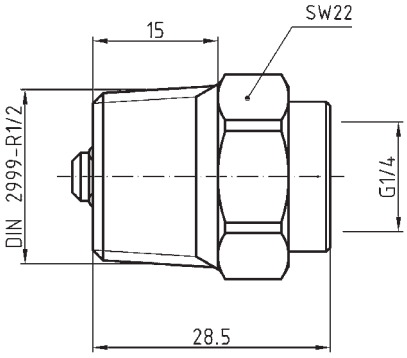
① Mounting valve

TM 80 with mounting valve

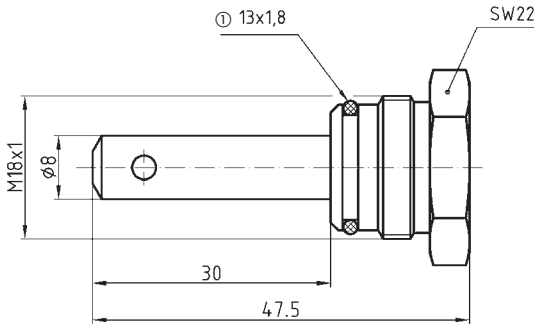


① Mounting valve

Mounting valve



Adapter for instrument connection G¼/G½



① O ring

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Combined thermometer/pressure gauges / thermometer-hydrometers

DG: G

Type	TM 63, D211	TM 63, D211	TM 80, D111	TM 80, D211	TM 80, D211	TH 80, D211
Version						
Housing Ø	63	63	80	80	80	80
Housing	Sheet steel, black		Plastic	Sheet steel, black		
Accuracy class	Pressure gauge/hydrometer 2.5 – Thermometer 2					
Connection	G¼B with mounting valve G¼ to R½					
Adapter for instrument connection G¼/G½	Without	With	Without	Without	With	Without
Range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
0/4 bar 20/120 °C	63318	**63346**	63317	**63341**	63348	---
0/6 bar 20/120 °C	---	---	---	63342	---	---
0/10 bar 20/120 °C	---	---	---	63343	---	---
0/6 mWC 20/120 °C	---	---	---	---	---	**63311**
0/10 mWC 20/120 °C	---	---	---	---	---	**63312**
0/16 mWC 20/120 °C	---	---	---	---	---	**63313**
0/25 mWC 20/120 °C	---	---	---	---	---	**63314**
0/40 mWC 20/120 °C	---	---	---	---	---	**63315**
0/60 mWC 20/120 °C	---	---	---	---	---	**63316**

Minimum order quantity for non-stock items = 100 pieces

Spare parts

DG: G	Part no.	**Price €**
Mounting valve G¼ to R½, brass	05 00 25 12	
Adapter G¼ to M 18 x 1, brass	05 00 40 01	

Standard Bourdon tube pressure gauges EN 837-1

- For pneumatic and heating system applications (e. g. pressure reducers, water filters)
- Design as per EN 837-1
- Accuracy class 1.6
- Corrosion-resistant, highly impact-resistant plastic housing
- Many customised versions available

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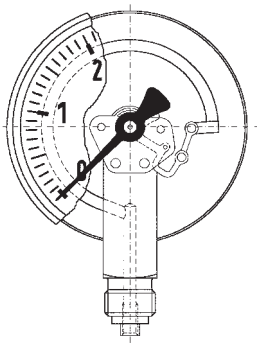
Page 386



Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 1

Nominal size
40 – 50 – 63 – 80 – 100

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or centre back
NG 40 G⅛B – SW 12
NG 50-63 G¼B – SW 14
NG 80-100 bottom G½B – spanner size SW 22
NG 80-100 centre back G¼B – spanner size SW 14
(EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Brass

Dial
Plastic, white
Dial marking black

Pointer
Plastic, black

Housing
Black ABS, highly impact-resistant and corrosion-resistant

Window
Clip-in plastic, NG 80-100 with adjustable red reference pointer

Options

- Damping screw
- Reference pointer
- Special scales
- Other process connections

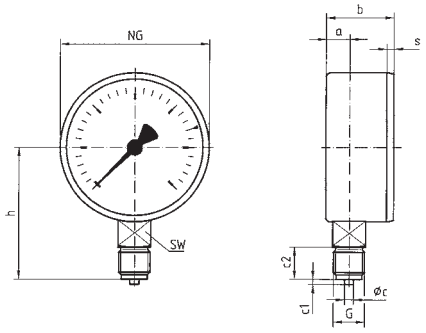
See page 262 for prices.

Standard Bourdon tube pressure gauges

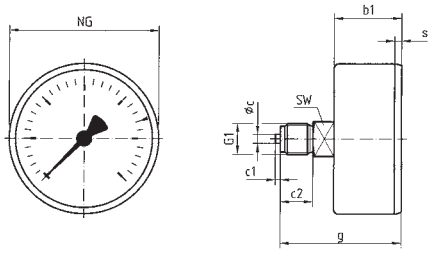
Type D 1 – NG 40/50/63/80/100

Housing types and dimensions

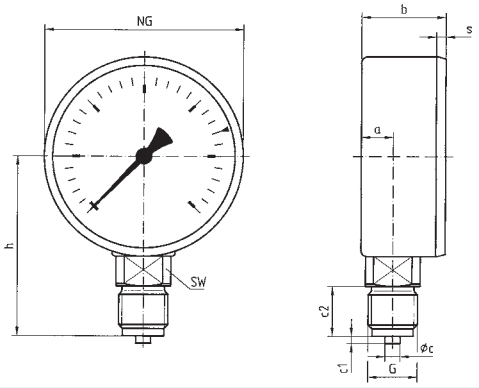
NG 40/50/63 – bottom connection



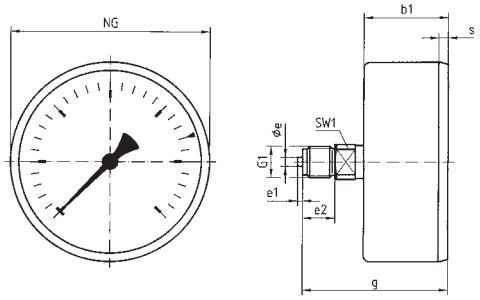
NG 40/50/63 – centre back connection



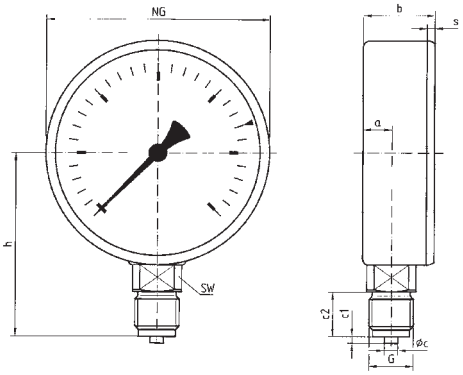
NG 80 – bottom connection



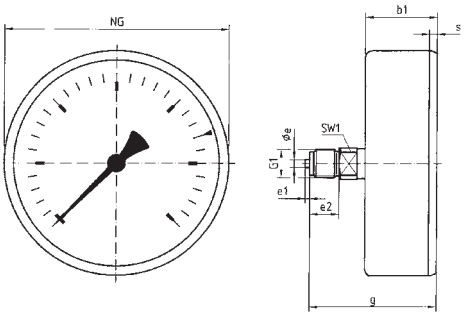
NG 80 – centre back connection



NG 100 – bottom connection



NG 100 – centre back connection



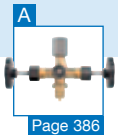
Dimensions (mm)

Nominal size (NG)	a	b	b1	Øc	c1	c2	Øe	e1	e2	g	G	G1	h	s	SW	1
40	9.5	25	25	4	2	10	-	-	-	41.5	G⅛B	G⅛B	36	3	12	-
50	10.3	26.8	27.1	5	2	13	-	-	-	47.1	G¼B	G¼B	45	3.8	14	-
63	9.8	29.7	30.4	5	2	13	-	-	-	50.4	G¼B	G¼B	51.5	3.7	14	-
80	12.8	32.8	32.8	6	3	20	5	2	13	55.8	G½B	G¼B	72	2.8	22	14
100	15.5	34.5	32	6	3	20	5	2	13	55	G½B	G¼B	82	3.5	22	14

Standard Bourdon tube pressure gauges EN 837-1

- For pneumatic and heating system applications (e. g. pressure reducers, water filters)
- Robust steel or stainless steel housing
- Accuracy class 1.6
- Corrosion-resistant, highly impact-resistant plastic housing
- Many customised versions available

A



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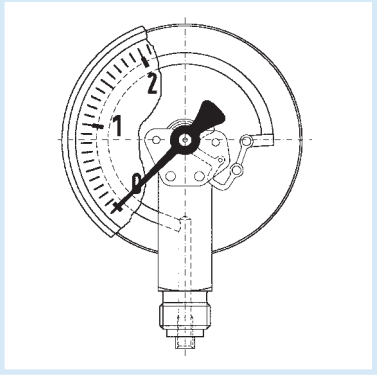


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 2/D 3

Nominal size
40 – 50 – 63

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range

Medium:	T_{max}	= +60 °C
Ambient:	T_{min}	= -20 °C
	T_{max}	= +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or centre back
NG 40 G⅛B – spanner size SW 12
NG 50-63 G¼B – spanner size SW 14
(EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Brass

Dial
Plastic, white
Dial marking black

Pointer
Plastic, black

Housing
D 2 – black sheet steel
D 3 – stainless steel 304

Window
Clip-in plastic

Options

- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Damping screw
- Reference pointer
- Special scales
- Other process connections

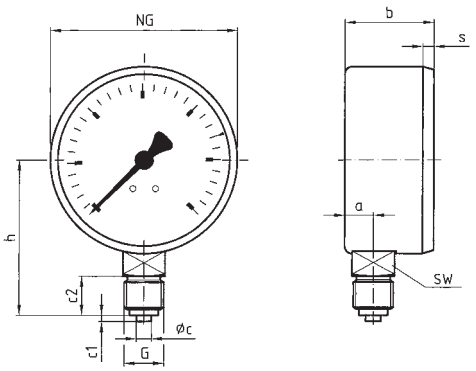
See page 263 for prices.

Standard Bourdon tube pressure gauges

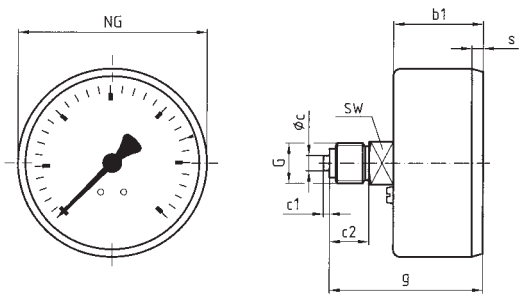
Type D 2/D 3 – NG 40/50/63

Housing types and dimensions

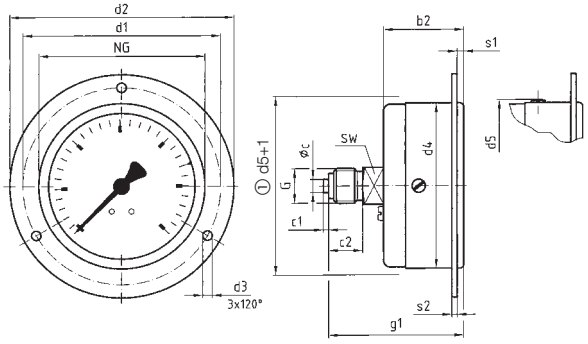
Bottom connection



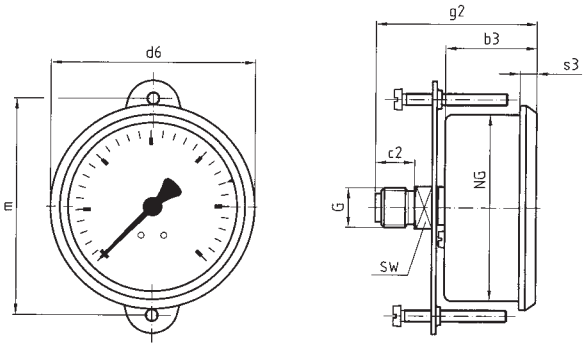
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, panel mounting bezel for clamp fixing



① Panel cut-out

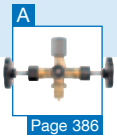
Dimensions (mm)

Nominal size (NG)	a	b	b1	b2	b3	Øc	c1	c2	d1	d2	d3	d4	d5	d6	g	g1	g2	G	h	m
40	8.5	23.5	25	26	28	4	2	10	51	61	3.6	41	45	44	41.5	42.5	46.6	G⅛B	36	50
50	10.5	26	26	27.5	30.3	5	2	13	60	71	3.6	50	54	54	47	49	51.3	G¼B	45	58
63	9.5	29.4	29.4	30.3	30.3	5	2	13	75	85	3.6	63	66.5	67.8	50.4	51.3	53.3	G¼B	51.5	72

Nominal size (NG)	s	s1	s2	s3	SW
40	3	2.5	2	5.2	12
50	3.8	2.5	2	5.4	14
63	3.7	2.5	2	5.6	14

Standard Bourdon tube pressure gauges EN 837-1

- For domestic and engineering applications
- Robust steel housing
- Window with adjustable reference pointer
- Many customised versions available



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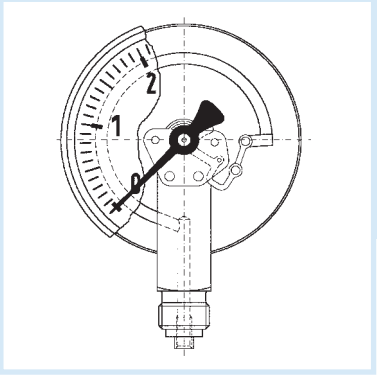


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 2

Nominal size
80 – 100

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range

Medium:	T_{max}	= +60 °C
Ambient:	T_{min}	= -20 °C
	T_{max}	= +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom:
NG 80 - 100 G½B – spanner size SW 22
Brass, centre back:
NG 80 – 100 G¼B – spanner size SW 14
(EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Brass

Dial
Plastic, white
Dial marking black

Pointer
Plastic, black

Housing
Sheet steel, black

Window
Clip-in plastic, adjustable red reference pointer

Options

- Stainless steel housing (NG 100)
- Push on bezel
- Instrument glass window
- 3-hole fixing, panel mounting bezel
- Damping screw
- Reference pointer
- Special scales
- Other process connections

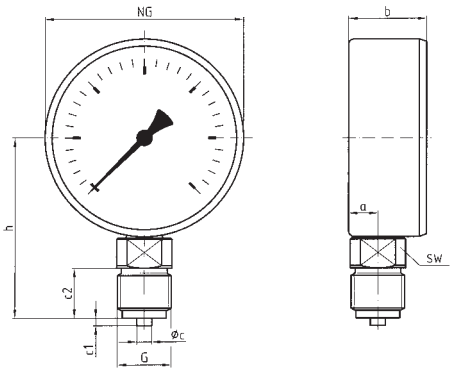
See page 263 for prices.

Standard Bourdon tube pressure gauges

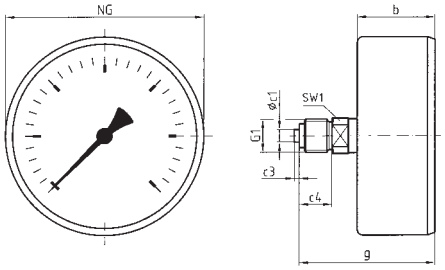
Type D 2 – NG 80/100

Housing types and dimensions

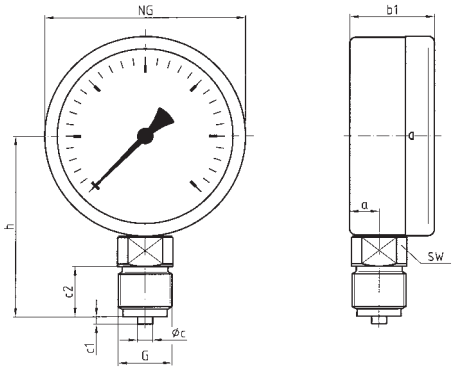
Bottom connection



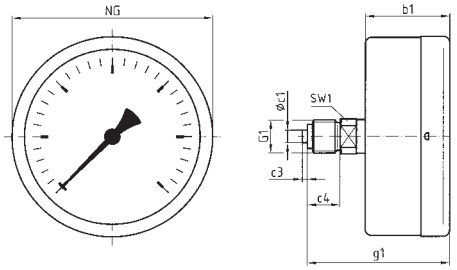
Centre back connection



Bottom connection, with push on bezel



Centre back connection, with push on bezel



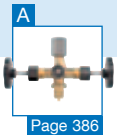
9

Dimensions (mm)

Nominal size (NG)	a	b	b1	Øc	c1	c2	Øc1	c3	c4	g	g1	G	G1	h	SW	1
80	11.7	31	33.5	6	3	20	5	2	13	54	56.5	G½B	G¼B	72	22	14
100	11	29.5	34	6	3	20	5	2	13	52.5	57	G½B	G¼B	82	22	14

Standard Bourdon tube pressure gauges EN 837-1

- For domestic and engineering applications
- With reference pointer on dial
- Robust steel housing
- Window with adjustable reference pointer
- Many customised versions available


A
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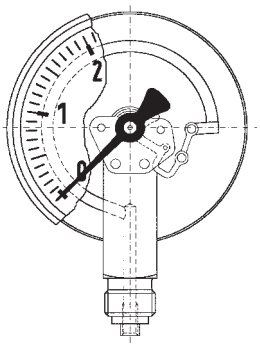


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 2

Nominal size
160

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom: G½B – spanner size SW 22

Measuring element
Bourdon tube, copper alloy
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Brass

Dial
Aluminium, white
Dial marking black with adjustable reference pointer

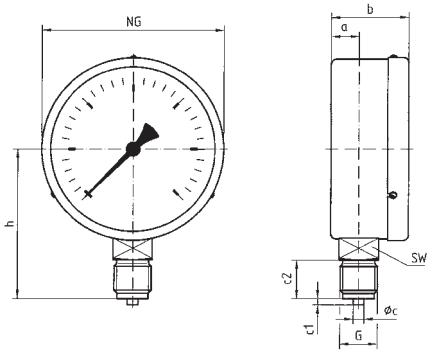
Pointer
Aluminium, black

Housing
Sheet steel, black

Push on bezel
Sheet steel, black

Window
Instrument glass

Bottom connection



Dimensions (mm)

Nominal size (NG)	a	b	Øc	c1
160	15.5	50	6	3
Nominal size (NG)	c2	G	h	SW
160	20	G½B	116	22

Options

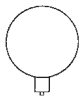
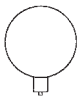
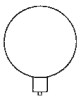
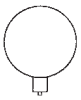
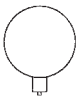
- Damping screw
- Reference pointer
- Special scales
- Other process connections

i
See page 263 for prices.

Standard Bourdon tube pressure gauges

EN 837-1

DG: M

Type	RF40, D101	RF40, D111	RF50, D101	RF50, D111	RF63, D101	RF63, D111	RF80, D101	RF100, D101
Version								
Housing Ø	40	40	50	50	63	63	80	100
Housing	ABS highly impact-resistant, clip-in plastic window							
Measuring element	Bourdon tube, copper alloy							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G⅛B	G⅛B	G¼B	G¼B	G¼B	G¼B	G½B	G½B
PU*	100 pieces	100 pieces	100 pieces	100 pieces	100 pieces	100 pieces	50 pieces	50 pieces
							With adjustable red reference pointer on window	
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	**85001101**	**85001111**	**85051101**	**85051111**	**85101101**	**85101111**	85151101	85201101
-1/+0.6	---	---	---	---	85102101	85102111	85152101	85202101
-1/+1.5	---	---	---	---	**85103101**	**85103111**	85153101	85203101
-1/+3	---	---	---	---	**85104101**	**85104111**	85154101	85204101
-1/+5	---	---	---	---	**85105101**	**85105111**	85155101	85205101
-1/+9	---	---	---	---	85106101	85106111	85156101	85206101
-1/+15	---	---	---	---	**85107101**	85107111	85157101	85207101
Price €								
0/0.6	85009101	85009111	85059101	85059111	**85109101**	**85109111**	85159101	85209101
0/1	**85010101**	**85010111**	**85060101**	**85060111**	**85110101**	**85110111**	85160101	85210101
0/1.6	**85011101**	**85011111**	**85061101**	**85061111**	**85111101**	**85111111**	85161101	85211101
0/2.5	**85012101**	**85012111**	**85062101**	**85062111**	**85112101**	**85112111**	85162101	85212101
0/4	**85013101**	**85013111**	**85063101**	**85063111**	**85113101**	**85113111**	85163101	85213101
0/6	**85014101**	**85014111**	**85064101**	**85064111**	**85114101**	**85114111**	85164101	85214101
0/10	**85015101**	**85015111**	**85065101**	**85065111**	**85115101**	**85115111**	85165101	85215101
0/16	**85016101**	**85016111**	**85066101**	**85066111**	**85116101**	**85116111**	85166101	85216101
0/25	**85017101**	**85017111**	**85067101**	**85067111**	**85117101**	**85117111**	85167101	85217101
0/40	**85018101**	**85018111**	**85068101**	**85068111**	**85118101**	**85118111**	85168101	85218101
Price €								
0/60	85019101	85019111	**85069101**	**85069111**	**85119101**	**85119111**	85169101	85219101
0/100	85020101	85020111	**85070101**	**85070111**	**85120101**	**85120111**	85170101	85220101
0/160	85021101	85021111	**85071101**	**85071111**	**85121101**	**85121111**	85171101	85221101
0/250	85022101	85022111	85072101	85072111	**85122101**	**85122111**	85172101	85222101
0/400	---	---	85073101	85073111	**85123101**	**85123111**	85173101	85223101

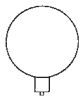
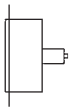
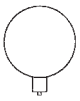
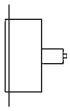
* Minimum order quantity for non-stock items = 100 pieces

See page 265 for extra charges.

Standard Bourdon tube pressure gauges

EN 837-1

DG: M

Type	RF40, D201	RF40, D211	RF40, D231*	RF40, D251*	RF50, D201	RF50, D211	RF50, D231*	RF50, D251*
Version								
Housing Ø	40	40	40	40	50	50	50	50
Housing	Black sheet steel, plastic, clip-in window							
Measuring element	Bourdon tube, copper alloy							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G⅛B	G⅛B	G⅛B	G⅛B	G¼B	G¼B	G¼B	G¼B
			3-hole fixing, panel mounting bezel nickel-plated	Panel mounting bezel stainless steel, polished, clamp fixing			3-hole fixing, panel mounting bezel nickel-plated	Panel mounting bezel stainless steel, polished, clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	**85001201**	**85001211**	85001231	85001251	85051201	85051211	85051231	**85051251**
-1/+0.6	---	---	---	---	---	---	---	---
-1/+1.5	---	---	---	---	---	---	---	---
-1/+3	---	---	---	---	---	---	---	---
-1/+5	---	---	---	---	---	---	---	---
-1/+9	---	---	---	---	---	---	---	---
-1/+15	---	---	---	---	---	---	---	---
Price €								
0/1	85010201	85010211	85010231	85010251	85060201	85060211	85060231	**85060251**
0/1.6	85011201	85011211	85011231	85011251	85061201	85061211	85061231	**85061251**
0/2.5	85012201	85012211	85012231	85012251	85062201	85062211	**85062231**	**85062251**
0/4	**85013201**	**85013211**	**85013231**	**85013251**	**85063201**	**85063211**	**85063231**	**85063251**
0/6	**85014201**	**85014211**	**85014231**	**85014251**	**85064201**	**85064211**	**85064231**	**85064251**
0/10	**85015201**	**85015211**	**85015231**	**85015251**	**85065201**	**85065211**	**85065231**	**85065251**
0/16	**85016201**	**85016211**	**85016231**	**85016251**	**85066201**	**85066211**	**85066231**	**85066251**
0/25	85017201	85017211	85017231	85017251	85067201	85067211	85067231	85067251
0/40	85018201	85018211	85018231	85018251	85068201	85068211	85068231	85068251
Price €								
0/60	85019201	85019211	85019231	85019251	85069201	85069211	85069231	85069251
0/100	85020201	85020211	85020231	85020251	85070201	85070211	85070231	85070251
0/160	85021201	85021211	85021231	85021251	85071201	85071211	85071231	85071251
0/250	85022201	85022211	85022231	85022251	85072201	85072211	85072231	85072251
0/400	---	---	---	---	85073201	85073211	85073231	85073251

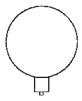
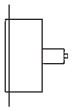
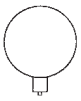
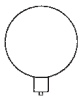
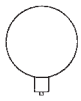
* Dual scale, bar outer, black – psi inner, red
Minimum order quantity for non-stock items = 100 pieces

See page 265 for extra charges.

Standard Bourdon tube pressure gauges

EN 837-1

DG: M

Type	RF63, D201	RF63, D211	RF63, D231*	RF63, D251*	RF80, D201	RF100, D201	RF100, D211	RF160, D201
Version								
Housing Ø	63	63	63	63	80	100	100	160
Housing	Black sheet steel, plastic, clip-in window							Push on bezel, instrument glass
Measuring element	Bourdon tube, copper alloy							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B	G½B	G½B	G¼B	G½B
			3-hole fixing, panel mounting bezel, nickel-plated	Panel mounting bezel stainless steel, polished, clamp fixing	With adjustable red reference pointer			
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	**85101201**	**85101211**	85101231	**85101251**	**85151201**	**85201201**	85201211	**85251201**
-1/+0.6	85102201	85102211	85102231	85102251	85152201	**85202201**	85202211	85252201
-1/+1.5	85103201	85103211	85103231	85103251	85153201	**85203201**	85203211	85253201
-1/+3	85104201	85104211	85104231	85104251	85154201	**85204201**	85204211	85254201
-1/+5	85105201	85105211	85105231	85105251	85155201	**85205201**	85205211	85255201
-1/+9	85106201	85106211	85106231	85106251	85156201	**85206201**	85206211	85256201
-1/+15	85107201	85107211	85107231	85107251	85157201	**85207201**	85207211	85257201
Price €								
0/0.6	85109201	85109211	85109231	85109251	**85159201**	**85209201**	85209211	**85259201**
0/1	**85110201**	85110211	85110231	**85110251**	**85160201**	**85210201**	85210211	**85260201**
0/1.6	**85111201**	85111211	85111231	**85111251**	**85161201**	**85211201**	85211211	**85261201**
0/2.5	**85112201**	**85112211**	**85112231**	**85112251**	**85162201**	**85212201**	85212211	**85262201**
0/4	**85113201**	**85113211**	**85113231**	**85113251**	**85163201**	**85213201**	**85213211**	**85263201**
0/6	**85114201**	**85114211**	**85114231**	**85114251**	**85164201**	**85214201**	**85214211**	**85264201**
0/10	**85115201**	**85115211**	**85115231**	**85115251**	**85165201**	**85215201**	**85215211**	**85265201**
0/16	**85116201**	**85116211**	**85116231**	**85116251**	**85166201**	**85216201**	**85216211**	**85266201**
0/25	**85117201**	**85117211**	85117231	**85117251**	**85167201**	**85217201**	85217211	**85267201**
0/40	85118201	85118211	85118231	85118251	**85168201**	**85218201**	85218211	**85268201**
Price €								
0/60	85119201	85119211	85119231	85119251	**85169201**	**85219201**	85219211	85269201
0/100	85120201	85120211	85120231	85120251	85170201	85220201	85220211	85270201
0/160	85121201	85121211	85121231	85121251	85171201	85221201	85221211	85271201
0/250	85122201	85122211	85122231	85122251	85172201	85222201	85222211	85272201
0/400	85123201	85123211	85123231	85123251	85173201	85223201	85223211	85273201

* Dual scale, bar outer, black – psi inner, red
Minimum order quantity for non-stock items = 100 pieces

See page 265 for extra charges.

Extra charges* for standard Bourdon tube pressure gauges

DG: M

Housing diameter (mm)	40	50	63	80	100	160
Description	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Housing nickel-plated/chrome-plated	38064	38065	38066	---	---	---
Push on bezel nickel-plated/chrome-plated, (NG 160, extra charge, instead of black bezel)	38250	38251	38252	38253	38254	38255
Housing stainless steel 304, vibration-ground (extra charge, instead of steel housing)	38256	38257	38258	---	38300	---
Housing stainless steel 304, polished (extra charge, instead of steel housing)	38259	38260	38261	---	38314	---
Push on bezel stainless steel 304, polished, screw fixing at side	38262	38263	38264	---	---	---
3-hole fixing, panel mounting bezel, stainless steel, screw fixing at side	---	---	---	---	On request	On request
Back flange, black sheet steel (only for steel housing)	---	---	---	---	38044	38045
Connection socket nickel-plated/chrome-plated	38082	38083	38084	38085	38086	38087
Connection socket with special thread	On request	On request	On request	On request	On request	On request
Damping screw brass – hole 0.3 – 0.5 – 0.7 mm (please specify)	38095	38096	38097	38098	38099	38100
Red mark on dial	38182	38183	38184	38185	38186	38187
1 reference pointer, red, printed on window	38315	38316	38109	Standard	Standard	---
2 reference pointers, red, on dial, adjustable	---	---	---	---	38123	---
Printing block costs per scale and colour (scale design as per EN 837-1, others on request)	38151	38152	38153	38154	38155	38156
Printing costs per additional colour	38163	38164	38165	38166	38167	38168

* Minimum order quantity for special versions (non-stock items) = 100 pieces per version and delivery

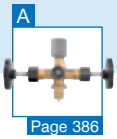
Spare windows for standard Bourdon tube pressure gauges

DG: M

Housing diameter (mm)	40	50	63	80	100	160
Description	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Plastic window, clip-in, for plastic housing	38285	38271	38272	38273	38274	---
Plastic window, clip-in, for steel housing	38275	38276	38277	38317	38318	---
Instrument glass window	---	---	---	38278	38279	38280

Bourdon tube pressure gauges for industrial applications EN 837-1

- For machine and plant engineering
- Robust steel or stainless steel housing
- Many customised versions available



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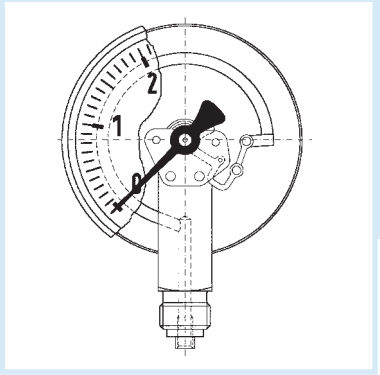


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For high measuring accuracy.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 2/D 3

Nominal size
100

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/1000 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value
Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value

Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or lower back
G½B – spanner size SW 22 (EN 837-1/7.3)

Measuring element
Bourdon tube,
≤ 60 bar "C" type tube, copper alloy
> 60 bar helical tube,
stainless steel 316 Ti/316 L

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
D 2 – black sheet steel
D 3 – stainless steel 304

Window
Clip-in plastic

Options

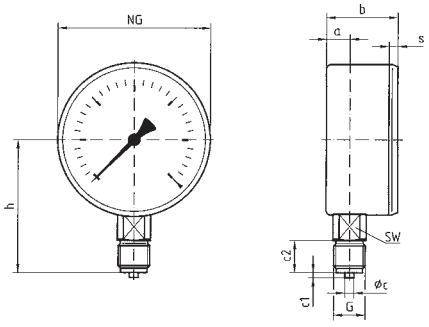
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Damping screw
- Reference pointer
- Electrical contacts
- Special scales
- Other process connections

See page 268 for prices.

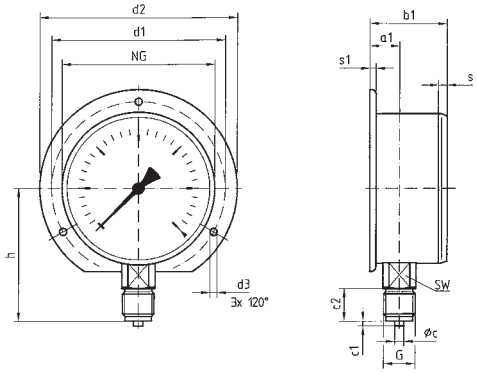
Bourdon tube pressure gauges for industrial applications Type D 2 / D 3 – NG 100

Housing types and dimensions

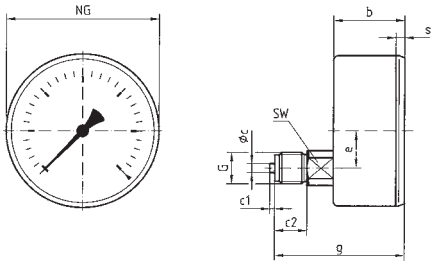
Bottom connection



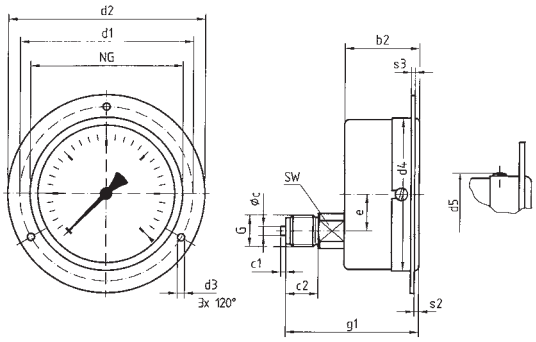
Bottom connection, back flange



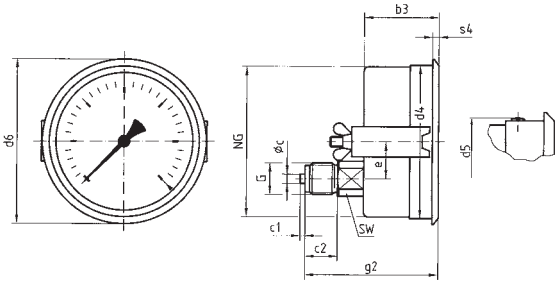
Lower back connection



Lower back connection, 3-hole fixing, panel mounting bezel



Lower back connection, panel mounting bezel for clamp fixing



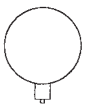
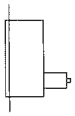
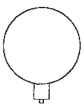
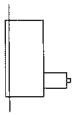
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	g2	h
100	15.6	19.1	44	47.5	45.6	47	6	3	20	116	132	4.8	101	105	107	26.5	G½B	76	77.6	79	86
Nominal size (NG)	s	s1	s2	s3	s4	SW															
100	3.5	5.5	3.5	2	4.5	22															

* Dimensions for NG 100 according to DIN 16064

Bourdon tube pressure gauges for industrial applications EN 837-1

DG: M

Type	RF100 I, D201	RF100 I, D211	RF100 I, D221	RF100 I, D301	RF100 I, D311	RF100 I, D331	RF100 I, D351
Version							
Housing Ø	100	100	100	100	100	100	100
Housing	Black sheet steel, plastic, clip-in window				Stainless steel 304, plastic clip-in window		
Measuring element	Bourdon tube, copper alloy (> 60 bar stainless steel 316 Ti/316 L)						
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G½B	G½B	G½B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, black			3-hole fixing, panel mounting bezel, stainless steel, polished	Panel mounting bezel, chrome plated, clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	85301201	85301211	85301221	85301301	85301311	85301331	85301351
-1/+0.6	85302201	85302211	85302221	85302301	85302311	85302331	85302351
-1/+1.5	85303201	85303211	85303221	85303301	85303311	85303331	85303351
-1/+3	85304201	85304211	85304221	85304301	85304311	85304331	85304351
-1/+5	85305201	85305211	85305221	85305301	85305311	85305331	85305351
-1/+9	85306201	85306211	85306221	85306301	85306311	85306331	85306351
-1/+15	85307201	85307211	85307221	85307301	85307311	85307331	85307351
Price €							
0/0.6	85309201	85309211	85309221	85309301	85309311	85309331	85309351
0/1	85310201	85310211	85310221	85310301	85310311	85310331	85310351
0/1.6	85311201	85311211	85311221	85311301	85311311	85311331	85311351
0/2.5	85312201	85312211	85312221	85312301	85312311	85312331	85312351
0/4	85313201	85313211	85313221	85313301	85313311	85313331	85313351
0/6	85314201	85314211	85314221	85314301	85314311	85314331	85314351
0/10	85315201	85315211	85315221	85315301	85315311	85315331	85315351
0/16	85316201	85316211	85316221	85316301	85316311	85316331	85316351
0/25	85317201	85317211	85317221	85317301	85317311	85317331	85317351
0/40	85318201	85318211	85318221	85318301	85318311	85318331	85318351
Price €							
0/60	85319201	85319211	85319221	85319301	85319311	85319331	85319351
0/100	85320201	85320211	85320221	85320301	85320311	85320331	85320351
0/160	85321201	85321211	85321221	85321301	85321311	85321331	85321351
0/250	85322201	85322211	85322221	85322301	85322311	85322331	85322351
0/400	85323201	85323211	85323221	85323301	85323311	85323331	85323351
Price €							
0/600	85324201	85324211	85324221	85324301	85324311	85324331	85324351
0/1000	85325201	---	---	85325301	---	---	---

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i

See page 306 for extra charges.

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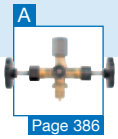
Bourdon tube pressure gauges for industrial applications EN 837-1

- For machine and plant engineering
- Robust, stainless steel housing with bayonet bezel
- Optionally available up to nominal size 250 mm
- Can be equipped with electrical contact
- DNV type approval GOSSTANDART-certified



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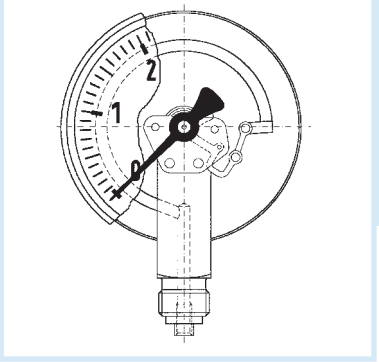


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For high accuracy and rough application conditions.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/1000 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value
Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value
Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C::
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Brass, bottom or lower back
G½B – spanner size SW 22 (EN 837-1/7.3)

Measuring element
Bourdon tube, ≤ 60 bar "C" type tube, copper alloy > 60 bar helical tube, stainless steel 316 Ti/316 L

Movement
Brass

Dial
Aluminium, white, dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304
with blow-out

Bayonet bezel
Stainless steel 304

Window
Instrument glass

Options

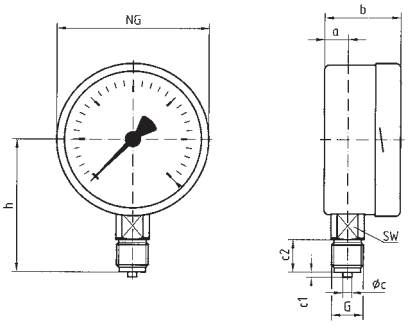
- Nominal size 250 (bottom connection)
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Safety glass window
- Damping screw
- Reference pointer
- Electrical contacts
- Special scales
- Other process connections

See page 271 for prices.

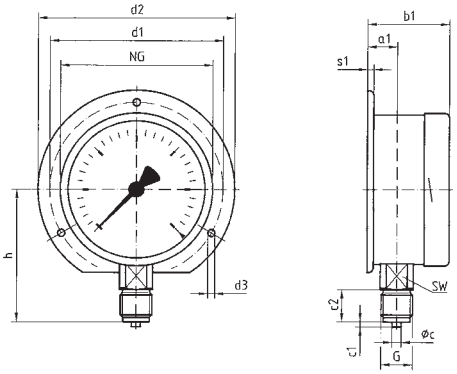
Bourdon tube pressure gauges for industrial applications Type D 4 – NG 100/160

Housing types and dimensions

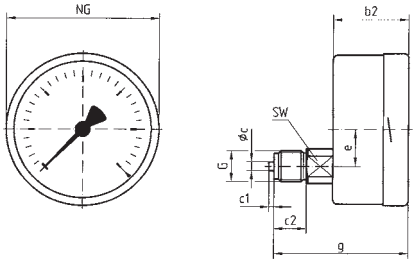
Bottom connection



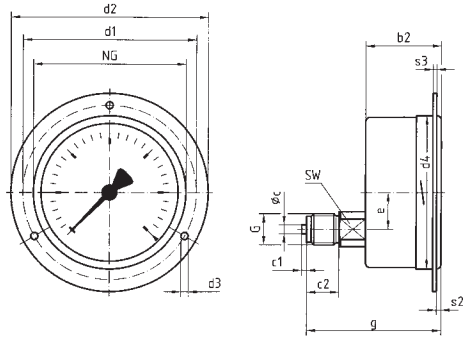
Bottom connection, back flange



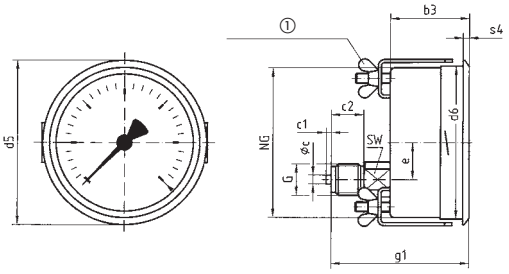
Lower back connection



Lower back connection, 3-hole fixing, panel mounting bezel



Lower back connection, panel mounting bezel for clamp fixing



① 90° drawn staggered

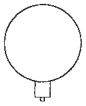
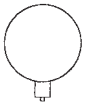
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	h	s1
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	26.5	G½B	81	81	86	5.5
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	26.5	G½B	82	84	116	6
250	16	-	57	59	-	-	6	3	20	270	285	5.8	-	-	-	-	G½B	-	-	165	2
Nominal size (NG)	s2	s3	s4	SW																	
100	4	2	4	22																	
160	4	2	4.5	22																	
250	-	-	-	22																	

* Dimensions for NG 100 according to DIN 16064

Bourdon tube pressure gauges for industrial applications EN 837-1

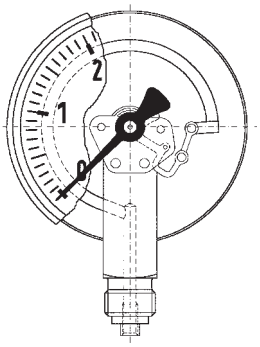
DG: M

Type	RF100 l, D401	RF100 l, D411	RF100 l, D431	RF100 l, D451	RF160 l, D401	RF160 l, D411	RF160 l, D431	RF160 l, D451
Version								
Housing Ø	100	100	100	100	160	160	160	160
Housing	Stainless steel 304 with bayonet bezel, instrument glass window							
Measuring element	Bourdon tube, copper alloy (> 60 bar stainless steel 316 Ti/316 L)							
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G½B	G½B	G½B	G½B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, clamp fixing			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	**85301401**	85301411	85301431	85301451	85351401	85351411	85351431	85351451
-1/+0.6	85302401	85302411	85302431	85302451	85352401	85352411	85352431	85352451
-1/+1.5	**85303401**	85303411	85303431	85303451	85353401	85353411	85353431	85353451
-1/+3	**85304401**	85304411	85304431	85304451	85354401	85354411	85354431	85354451
-1/+5	**85305401**	85305411	85305431	85305451	85355401	85355411	85355431	85355451
-1/+9	85306401	85306411	85306431	85306451	85356401	85356411	85356431	85356451
-1/+15	85307401	85307411	85307431	85307451	85357401	85357411	85357431	85357451
Price €								
0/0.6	85309401	85309411	85309431	85309451	85359401	85359411	85359431	85359451
0/1	**85310401**	85310411	85310431	85310451	**85360401**	85360411	85360431	85360451
0/1.6	**85311401**	85311411	85311431	85311451	**85361401**	85361411	85361431	85361451
0/2.5	**85312401**	85312411	85312431	85312451	**85362401**	85362411	85362431	85362451
0/4	**85313401**	85313411	85313431	85313451	**85363401**	85363411	85363431	85363451
0/6	**85314401**	85314411	85314431	85314451	**85364401**	85364411	85364431	85364451
0/10	**85315401**	85315411	85315431	85315451	**85365401**	85365411	85365431	85365451
0/16	**85316401**	85316411	85316431	85316451	**85366401**	85366411	85366431	85366451
0/25	**85317401**	85317411	85317431	85317451	**85367401**	85367411	85367431	85367451
0/40	**85318401**	85318411	85318431	85318451	85368401	85368411	85368431	85368451
Price €								
0/60	**85319401**	85319411	85319431	85319451	85369401	85369411	85369431	85369451
0/100	**85320401**	85320411	85320431	85320451	85370401	85370411	85370431	85370451
0/160	**85321401**	85321411	85321431	85321451	85371401	85371411	85371431	85371451
0/250	**85322401**	85322411	85322431	85322451	85372401	85372411	85372431	85372451
0/400	**85323401**	85323411	85323431	85323451	85373401	85373411	85373431	85373451
Price €								
0/600	85324401	85324411	85324431	85324451	85374401	85374411	85374431	85374451
0/1000	85325401	85325411	85325431	85325451	85375401	85375411	85375431	85375451
Extra charge €								
Nominal size 250	---	---	---	---		---	---	---

See page 306 for extra charges.

Glycerine filled Bourdon tube pressure gauges EN 837-1

- **Can be used in case of heavy vibrations and high, dynamic pressure loads**
- **Longer service life due to less wear and corrosion protection of the measuring system**
- **No steaming up of the inside of the window in case of outdoor applications**



Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas and vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 6

Nominal size
40

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
0/4 bar to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of +20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529)
with housing vent (≤ 25 bar)
IP 54

Standard version

Connection
Brass, centre back G1/8B – spanner size SW 12 (EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Brass

Dial
Plastic, white / dial marking black

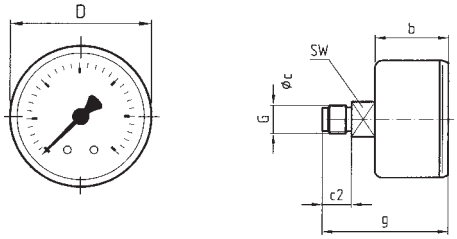
Pointer
Plastic, black

Housing
Plastic (ABS), black, with pressure relief port

Window
Plastic, ultrasonically welded to housing

Filling liquid
Glycerine (99.5 %)

Centre connection back – NG 40



Dimensions (mm)

Nominal size (NG)	b	Øc	c2	-
40	25	4	10	-

Nominal size (NG)	D	G	g	SW
40	40	G1/8B	43	12

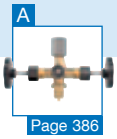
i
See page 275 for prices.

Options

- Special scales
- Damping screw
- Other process connections

Glycerine filled Bourdon tube pressure gauges EN 837-1

- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Longer service life due to less wear and corrosion protection of the measuring system
- No steaming up of the inside of the window in case of outdoor applications



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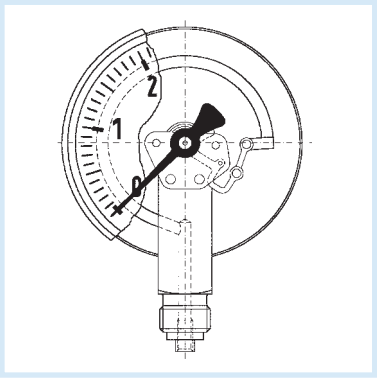


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 6

Nominal size
50 – 63

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529)
with housing vent (≤ 25 bar)
IP 54

Standard version

Connection
Brass, bottom or centre back
G¼B – spanner size SW 14 (EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Plastic, black

Housing
Polyamide black
with pressure relief port

Crimped bezel
Aluminium, black

Window
Plastic

Filling liquid
Glycerine (99.5 %)

Options

- Back flange (NG 63)
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 63)
- Damping screw
- Special scales
- Other process connections

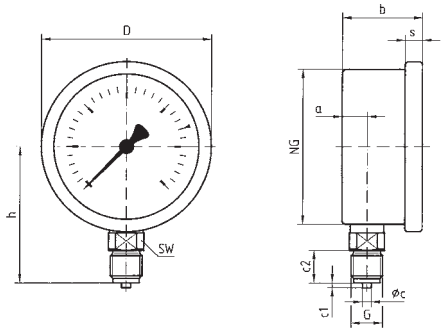
See page 275 for prices.

Glycerine filled Bourdon tube pressure gauges

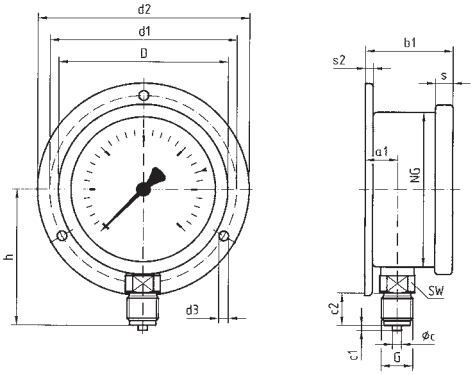
Type D 6 – NG 50/63

Housing types and dimensions

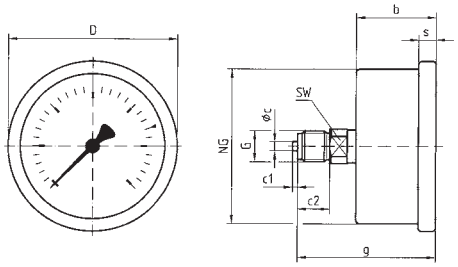
Bottom connection



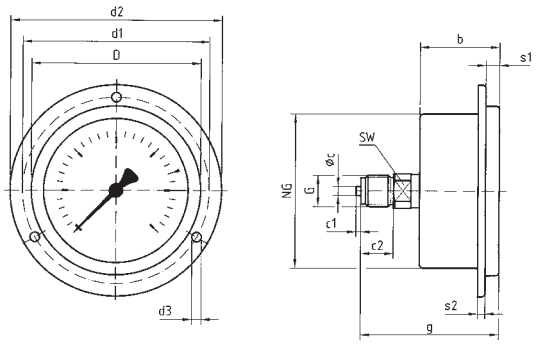
Bottom connection, back flange



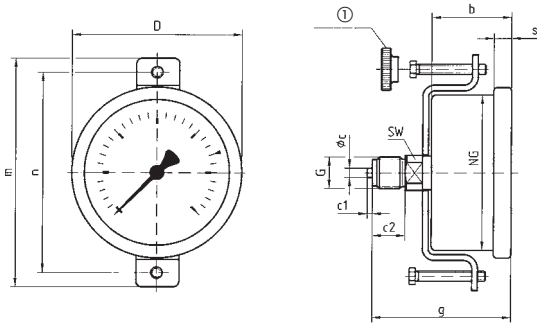
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, clamp fixing



① Turning knob

Dimensions (mm)

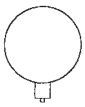
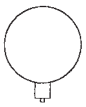
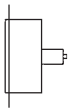
Nominal size (NG)	a	a_1	b	b_1	Øc	c_1	c_2	d_1*	d_2	d_3*	D	G	g	h	m	n	s	s_1	s_2	SW
50	12	-	31.5	-	5	2	13	-	-	-	53	G¼B	54.5	47	82	73	5	-	-	14
63	10	13	32	35	5	2	13	75	85	3.6	68	G¼B	55	53	94	82	7	5.5	3	14

* Dimensions for NG 100 according to DIN 16064

Glycerine filled Bourdon tube pressure gauges

EN 837-1

DG: M

Type	RF40Gly, D611	RF50Gly, D601	RF50Gly, D611	RF50Gly, D641	RF63Gly, D601	RF63Gly, D611	RF63Gly, D621	RF63Gly, D641
Version								
Housing Ø	40	50	50	50	63	63	63	63
Housing	ABS black	Polyamide, black, with crimped bezel, black, plastic window						
Measuring element	Bourdon tube, copper alloy							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G⅛B	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B
				Clamp fixing			3-hole fixing, panel mounting bezel, black	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €	**---**							
-1/0	---	**85051601**	85051611	85051641	85101601	85101611	85101621	85101641
-1/+0.6	---	85052601	85052611	85052641	85102601	85102611	85102621	85102641
-1/+1.5	---	85053601	85053611	85053641	85103601	85103611	85103621	85103641
1/+3	---	85054601	85054611	85054641	85104601	85104611	85104621	85104641
-1/+5	---	85055601	85055611	85055641	85105601	85105611	85105621	85105641
-1/+9	---	85056601	85056611	85056641	85106601	85106611	85106621	85106641
-1/+15	---	85057601	85057611	85057641	85107601	85107611	85107621	85107641
Price €								
0/0.6	---	85059601	85059611	85059641	85109601	85109611	85109621	85109641
0/1	---	85060601	85060611	85060641	85110601	85110611	85110621	85110641
0/1.6	---	85061601	85061611	85061641	85111601	85111611	85111621	85111641
0/2.5	---	85062601	85062611	85062641	85112601	85112611	85112621	85112641
0/4	85013611	85063601	85063611	85063641	85113601	85113611	85113621	85113641
0/6	**85014611**	85064601	85064611	85064641	85114601	85114611	85114621	85114641
0/10	**85015611**	85065601	85065611	85065641	85115601	85115611	85115621	85115641
0/16	**85016611**	85066601	85066611	85066641	85116601	85116611	85116621	85116641
0/25	85017611	**85067601**	85067611	85067641	85117601	85117611	85117621	85117641
0/40	85018611	85068601	85068611	85068641	85118601	85118611	85118621	85118641
Price €								
0/60	85019611	85069601	85069611	85069641	85119601	85119611	85119621	85119641
0/100	85020611	85070601	85070611	85070641	85120601	85120611	85120621	85120641
0/160	85021611	85071601	85071611	85071641	85121601	85121611	85121621	85121641
0/250	85022611	85072601	85072611	85072641	85122601	85122611	85122621	85122641
0/400	85023611	85073601	85073611	85073641	85123601	85123611	85123621	85123641

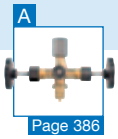
* Minimum order quantity for non-stock items = 10 pieces

See page 306 for prices.

Glycerine filled Bourdon tube pressure gauges EN 837-1

- Robust stainless steel housing
- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Longer service life due to less wear and corrosion protection of the measuring system
- No steaming up of the inside of the window in case of outdoor applications
- DNV-certified

A



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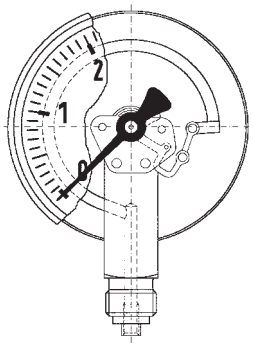


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 7

Nominal size
50 – 63

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/400 bar
NG 63 to 0/600 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 % /10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529)
with housing vent (≤ 25 bar)
IP 54

Standard version

Connection
Brass, bottom or centre back
G¼B – spanner size SW 14 (EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304
with pressure relief port

Crimped bezel
Stainless steel 304

Window
Plastic

Filling liquid
Glycerine (99.5 %)

Options

- Filling liquid silicone oil
- Back flange (NG 63)
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 63)
- Crimped bezel polished
- Special scales
- Damping screw
- Other process connections

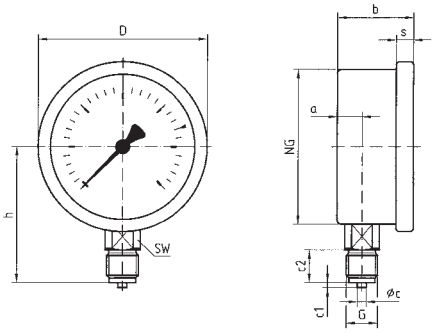
i
See page 278 for prices.

Glycerine filled Bourdon tube pressure gauges

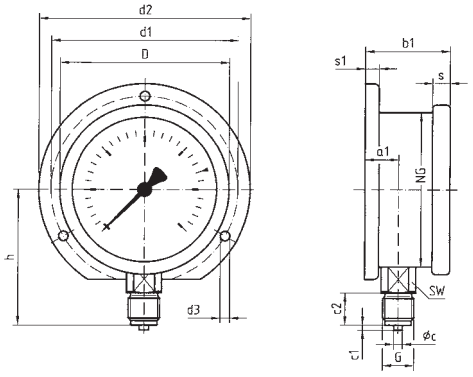
Type D 7 –NG 50/63

Housing types and dimensions

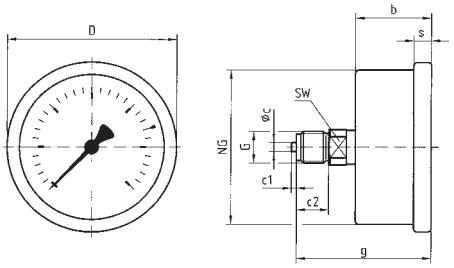
Bottom connection



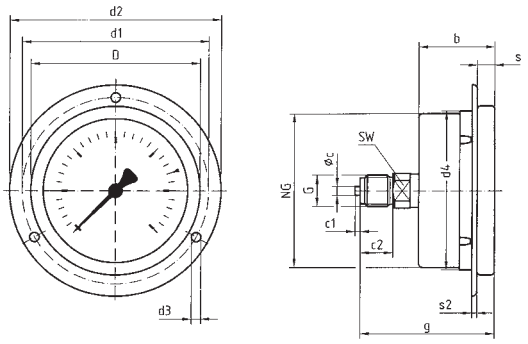
Bottom connection, back flange



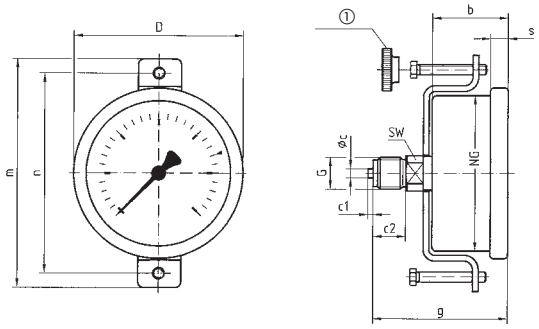
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel



Centre back connection, clamp fixing



① Turning knob

Dimensions (mm)

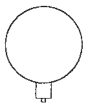
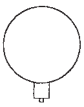
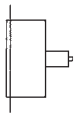
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2	d3*	d4	D	G	g	h	m	n	s	s1	s2	SW
50	11	-	28	-	5	2	13	-	-	-	-	53	G¼B	51	45.5	82	73	4.5	-	-	14
63	9.5	13	30.5	34	5	2	13	75	85	3.6	64	68	G¼B	53.3	53	94	82	7	5.5	2	14

* Dimensions as per DIN 16063

Glycerine filled Bourdon tube pressure gauges

EN 837-1

DG: M

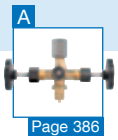
Type	RF50Gly, D701	RF50Gly, D711	RF50Gly, D751	RF63Gly, D701	RF63Gly, D711	RF63Gly, D731	RF63Gly, D751
Version							
Housing Ø	50	50	50	63	63	63	63
Housing	Stainless steel 304 with crimped bezel 304, plastic window						
Measuring element	Bourdon tube, copper alloy						
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B
			Clamp fixing	* Dual scale, bar outer, black – psi inner, red		3-hole fixing, panel mounting bezel 304	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	85051701	85051711	85051751	**85101701**	**85101711**	**85101731**	**85101751**
-1/+0.6	85052701	85052711	85052751	85102701	85102711	85102731	85102751
-1/+1.5	85053701	85053711	85053751	**85103701**	**85103711**	**85103731**	**85103751**
-1/+3	85054701	85054711	85054751	**85104701**	85104711	85104731	85104751
-1/+5	85055701	85055711	85055751	**85105701**	**85105711**	**85105731**	**85105751**
-1/+9	85056701	85056711	85056751	**85106701**	85106711	85106731	85106751
-1/+15	85057701	85057711	85057751	**85107701**	**85107711**	**85107731**	**85107751**
Price €							
0/0.6	85059701	85059711	85059751	**85109701**	**85109711**	**85109731**	**85109751**
0/1	85060701	85060711	85060751	**85110701**	**85110711**	**85110731**	**85110751**
0/1.6	85061701	85061711	85061751	**85111701**	**85111711**	**85111731**	**85111751**
0/2.5	85062701	85062711	85062751	**85112701**	**85112711**	**85112731**	**85112751**
0/4	85063701	85063711	85063751	**85113701**	**85113711**	**85113731**	**85113751**
0/6	85064701	85064711	85064751	**85114701**	**85114711**	**85114731**	**85114751**
0/10	85065701	85065711	85065751	**85115701**	**85115711**	**85115731**	**85115751**
0/16	85066701	85066711	85066751	**85116701**	**85116711**	**85116731**	**85116751**
0/25	85067701	85067711	85067751	**85117701**	**85117711**	**85117731**	**85117751**
0/40	85068701	85068711	85068751	**85118701**	**85118711**	**85118731**	**85118751**
Price €							
0/60	85069701	85069711	85069751	**85119701**	**85119711**	**85119731**	**85119751**
0/100	85070701	85070711	85070751	**85120701**	**85120711**	**85120731**	**85120751**
0/160	85071701	85071711	85071751	**85121701**	**85121711**	**85121731**	**85121751**
0/250	85072701	85072711	85072751	**85122701**	**85122711**	**85122731**	**85122751**
0/315				**86818701**	**86818711**	**86818731**	**86818751**
0/400	85073701	85073711	85073751	**85123701**	**85123711**	**85123731**	**85123751**
Price €							
0/600	---	---	---	**85124701**	**85124711**	**85124731**	**85124751**

* Append the code Z001 to the part number for single scales.
Minimum order quantity for non-stock items = 25 pieces

See page 306 for prices.

Glycerine filled Bourdon tube pressure gauges EN 837-1

- Robust stainless steel housing
- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Longer service life due to less wear and corrosion protection of the measuring system
- No steaming up of the inside of the window in case of outdoor applications
- DNV-certified



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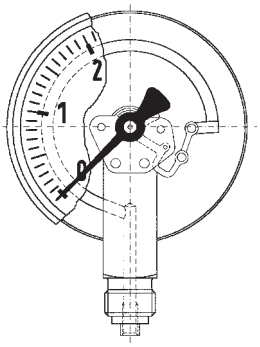

Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 7

Nominal size
80 – 100

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/1 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529)
with housing vent (≤ 25 bar)
IP 54

Standard version

Connection
Brass, bottom NG 80-100 G½B – spanner size SW 22
Brass, centre back NG 80 G¼B – spanner size SW 14
NG 100 G½B – spanner size SW 22
(EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with pressure relief port

Crimped bezel
Stainless steel 304

Window
Plastic (Makrolon)

Filling liquid
Glycerine (99.5 %)

Options

- Filling liquid silicone oil
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 100)
- Crimped bezel polished
- Measuring system stainless steel (up to 1000 bar)
- Special scales
- Damping screw
- Other process connections

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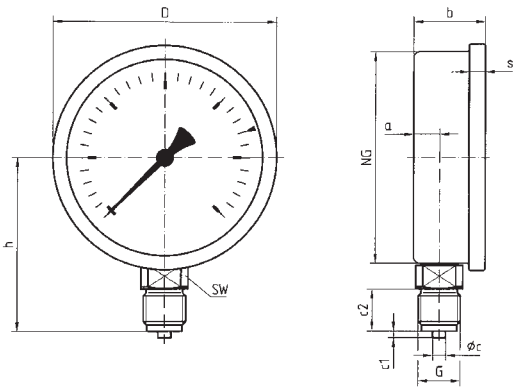
See page 281 for prices.

Glycerine filled Bourdon tube pressure gauges

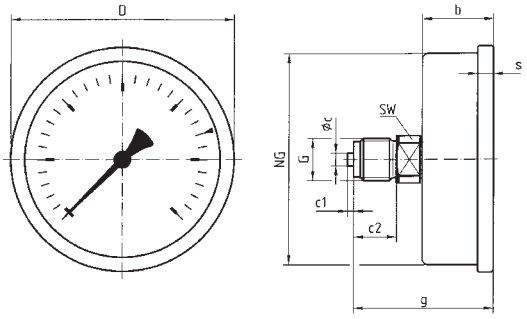
Type D 7 – NG 80/100

Housing types and dimensions

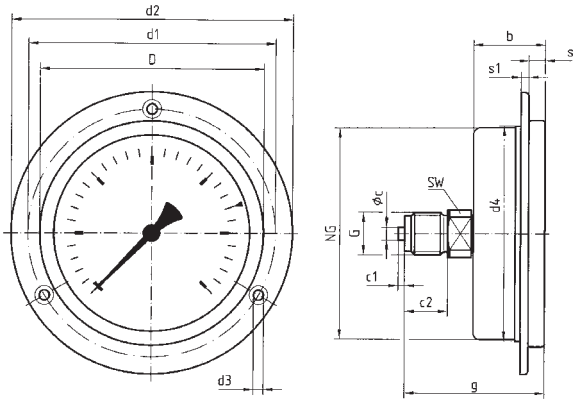
Bottom connection



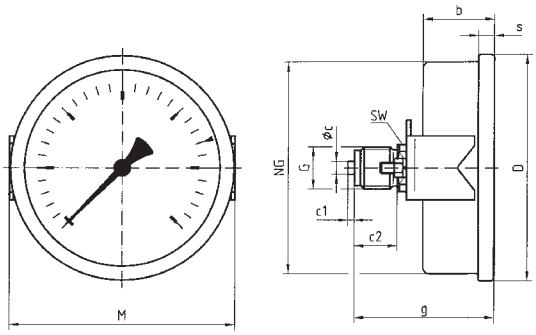
Centre back connection



Centre back connection, 3-hole fixing, panel mounting bezel (NG 100)



Centre back connection, clamp fixing



Dimensions (mm)

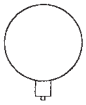
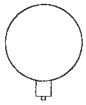
Nominal size (NG)	a	b	Øc	c1	c2	d1*	d2	d3*	d4	D	g	G	h	M	s	s1	SW
80 Ms ax	-	33.5	5	2	13	-	-	-	-	85	56.5	G¼B	-	82	7	-	14
80 VA ax	-	33.5	5	2	13	-	-	-	-	85	59	G¼B	-	82	7	-	14
80 Ms rad	12.2	33.5	6	3	20	-	-	-	-	85	-	G½B	71	-	7	-	22
80 VA rad	12.2	33.5	6	3	20	-	-	-	-	85	-	G½B	79.5	-	7	-	22
100 Ms	12.2	33.5	6	3	20	116	132	4.8	101	106	65.5	G½B	81	106	7	3.8	22
100 VA	11.8	33.5	6	3	20	116	132	4.8	101	106	76.5	G½B	90	106	7	3.8	22

* Dimensions as per DIN 16064

Glycerine filled Bourdon tube pressure gauges

EN 837-1

DG: M

	Measuring system copper alloy			Measuring system stainless steel		
Type	RF80Gly, D701	RF80Gly, D711	RF80Gly, D751	RF80EGly, D702	RF80EGly, D712	RF80EGly, D752
Version						
Housing Ø	80	80	80	80	80	80
Housing	Stainless steel 304 with crimped bezel 304, plastic window			Stainless steel 304 with crimped bezel 304, plastic window		
Measuring element	Bourdon tube, copper alloy			Bourdon tube, stainless steel 316 Ti/316 L		
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G½B	G¼B	G¼B	G½B	G¼B	G¼B
			Clamp fixing			Clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
-1/0	85151701	85151711	85151751	85151702	85151712	85151752
-1/+0.6	85152701	85152711	85152751	85152702	85152712	85152752
-1/+1.5	85153701	85153711	85153751	85153702	85153712	85153752
-1/+3	85154701	85154711	85154751	85154702	85154712	85154752
-1/+5	85155701	85155711	85155751	85155702	85155712	85155752
-1/+9	85156701	85156711	85156751	85156702	85156712	85156752
-1/+15	85157701	85157711	85157751	85157702	85157712	85157752
Price €						
0/1	85160701	85160711	85160751	85160702	85160712	85160752
0/1.6	85161701	85161711	85161751	85161702	85161712	85161752
0/2.5	85162701	85162711	85162751	85162702	85162712	85162752
0/4	85163701	85163711	85163751	85163702	85163712	85163752
0/6	85164701	85164711	85164751	85164702	85164712	85164752
0/10	85165701	85165711	85165751	85165702	85165712	85165752
0/16	85166701	85166711	85166751	85166702	85166712	85166752
0/25	85167701	85167711	85167751	85167702	85167712	85167752
0/40	85168701	85168711	85168751	85168702	85168712	85168752
Price €						
0/60	85169701	85169711	85169751	85169702	85169712	85169752
0/100	85170701	85170711	85170751	85170702	85170712	85170752
0/160	85171701	85171711	85171751	85171702	85171712	85171752
0/250	85172701	85172711	85172751	85172702	85172712	85172752
0/400	85173701	85173711	85173751	85173702	85173712	85173752
Price €						
0/600	---	---	---	85174702	85174712	85174752
0/1000	---	---	---	85175702	85175712	85175752
Extra charges				**Price €**	**Price €**	**Price €**
Class 1.0	---	---	---			

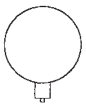
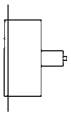
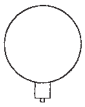
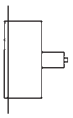
Minimum order quantity = 10 pieces

See page 306 for prices.

Glycerine filled Bourdon tube pressure gauges

EN 837-1

DG: M

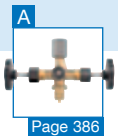
	Measuring system copper alloy				Measuring system stainless steel			
Type	RF100Gly, D701	RF100Gly, D711	RF100Gly, D731	RF100Gly, D751	RF100EGly, D702	RF100EGly, D712	RF100EGly, D732	RF100EGly, D752
Version								
Housing Ø	100	100	100	100	100	100	100	100
Housing	Stainless steel 304 with crimped bezel 304, plastic window				Stainless steel 304 with crimped bezel 304, plastic window			
Measuring element	Bourdon tube, copper alloy				Bourdon tube, stainless steel 316 Ti/316 L			
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G½B	G½B	G½B	G½B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, stainless steel	Clamp fixing			3-hole fixing, panel mounting bezel, stainless steel	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	**85201701**	85201711	85201731	85201751	85201702	85201712	85201732	85201752
-1/+0.6	85202701	85202711	85202731	85202751	85202702	85202712	85202732	85202752
-1/+1.5	85203701	85203711	85203731	85203751	85203702	85203712	85203732	85203752
-1/+3	85204701	85204711	85204731	85204751	85204702	85204712	85204732	85204752
-1/+5	85205701	85205711	85205731	85205751	85205702	85205712	85205732	85205752
-1/+9	85206701	85206711	85206731	85206751	85206702	85206712	85206732	85206752
-1/+15	85207701	85207711	85207731	85207751	85207702	85207712	85207732	85207752
Price €								
0/1	**85210701**	85210711	85210731	85210751	85210702	85210712	85210732	85210752
0/1.6	**85211701**	85211711	85211731	85211751	85211702	85211712	85211732	85211752
0/2.5	**85212701**	85212711	85212731	85212751	85212702	85212712	85212732	85212752
0/4	**85213701**	85213711	85213731	85213751	**85213702**	85213712	85213732	85213752
0/6	**85214701**	85214711	85214731	85214751	**85214702**	85214712	85214732	85214752
0/10	**85215701**	85215711	85215731	85215751	**85215702**	85215712	85215732	85215752
0/16	**85216701**	85216711	85216731	85216751	**85216702**	85216712	85216732	85216752
0/25	**85217701**	85217711	85217731	85217751	**85217702**	85217712	85217732	85217752
0/40	**85218701**	85218711	85218731	85218751	85218702	85218712	85218732	85218752
Price €								
0/60	**85219701**	85219711	85219731	85219751	85219702	85219712	85219732	85219752
0/100	**85220701**	85220711	85220731	85220751	85220702	85220712	85220732	85220752
0/160	**85221701**	85221711	85221731	85221751	85221702	85221712	85221732	85221752
0/250	**85222701**	85222711	85222731	85222751	85222702	85222712	85222732	85222752
0/400	**85223701**	85223711	85223731	85223751	85223702	85223712	85223732	85223752
Price €								
0/600	---	---	---	---	85224702	85224712	85224732	85224752
0/1000	---	---	---	---	85225702	85225712	85225732	85225752
Extra charges					**Price €**	**Price €**	**Price €**	**Price €**
Class 1.0	---	---	---	---				

Minimum order quantity for non-stock items = 10 pieces

See page 306 for extra charges.

Glycerine filled Bourdon tube pressure gauges EN 837-1

- Robust, stainless steel housing with bayonet bezel
- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Longer service life due to less wear and corrosion protection of the measuring system
- No steaming up of the inside of the window in case of outdoor applications
- DNV-certified



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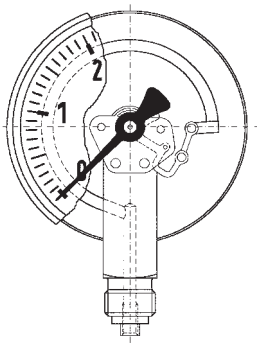


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 8

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/1000 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value
Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value
Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529)
with housing vent (≤ 25 bar)
IP 54

Standard version

Connection
Brass, bottom or lower back
G½B – spanner size SW 22 (EN 837-1/7.3)

Measuring element
Bourdon tube,
≤ 60 bar "C" type tube, copper alloy
> 60 bar helical tube,
stainless steel 316 Ti/316 L

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet bezel
Stainless steel 304

Window
Instrument glass

Filling liquid
Glycerine (99.5 %)

Options

- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Special scales
- Other process connections

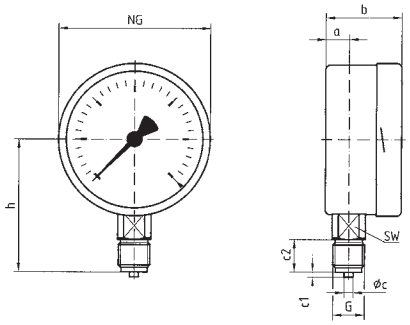
See page 285 for prices.

Glycerine filled Bourdon tube pressure gauges

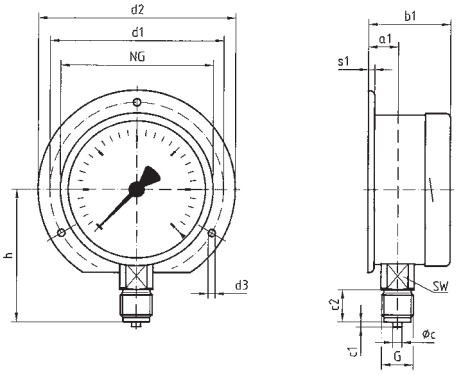
Type D 8 – NG 100/160

Housing types and dimensions

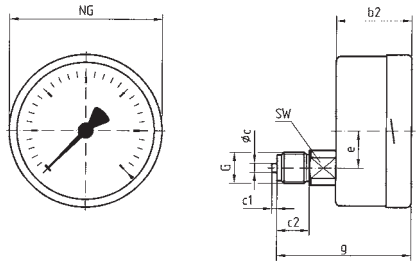
Bottom connection



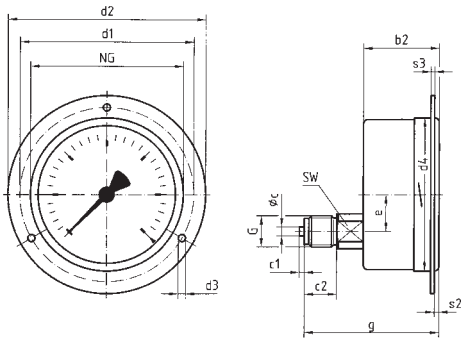
Bottom connection, back flange



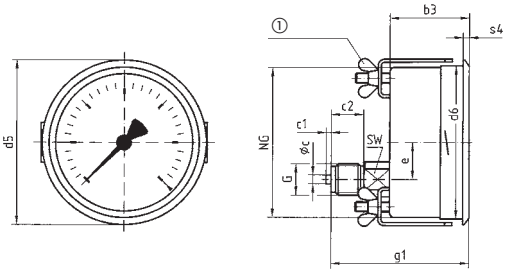
Lower back connection



Lower back connection, 3-hole fixing, panel mounting bezel



Lower back connection, panel mounting bezel for clamp fixing



① 90° drawn staggered

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	h	s1
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	26.5	G½B	81	81	86	5.5
160	17.5	20	50	53	50	52	6	3	20	178	196	5.8	164	167	161	26.5	G½B	82	84	116	6

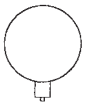
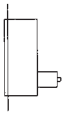
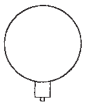
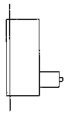
Nominal size (NG)	s2	s3	s4	SW
100	4	2	4	22
160	4	2	4.5	22

* Dimensions as per DIN 16064

Glycerine filled Bourdon tube pressure gauges

EN 837-1

DG: M

Type	RF100Gly, D801	RF100Gly, D811	RF100Gly, D831	RF160Gly, D801	RF160Gly, D811	RF160Gly, D831
Version						
Housing Ø	100	100	100	160	160	160
Housing	Stainless steel 304, instrument glass window					
Measuring element	Bourdon tube, copper alloy (> 60 bar stainless steel 316 Ti/316 L)					
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G½B	G½B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, 304, polished			3-hole fixing, panel mounting bezel, 304, polished
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
-1/0	**85201801**	85201811	85201831	85251801	85251811	85251831
-1/+0.6	85202801	85202811	85202831	85252801	85252811	85252831
-1/+1.5	85203801	85203811	85203831	85253801	85253811	85253831
-1/+3	85204801	85204811	85204831	85254801	85254811	85254831
-1/+5	85205801	85205811	85205831	85255801	85255811	85255831
-1/+9	85206801	85206811	85206831	85256801	85256811	85256831
-1/+15	85207801	85207811	85207831	85257801	85257811	85257831
Price €						
0/0.6	85209801	85209811	85209831	85259801	85259811	85259831
0/1	**85210801**	85210811	85210831	85260801	85260811	85260831
0/1.6	**85211801**	85211811	85211831	85261801	85261811	85261831
0/2.5	**85212801**	85212811	85212831	85262801	85262811	85262831
0/4	**85213801**	**85213811**	85213831	85263801	85263811	85263831
0/6	**85214801**	**85214811**	85214831	85264801	85264811	85264831
0/10	**85215801**	**85215811**	85215831	85265801	85265811	85265831
0/16	**85216801**	**85216811**	85216831	85266801	85266811	85266831
0/25	**85217801**	85217811	85217831	85267801	85267811	85267831
0/40	**85218801**	85218811	85218831	85268801	85268811	85268831
Price €						
0/60	**85219801**	85219811	85219831	85269801	85269811	85269831
0/100	**85220801**	85220811	85220831	85270801	85270811	85270831
0/160	**85221801**	85221811	85221831	85271801	85271811	85271831
0/250	**85222801**	85222811	85222831	85272801	85272811	85272831
0/400	**85223801**	85223811	85223831	85273801	85273811	85273831
Price €						
0/600	**85224801**	85224811	85224831	85274801	85274811	85274831
0/1000	85225801	85225811	85225831	85275801	85275811	85275831

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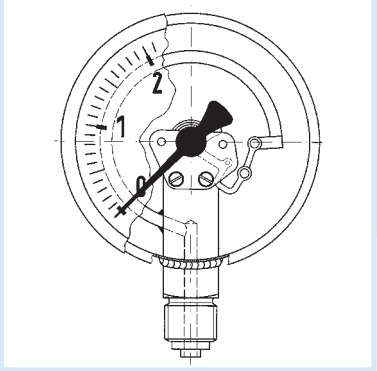
See page 306 for extra charges.

Stainless steel Bourdon tube pressure gauges EN 837-1

NEW

- Extremely compact design
- Wetted parts and movement made of stainless steel
- Housing welded to pressure connection
- Option for control cabinet mounting
- Tightness-tested with helium
- GOSSTANDART-certified



Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 3

Nominal size
40

Accuracy class (EN 837-1/6)
2.5

Ranges (EN 837-1/5)
Type RF40 rad D302
0/1.6 bar to 0/600 bar
Type RF40 ax D312
0/1.6 bar to 0/60 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Stainless steel 316 L
G1/8B – spanner size SW 14 bottom or centre back
(EN 837-1/7.3)

Measuring element
Bourdon tube, stainless steel 316 L
≤ 60 "C" type tube
> 60 bar helical tube
tightness-tested with helium (EN 837-1/9.5.6)

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304

Window
Clip-in plastic

Options

- Other process connections
- 3-hole fixing, panel mounting bezel
- Special scales
- Oil- and grease-free version

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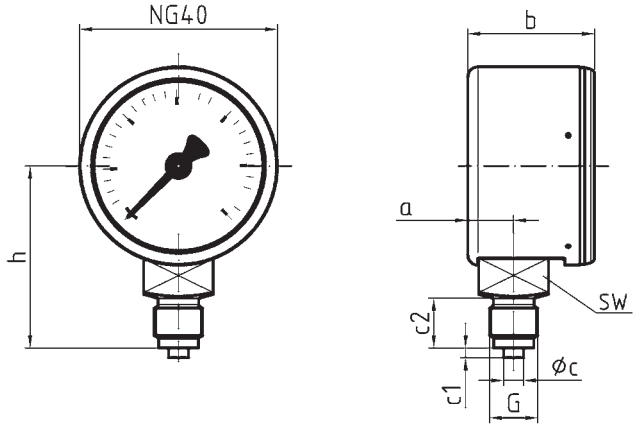
See page 288 for prices.

Stainless steel Bourdon tube pressure gauges

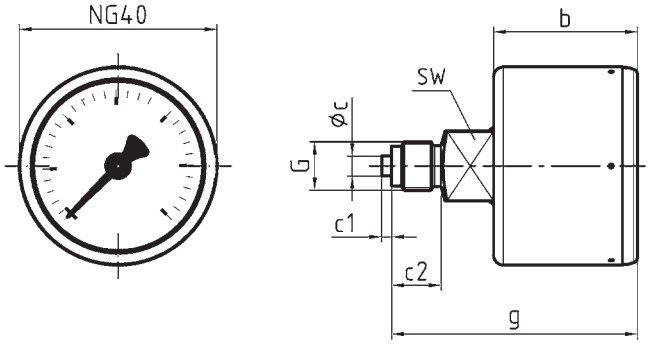
NEW

Type D3 – NG 40

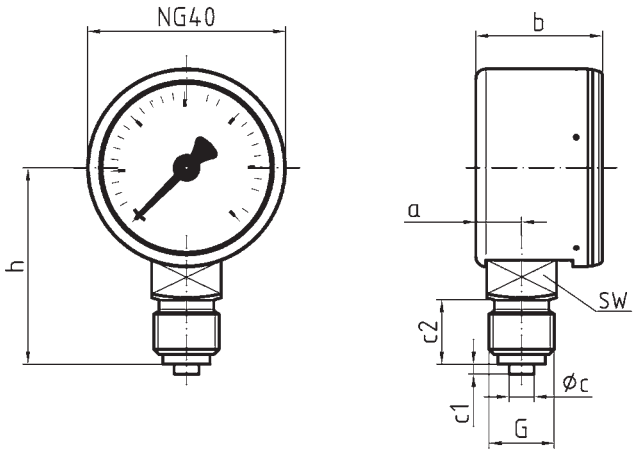
Bottom connection G⅛B



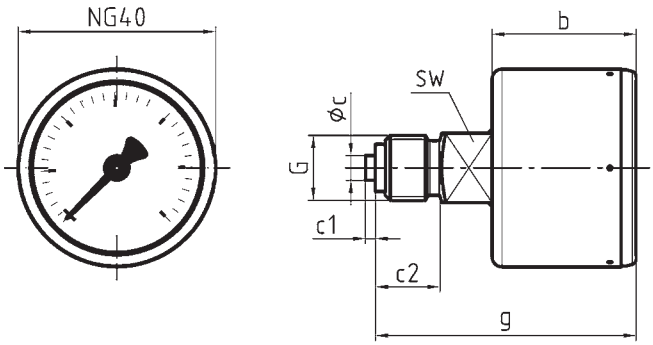
Centre back connection G⅛B



Bottom connection G¼B (optional)



Centre back connection G¼B (optional)



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Dimensions (mm)

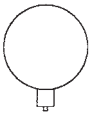
Connection (G)	a	b	Øc	c1	c2	g	h	SW
G⅛B bottom	9.2	25.5	4	2	10	-	36.5	14
G⅛B centre back	-	29	4	2	10	49.5	-	14
G¼B bottom	9.2	25.5	5	2	13	-	39.5	14
G¼B centre back	-	29	5	2	13	52.5	-	14

Stainless steel Bourdon tube pressure gauges

NEW

EN 837-1

DG: M

Type	RF40E, D302	RF40E, D312
Version		
Housing Ø	40	40
Housing	Stainless steel 304	
Measuring element	Bourdon tube, stainless steel 316 L	
Accuracy class	2.5	2.5
Connection	G1/8B	G1/8B
Range (bar)	Part no.	Part no.
Price €		
-1/0	---	---
-1/+0.6	---	---
-1/+1.5	---	---
-1/+3	---	---
-1/+5	---	---
-1/+9	---	---
-1/+15	---	---
Price €		
0/0.6	---	---
0/1	---	---
0/1.6	85011302	85011312
0/2.5	85012302	85012312
0/4	85013302	85013312
0/6	85014302	**85014312**
0/10	85015302	**85015312**
0/16	85016302	**85016312**
0/25	85017302	85017312
0/40	85018302	85018312
Price €		
0/60	85019302	85019312
0/100	85020302	---
0/160	85021302	---
0/250	85022302	---
0/400	85023302	---
Price €		
0/600	85024302	---

Minimum order quantity for non-stock items = 100 pieces

9

See page 306 for extra charges.

Bourdon tube pressure gauges for chemical applications EN 837-1

- For chemical and process engineering applications
- Measuring system fully welded to housing
- Extremely robust design
- For temperatures of the medium of up to 150 °C
- Tightness-tested with helium
- GOSSTANDART-certified

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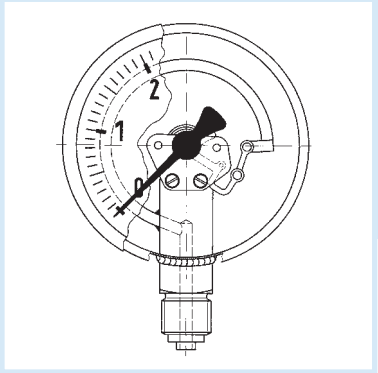


Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for corrosive environments.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 9

Nominal size
50 – 63

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
NG 50:
-1/0 to -1/+15 bar
0/0.6 to 0/600 bar
NG 63:
-1/0 to -1/+15 bar
0/0.6 to 0/1000 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +150 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529)
with housing vent (≤ 25 bar)
IP 54

Standard version

Connection
Stainless steel 316 Ti/316 L
NG 50 bottom or lower back
NG 63 bottom or centre back
G¼B – spanner size SW 14 (EN 837-1/7.3)

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube
tightness-tested with helium
(EN 837-1/9.5.6)

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with pressure relief port

Crimped bezel
Stainless steel 304

Window
NG 50 plastic
NG 63 laminated safety glass

Options

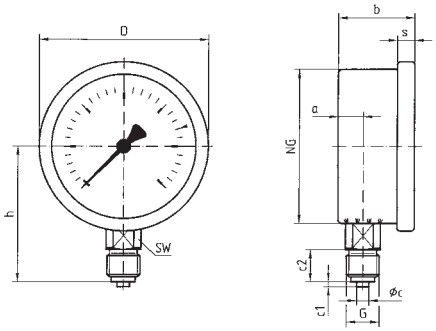
- Plastic window (NG 63)
- Back flange (NG 63)
- Clamp fixing
- Crimped bezel, polished
- Special scales
- Other process connections

See page 291 for prices.

Bourdon tube pressure gauges for chemical applications Type D 9 – NG 50/63

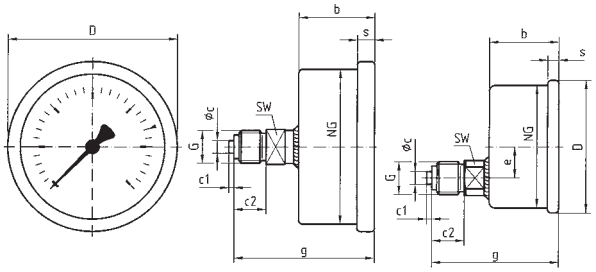
Housing types and dimensions

Bottom connection NG 50/63

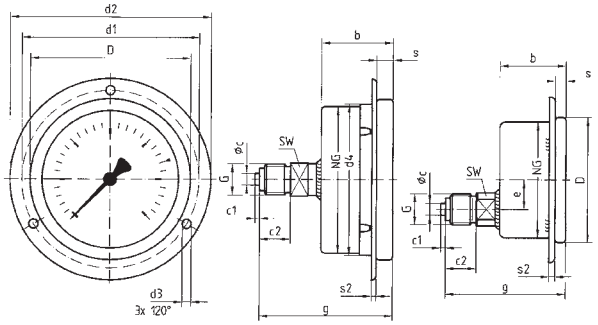


Centre/lower back connection

NG 63 NG 50

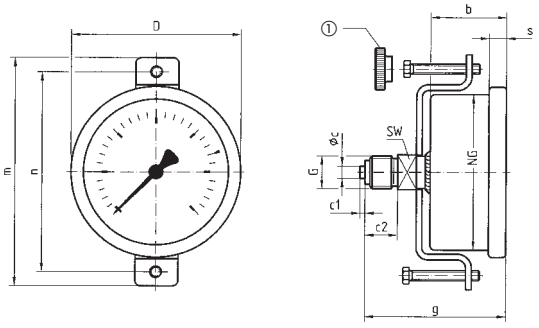


Centre/lower back connection,
3-hole fixing, panel mounting bezel



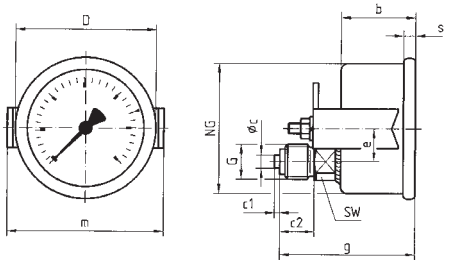
NG 63 NG 50

Centre back connection, clamp fixing, NG 63

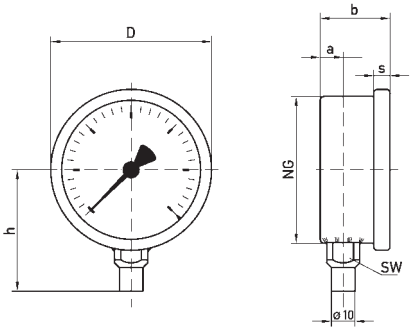


① Turning knob

Lower back connection, clamp fixing, NG 50



Bottom connection for chemical seal mounting



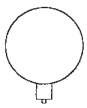
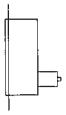
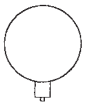
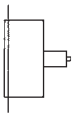
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	d4	D	e	G	g	h	m	n	s	s1	s
50	10.5	-	28	-	5	2	13	60	70	3.6	-	53	12.5	G¼B	51	46	59	-	4.5	-	2.5
63	9.5	13	30.5	34	5	2	13	75	85	3.6	64	68	-	G¼B	56	53	94	82	7	5.5	2
Nominal size (NG)	SW																				
50	14																				
63	14																				

* Dimensions as per DIN 16063

Bourdon tube pressure gauges for chemical applications EN 837-1

DG: M

Type	RF50Ch, D902	RF50Ch, D912	RF50Ch, D932	RF50Ch, D952	RF63Ch, D902	RF63Ch, D912	RF63Ch, D932	RF63Ch, D952
Version								
Housing Ø	50	50	50	50	63	63	63	63
Housing	Stainless steel 304 with crimped bezel 304							
Measuring element	Bourdon tube, stainless steel 316 Ti/316 L							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B
			3-hole fixing, panel mounting bezel, 304, bare metal surface	Clamp fixing			3-hole fixing, panel mounting bezel, 304, bare metal surface	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85051902	85051912	85051932	85051952	**85101902**	85101912	85101932	85101952
-1/+0.6	85052902	85052912	85052932	85052952	85102902	85102912	85102932	85102952
-1/+1.5	85053902	85053912	85053932	85053952	85103902	85103912	85103932	85103952
-1/+3	85054902	85054912	85054932	85054952	85104902	85104912	85104932	85104952
-1/+5	85055902	85055912	85055932	85055952	85105902	85105912	85105932	85105952
-1/+9	85056902	85056912	85056932	85056952	85106902	85106912	85106932	85106952
-1/+15	85057902	85057912	85057932	85057952	85107902	85107912	85107932	85107952
Price €								
0/0.6	85059902	85059912	85059932	85059952	85109902	85109912	85109932	85109952
0/1	85060902	85060912	85060932	85060952	**85110902**	85110912	85110932	85110952
0/1.6	85061902	85061912	85061932	85061952	**85111902**	85111912	85111932	85111952
0/2.5	85062902	85062912	85062932	85062952	**85112902**	85112912	85112932	85112952
0/4	85063902	85063912	85063932	85063952	**85113902**	85113912	85113932	85113952
0/6	85064902	85064912	85064932	85064952	**85114902**	**85114912**	**85114932**	**85114952**
0/10	85065902	85065912	85065932	85065952	**85115902**	**85115912**	**85115932**	**85115952**
0/16	85066902	85066912	85066932	85066952	**85116902**	**85116912**	**85116932**	**85116952**
0/25	85067902	85067912	85067932	85067952	**85117902**	**85117912**	**85117932**	**85117952**
0/40	85068902	85068912	85068932	85068952	**85118902**	85118912	85118932	85118952
Price €								
0/60	85069902	85069912	85069932	85069952	85119902	85119912	85119932	85119952
0/100	85070902	85070912	85070932	85070952	85120902	85120912	85120932	85120952
0/160	85071902	85071912	85071932	85071952	85121902	85121912	85121932	85121952
0/250	85072902	85072912	85072932	85072952	85122902	85122912	85122932	85122952
0/400	85073902	85073912	85073932	85073952	85123902	85123912	85123932	85123952
Price €								
0/600	85074902	85074912	85074932	85074952	85124902	85124912	85124932	85124952
0/1000	---	---	---	---	85125902	85125912	85125932	85125952

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See page 306 for extra charges.

Bourdon tube pressure gauges for chemical applications EN 837-1

- For chemical and process engineering applications
- Measuring system fully welded to housing
- Extremely robust design
- For temperatures (medium) ≤ 150 °C
- Optionally available with electrical contact
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified

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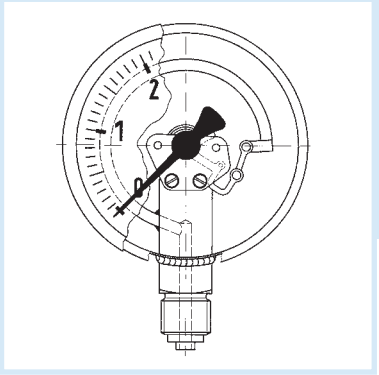

Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for corrosive environments.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
NG 100 0/0.6 to 0/1000 bar
NG 160 0/0.6 to 0/1600 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value

Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value

Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Operating temperature range
Medium: T_{max} = +150 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529)
with housing vent (≤ 25 bar)
IP 54

Standard version

Connection
Stainless steel 316 Ti or 316 L,
bottom or lower back
G½B – spanner size SW 22 (EN 837-1/7.3)

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube
tightness-tested with helium
(EN 837-1/9.5.6)

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Options

- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Special scales
- Electrical contacts
- Other process connections

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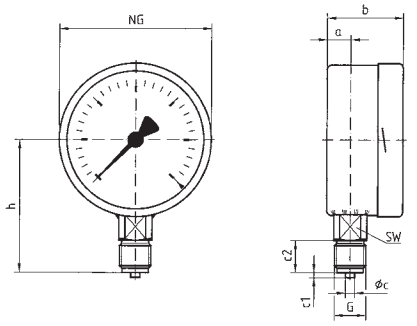
See page 294 for prices.

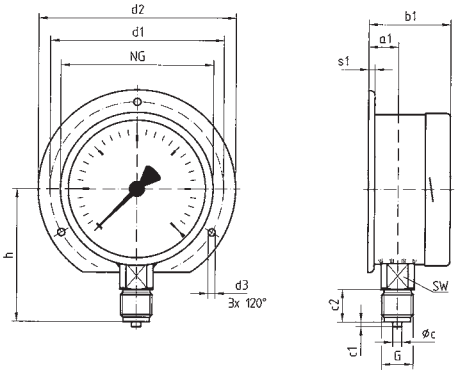
Bourdon tube pressure gauges for chemical applications Type D 4 – NG 100/160

Housing types and dimensions (mm)

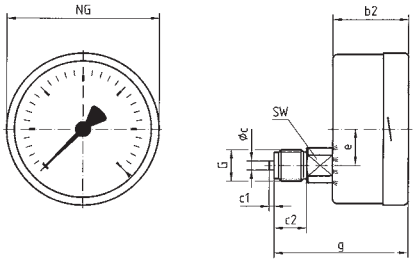
Bottom connection



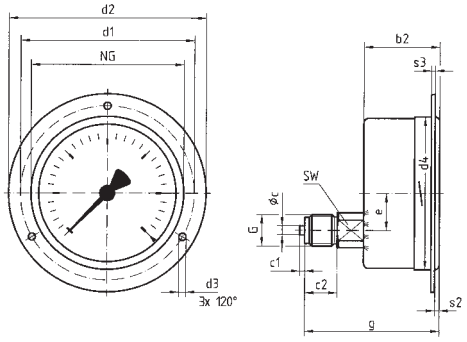
Bottom connection, back flange



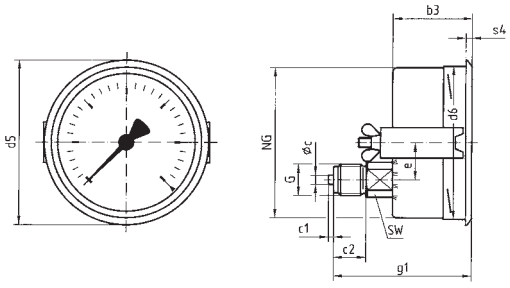
Lower back connection



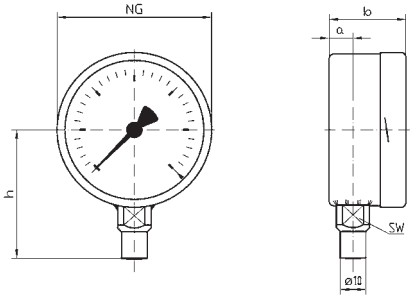
Lower back connection, 3-hole fixing, panel mounting bezel



Lower back connection, panel mounting bezel for clamp fixing



Bottom connection for chemical seal mounting



Dimensions (mm)

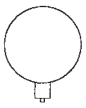
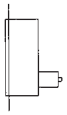
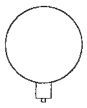
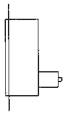
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2*	d3*	d4	d5	d6	e	G	g	g1	h	s1
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	34.5	G½B	83	83	86	5.5
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	34.5	G½B	84	86	116	6

Nominal size (NG)	s2	s3	s4	SW
100	4	2	4	22
160	4	2	4.5	22

* Dimensions as per DIN 16064

Bourdon tube pressure gauges for chemical applications EN 837-1

DG: M

Type	RF100Ch, D402	RF100Ch, D412	RF100Ch, D432	RF100Ch, D452	RF160Ch, D402	RF160Ch, D412	RF160Ch, D432	RF160Ch, D452
Version								
Housing Ø	100	100	100	100	160	160	160	160
Housing	Stainless steel 304 with bayonet bezel, laminated safety glass window							
Measuring element	Bourdon tube, stainless steel 316 Ti/316 L							
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G½B	G½B	G½B	G½B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, clamp fixing			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85201402	85201412	85201432	85201452	85251402	85251412	85251432	85251452
-1/+0.6	85202402	85202412	85202432	85202452	85252402	85252412	85252432	85252452
-1/+1.5	85203402	85203412	85203432	85203452	85253402	85253412	85253432	85253452
-1/+3	85204402	85204412	85204432	85204452	85254402	85254412	85254432	85254452
-1/+5	85205402	85205412	85205432	85205452	85255402	85255412	85255432	85255452
-1/+9	85206402	85206412	85206432	85206452	85256402	85256412	85256432	85256452
-1/+15	85207402	85207412	85207432	85207452	85257402	85257412	85257432	85257452
Price €								
0/0.6	**85209402**	85209412	85209432	85209452	85259402	85259412	85259432	85259452
0/1	**85210402**	85210412	85210432	85210452	85260402	85260412	85260432	85260452
0/1.6	**85211402**	85211412	85211432	85211452	85261402	85261412	85261432	85261452
0/2.5	**85212402**	85212412	85212432	85212452	85262402	85262412	85262432	85262452
0/4	**85213402**	**85213412**	85213432	85213452	**85263402**	85263412	85263432	85263452
0/6	**85214402**	**85214412**	85214432	85214452	**85264402**	85264412	85264432	85264452
0/10	**85215402**	**85215412**	85215432	85215452	**85265402**	85265412	85265432	85265452
0/16	**85216402**	85216412	85216432	85216452	**85266402**	85266412	85266432	85266452
0/25	**85217402**	85217412	85217432	85217452	**85267402**	85267412	85267432	85267452
0/40	**85218402**	85218412	85218432	85218452	85268402	85268412	85268432	85268452
Price €								
0/60	**85219402**	85219412	85219432	85219452	85269402	85269412	85269432	85269452
0/100	**85220402**	85220412	85220432	85220452	85270402	85270412	85270432	85270452
0/160	**85221402**	85221412	85221432	85221452	85271402	85271412	85271432	85271452
0/250	**85222402**	85222412	85222432	85222452	**85272402**	85272412	85272432	85272452
0/400	**85223402**	85223412	85223432	85223452	85273402	85273412	85273432	85273452
Price €								
0/600	**85224402**	85224412	85224432	85224452	85274402	85274412	85274432	85274452
0/1000	85225402	85225412	85225432	85225452	85275402	85275412	85275432	85275452
0/1600	---	---	---	---	85276402	85276412	85276432	85276452

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See page 306 for extra charges.

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Bourdon tube pressure gauges for chemical applications with glycerine filling EN 837-1

- For chemical and process engineering applications
- Measuring system fully welded to housing
- Extremely robust design
- Can be used in case of heavy vibrations and high, dynamic pressure loads.
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified

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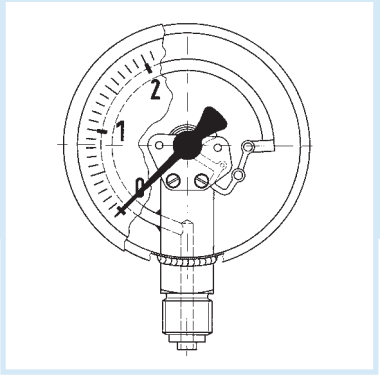


Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for corrosive environments. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 7

Nominal size
50 – 63

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
NG 50:
-1/0 to -1/+15 bar
0/0.6 to 0/600 bar
NG 63:
-1/0 to -1/+15 bar
0/0.6 to 0/1000 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529)
with housing vent (< 25 bar)
IP 54

Standard version

Connection
Stainless steel 316 Ti/316 L
NG 50 bottom or lower back
NG 63 bottom or centre back
G¼B – spanner size SW 14
(EN 837-1/7.3)

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube
tightness-tested with helium (EN 837-1/9.5.6)

Movement
Stainless steel

Dial
Aluminium, white / dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with pressure relief port

Crimped bezel
Stainless steel 304

Window
NG 50 plastic
NG 63 laminated safety glass

Filling liquid
Glycerine (99.5 %)

Options

- Filling liquid silicone oil
- Plastic window (NG 63)
- Back flange (NG 63)
- Clamp fixing
- Crimped bezel, polished
- Special scales
- Other process connections

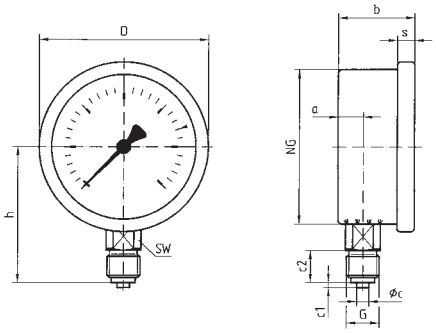
See page 297 for prices.

Bourdon tube pressure gauges for chemical applications with glycerine filling

Type D 7 – NG 50/63

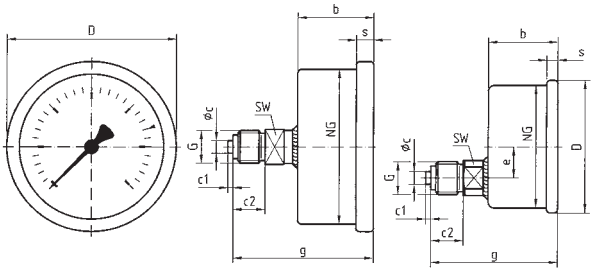
Housing types and dimensions

Bottom connection NG 50/63

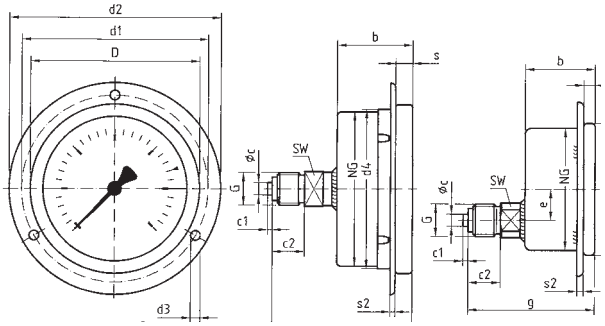


Lower back connection

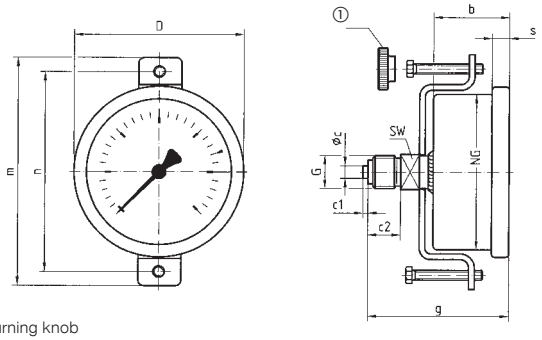
NG 63 NG 50



Centre/lower back connection,
3-hole fixing, panel mounting bezel NG 63 NG 50

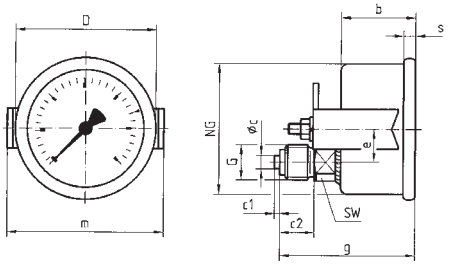


Centre back connection, clamp fixing, NG 63

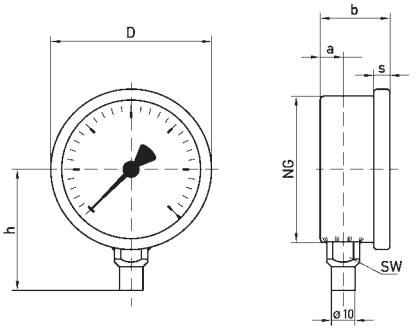


① Turning knob

Lower back connection, clamp fixing, NG 50



Bottom connection for chemical seal mounting



Dimensions (mm)

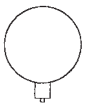
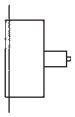
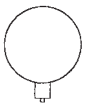
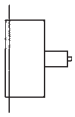
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	d4	D	e	G	g	h	m	n	s	s1	s2
50	10.5	-	28	-	5	2	13	60	70	3.6	-	53	12.5	G¼B	51	46	59	-	4.5	-	2.5
63	9.5	13	30.5	34	5	2	13	75	85	3.6	64	68	-	G¼B	56	53	94	82	7	5.5	2

Nominal size (NG)	SW
50	14
63	14

* Dimensions as per DIN 16063

Bourdon tube pressure gauges for chemical applications with glycerine filling EN 837-1

DG: M

Type	RF50ChGly, D702	RF50ChGly, D712	RF50ChGly, D732	RF50ChGly, D752	RF63ChGly, D702	RF63ChGly, D712	RF63ChGly, D732	RF63ChGly, D752
Version								
Housing Ø	50	50	50	50	63	63	63	63
Housing	Stainless steel 304 with crimped bezel 304							
Measuring element	Bourdon tube, stainless steel 316 Ti/316 L							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B
			3-hole fixing, panel mounting bezel, 304, bare metal surface	Clamp fixing			3-hole fixing, panel mounting bezel, 304, bare metal surface	Clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	85051702	85051712	85051732	85051752	85101702	85101712	85101732	85101752
-1/+0.6	85052702	85052712	85052732	85052752	85102702	85102712	85102732	85102752
-1/+1.5	85053702	85053712	85053732	85053752	85103702	85103712	85103732	85103752
-1/+3	85054702	85054712	85054732	85054752	85104702	85104712	85104732	85104752
-1/+5	85055702	85055712	85055732	85055752	85105702	85105712	85105732	85105752
-1/+9	85056702	85056712	85056732	85056752	85106702	85106712	85106732	85106752
-1/+15	85057702	85057712	85057732	85057752	85107702	85107712	85107732	85107752
Price €								
0/0.6	85059702	85059712	85059732	85059752	85109702	85109712	85109732	85109752
0/1	85060702	85060712	85060732	85060752	85110702	85110712	85110732	85110752
0/1.6	85061702	85061712	85061732	85061752	85111702	85111712	85111732	85111752
0/2.5	85062702	85062712	85062732	85062752	**85112702**	85112712	85112732	85112752
0/4	85063702	85063712	85063732	85063752	**85113702**	**85113712**	**85113732**	**85113752**
0/6	85064702	85064712	85064732	85064752	**85114702**	**85114712**	**85114732**	**85114752**
0/10	85065702	85065712	85065732	85065752	**85115702**	**85115712**	**85115732**	**85115752**
0/16	85066702	85066712	85066732	85066752	**85116702**	**85116712**	**85116732**	**85116752**
0/25	85067702	85067712	85067732	85067752	**85117702**	85117712	85117732	85117752
0/40	85068702	85068712	85068732	85068752	**85118702**	85118712	85118732	85118752
Price €								
0/60	85069702	85069712	85069732	85069752	**85119702**	85119712	85119732	85119752
0/100	85070702	85070712	85070732	85070752	**85120702**	85120712	85120732	85120752
0/160	85071702	85071712	85071732	85071752	**85121702**	85121712	85121732	85121752
0/250	85072702	85072712	85072732	85072752	**85122702**	85122712	85122732	85122752
0/400	85073702	85073712	85073732	85073752	**85123702**	85123712	85123732	85123752
Price €								
0/600	85074702	85074712	85074732	85074752	85124702	85124712	85124732	85124752
0/1000	---	---	---	---	85125702	85125712	85125732	85125752

See page 306 for extra charges.

Bourdon tube pressure gauges for chemical applications with glycerine filling EN 837-1

- For chemical and process engineering applications
- Measuring system fully welded to housing
- Extremely robust design
- Vibration- and shock-tested
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified

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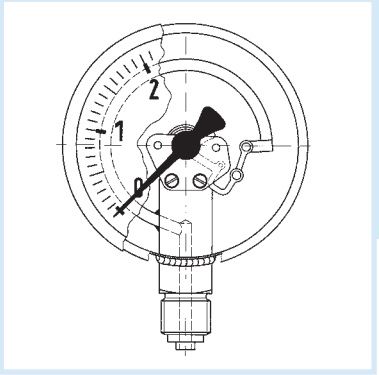


Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for corrosive environments. For measurements in areas with high vibration levels and high, dynamic pressure loads.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 8

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
NG 100 0/0.6 to 0/1000 bar
NG 160 0/0.6 to 0/1600 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value
Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value
Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529)
with housing vent (< 25 bar)
IP 54

Standard version

Connection
Stainless steel 316 Ti/316 L,
bottom or lower back
G½B – spanner size SW 22 (EN 837-1/7.3)

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube
tightness-tested with helium (EN 837-1/9.5.6)

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Filling liquid
Glycerine (99.5 %)

Options

- Filling liquid silicone oil
- Brass movement
- Back flange
- Panel mounting bezel for clamp fixing
- 3-hole fixing, panel mounting bezel
- Electrical contacts
- Special scales
- Other process connections

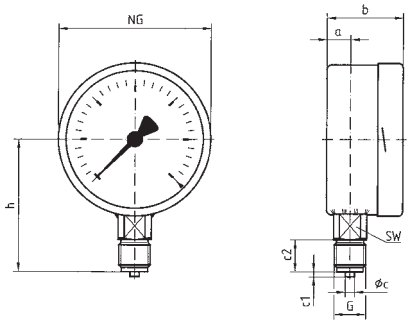
i See page 300 for prices.

Bourdon tube pressure gauges for chemical applications with glycerine filling

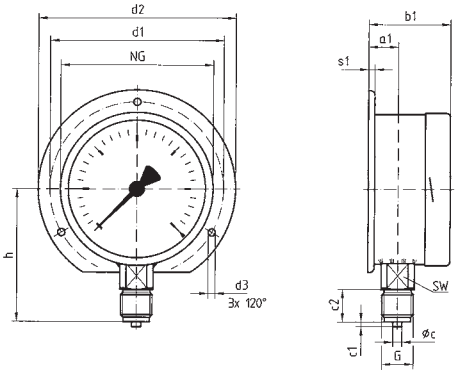
Type D 8 – NG 100/160

Housing types and dimensions (mm)

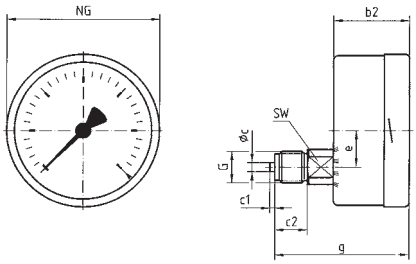
Bottom connection



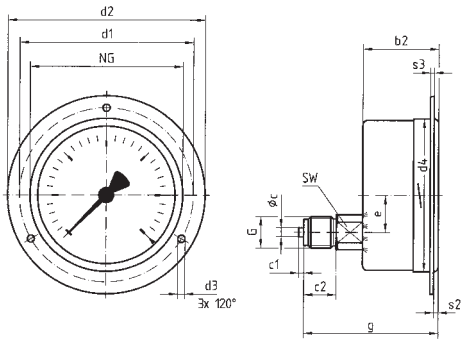
Bottom connection, back flange



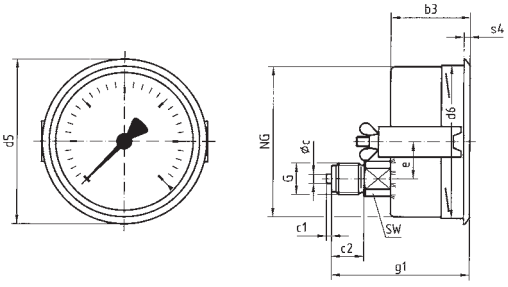
Lower back connection



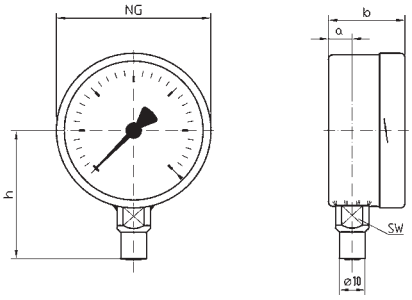
Lower back connection, 3-hole fixing, panel mounting bezel



Lower back connection, panel mounting bezel for clamp fixing



Bottom connection for chemical seal mounting



Dimensions (mm)

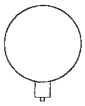
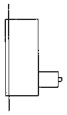
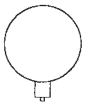
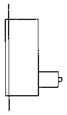
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2*	d3*	d4	d5	d6	e	G	g	g1	h	s1
100	15.6	19.1	49	52.5	49	49	6	3	20	116	132	4.8	104	107	101	34.5	G½B	83	83	86	5.5
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	34.5	G½B	84	86	116	6

Nominal size (NG)	s2	s3	s4	SW
100	4	2	4	22
160	4	2	4.5	22

* Dimensions for NG 100 as per DIN 16064

Bourdon tube pressure gauges for chemical applications with glycerine filling EN 837-1

DG: M

Type	RF100ChGly, D802	RF100ChGly, D812	RF100ChGly, D832	RF100ChGly, D852	RF160ChGly, D802	RF160ChGly, D812	RF160ChGly, D832	RF160ChGly, D852
Version								
Housing Ø	100	100	100	100	160	160	160	160
Housing	Stainless steel 304 with bayonet bezel, laminated safety glass window							
Measuring element	Bourdon tube, stainless steel 316 Ti/316 L							
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G½B	G½B	G½B	G½B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, clamp fixing			3-hole fixing, panel mounting bezel, 304, polished	Panel mounting bezel, 304, polished, clamp fixing
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	**85201802**	85201812	85201832	85201852	85251802	85251812	85251832	85251852
-1/+0.6	85202802	85202812	85202832	85202852	85252802	85252812	85252832	85252852
-1/+1.5	85203802	85203812	85203832	85203852	85253802	85253812	85253832	85253852
-1/+3	85204802	85204812	85204832	85204852	85254802	85254812	85254832	85254852
-1/+5	85205802	85205812	85205832	85205852	85255802	85255812	85255832	85255852
-1/+9	85206802	85206812	85206832	85206852	85256802	85256812	85256832	85256852
-1/+15	85207802	85207812	85207832	85207852	85257802	85257812	85257832	85257852
Price €								
0/0.6	85209802	85209812	85209832	85209852	85259802	85259812	85259832	85259852
0/1	**85210802**	85210812	85210832	85210852	85260802	85260812	85260832	85260852
0/1.6	**85211802**	85211812	85211832	85211852	85261802	85261812	85261832	85261852
0/2.5	**85212802**	85212812	85212832	85212852	85262802	85262812	85262832	85262852
0/4	**85213802**	85213812	85213832	85213852	85263802	85263812	85263832	85263852
0/6	**85214802**	85214812	85214832	85214852	85264802	85264812	85264832	85264852
0/10	**85215802**	85215812	85215832	85215852	85265802	85265812	85265832	85265852
0/16	**85216802**	85216812	85216832	85216852	85266802	85266812	85266832	85266852
0/25	**85217802**	85217812	85217832	85217852	85267802	85267812	85267832	85267852
0/40	**85218802**	85218812	85218832	85218852	85268802	85268812	85268832	85268852
Price €								
0/60	**85219802**	85219812	85219832	85219852	85269802	85269812	85269832	85269852
0/100	**85220802**	85220812	85220832	85220852	85270802	85270812	85270832	85270852
0/160	**85221802**	85221812	85221832	85221852	85271802	85271812	85271832	85271852
0/250	**85222802**	85222812	85222832	85222852	85272802	85272812	85272832	85272852
0/400	**85223802**	85223812	85223832	85223852	85273802	85273812	85273832	85273852
Price €								
0/600	**85224802**	85224812	85224832	85224852	85274802	85274812	85274832	85274852
0/1000	85225802	85225812	85225832	85225852	85275802	85275812	85275832	85275852
0/1600	---	---	---	---	85276802	85276812	85276832	85276852

9

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See page 306 for extra charges.

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Bourdon tube safety pressure gauges EN 837-1

- Safety pressure gauge S3 as per EN 837-1/9.7.2
- Measuring system fully welded to housing
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified

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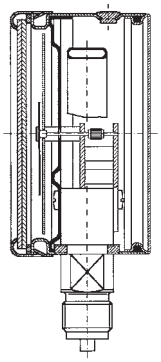

Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for corrosive environments. This gauge is designed for applications as per EN 837-1/9.7.2.

Technical specifications

Type
D 4

Nominal size
63

Accuracy class (EN 837-1/6)
1.6 (> 0/600 bar 2.5)

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/1000 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Stainless steel 316 L,
bottom or lower back
G¼B – spanner size SW 14 (EN 837-1/7.3)

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube
leak tested with helium (EN 837-1/9.5.6)

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with solid baffle wall and blow-out (S3)

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Options

- Glycerine filling (type D 8)
- 3-hole fixing, panel mounting bezel
- Back flange
- Special scales
- Other process connections

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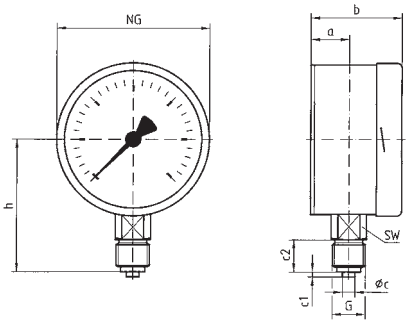
See page 305 for prices.

Bourdon tube safety pressure gauge

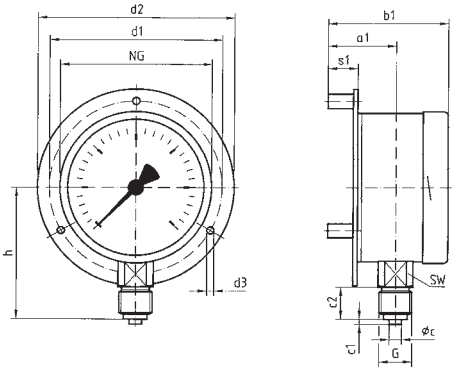
Type D 4 – NG 63

Housing types and dimensions

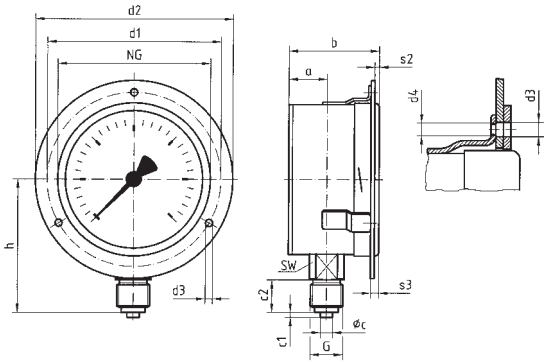
Bottom connection



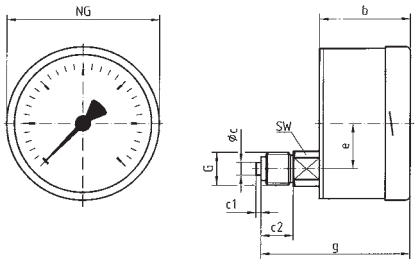
Bottom connection, back flange



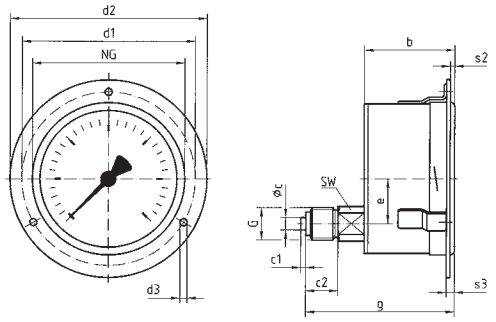
Bottom connection, 3-hole fixing, panel mounting bezel



Lower back connection



Lower back connection, 3-hole fixing, panel mounting bezel



Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1	d2	d3	d4	e	g	G	h	s1	s2	s3	SW
63	18	38	41	61	5	2	13	75	85	3.6	M3	18	60	G¼B	54	21	3	5	14

Bourdon tube safety pressure gauges EN 837-1

- Safety housing S3 as per EN 837-1/9.7.2
- Measuring system fully welded to housing
- Tightness-tested with helium
- DNV- and GOSSTANDART-certified

A
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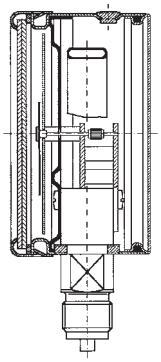

Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for aggressive environments. This gauge is designed for applications as per EN 837-1/9.7.2.

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/1000 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value
Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value

Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Stainless steel 316 L, bottom
G½B – spanner size SW 22
(EN 837-1/7.3)

Measuring element
Bourdon tube, stainless steel 316 L
≤ 60 bar "C" type tube
> 60 bar helical tube tightness-tested with helium (EN 837-1/9.5.6)

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with solid baffle wall and blow-out (S3)

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Options

- Glycerine filling (type D 8)
- 3-hole fixing, panel mounting bezel
- Back flange
- Special scales
- Other process connections

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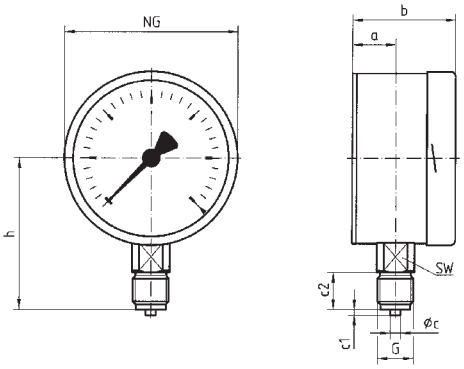
See page 305 for prices.

Bourdon tube safety pressure gauge

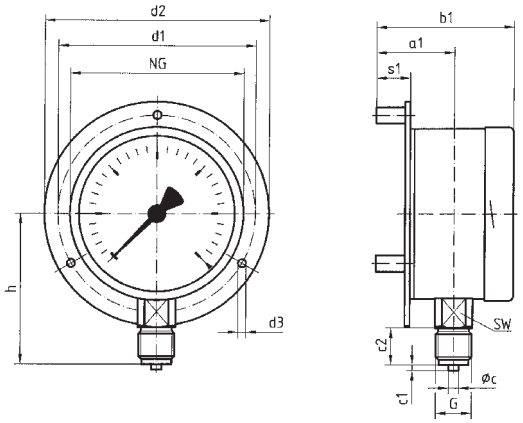
Type D 4 – NG 100/160

Housing types and dimensions

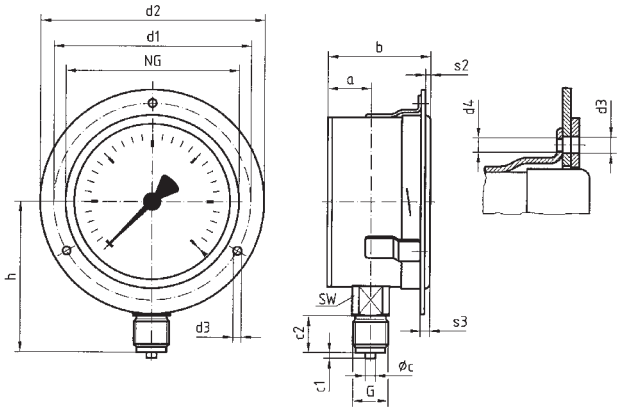
Bottom connection



Bottom connection, back flange



Bottom connection, 3-hole fixing, panel mounting bezel



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Dimensions (mm)

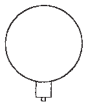
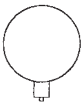
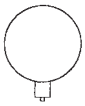
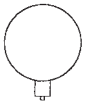
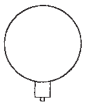
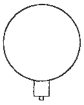
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	d4	G	h	s1	s2	s3	SW
100	27	57	60	90	6	3	20	116	132	4.8	M4	G½B	87	32	3	5	22
160	40	70	78	108	6	3	20	178	196	5.8	M5	G½B	118	32	3	5	22

* Dimensions as per DIN 16064

Bourdon tube safety pressure gauges

EN 837-1

DG: H

Type	RF63Si, D402	RF63Si, D412	RF100Si, D402	RF160Si, D402	RF63SiGly, D802	RF100SiGly, D802	RF160SiGly, D802
					Version with glycerine filling		
Version							
Housing Ø	63	63	100	160	63	100	160
Housing (S3)	Stainless steel 304 with bayonet bezel, laminated safety glass window, blow out baffle wall				Stainless steel 304 with bayonet bezel, laminated safety glass window, blow out baffle wall		
Measuring element	Bourdon tube, stainless steel 316 L				Bourdon tube, stainless steel 316 L		
Accuracy class	1.6*	1.6*	1.0	1.0	1.6*	1.0	1.0
Connection	G¼B	G¼B	G½B	G½B	G¼B	G½B	G½B
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	85401402	85401412	85451402	85501402	85401802	85451802	85501802
-1/+0.6	85402402	85402412	85452402	85502402	85402802	85452802	85502802
-1/+1.5	85403402	85403412	85453402	85503402	85403802	85453802	85503802
-1/+3	85404402	85404412	85454402	85504402	85404802	85454802	85504802
-1/+5	85405402	85405412	85455402	85505402	85405802	85455802	85505802
-1/+9	85406402	85406412	85456402	85506402	85406802	85456802	85506802
-1/+15	85407402	85407412	85457402	85507402	85407802	85457802	85507802
Price €							
0/0.6	85409402	85409412	85459402	85509402	85409802	85459802	85509802
0/1	85410402	85410412	85460402	85510402	85410802	85460802	85510802
0/1.6	85411402	85411412	85461402	85511402	85411802	85461802	85511802
0/2.5	85412402	85412412	85462402	85512402	85412802	85462802	85512802
0/4	85413402	85413412	85463402	85513402	85413802	85463802	85513802
0/6	85414402	85414412	85464402	85514402	85414802	85464802	85514802
0/10	85415402	85415412	85465402	85515402	85415802	85465802	85515802
0/16	85416402	85416412	85466402	85516402	85416802	85466802	85516802
0/25	85417402	85417412	85467402	85517402	85417802	85467802	85517802
0/40	85418402	85418412	85468402	85518402	85418802	85468802	85518802
Price €							
0/60	85419402	85419412	85469402	85519402	85419802	85469802	85519802
0/100	85420402	85420412	85470402	85520402	85420802	85470802	85520802
0/160	85421402	85421412	85471402	85521402	85421802	85471802	85521802
0/250	85422402	85422412	85472402	85522402	85422802	85472802	85522802
0/400	85423402	85423412	85473402	85523402	85423802	85473802	85523802
Price €							
0/600	85424402	85424412	85474402	85524402	85424802	85474802	85524802
0/1000	85425402	85425412	85475402	85525402	85425802	85475802	85525802

* > 0/600 bar class 2.5

See page 306 for extra charges. See page 352 for extra charges for electrical contacts.

Extra charges for Bourdon tube pressure gauges

(Industrial, glycerine, chemical, safety versions)

DG: M

Housing diameter (mm)	**50**	**63**	**100**	**160**
Description	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Housing 304 polished	38281	38282	38283	38284
Bayonet bezel 304 polished	---	38286	38287	38288
Crimped bezel 304 polished	38289	38290	38291	---
Laminated safety glass window	---	38072	38074	38075
Connection socket nickel-plated/chrome-plated	38083	38084	38086	38087
Connection socket with special thread				
Damping screw brass – hole 0.3 – 0.5 – 0.7 mm (please specify)	38096	38097	38099	38100
Damping screw stainless steel – hole 0.3 – 0.5 – 0.7 mm (please specify)	38102	38103	38105	38106
Red mark on dial	38183	38184	38186	38187
1 reference pointer red - external knob adjustment for unfilled gauges (plastic window)	---	38188	38190	38191
1 reference pointer red - external knob adjustment for filled gauges (plastic window)	---	38301	38302	38303
Max. pointer for unfilled gauges (only for gauges with bayonet bezel, plastic window)	---	---	38129	38130
Max. pointer for filled gauges (only for gauges with bayonet bezel, plastic window)	---	---	38306	38307
Knife edge pointer	---	38133	38135	38136
Micro-adjustable pointer for zero correction	---	38335	38308	38309
Damped movement			38293	38294
Measuring system hard-soldered, suitable for temperature of medium T_{max} of +180°C (gauges with filling T_{max} of medium +100°C)	---	38295	38296	38297
Version suitable for calibration approval – housing can be plumbed, serial number on dial (only for housing with bayonet bezel)	---	---	38298	38299
Special mounting position	38146	38147	38149	38150
Wetted parts cleaned for oxygen[1)] label "Oxygen", symbol "Free from oil and grease" (gauges without filling only)	38138	38139	38141	38142
Printing block costs per scale and colour (scale design as per EN 837-3, others on request)	38152	38153	38155	38156
Printing costs per additional colour	38164	38165	38167	38168

1) Observe table "Selection criteria according to EN 837-2" (see appendix)

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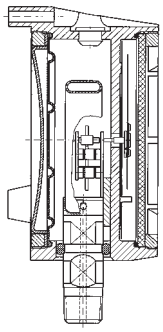
See the overview "Accessories for panel mounting and wall mounting" on page 385.

AFRISO EURO-INDEX

Bourdon tube pressure gauges
Process Gauge

- **Extremely robust pressure gauge for offshore and onshore applications**
- **Glass-fibre reinforced safety housing with solid baffle wall and blow-out**
- **Tightness-tested with helium**
- **GOSSTANDART-certified**



Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise. Specially suitable for the oil and chemical industries.

Technical specifications

Type
D 1

Nominal size
4½"

Accuracy class
Grade 2A as per ANSI B 40.1
(corresponds to class 0.5)

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/1000 bar

Application area
Static load: Full scale value
Dynamic load: 0.9 x full scale value
Short-term: 1.3 x full scale value

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -40 °C
T_{max} = +65 °C
with glycerine filling -20/+65 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 45 (EN 60529)

Standard version

Connection
Stainless steel 316 Ti
bottom or lower back
½-14 NPT – spanner size SW 22

Measuring element
Bourdon tube, stainless steel 316 Ti
≤ 60 bar "C" type tube
> 60 bar helical tube tightness-tested with helium (EN 837 – 1/9.5.6)

Movement
Stainless steel

Dial
Aluminium white
Dial marking black

Pointer
Micro-adjustable pointer, brass, black
Gear brass, nickel-plated

Housing
PP-GF20, black, with solid baffle wall and blow-out
Integrated back flange

Screw type bezel
PP-GF20, black, internal

Window
Plastic (PMMA)

Options

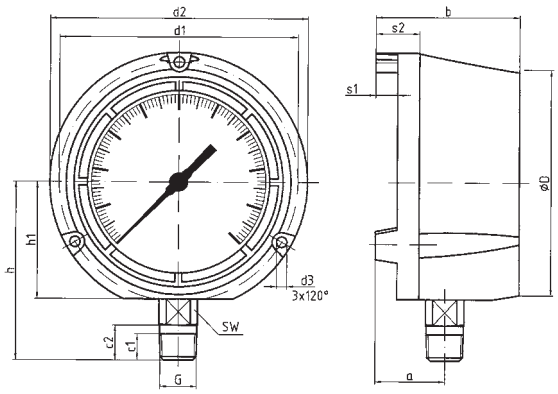
- Glycerine filling (type D6)
- Silicone oil filling (type D 6)
- Special scales
- Measuring system copper alloy
- Measuring system Monel
- Laminated safety glass window
- Damping screw
- Reference pointer
- Max. pointer
- Electrical contacts
- Other process connections

See page 309 for prices.

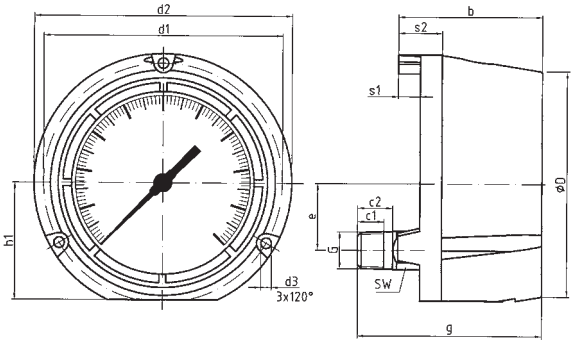
Bourdon tube pressure gauge
Process Gauge Type D 1/D 6 – NG 4½"

Housing types and dimensions

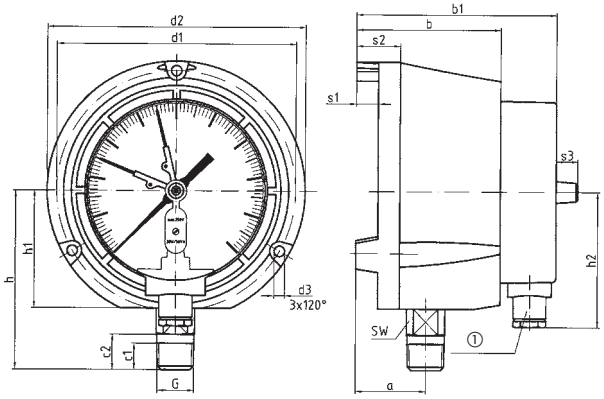
Bottom connection



Lower back connection

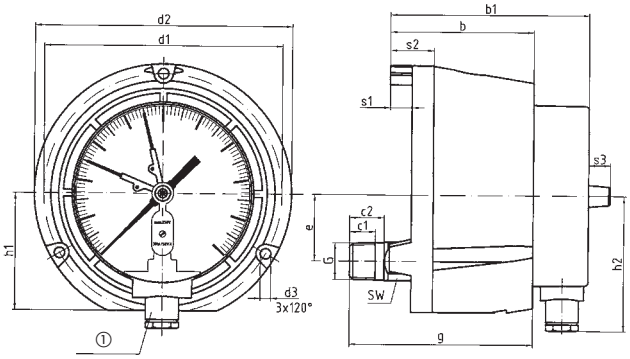


Bottom connection, with electrical contact



① Junction box

Lower back connection, with electrical contact



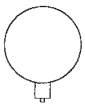
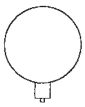
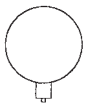
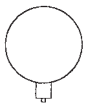
① Junction box

Dimensions (mm)

Nominal size (NG)	a	b	b1	c1	c2	d1	d2	d3	ØD	e	G	g	h	h1	h2	s1	s2	s3	SW
4½" (D 1/D 6)	40	82.5	114.5	15	20	137	148	6	129	38	½-14 NPT	105.5	102	67	78	12.5	25	12.5	22

Bourdon tube pressure gauge
Process Gauge

DG: M

Type	RF 130PG, D101	RF 130PG, D111	RF 130PG, D102	RF 130PG, D112	RF 130PG Gly, D601	RF 130PG Gly, D611	RF 130PG Gly, D602	RF 130PG Gly, D612
					Version with glycerine filling			
Version								
Housing Ø	4 ½"	4 ½"	4 ½"	4 ½"	4 ½"	4 ½"	4 ½"	4 ½"
Housing	PP-GF 20, black, with internal screw type bezel				PP-GF 20, black, with internal screw type bezel			
Measuring element	Copper alloy		Stainless steel 316 Ti/316 L		Copper alloy		Stainless steel 316 Ti/316 L	
Accuracy class	Grade 2A as per ANSI B 40.1 (corresponds to class 0.5)				Grade 2A as per ANSI B 40.1 (corresponds to class 0.5)			
Connection	½-14 NPT	½-14 NPT	½-14 NPT	½-14 NPT	½-14 NPT	½-14 NPT	½-14 NPT	½-14 NPT
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	87901101	87901111	87901102	87901112	87901601	87901611	87901602	87901612
-1/+0.6	87902101	87902111	87902102	87902112	87902601	87902611	87902602	87902612
-1/+1.5	87903101	87903111	87903102	87903112	87903601	87903611	87903602	87903612
-1/+3	87904101	87904111	87904102	87904112	87904601	87904611	87904602	87904612
-1/+5	87905101	87905111	87905102	87905112	87905601	87905611	87905602	87905612
-1/+9	87906101	87906111	87906102	87906112	87906601	87906611	87906602	87906612
-1/+15	87907101	87907111	87907102	87907112	87907601	87907611	87907602	87907612
Price €								
0/0.6	87909101	87909111	87909102	87909112	87909601	87909611	87909602	87909612
0/1	87910101	87910111	87910102	87910112	87910601	87910611	87910602	87910612
0/1.6	87911101	87911111	87911102	87911112	87911601	87911611	87911602	87911612
0/2.5	87912101	87912111	87912102	87912112	87912601	87912611	87912602	87912612
0/4	87913101	87913111	87913102	87913112	87913601	87913611	87913602	87913612
0/6	87914101	87914111	87914102	87914112	87914601	87914611	87914602	87914612
0/10	87915101	87915111	87915102	87915112	87915601	87915611	87915602	87915612
0/16	87916101	87916111	87916102	87916112	87916601	87916611	87916602	87916612
0/25	87917101	87917111	87917102	87917112	87917601	87917611	87917602	87917612
0/40	87918101	87918111	87918102	87918112	87918601	87918611	87918602	87918612
Price €								
0/60	87919101	87919111	87919102	87919112	87919601	87919611	87919602	87919612
0/100	87920101	87920111	87920102	87920112	87920601	87920611	87920602	87920612
0/160	87921101	87921111	87921102	87921112	87921601	87921611	87921602	87921612
0/250	87922101	87922111	87922102	87922112	87922601	87922611	87922602	87922612
0/400	87923101	87923111	87923102	87923112	87923601	87923611	87923602	87923612
Price €								
0/600	87924101	87924111	87924102	87924112	87924601	87924611	87924602	87924612
0/1000	87925101	87925111	87925102	87925112	87925601	87925611	87925602	87925612

* Pressure unit psi available at no extra charge

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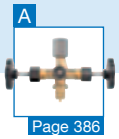
Precision Bourdon tube pressure gauges

- High accuracy (class 0.6)
- Housing can be plumbed
- Serial number on dial
- Suitable as measuring equipment as per QA requirements
- DNV- and GOSSTANDART-certified



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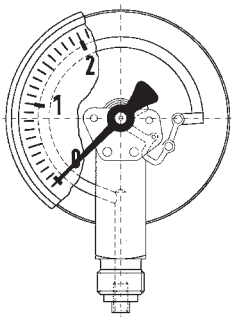


Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise. For high measuring accuracy.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
160 – 250

Accuracy class (EN 837-1/6)
0.6

Ranges (EN 837-1/5)
-1/0 bar to -1/+15 bar
0/0.6 to 0/600 bar

Calibration medium
≤ 40 bar: air
> 40 bar: water

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Brass, bottom or lower back
(NG 160 only)
G½B – spanner size SW 22 (EN 837-1/7.3)

Measuring element
Bourdon tube
≤ 100 bar "C" type tube, copper alloy
> 100 bar helical tube,
stainless steel 316 Ti/316 L

Movement
Brass/nickel silver
jewel bearing

Dial
Aluminium, white
Dial marking black

Pointer
Knife edge pointer aluminium, black

Housing
Stainless steel 304

Bayonet bezel
Stainless steel 304

Window
Plastic (PMMA)

Options

- Glycerine filling (NG 160/type D 8) > 2.5 bar
- Wetted parts stainless steel (type D 4X2)
- Laminated safety glass window (NG 160)
- Back flange (NG 160)
- 3-hole fixing, panel mounting bezel (NG 160)
- Damping screw
- Special scales
- Other process connections

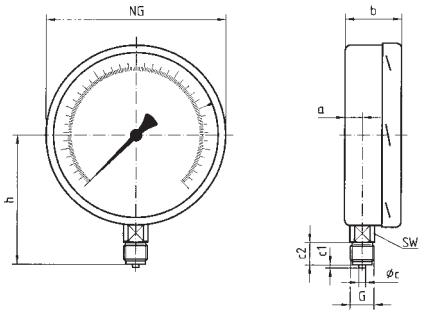
See page 314 for prices.

Precision Bourdon tube pressure gauge

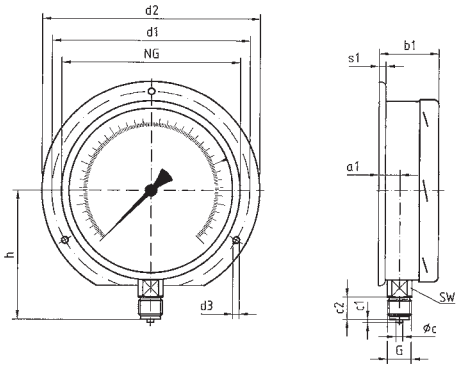
Type D 4 – NG 160/250

Housing types and dimensions

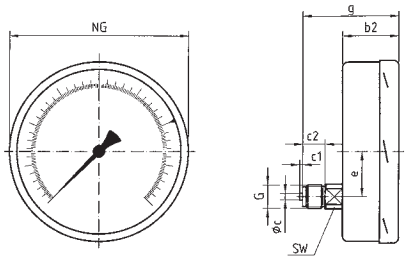
Bottom connection



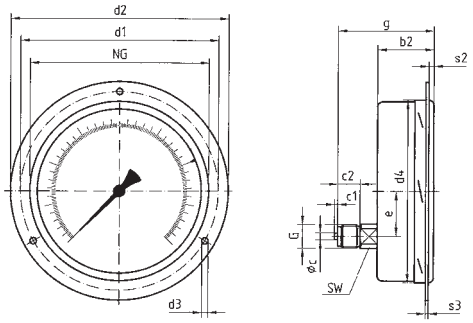
Bottom connection, back flange



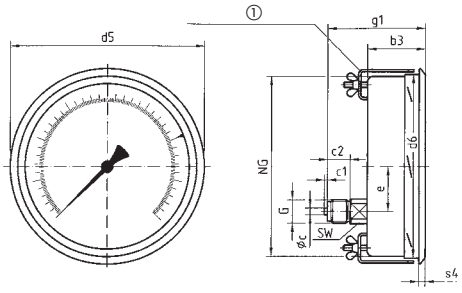
Lower back connection (NG 160 only)



Lower back connection, 3-hole fixing, panel mounting bezel (NG 160 only)



Lower back connection, panel mounting bezel for clamp fixing (NG 160 only)



① 90° drawn staggered

Dimensions (mm)

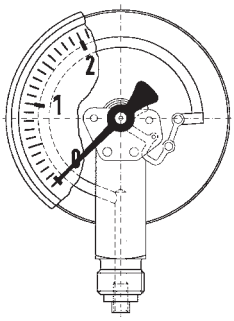
Nominal size (NG)	a	a_1	b	b_1	b_2	b_3	Øc	c_1	c_2	d_1*	d_2	d_3*	d_4	d_5	d_6	e	G	g	g_1	h	s_1
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	44.5	G½B	82	84	116	6
250	16	-	57	-	-	-	6	3	20	-	-	-	-	-	-	-	G½B	-	-	165	-

Nominal size (NG)	s_2	s_3	s_4	SW
160	4	2	4.5	22
250	-	-	-	22

* Dimensions as per DIN 16070

Precision Bourdon tube pressure gauges

- Very high measuring accuracy (class 0.5)
- Housing can be plumbed
- Serial number on dial
- Suitable as measuring equipment as per QA requirements
- DNV- and GOSTSTANDART-certified



Application

For gaseous and liquid media which are not corrosive and not highly viscous and which do not crystallise. For very high measuring accuracy.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
160 – 250

Accuracy class (EN 837-1/6)
0.25

Ranges (EN 837-1/5)
-1/0 bar to -1/+15 bar
0/0.6 to 0/400 bar

Calibration medium
≤ 40 bar: air
> 40 bar: water

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Brass, bottom or lower back
(NG 160 only)
G½B – spanner size SW 22 (EN 837-1/7.3)

Measuring element
Bourdon tube
≤ 100 bar "C" type tube, copper alloy
> 100 bar helical tube, copper alloy

Movement
Brass/nickel silver ball bearing

Dial
Aluminium, white
Dial marking black
NG 160 mirror scale 270°
NG 250 mirror scale 330°
with zero correction

Pointer
Knife edge pointer
Aluminium

Housing
Stainless steel 304

Bayonet bezel
Stainless steel 304

Window
Plastic (PMMA)

Options

- Back flange (NG 160)
- 3-hole fixing, panel mounting bezel (NG 160)
- Factory test certificate
- Special scales
- Other process connections

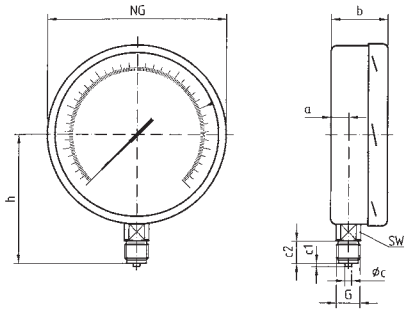
See page 314 for prices.

Precision Bourdon tube pressure gauge

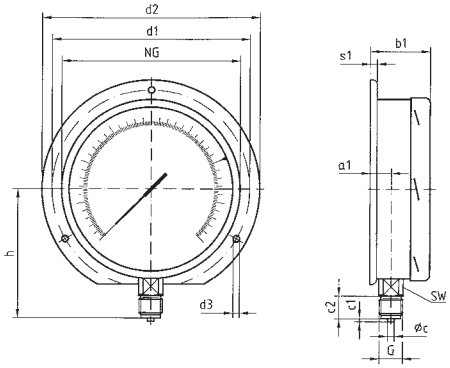
Type D 4 – NG 160/250

Housing types and dimensions

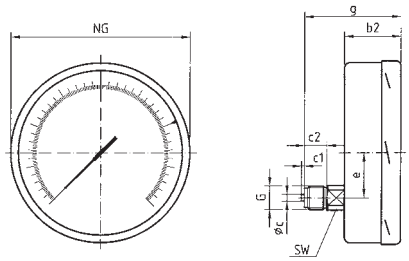
Bottom connection – NG 160



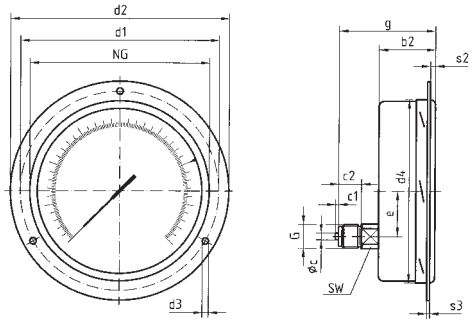
Bottom connection, back flange – NG 160



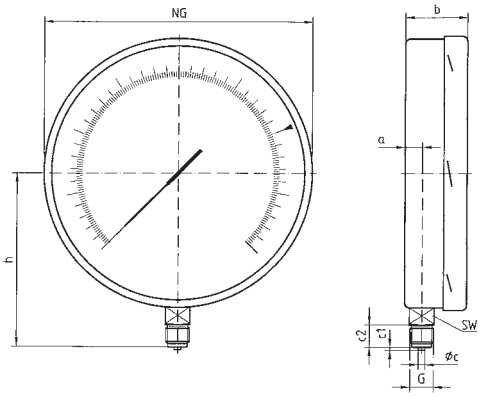
Lower connection back – NG 160



Lower back connection, 3-hole fixing, panel mounting bezel – NG 160



Bottom connection – NG 250



Dimensions (mm)

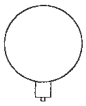
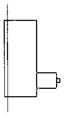
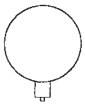
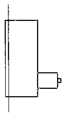
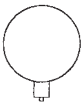
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	d4	d5	d6	e	G	g	g1	h	s1
160	17.5	20.5	50	53	50	52	6	3	20	178	196	5.8	164	167	161	44.5	G½B	82	84	116	6
250	16	-	57	-	-	-	6	3	20	-	-	-	-	-	-	-	G½B	-	-	165	-

Nominal size (NG)	s2	s3	s4	SW
160	4	2	4.5	22
250	-	-	-	22

* Dimensions as per DIN 16070

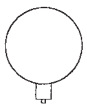
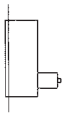
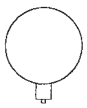
Precision Bourdon tube pressure gauge

DG: M

Type	RF160F, D401	RF160F, D411	RF160F, D431	RF160ChF, D402	RF160ChF, D412	RF160ChF, D432	RF250F, D401
Version							
Housing Ø	160	160	160	160	160	160	250
Housing	Stainless steel 304 with bayonet bezel						
Measuring element	Bourdon tube, copper alloy			Bourdon tube, stainless steel 316 Ti/316 L			Cu alloy
Accuracy class	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Connection	G½B	G½B	G½B	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel, stainless steel			3-hole fixing, panel mounting bezel, stainless steel	
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	85701401	85701411	85701431	85701402	85701412	85701432	85751401
-1/+0.6	85702401	85702411	85702431	85702402	85702412	85702432	85752401
-1/+1.5	85703401	85703411	85703431	85703402	85703412	85703432	85753401
Price €							
-1/+3	85704401	85704411	85704431	85704402	85704412	85704432	85754401
-1/+5	85705401	85705411	85705431	85705402	85705412	85705432	85755401
-1/+9	85706401	85706411	85706431	85706402	85706412	85706432	85756401
-1/+15	85707401	85707411	85707431	85707402	85707412	85707432	85757401
Price €							
0/0.6	85709401	85709411	85709431	85709402	85709412	85709432	85759401
0/1	85710401	85710411	85710431	85710402	85710412	85710432	85760401
0/1.6	85711401	85711411	85711431	85711402	85711412	85711432	85761401
Price €							
0/2.5	85712401	85712411	85712431	85712402	85712412	85712432	85762401
0/4	85713401	85713411	85713431	85713402	85713412	85713432	85763401
0/6	85714401	85714411	85714431	85714402	85714412	85714432	85764401
0/10	85715401	85715411	85715431	85715402	85715412	85715432	85765401
0/16	85716401	85716411	85716431	85716402	85716412	85716432	85766401
0/25	85717401	85717411	85717431	85717402	85717412	85717432	85767401
0/40	85718401	85718411	85718431	85718402	85718412	85718432	85768401
Price €							
0/60	85719401	85719411	85719431	85719402	85719412	85719432	85769401
0/100	85720401	85720411	85720431	85720402	85720412	85720432	85770401
0/160	85721401	85721411	85721431	85721402	85721412	85721432	85771401
0/250	85722401	85722411	85722431	85722402	85722412	85722432	85772401
0/400	85723401	85723411	85723431	85723402	85723412	85723432	85773401
0/600	85724401	85724411	85724431	85724402	85724412	85724432	85774401
Extra charge glycerine filling (for NG 160 > 2.5 bar)							

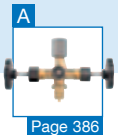
Precision Bourdon tube pressure gauge

DG: M

Type	RF160F, D401	RF160F, D411	RF160F, D431	RF250F, D401
Version				
Housing Ø	160	160	160	250
Housing	Stainless steel 304 with bayonet bezel			
Measuring element	Copper alloy			
Dial	Mirror scale 270°			Mirror scale 330°
Accuracy class	0.25	0.25	0.25	0.25
Connection	G½B	G½B	G½B	G½B
			3-hole fixing, panel mounting bezel 304	
Range (bar)	Part no.	Part no.	Part no.	Part no.
Price €				
-1/0	88201401	88201411	88201431	88231401
-1/+0.6	88202401	88202411	88202431	88232401
-1/+1.5	88203401	88203411	88203431	88233401
-1/+3	88204401	88204411	88204431	88234401
-1/+5	88205401	88205411	88205431	88235401
-1/+9	88206401	88206411	88206431	88236401
-1/+15	88207401	88207411	88207431	88237401
0/0.6	88209401	88209411	88209431	88239401
0/1	88210401	88210411	88210431	88240401
0/1.6	88211401	88211411	88211431	88241401
0/2.5	88212401	88212411	88212431	88242401
Price €				
0/4	88213401	88213411	88213431	88243401
0/6	88214401	88214411	88214431	88244401
0/10	88215401	88215411	88215431	88245401
0/16	88216401	88216411	88216431	88246401
0/25	88217401	88217411	88217431	88247401
0/40	88218401	88218411	88218431	88248401
Price €				
0/60	88219401	88219411	88219431	88249401
0/100	88220401	88220411	88220431	88250401
0/160	88221401	88221411	88221431	88251401
0/250	88222401	88222411	88222431	88252401
0/400	88223401	88223411	88223431	88253401

Bourdon tube pressure gauges for panel mounting

- Suitable for various standard cut-out dimensions
- For installation in control panels
- For positive and negative pressure ranges



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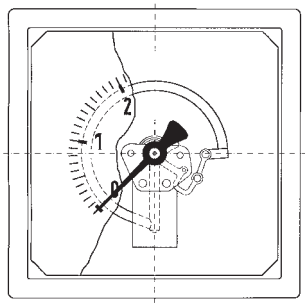


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For panel mounting.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 2/D 3

Nominal size
72 x 72, 96 x 96, 144 x 144

Accuracy class (EN 837-1/6)
72 x 72 and 96 x 96: 1.6
144 x 144: 1.0

Ranges (EN 837-1/5)
-1/0 bar to -1/+15 bar
0/0.6 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range

Medium:	T_{max}	= +60 °C
Ambient:	T_{min}	= -20 °C
	T_{max}	= +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Brass, back
72 x 72 and 96 x 96: G¼B – spanner size SW 14
144 x 144: G½B – spanner size SW 22
(EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing

NG 72/NG 96	D3 – stainless steel 304
NG 144	D2 – sheet steel, black

Bezel

NG 72/NG 96	aluminium, black
NG 144	sheet steel, black

Window
Plastic

Options

- Zero correction (NG 96)
- Wetted parts stainless steel (NG 72/NG 96)
- Special scales
- Damping screw
- Reference pointer
- Other process connections

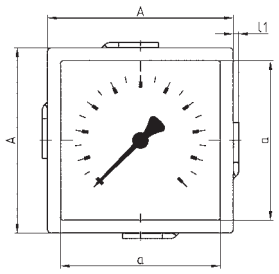
See page 320 for prices.

Bourdon tube pressure gauges for panel mounting

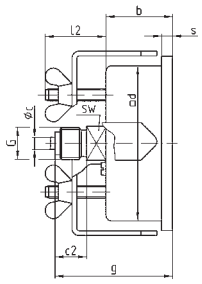
NG 72 x 72/96 x 96/144 x 144

Housing types and dimensions

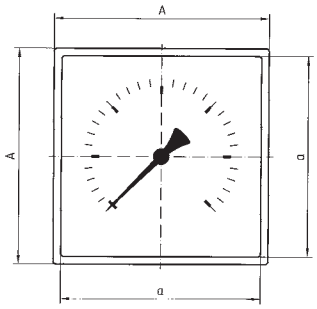
NG 72 x 72 – type D 3



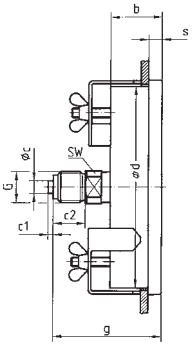
NG 72 x 72 – type D 3



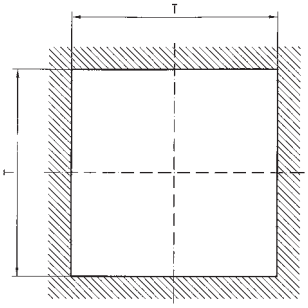
NG 96 x 96 – type D 3/NG 144 x 144 – type D 2



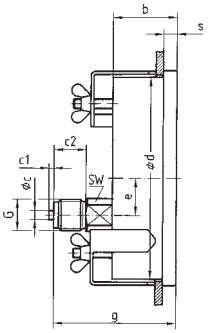
NG 96 x 96 – type D 3



Panel cut out



NG 144 x 144 – type D 2



Dimensions (mm)

Nominal size (NG)	A	a	b	Øc	c1	c2	d	e	G	g	l1	l2	s	SW	T
72 x 72	72	62	27.5	5	2	13	64	-	G¼B	44.5	2	25	4.5	14	66
96 x 96	96	88	32	5	2	13	88	-	G¼B	55	-	-	6.5	14	90
144 x 144	144	134	49	6	3	20	136	26.5	G½B	81	-	-	9	22	138

Bourdon tube pressure gauges for high pressure EN 837-1

- For pressure ranges up to 4,000 bar
- Housing with solid baffle wall and blow-out

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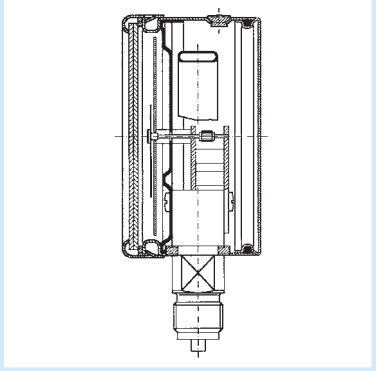


Application

For measurement of extremely high pressures in gaseous and liquid corrosive media which are not highly viscous and do not crystallise; also suitable for corrosive atmospheres.

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges
0/2,500 bar
0/4,000 bar

Application area
Static load: full scale value
Dynamic load: 65 % of full scale value

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Stainless steel 316 L, bottom
HP connection for ¼" pipe
Female thread M 16 x 1.5 or 9/16–18 UNF
each with sealing cone 60°

Measuring element
Bourdon tube, NiFe alloy
Helical tube

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with solid baffle wall and blow-out

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Fixing
Wall mounting with instrument bracket, length 60 mm (included in scope of delivery for Ø 160 mm) or panel mounting using by means of 3-hole fixing, panel mounting bezel (option). Direct mounting to rigid measuring line possible.

Options

- Glycerine filling (type D 802)
- 3-hole fixing, panel mounting bezel
- Other process connections
- Electrical contacts
- Helium tightness test

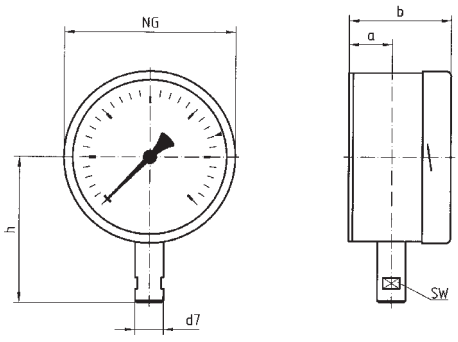
See page 320 for prices.

Bourdon tube pressure gauges for high pressure

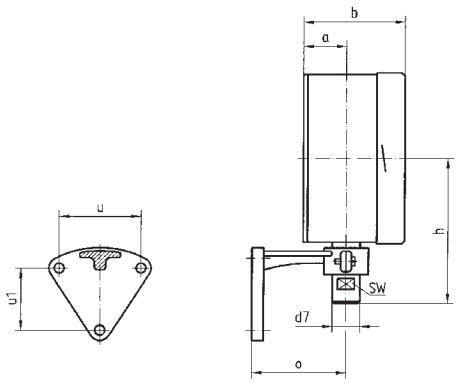
Type D 4 – NG 100 – 160

Housing types and dimensions

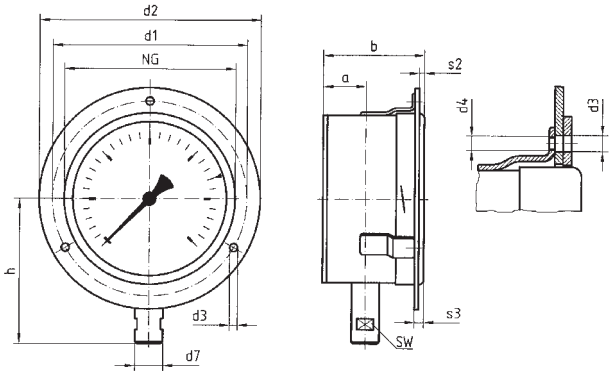
Bottom connection



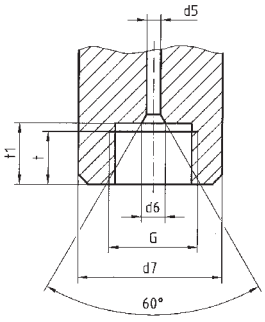
Bottom connection, with instrument bracket



Bottom connection, 3-hole fixing, panel mounting bezel



HP connection female thread M 16 x 1.5



Dimensions (mm)

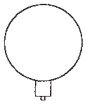
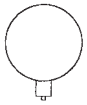
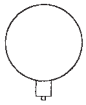
Nominal size (NG)	a	a1	b	b1	d1*	d2	d3*	d4	d5	d6	d7	G	h	o	s2	s3	t	t1	u
160	34	64	78	108	178	196	5.8	M 5	2.5	4.3	26	M16 x 1.5	139	63	1.5	8	9.5	11	65
100	27	52	60	90	116	132	4.8	M 4	2.5	4.3	26		71	-	1	7	9.5	11	-

Nominal size (NG)	u1	SW
160	56	22
100	-	22

* Dimensions as per DIN 16064

Bourdon tube pressure gauges for panel mounting
Bourdon tube pressure gauges for high pressure

DG: M

					Glycerine filling		Glycerine filling
Type	RF72, D311	RF96, D311	RF144, D211	RF96, D312	RF100HDGly, D802	RF160HD, D402	RF160HDGly, D802
Version							
Housing Ø	72 x 72	96 x 96	144 x 144	96 x 96	100	160	160
Housing	Stainless steel	Stainless steel	Sheet steel	Stainless steel	Stainless steel 304		
Measuring element	Bourdon tube, copper alloy			Stainless steel	NiFe alloy		Cu alloy
Accuracy class	1.6	1.6	1.0	1.6	1.0	1.0	1.0
Connection	G¼B	G¼B	G½B	G¼B	G½B	HP connection ¼" with female thread M16 x 1.5 with sealing cone 60°	
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	85828311	85801311	85851211	85801312	---	---	---
-1/+0.6	85844311	85802311	85852211	85802312	---	---	---
-1/+1.5	85845311	85803311	85853211	85803312	---	---	---
-1/+3	85846311	85804311	85854211	85804312	---	---	---
-1/+5	85847311	85805311	85855211	85805312	---	---	---
-1/+9	85848311	85806311	85856211	85806312	---	---	---
-1/+15	85849311	85807311	85857211	85807312	---	---	---
Price €							
0/0.6	85829311	85809311	85859211	85809312	---	---	---
0/1	85830311	85810311	85860211	85810312	---	---	---
0/1.6	85831311	85811311	85861211	85811312	---	---	---
0/2.5	85832311	85812311	85862211	85812312	---	---	---
0/4	85833311	85813311	85863211	85813312	---	---	---
0/6	85834311	85814311	85864211	85814312	---	---	---
0/10	85835311	85815311	85865211	85815312	---	---	---
0/16	85836311	85816311	85866211	85816312	---	---	---
0/25	85837311	85817311	85867211	85817312	---	---	---
0/40	85838311	85818311	85868211	85818312	---	---	---
Price €							
0/60	85839311	85819311	85869211	85819312	---	---	---
0/100	85840311	85820311	85870211	85820312	---	---	---
0/160	85841311	85821311	85871211	85821312	---	---	---
0/250	85842311	85822311	85872211	85822312	---	---	---
0/400	85843311	85823311	85873211	85823312	---	---	---
Price €							
0/2,500	---	---	---	---	86031802	85277402	85277802
Price €							
0/4,000	---	---	---	---	---	85278402	85278802

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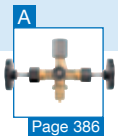
Bourdon tube pressure gauges with glycerine filling for refrigeration engineering

- Can be used in case of heavy vibrations and high, dynamic pressure loads
- Longer service life due to less wear and corrosion protection of the measuring system
- Various refrigerants measurable with multiple scales
- DNV- and GOSSTANDART-certified


A
Page 386

Application

For simultaneous measurement of vapour pressures and temperatures in refrigeration engineering.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 7/D 8

Nominal size
63 – 80 – 100 (D 7)
100 (D 8)

Accuracy class (EN 837-1/6)
NG 63: 1.6
NG 80/NG 100: 1.0

Ranges
-1/+ 9 bar -1/+12.5 bar
-1/+15 bar -1/+24 bar
-1/+30 bar
each with temperature scale

Temperature scales
for refrigerants:
R 134a R 134a/R 22
R 22/R 12/R 502 R 12
R 404A R 407A
R 717 (NH_3)

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: According to refrigerant
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 65 (EN 60529), with housing vent (≤ 25 bar) IP 54

Standard version

Connection
Brass, bottom or lower back
NG 63 – 100 D 7 lower back
NG 100 D 8 bottom back
7/16-20 UNFuack SAE J514 / ISO 8434-2 (37°),
G¼B, G½B (for R 717 stainless steel 316 Ti/316 L)

Measuring element
Bourdon tube, copper alloy
"C" type tube (for R 717 stainless steel 316 Ti/316 L)

Movement
Brass

Dial
Aluminium, white / Pressure dial marking black
Temperature dial marking coloured
(see appendix for examples)

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bezel
D 7 – NG 63 – 80 – 100:
crimped bezel stainless steel 304
D 8 – NG 100:
bayonet bezel stainless steel 304

Window
Plastic

Filling liquid
Glycerine (99.5 %)

Options

- Temperature scales for other refrigerants
- Back flange
- Clamp fixing
- 3-hole fixing, panel mounting bezel (NG 63/100)
- Damping screw
- Special scales
- Other process connections

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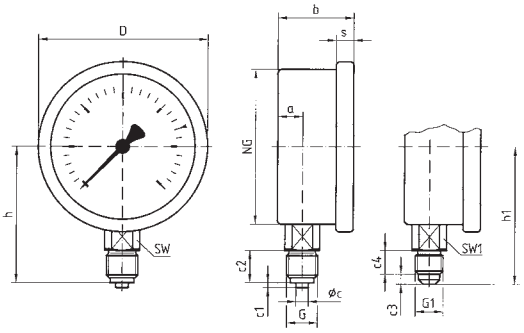
See page 323 for prices.

Bourdon tube pressure gauges for gas refrigeration engineering

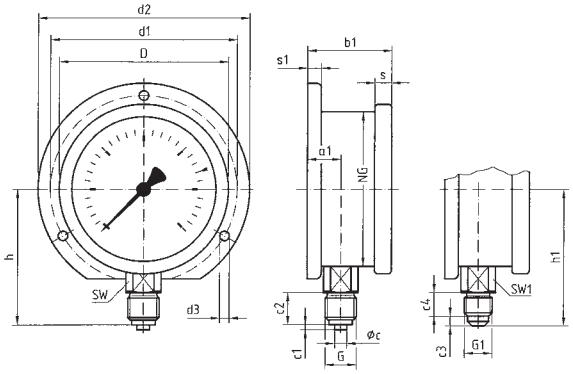
Type D 7/D 8 – NG 63/80/100

Housing types and dimensions

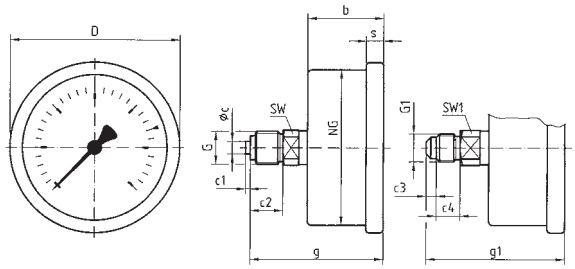
Type D 7 – bottom connection



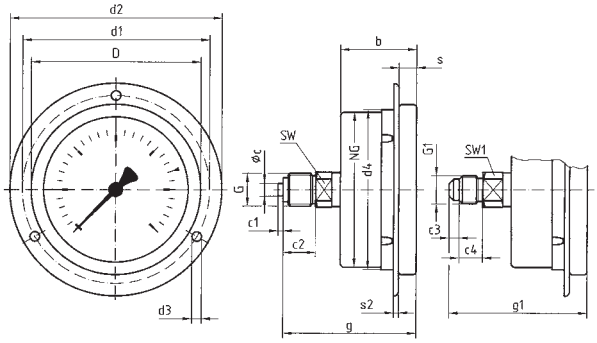
Type D 7 – bottom connection, back flange



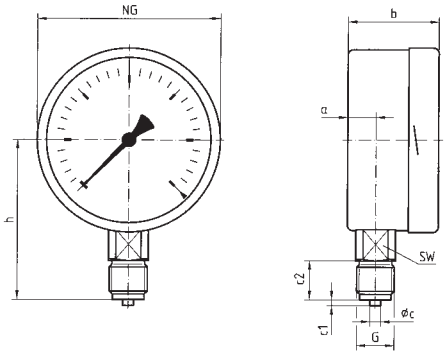
Type D 7 – centre back connection



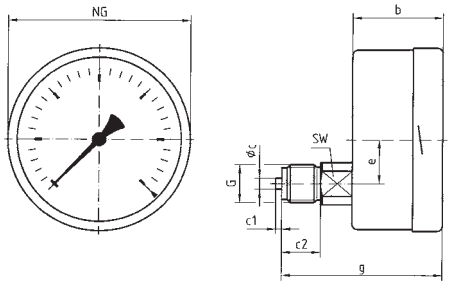
Type D 7 – centre back connection, 3-hole fixing, panel mounting bezel (NG 63/100)



Type D 8 – bottom connection



Type D 8 – lower back connection



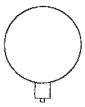
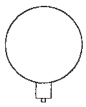
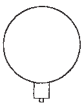
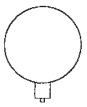
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	c3	c4	d1*	d2*	d3*	d4	D	e	g	g1	G	G1	h	h1
63 (D 7)	9.5	13	30.5	34	5	2	13	4	9.5	75	85	3.6	64	68	-	53.5	55.5	G¼B	7/16-20 UNF	53	55
80 (D 7)	12.2	15.2	33.5	36.5	6	3	20	4	9.5	95	110	5	-	85	-	65.5	58.5	G½B	7/16-20 UNF	71	62.5
100 (D 7)	12.2	15.7	33.5	37	6	3	20	4	9.5	116	132	4.8	101	106	-	65.5	58.5	G½B	7/16-20 UNF	81	72.5
100 (D 8)	15.6	19.1	49	52.5	6	3	20	-	-	-	-	-	-	-	26.5	81	-	G½B	-	86	-
Nominal size (NG)	s	s1	s2	SW	1																
63 (D 7)	7	5.5	2	14	14																
80 (D 7)	7	5.5	-	22	14																
100 (D 7)	7	5.5	3.8	22	14																
100 (D 8)	-	5.5	2	22	-																

* Dimensions as per DIN 16063 (NG 63) and 16064 (NG 80/100)

Bourdon tube pressure gauges for refrigeration engineering with glycerine filling

DG: M

Type	RF63KTGly, D701	RF63KTGly, D711	RF80KTGly, D701	RF80KTGly, D711	RF100KTGly, D701	RF100KTGly, D711	RF100KTGly, D802	RF100KTGly, D812
Version								
Housing Ø	63	63	80	80	100	100	100	100
Housing	Stainless steel 304 with crimped bezel						Stainless steel 304 with bayonet bezel	
Measuring element	Bourdon tube, copper alloy						Bourdon tube, stainless steel 316 Ti/316 L	
Scale	according to selection table						Temperature scale R 717	
Accuracy class	1.6	1.6	1.0	1.0	1.0	1.0	1.0	1.0
Connection	7/16-20 UNF	7/16-20 UNF	7/16-20 UNF	7/16-20 UNF	7/16-20 UNF	7/16-20 UNF	G½B	G½B
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/+9	85130701	85130711	85180701	85180711	85230701	85230711	–	–
-1/+12.5	85131701	85131711	85181701	85181711	85231701	85231711	85231802	85231812
-1/+15	85132701	85132711	85182701	85182711	85232701	85232711	85232802	85232812
-1/+24	85133701	85133711	85183701	85183711	85233701	85233711	85233802	85233812
-1/+30	85134701	85134711	85184701	85184711	85234701	85234711	–	–
Extra charges	**Price €**							
Wetted parts 316 Ti/316 L*							–	

* Wetted parts stainless steel: connection NG 63/80 centre G¼B – NG 80 radial/100 G½B

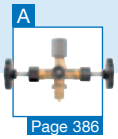
See pages 306 and 385 for other extra charges.

Selection table – temperature scales for refrigerants (see appendix for examples)
Please specify the code of the required temperature scale along with the part number of the basic gauge. Temperature scales for other refrigerants on request.

Temperature scale for refrigerant	**Code**
R 134a	A
R 134a/R 22	B
R 22/R 12/R 502	C
R 12	D
R 404A	E
R 717 (NH3) – stainless steel with wetted parts only	F
R 407A	G
R 410A	H

Bourdon tube pressure gauges for welding applications EN 562

- Design as per EN 562
- Rear blow-out
- Measuring system cleaned, oil-free and grease-free
- Many customised versions available



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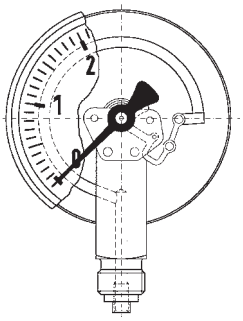

Application

For welding and cutting machines and systems as well as similar processes.

Technical specifications

Type
D 2/D 3

Nominal size
50 – 63

Version
EN 562

Accuracy class (EN 562)
2.5

Ranges (EN 562)
-1/0 to -1/+15 bar
0/1 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or centre back,
with damping in the pressure inlet
G¼B – spanner size SW 14 (EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy ≤ 40 bar
"C" type tube > 40 bar helical tube
(copper portion in case of acetylene < 70 %)

Degree of cleanliness
Wetted parts oil- and grease-free

Movement
Brass

Dial
Aluminium, white
Dial marking black

Marking
Label "Oxygen" and symbol "Free from oil and grease" for oxygen
Label "Acetylene" for acetylene

Pointer
Aluminium, black

Housing
D 2 – sheet steel (gold or black)
D 3 – stainless steel 304 with rear blow-out

Window
Plastic, clip-in

Options

- Litre scales for argon/CO_2
- Special scales
- Other connection threads

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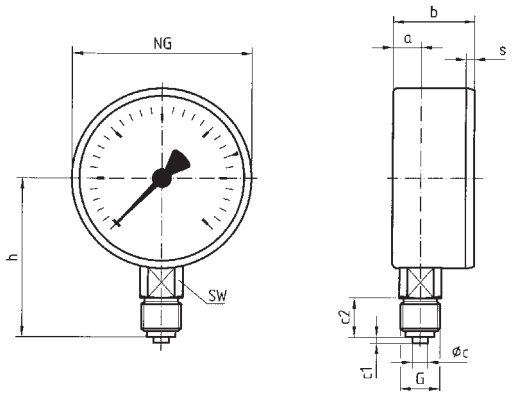
See page 328 for prices.

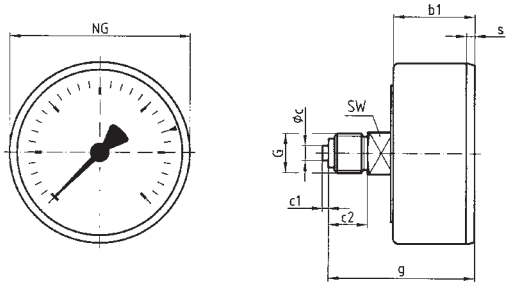
Bourdon tube pressure gauges for welding applications Type D 3 – NG 50/63

Housing types and dimensions

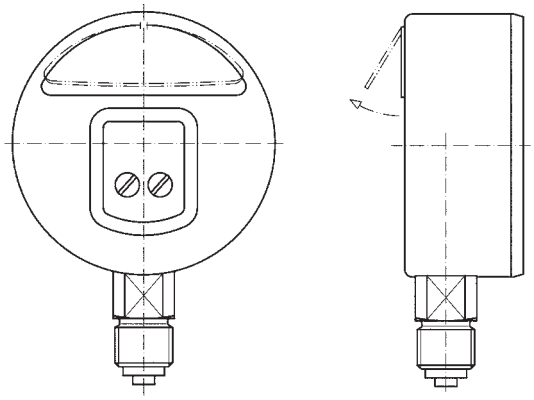
Bottom connection



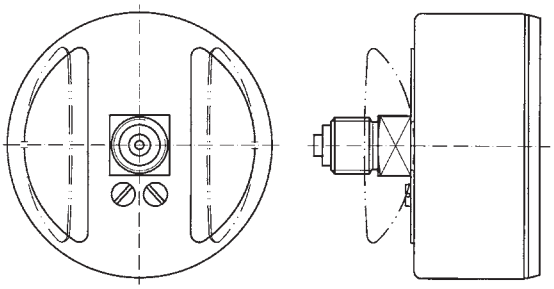
Centre back connection



Blow-out – bottom connection



Blow-out – centre back connection



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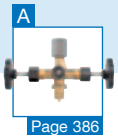
Dimensions (mm)

Nominal size (NG)	a	b	b_1	Øc	c_1	c_2	G	g	h	s	SW
50	10.5	29	26	5	2	13	G¼B	47	46	3.8	14
63	11	29.5	29.5	5	2	13	G¼B	50.5	53	3.7	14

Bourdon tube pressure gauge for gas applications EN 837-1/2

- Design as per EN 562
- Dual scale for measurement of different media (option)
- Rear blow-out
- Many customised versions available



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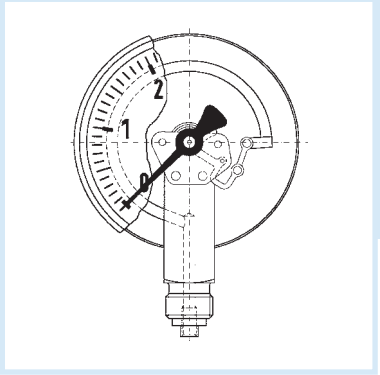


Application

For gaseous and liquid media which are not highly viscous and do not crystallise. Specially designed for gas technology devices, fittings and installations.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 3

Nominal size
50 – 63

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/1 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or centre back
G¼B – spanner size SW 14 (EN 837-1/7.3)

Measuring element
Bourdon tube, copper alloy ≤ 40 bar
"C" type tube > 40 bar helical tube

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with rear blow-out as per EN 562

Window
Plastic, clip-in

Options

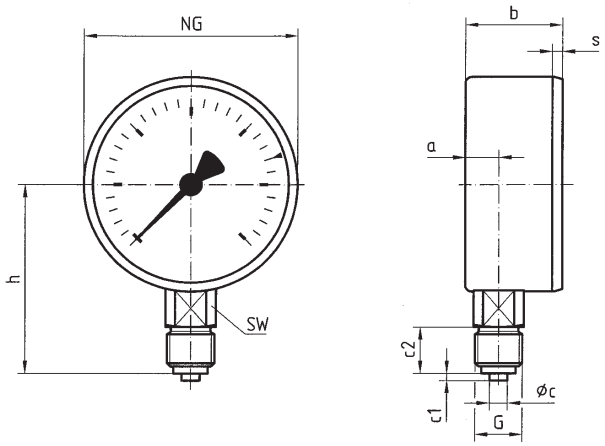
- Wetted parts stainless steel
- Wetted parts oil- and grease-free
- Helium leak test
- Special scales
- Other connection threads
- Damping screw

i
See page 328 for prices.

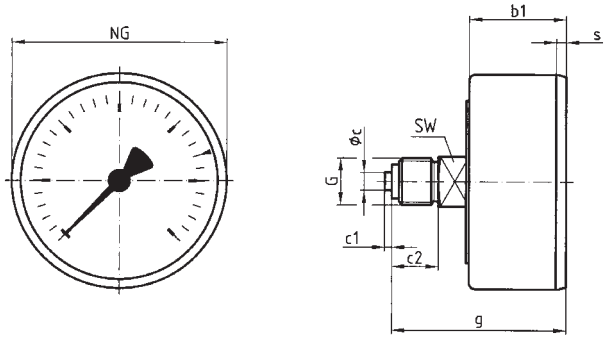
Bourdon tube pressure gauges for gas applications Type D 3 – NG 50/63

Housing types and dimensions

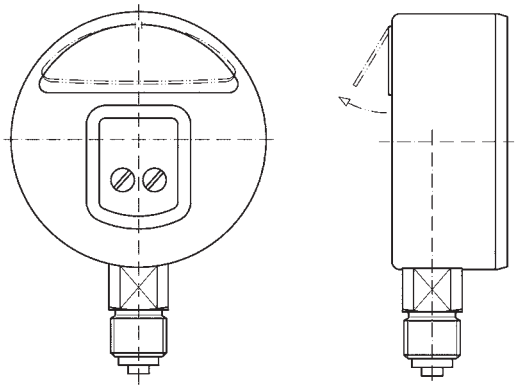
Bottom connection



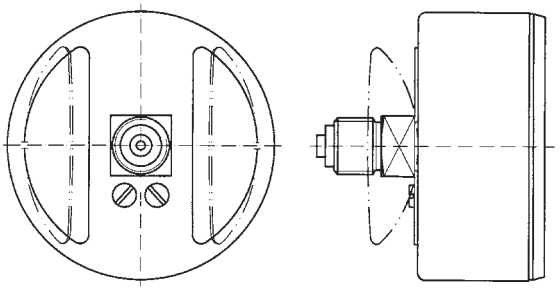
Centre back connection



Blow-out – bottom connection



Blow-out – centre back connection

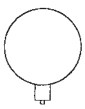
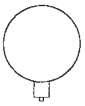
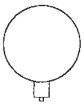
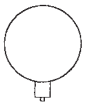
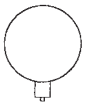


Dimensions (mm)

Nominal size (NG)	a	b	b_1	Øc	c_1	c_2	G	g	h	s	SW
50	10.5	29	26	5	2	13	G¼B	47	46	3.8	14
63	11	29.5	29.5	5	2	13	G¼B	50.5	53	3.7	14

Bourdon tube pressure gauges for welding/gas applications

DG: M

	Version for welding applications EN 562						
Type	RF63ST, D301	RF50GT, D301	RF50GT, D311	RF63GT, D301	RF63GT, D311	RF50GT, D302 4)	RF63GT, D302 4)
Version							
Housing Ø	63	50	50	63	63	50	63
Housing	Stainless steel 304 with blow-out						
Measuring element	CU alloy, oil- and grease-free	Copper alloy				Stainless steel 316 Ti/316 L	
Accuracy class	2.5	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	---	85051301GT	85051311GT	85101301GT	85101311GT	85051302GT	85101302GT
-1/+0.6	---	85052301GT	85052311GT	85102301GT	85102311GT	85052302GT	85102302GT
-1/+1.5	---	85053301GT	85053311GT	85103301GT	85103311GT	85053302GT	85103302GT
-1/+3	---	85054301GT	85054311GT	85104301GT	85104311GT	85054302GT	85104302GT
-1/+5	---	85055301GT	85055311GT	85105301GT	85105311GT	85055302GT	85105302GT
-1/+9	---	85056301GT	85056311GT	85106301GT	85106311GT	85056302GT	85106302GT
-1/+15	---	85057301GT	85057311GT	85107301GT	85107311GT	85057302GT	85107302GT
Price €							
0/0.6	---	85059301GT	85059311GT	85109301GT	85109311GT	85059302GT	85109302GT
0/1	88300301 1)	85060301GT	85060311GT	85110301GT	85110311GT	85060302GT	85110302GT
0/1.6	88301301 1)	85061301GT	85061311GT	85111301GT	85111311GT	85061302GT	85111302GT
0/2.5	88302301 1)	85062301GT	85062311GT	85112301GT	85112311GT	85062302GT	85112302GT
0/4	88303301	85063301GT	85063311GT	85113301GT	85113311GT	85063302GT	85113302GT
0/6	88304301 2)	85064301GT	85064311GT	85114301GT	85114311GT	85064302GT	85114302GT
0/10	88305301	85065301GT	85065311GT	85115301GT	85115311GT	85065302GT	85115302GT
0/10	88306301 3)	---	---	---	---	---	---
0/16	88307301 2)	85066301GT	85066311GT	85116301GT	85116311GT	85066302GT	85116302GT
0/25	88308301	85067301GT	85067311GT	85117301GT	85117311GT	85067302GT	85117302GT
0/40	88309301 1)	85068301GT	85068311GT	85118301GT	85118311GT	85068302GT	85118302GT
0/40	88310301 2)	---	---	---	---	---	---
Price €							
0/60	---	85069301GT	85069311GT	85119301GT	85119311GT	85069302GT	85119302GT
0/100	---	85070301GT	85070311GT	85120301GT	85120311GT	85070302GT	85120302GT
0/160	---	85071301GT	85071311GT	85121301GT	85121311GT	85071302GT	85121302GT
0/250	88314301	85072301GT	85072311GT	85122301GT	85122311GT	85072302GT	85122302GT
0/315	88315301 2)	85079301GT	85079311GT	85129301GT	85129311GT	85079302GT	85129302GT
0/315	88316301	---	---	---	---	---	---
0/400	88317301	85073301GT	85073311GT	85123301GT	85123311GT	85073302GT	85123302GT

1) With label "Acetylene" 2) With label "Oxygen" 3) Scale 0/30 l/min "Argon" red, 0/28 l/min "CO2" black 4) Extra charge centre back connection € 4.70

See page 306 for extra charges.

Bourdon tube pressure gauges for ultra-pure gas applications

- Wetted parts specially cleaned, flushed and electropolished
- Tightness-tested with helium
- Rear blow-out
- Various connections possible
- DNV- and GOSSTANDART-certified

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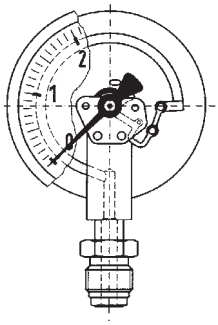


Application

Designed for highly demanding applications in terms of surface quality and purity of the wetted parts, particularly for measuring ultra-pure gases.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 3

Nominal size
63

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/0.6 to 0/400 bar

Calibration medium
Nitrogen or dried air

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Operating temperature range
Medium: T_{max} = +150 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Bottom, either:
¼–18 NPT
9/16–18 UNF, with pressure screw
9/16–18 UNF, with union nut

Measuring element
Bourdon tube
≤ 60 bar "C" type tube
> 60 bar helical tube
tightness-tested with helium,
leak rate ≤ 10^{-9} mbar x l/s

Wetted parts
Connection stainless steel 316 Ti/316 L
Measuring element stainless steel 316 Ti/316 L
Cleaned, flushed with nitrogen,
electropolished, surface roughness
≤ Ra 0.6 µm

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black
Label "Ultra-pure gas"

Pointer
Aluminium, black

Housing
Stainless steel 304 with rear blow-out

Push on bezel
Stainless steel 304, bare metal surface

Window
Plastic

Options

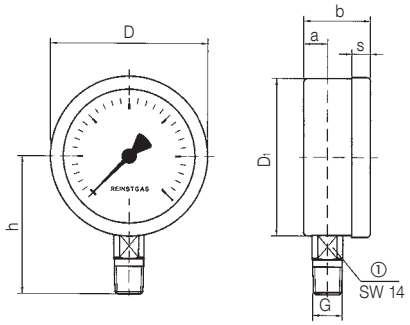
See page 331 for prices.

- Surface roughness Ra 0.4/0.25 µm
- Housing polished
- Push on bezel polished
- Electrical contacts
- Special scales
- Other process connections

Bourdon tube pressure gauges for ultra-pure gas applications Type D 3 – NG 63

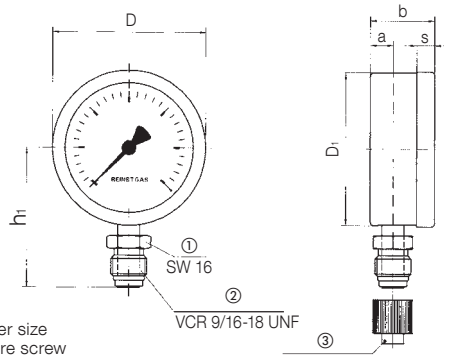
Housing types and dimensions

Bottom connection, ¼-18 NPT



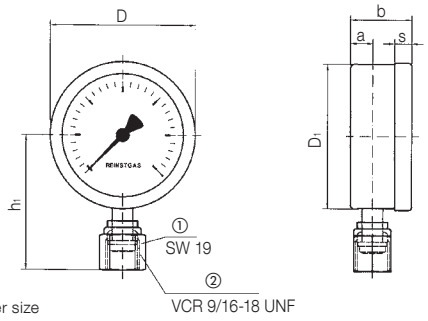
① Spanner size

Bottom connection, 9/16-18 UNF, with pressure screw



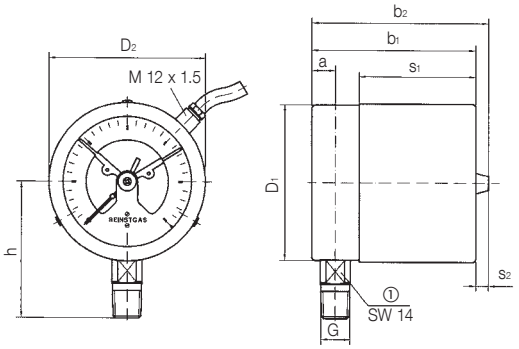
① Spanner size
② Pressure screw
③ Protective cap

Bottom connection, 9/16-18 UNF, with union nut



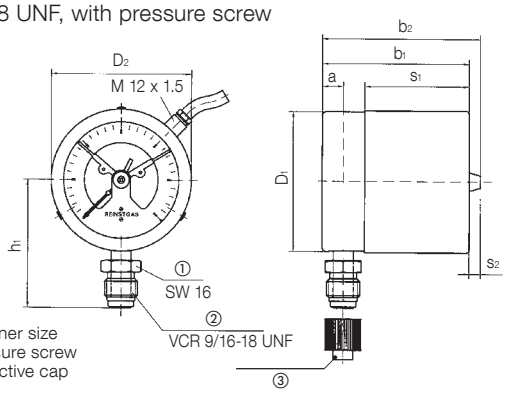
① Spanner size
② Union nut

Version with contacts – bottom connection, ¼-18 NPT



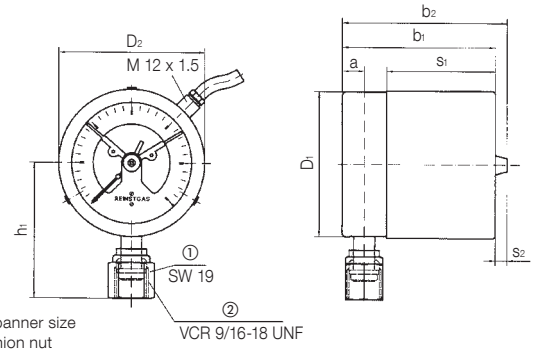
① Spanner size

Version with contacts – bottom connection, 9/16-18 UNF, with pressure screw



① Spanner size
② Pressure screw
③ Protective cap

Version with contacts – bottom connection, 9/16-18 UNF, with union nut



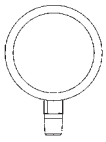
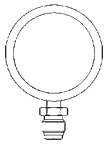
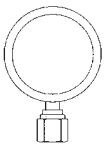
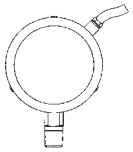
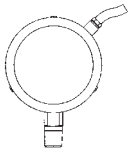
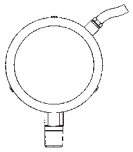
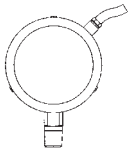
① Spanner size
② Union nut

Dimensions (mm)

Nominal size (NG)	a	b	b1	b2	D	D1	D2	G	h	h1	S	S1	S2
63	9	28	66	74	63	62	64	¼–18 NPT	54	57	8	48	8

Bourdon tube pressure gauges for ultra-pure gas applications

DG: M

				Version with electrical contacts			
Type	RF63RG, D302	RF63RG, D302	RF63RG, D302	RF63RG, MK1, D302	RF63RG, MK2, D302	RF63RG, IK1, D302	RF63RG, IK2, D302
Version							
Housing Ø	63	63	63	63	63	63	63
Contact type				Single magnetic spring contact	Dual magnetic spring contact	Single inductive contact	Dual inductive contact
Housing	Stainless steel 304 with push on bezel, plastic window						
Measuring element	Bourdon tube, stainless steel 316 Ti/316 L						
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	¼-18 NPT	9/16-18 UNF with pressure screw	9/16-18 UNF with union nut	¼-18 NPT	¼-18 NPT	¼-18 NPT	¼-18 NPT
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
-1/0	87001302	87051302	87101302	---	---	---	---
-1/+0.6	87002302	87052302	87102302	87352302	87202302	87252302	87302302
-1/+1.5	87003302	87053302	87103302	87353302	87203302	87253302	87303302
-1/+3	87004302	87054302	87104302	87354302	87204302	87254302	87304302
-1/+5	87005302	87055302	87105302	87355302	87205302	87255302	87305302
-1/+9	87006302	87056302	87106302	87356302	87206302	87256302	87306302
-1/+15	87007302	87057302	87107302	87357302	87207302	87257302	87307302
Price €							
0/0.6	87009302	87059302	87109302	---	---	---	---
0/1	87010302	87060302	87110302	---	---	---	---
0/1.6	87011302	87061302	87111302	87361302	87211302	87261302	87311302
0/2.5	87012302	87062302	87112302	87362302	87212302	87262302	87312302
0/4	87013302	87063302	87113302	87363302	87213302	87263302	87313302
0/6	87014302	87064302	87114302	87364302	87214302	87264302	87314302
0/10	87015302	87065302	87115302	87365302	87215302	87265302	87315302
0/16	87016302	87066302	87116302	87366302	87216302	87266302	87316302
0/25	87017302	87067302	87117302	87367302	87217302	87267302	87317302
0/40	87018302	87068302	87118302	87368302	87218302	87268302	87318302
Price €							
0/60	87019302	87069302	87119302	87369302	87219302	87269302	87319302
0/100	87020302	87070302	87120302	87370302	87220302	87270302	87320302
0/160	87021302	87071302	87121302	87371302	87221302	87271302	87321302
0/250	87022302	87072302	87122302	87372302	87222302	87272302	87322302
0/400	87023302	87073302	87123302	87373302	87223302	87273302	87323302
				Extra charge 9/16-18 UNF pressure screw or union nut			

SF6 gas density monitor

- Housing completely tight due to welding and crimping
- Bimetal-compensated
- Robust and reliable
- With or without electrical contacts
- With application-specific process connection
- DNV and Gosstandart certified

Application

SF6 gas density monitors are designed to monitor the density of sulphur hexafluoride (SF 6) at insulated high voltage switchgears (GIS), converters, gas-insulated transmission lines (GIL) and transformers.

Description

SF6 gas density monitors excel with outstanding reliability. The application-specific process connection is fully factory-welded to the measuring instrument. This means that a second, potentially leaky screw connection at the sealing point is not required. Made to specific customer specifications.

The integrated bimetal compensation allows for maximum accuracy and thus reliability of SF6 gas insulated switchgears.

Technical specifications

Type
D 7

Nominal size
100

Accuracy
± 1.5 % of full scale value at 20 °C
± 2.5 % of full scale value at
-20/+60 °C (compensated range)

Ranges
-1/+5 bar
-1/+9 bar
Others on request

Application area
Full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)

Operating temperature range
Ambient: T_{min} = -40 °C
T_{max} = +65 °C
Medium: T_{max} = +100 °C
Compensated: -20/+60 °C

Degree of protection
IP 65 (EN 60529)
with housing vent IP 54

Standard version

Connection
Stainless steel 316 Ti/316 L
or lower back
G½B – spanner size SW 22 (EN 837-1/7.3)

Electrical connection
Junction box

Measuring element
Bourdon tube, stainless steel 316 /316 L

Movement
Stainless steel

Dial
Aluminium, white

Pointer
Aluminium, black

Housing
Stainless steel 304
with pressure relief port

Crimped bezel
Stainless steel 304

Window
Laminated safety glass

Filling liquid
Silicone oil

Options

- Without electrical contacts
- Special scales
- Other process connections (e. g. DILO DN 8)
- Housing nitrogen filled

Prices on request.

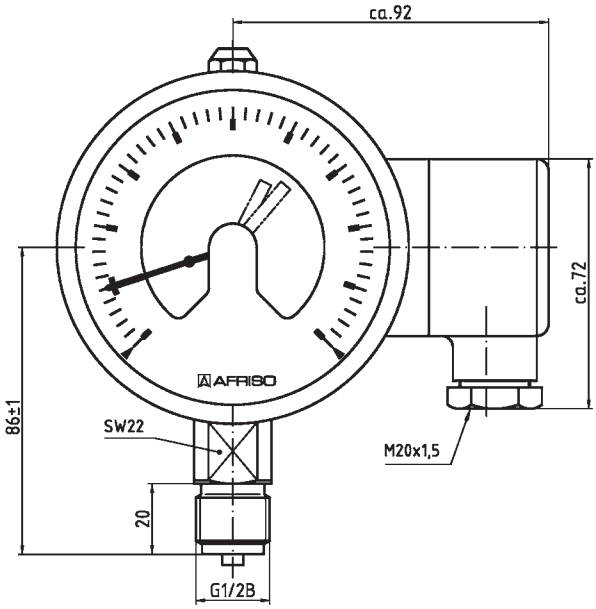
SF6 gas density monitor

Type D 7 – NG 100

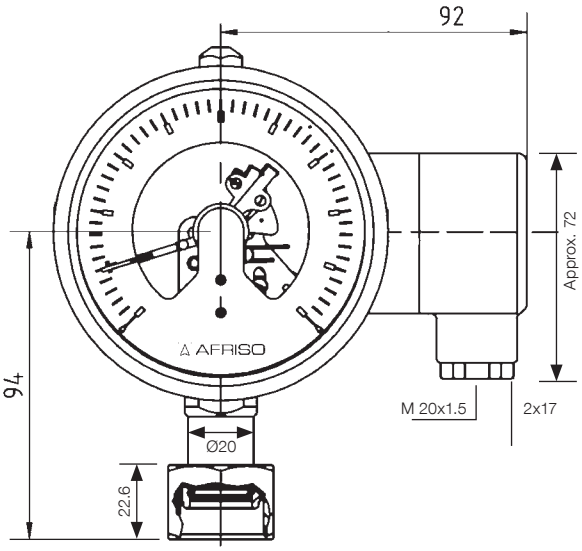
NEW

Housing types and dimensions (mm)

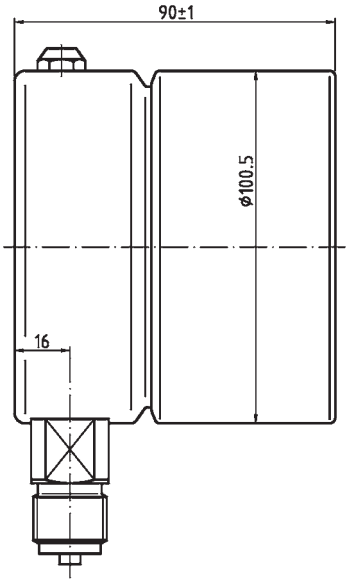
Bottom connection, G½B – spanner size SW 22



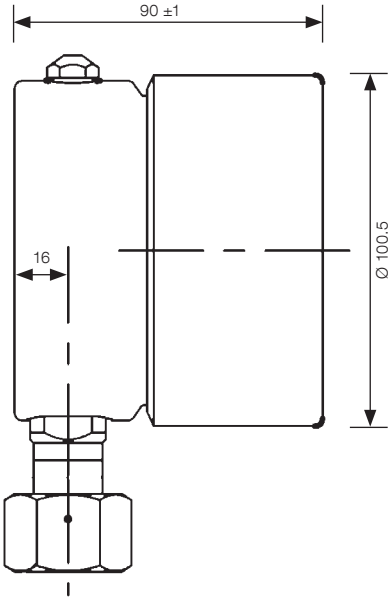
Connection DILO DN8



Bottom connection, G½B – spanner size SW 22



Connection DILO -DN 8

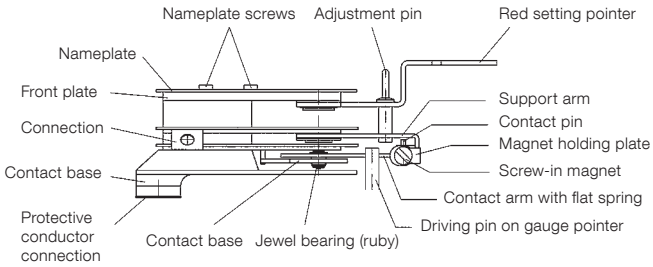


9

Electrical contacts electromechanical

Precision contact system

Sectional view



Magnetic spring contact

Electrical contacts (electromechanical magnetic spring contacts) in measuring devices with pointers are auxiliary electrical switches which open or close electrical circuits at set limit values by means of a contact arm which is moved in accordance with the indicated value. It consist of:

- An adjustable red setting pointer
- A support arm which is connected to the setting pointer and which holds the contact pin
- A contact arm which is moved by the gauge pointer and which carries the second contact pin

A contact adjustment lock in the window of the gauge allows the user to adjust the setting pointer to the value at which the device is to switch. The gauge pointer can move beyond the adjusted setting pointer after the contact has been made (however, the contact remains active).
Two types of electromechanical contacts are available: Magnetic spring contacts and sliding contacts.

9

Principle of operation

Magnetic spring contacts have a permanent magnet screwed to the setting pointer at the contact support arm. To close the circuit, the contact pin of the moving contact arm is attracted by the magnet so that the contact snaps closed. When the circuit opens, the magnet attracts the contact arm until the resetting force of the measuring element overcomes the effective force of the magnet so that the contact snaps open.

The snap action reduces arcing between the contacts, thus allowing for greater switch ratings. Due to the increased contact force, this type of contact is also less sensitive to vibrations. Furthermore, the contact stability is increased by greater contacting pressure.

Application

Magnetic spring contacts can be used under almost any type of operating condition. They can also be integrated into devices with filling. In order to prevent switching errors (particularly in the case of greater inductive switch ratings or considerable system vibration or in gauges with filling) we recommend installing our pulse-controlled series MSR contact protection relays.

Technical specifications

Supply voltage
Max. 250 V

Making current and breaking current
Max. 1.0 A

Continuous current
Max. 0.6 A

Switch rating
Max. 30 W 50 VA

Contact material
Ag80 Ni20 Au 10 µ
(extra charge for special materials)

Switching accuracy
Approx. 2–5 % of full scale value

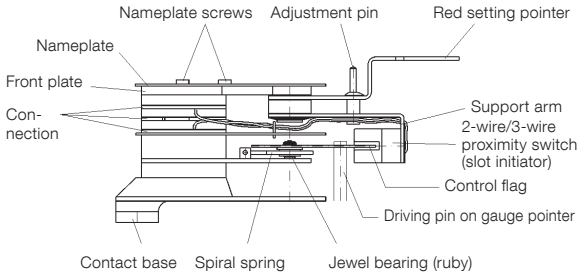
Operating temperature range
-20/+70 °C or corresponding to the respective gauges

Adjustment range
5–95 % measuring range of gauge

Electrical contacts electronic

Precision contact system

Sectional view



Electronic contact

Electronic contacts have non-contact electrical proximity sensors.
They consist of:

- An adjustable red setting pointer
- A support arm which is connected to the setting pointer and which carries the control head (initiator) with the completely encapsulated electronics
- A control flag which is moved by the gauge pointer

A contact adjustment lock in the window of the gauge allows the user to adjust the setting pointer to the value at which the device is to switch. The gauge pointer can move beyond the adjusted setting pointer after the contact has been made (however, the contact remains active).

Principle of operation

The proximity switches used in the electronic contacts are simple 2-wire or 3-wire DC voltage switches. Due to the slot design, the proximity switches are also referred to as slot initiators. The electromagnetic field is concentrated between 2 opposing coils. The switch is activated when the aluminium control flag moved by the gauge pointer reaches the gap between the two coils (slot). The signal is generated without a delay, according to the motion of the gauge pointer.

The switching behaviour of the PNP switches used in these contacts is usually defined as a normally open contact, i. e.:
Control flag in the slot initiator

- Contact closed
- Output active

Control flag not in the slot initiator

- Contact open
- Output not active

Application

Due to non-contact switching, the high switching accuracy and the long service life, electronic contacts with PNP output are ideal for any type of industrial application.
The use of these contacts is particularly advantageous in applications with liquid-filled measuring instruments, at low voltages (DC 10–30 V) and low DC loads ≤ 100 mA), e. g.

- For PLC signal input
- To control opto-isolators
- For other electronic evaluation units

Version

Standard electronic contacts are shipped with a 3-wire initiator type Si2-K08-AP6.
The contacts are also available with the Si2-K08-AG6 2-wire initiator.

Technical specifications

Supply voltage
DC 10–30 V

Switching current
≤ 100 mA

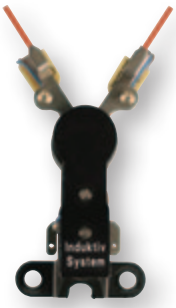
Switching accuracy
Approx. 0.5 % of full scale value

Operating temperature range
-25/+70 °C or corresponding to the respective gauges

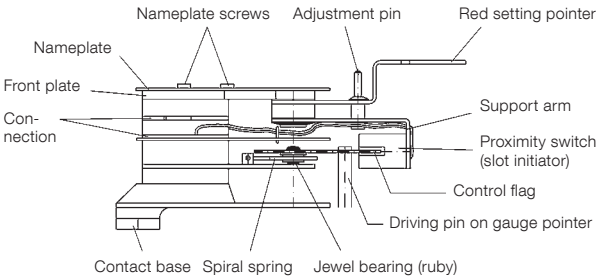
Adjustment range
5–95 % measuring range of gauge

Electrical contacts inductive

Precision contact system



Sectional view



Inductive contact

Inductive contacts have non-contact proximity sensors as per EN 60947-5-6 / NAMUR worksheet NA 001. They consist of:

- An adjustable red setting pointer
- A support arm which is connected to the setting pointer and which carries the control head (initiator) with the completely encapsulated electronics
- A control flag which is moved by the gauge pointer

A contact adjustment lock in the window of the gauge allows the user to adjust the setting pointer to the value at which the device is to switch. The gauge pointer can move beyond the adjusted setting pointer after the contact has been made (however, the contact remains active).

9

Principle of operation

Inductive contacts are used together with with an isolating switching amplifier. The amplifier supplies the control head with direct voltage. As soon as the control flag reaches the control head, the internal resistance in the control head increases (high-resistance initiator). This causes the current to change and is used to control the switching amplifier. The amplifier converts the input signal into a binary output signal. Therefore, the switching function of inductive contacts is not only determined by the slot initiator, but also by the switching amplifier.

Application

Due to non-contact switching, the high switching accuracy and the long service life, inductive contacts are ideal for industrial applications and should be used in liquid-filled instruments. Inductive contacts are particularly recommended when the switching function must be extremely reliable or when the switching frequency is high. The electronics are fully encapsulated so that this type of contact is also suitable for corrosive environments.

If suitable isolating switching amplifiers (such as KFA6-SR2-Ex) are used, the system will have the type of protection intrinsic safety "i". It is marked Ex II 1G Ex ia IIC T6 and is approved for use in hazardous areas, zones 1 and 2 together with an isolating switching amplifier. The isolation switching amplifier must always be installed outside of the hazardous area.

For standard industrial applications that do not require EX protection or that require only low EX protection (zone 2), we recommend our cost-efficient multifunctional series MSR-I relays.

Technical specifications

Nominal voltage
≈ DC 8 V = (Ri 1 kOhm)

Supply voltage
5–25 V

Current input
> 2 mA (active area free)
< 1 mA (active area covered)

Switching accuracy
Approx. 0.5 % of full scale value

Operating temperature range
-20/+70 °C
or corresponding to the respective gauges

Adjustment range
5–95 % measuring range of gauge

Option
Contact system with Safety Integrity Level SIL 2

Switching functions and definitions

Figure 1

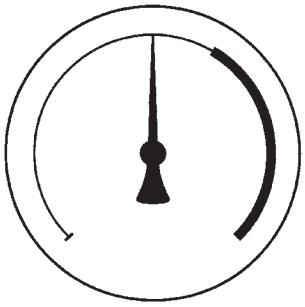


Figure 2

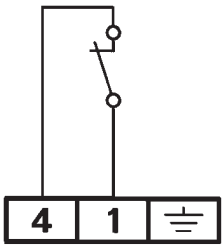
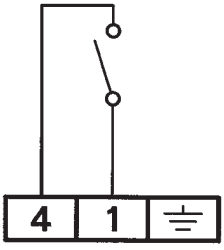


Figure 3



Definition of switching function

1 = Contact closes clockwise when the setpoint is reached
2 = Contact opens clockwise when the setpoint is reached
W = 1 contact opens and 1 contact closes at the same time (changeover contact)

The switching function of a contact is always specified in terms of a clockwise movement of the pointer. If the gauge pointer moves counterclockwise, the switching function is inverted!
If several contacts are fitted to a gauge, the contact closest to the left start or end value of the scale is defined as the first contact. This also applies to vacuum ranges!

Optimisation of the switching performance

Application-related specifications, such as the operating behaviour of the contact (e. g. contact switches with increasing or decreasing pressure), the switching point or the speed of pressure changes, help to optimise contact adjustment to achieve a more accurate switching performance.

Selection table switching functions

The selection tables on the following pages show the switching functions of single, double and the most common triple contacts (with switching scheme and wiring diagram).
This allows you to quickly and easily find the correct contact designation for the required switching function.

Description of switching scheme

Figure 1:
- Thin line means: contact open, circuit open
- Thick line means: contact closed, circuit closed

Description wiring diagram

Figure 2:
- Contact closed
- Circuit closed

Figure 3:
- Contact open
- Circuit open

Definition of the contact type

MK = **M**agnetic spring contact
SK = **S**liding contact
EK = **E**lectronic contact
IK = **I**nductive contact

Depending on the type of the pressure gauge, up to 4 contacts can be installed per gauge. The number of contacts is indicated by means of a figure (1–4) after the contact type designation.

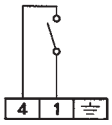
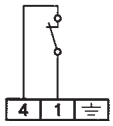
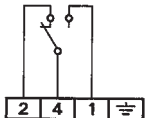
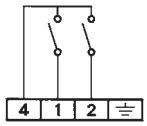
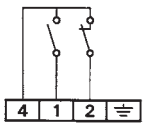
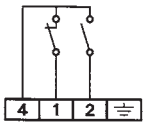
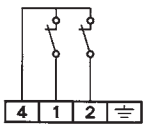
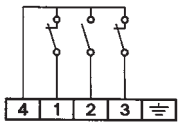
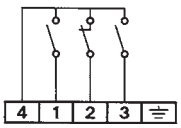
Example: MK 2.12
- Magnetic spring contact
- 2 contacts
- 1st contact closes
- 2nd contact opens

Definition of complete gauge

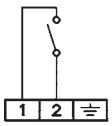
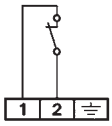
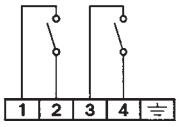
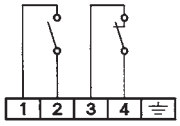
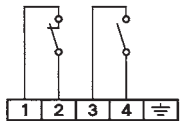
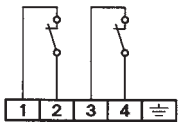
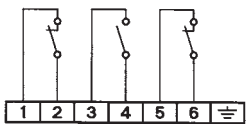
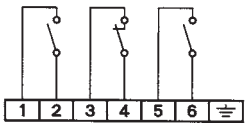
The code for the contact is appended to the type designation of the measuring instrument.

Example: RF100Ch IK1.2
- Bourdon tube pressure gauge
- NG 100
- Gauge for chemical applications
- Inductive contact
- 1 contact
- Contact opens

Switching functions of electrical contacts (electromechanical)

Switching scheme	Wiring diagram	Switching function (pointer moves clockwise)	Contact type	
			Magnetic spring contact	Sliding contact
Single contact				
		Contact closes	MK1.1	SK1.1
		Contact opens	MK1.2	SK1.2
		Switch over contact, i. e. 1 contact opens 1 contact closes	MK1.W	SK1.W
Double contact				
		1st contact closes 2nd contact closes	MK2.11	SK2.11
		1st contact closes 2nd contact opens	MK2.12	SK2.12
		1st contact open 2nd contact closes	MK2.21	SK2.21
		1st contact opens 2nd contact opens	MK2.2	SK2.2
Triple contact				
		1st contact opens 2nd contact closes 3rd contact opens	MK3.212	SK3.212
		1st contact closes 2nd contact opens 3rd contact closes	MK3.121	SK3.121

Switching functions of inductive contacts

Switching scheme	Wiring diagram	Switching function	When the setpoint is exceeded, the gauge pointer moves the control flag ...	Contact type
		Pointer moves clockwise		**Inductive contact**
Single contact				
		Contact closes	out of the control head	IK1.1
		Contact opens	into the control head	IK1.2
Double contact				
		1st contact closes 2nd contact closes	of the 1st and 2nd contact out of the control head	IK2.11
		1st contact closes 2nd contact opens	of the 1st contact out of the control head of the 2nd contact into the control head	IK2.12
		1st contact open 2nd contact closes	of the 1st contact into the control head of the 2nd contact out of the control head	IK2.21
		1st contact opens 2nd contact opens	of the 1st and the 2nd contact into the control head	IK2.22
Triple contact				
		1st contact opens 2nd contact closes 3rd contact opens	of the 1st and the 3rd contact into the control head of the 2nd contact out of the control head	IK3.212
		1st contact closes 2nd contact opens 3rd contact closes	of the 1st and the 3rd contact out of the control head of the 2nd contact into the control head	IK3.121

9

Bourdon tube pressure gauges with electrical contact nominal size 50

- Compact design
- Wetted parts and movement made of stainless steel
- Housing with blow-out as per EN 562

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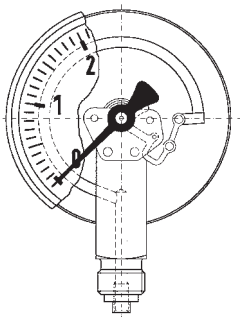
A Page 353



Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise. For measuring in areas with limited space. Especially suitable for monitoring minimum pressure in gas cylinders together with AFRISO alarm unit for low gas level (see page 353).

Technical specifications

Type
D 9

Nominal size
50

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/+1.5 to -1/+15 bar
0/2.5 to 0/400 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Contact type
Sliding contact (SK)

Minimum ranges
SK single contact: 2.5 bar
SK changeover contact: 16 bar (up to max. 60 bar)

Switching point
Indicate details on the switching point for optimum operation.

Operating temperature range
Medium: T_{max} = +150 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 42 (EN 60529)

Standard version

Connection
Stainless steel 316 Ti or 316 L, bottom
G¼B – spanner size SW 14
(EN 837-1/7.3)

Electrical connection
Cable gland,
2 m cable

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with
rear blow-out as per EN 562

Crimped bezel
Stainless steel 304

Contact cover
Makrolon, with contact adjustment lock

Options

- Wetted parts oil- and grease-free
- Damping screw
- Special scales
- Other process connections

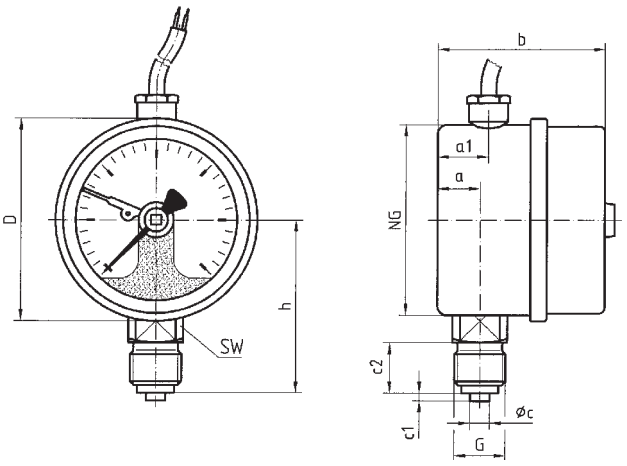
i

See page 350 for prices.

Bourdon tube pressure gauges with electrical contact nominal size 50 Type D 9

Housing types and dimensions

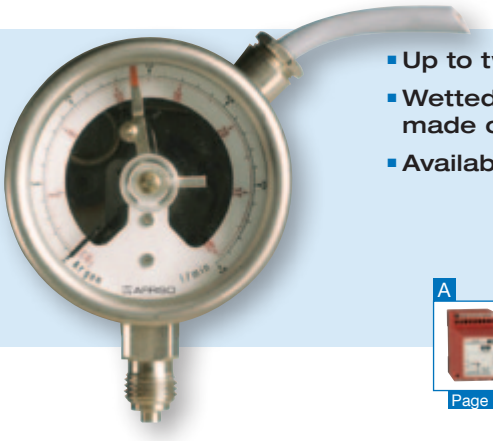
Bottom connection



Dimensions (mm)

Nominal size (NG)	a	a1	b	Øc	c1	c2	D	G	h	SW
50	10.5	13	43	5	2	13	53	G¼B	46	14

Bourdon tube pressure gauges with electrical contact nominal size 63



- Up to two contacts possible
- Wetted parts and movement made of stainless steel
- Available with MK, EK, IK

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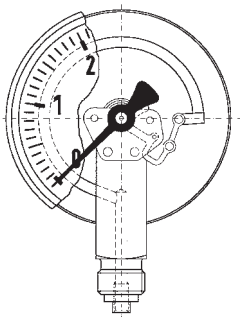
A Page 354

A Page 353



Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise. For measuring in areas with limited space. Especially suitable for monitoring minimum pressure in gas cylinders together with AFRISO alarm unit for low gas level (see page 353).

Technical specifications

Type
D 3

Nominal size
63

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
-1/+0.6 to -1/+15 bar
0/1.6 to 0/600 bar

Application area
Static load: ¾ x full scale value
Dynamic load: ⅔ x full scale value
Short-term: Full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)
See page 343 for technical specifications.

Minimum ranges
Contact
MK single 1.6 bar
MK double 1.6 bar
EK/IK single 1,6 bar
EK/IK double 1.6 bar

Operating temperature range
Medium: T_{max} = +150 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 42 (EN 60529)

Standard version

Connection
Stainless steel 316 Ti/316 L,
bottom or lower back
G¼B – spanner size SW 14 (EN 837-1/7.3)

Electrical connection
Cable gland M 12 x 1.5
1 metre cable

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with rear blow-out

Push on bezel
Stainless steel 304

Window
Makrolon, with contact adjustment lock

Options

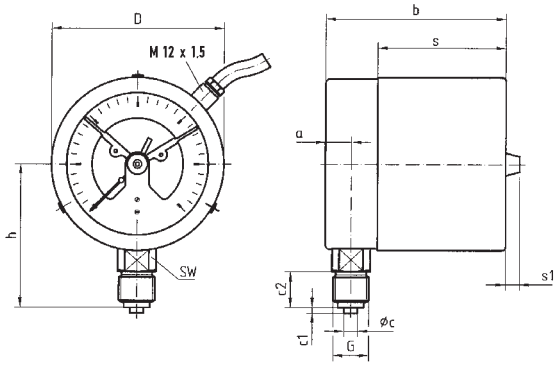
- Wetted parts oil- and grease-free (≤ 0/400 bar)
- Ultra-pure gas version
- Back flange
- Damping screw
- Special scales
- Other process connections

i See page 350 for prices.

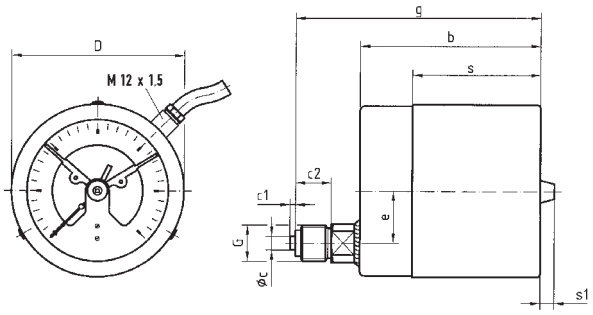
Bourdon tube pressure gauges with electrical contact nominal size 63 Type D3

Housing types and dimensions

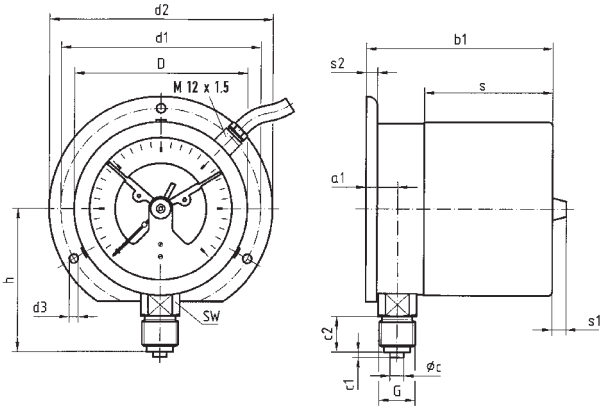
Bottom connection



Lower back connection



Bottom connection, back flange



9

Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	D*	d1*	d2*	d3*	g	G	h	s	s1	s2	SW
63	9.5	13	66	69.5	5	2	13	64	75	85	3.6	89	G¼B	46	47.5	8	5.5	14

* Dimensions as per DIN 16063

Bourdon tube pressure gauges for industrial applications with electrical contact

- Accuracy class 1
- Up to three contacts
- High reliability
- Also available with MK, EK, IK

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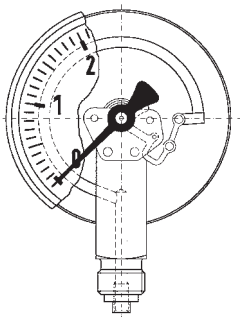


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For high measuring accuracy.

Technical specifications

Type
D 2

Nominal size
100

Accuracy class (EN 837-1/6)
Class 1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/1 to 0/1000 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value

Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value

Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)
See page 345 for technical specifications.

Minimum ranges
Contact
MK single 1.6 bar
MK double 1.6 bar
EK/IK single 1 bar
EK/IK double 1 bar

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom or lower back
G½B – spanner size SW 22 (EN 837-1/7.3)

Electrical connection
Cable gland M 12 x 1.5
1 metre cable

Measuring element
Bourdon tube, ≤ 60 bar "C" type tube, copper alloy,
> 60 bar helical tube 316 Ti/316 L

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Sheet steel, black

Push on bezel
Sheet steel, black

Window
Makrolon, with contact adjustment lock

Options

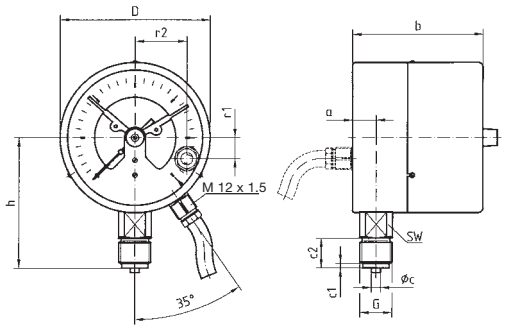
- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Junction box
- Connector
- Special scales
- Other process connections

i See page 350 for prices.

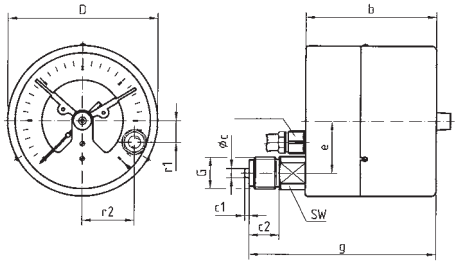
Bourdon tube pressure gauges for industrial applications with electrical contact Type D 2 – NG 100

Housing types and dimensions

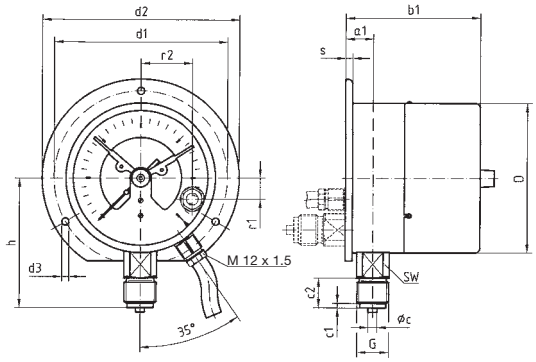
Bottom connection



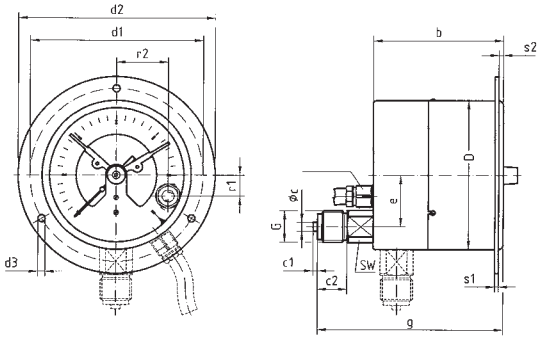
Lower back connection



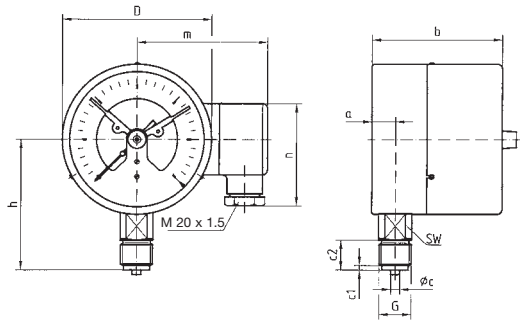
Bottom connection (centre back connection), back flange



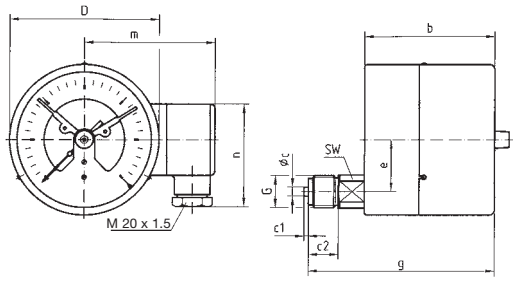
Lower back connection (bottom connection), 3-hole fixing, panel mounting bezel



Bottom connection, with junction box (option)



Lower back connection, with junction box (option)



Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	m	n	r1	r2	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	100.5	26.5	119	G½B	86	92	72	14	34.5	5.5	3
Nominal size (NG)	s2	SW																			
100	2.5	22																			

* Dimensions as per DIN 16064

Bourdon tube pressure gauges for industrial applications with electrical contact

- Robust stainless steel housing
- High accuracy
- Excellent readability
- Up to three contacts
- Also available with MK, EK, IK

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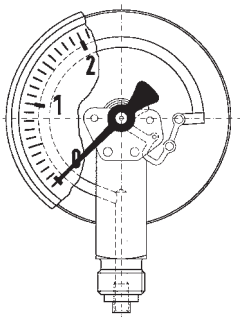


Application

For gaseous and liquid media which are not highly viscous, do not crystallise and do not attack copper alloys. For high measuring accuracy.

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/1 to 0/1000 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value
Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value
Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)
See page 347 for technical specifications.

Minimum ranges
Contact
MK single 1.6 bar
MK double 1.6 bar
EK/IK single 1 bar
EK/IK double 1 bar

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Brass, bottom or lower back
G½B – spanner size SW 22 (EN 837-1/7.3)

Electrical connection
Cable gland M 12 x 1.5
1 metre cable

Measuring element
Bourdon tube, ≤ 60 bar "C" type tube, copper alloy,
> 60 bar helical tube, 316 L

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet bezel
Stainless steel 304

Window
Makrolon, with contact adjustment lock

Options

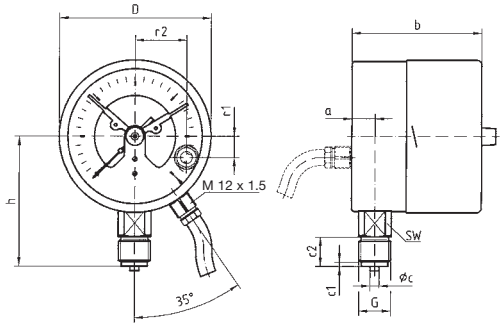
- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Junction box
- Connector
- Special scales
- Other process connections

i
See page 350 for prices.

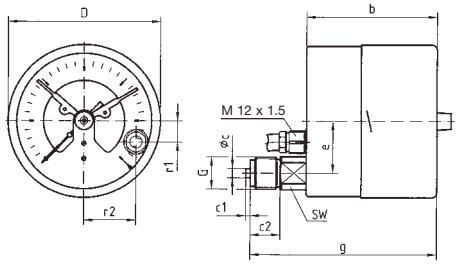
Bourdon tube pressure gauges for industrial applications with electrical contact Type D 4 – NG 100

Housing types and dimensions

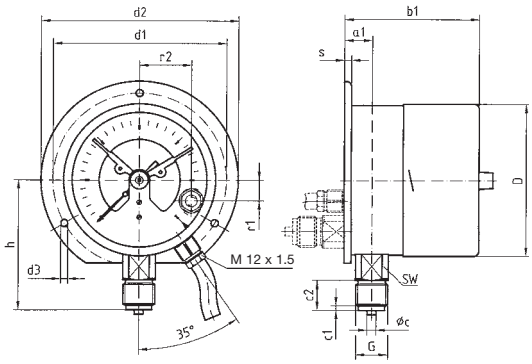
Bottom connection



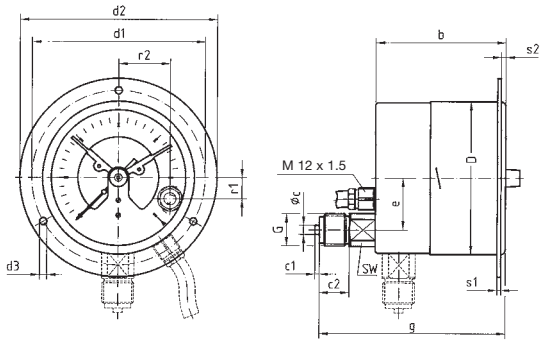
Lower back connection



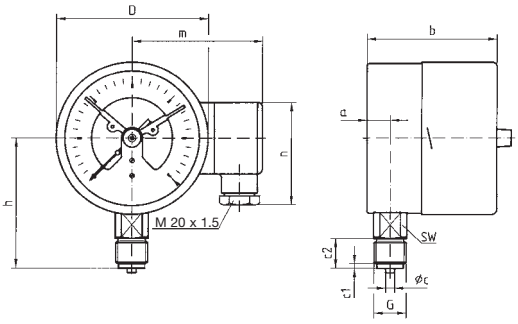
Bottom connection (lower back connection), back flange



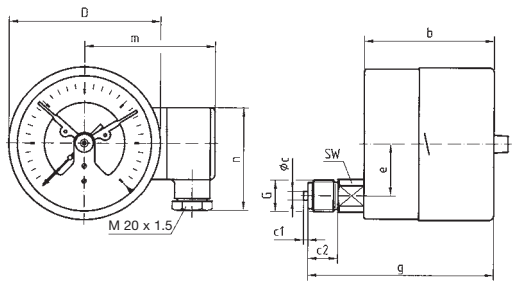
Lower back connection (bottom connection), 3-hole fixing, panel mounting bezel



Bottom connection, with junction box (option)



Lower back connection, with junction box (option)



Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	m	n	r1	r2	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	101.5	26.5	119	G½B	86	92	72	14	34.5	5.5	2
160	17.5	20.5	97	100	6	3	20	178	196	5.8	161.5	26.5	129	G½B	116	122	72	14	34.5	6	2

Nominal size (NG)	s2	SW
100	4	22
160	4	22

* Dimensions as per DIN 16064

Bourdon tube pressure gauges for chemical applications with electrical contact

- Measuring system fully welded to housing
- Robust mechatronical pressure gauge
- Up to three contacts
- Tightness-tested with helium
- GOSSTANDART-certified

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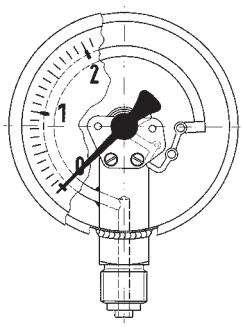


Application

For corrosive gaseous and liquid media which are not highly viscous and do not crystallise; suitable for corrosive environments. For high measuring accuracy.

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-1/6)
1.0

Ranges (EN 837-1/5)
-1/0 to -1/+15 bar
0/1 to 0/1000 bar

Application area
Static load:
≤ 600 bar = full scale value
> 600 bar = ¾ x full scale value

Dynamic load:
≤ 600 bar = 0.9 x full scale value
> 600 bar = ⅔ x full scale value

Short-term:
≤ 600 bar = 1.3 x full scale value
> 600 bar = full scale value

Contact types
Magnetic spring contact (MK)
Electronic contact (EK)
Inductive contact (IK)
See page 349 for technical specifications.

Minimum ranges
Contact
MK single 1.6 bar
MK double 1.6 bar
EK/IK single 1 bar
EK/IK double 1 bar

Operating temperature range
Medium: T_{max} = +150 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Stainless steel 316 Ti/316 L,
bottom or lower back,
G½B- spanner size SW 22 (EN 837-1/7.3)

Electrical connection
Junction box

Measuring element
Bourdon tube, stainless steel 316 Ti/316 L
≤ 60 bar "C" type tube
> 60 bar helical tube

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet bezel
Stainless steel 304

Window
Makrolon, with contact adjustment lock

Options

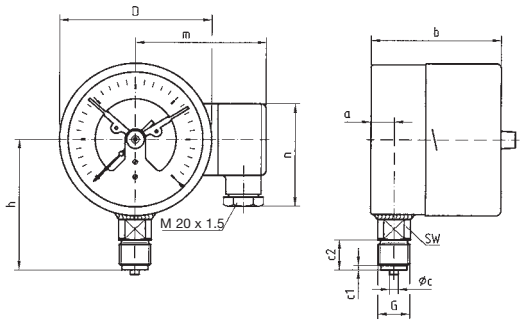
- Liquid filling (silicone oil)
- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Connector
- Special scales
- Other process connections

i See page 350 for prices.

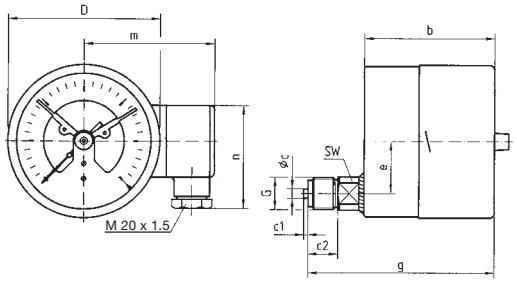
Bourdon tube pressure gauges for chemical applications with electrical contact Type D 4 – NG 100/160

Housing types and dimensions

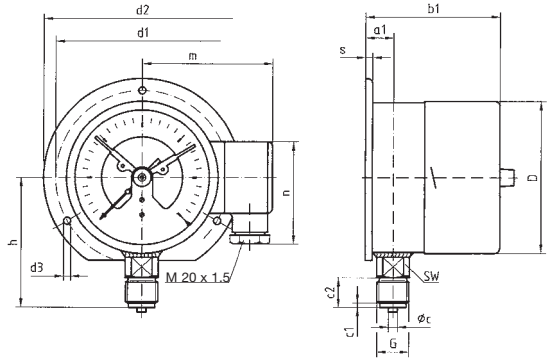
Bottom connection



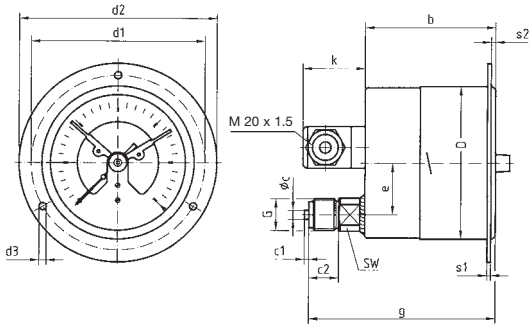
Lower back connection



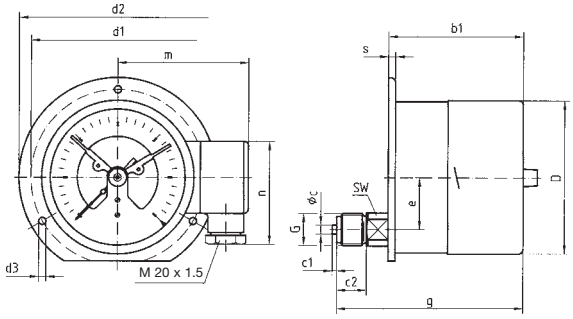
Bottom connection, back flange



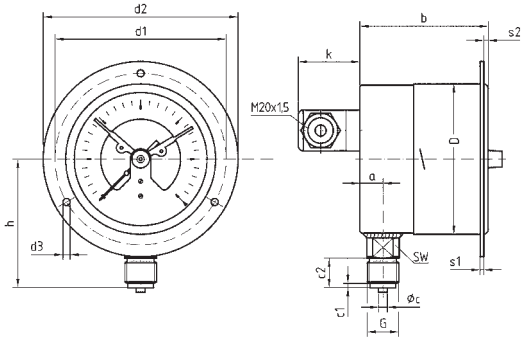
Lower back connection, 3-hole fixing, panel mounting bezel



Lower back connection, back flange



Bottom connection, 3-hole fixing, panel mounting bezel



Dimensions (mm)

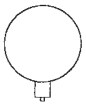
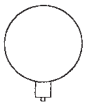
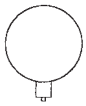
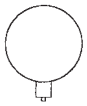
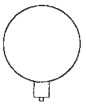
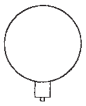
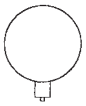
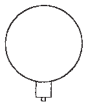
Nominal size (NG)	a	a1	b	b1	Øc	c1	c2	d1*	d2*	d3*	D	e	g	G	h	k	m	n	s	s1
100	15.6	19.1	87	90.5	6	3	20	116	132	4.8	101.5	34.5	121	G½B	86	40	92	72	5.5	2
160	17.5	20.5	97	100	6	3	20	178	196	5.8	161.5	34.5	131	G½B	116	40	122	72	6	2

Nominal size (NG)	SW
100	22
160	22

* Dimensions as per DIN 16064

Bourdon tube pressure gauges with electrical contact

DG: M

Type	RF50SK1, D902	RF50SKW, D902	RF63MK1, D302	RF63MK2, D302	RF63IK1, D302	RF63IK2, D302	RF100MK1, D201	RF100MK2, D201
Version								
Housing Ø	50	50	63	63	63	63	100	100
Housing	Stainless steel 304 with crimped bezel		Stainless steel 304 with push on bezel				Sheet steel, black, with push on bezel	
Measuring element	Bourdon tube, stainless steel 316 Ti/316 L						Copper alloy	
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.0	1.0
Connection	G¼B	G¼B	G¼B	G¼B	G¼B	G¼B	G½B	G½B
Contact type	Sliding, single	Sliding, changeo-ver	Magnetic spring, single	Magnetic spring double	Inductive, single	Inductive, double	Magnetic spring, single	Magnetic spring, double
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	---	---	---	---	---	---	---	---
-1/+0.6	---	---	87402302	87502302	87452302	87552302	87602201	87652201
-1/+1.5	87430902	---	87403302	87503302	87453302	87553302	87603201	87653201
-1/+3	87431902	---	87404302	87504302	87454302	87554302	87604201	87654201
-1/+5	87432902	---	87405302	87505302	87455302	87555302	87605201	87655201
-1/+9	87433902	---	87406302	87506302	87456302	87556302	87606201	87656201
-1/+15	87434902	87480902	87407302	87507302	87457302	87557302	87607201	87657201
Price €								
0/0.6	---	---	---	---	---	---	---	---
0/1	---	---	---	---	---	---	---	---
0/1.6	---	---	87411302	87511302	87461302	87561302	87611201	87661201
0/2.5	87435902	---	87412302	87512302	87462302	87562302	87612201	87662201
0/4	87436902	---	87413302	87513302	87463302	87563302	87613201	87663201
0/6	87437902	---	87414302	87514302	87464302	87564302	87614201	87664201
0/10	87438902	---	87415302	87515302	87465302	87565302	87615201	87665201
0/16	87439902	87481902	87416302	87516302	87466302	87566302	87616201	87666201
0/25	87440902	87482902	87417302	87517302	87467302	87567302	87617201	87667201
0/40	87441902	87483902	87418302	87518302	87468302	87568302	87618201	87668201
Price €								
0/60	87442902	87484902	87419302	87519302	87469302	87569302	87619201	87669201
0/100	87443902	---	87420302	87520302	87470302	87570302	87620201	87670201
0/160	87444902	---	87421302	87521302	87471302	87571302	87621201	87671201
0/250	87445902	---	87422302	87522302	87472302	87572302	87622201	87672201
0/400	87446902	---	87423302	87523302	87473302	87573302	87623201	87673201
Price €								
0/600	---	---	87424302	87524302	87474302	87574302	87624201	87674201
0/1000	---	---	---	---	---	---	87625201	87675201

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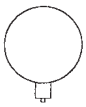
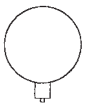
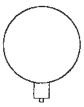
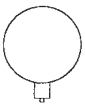
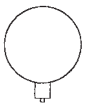
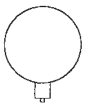
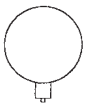
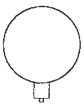
Please specify required switching function (normally closed/ normally open). See page 351/352 for other versions.

AFRISO EURO-INDEX

Bourdon tube pressure gauges with electrical contact

DG: M

Type	RF100I MK1, D401	RF100I MK2, D401	RF100I IK1, D401	RF100I IK2, D401	RF100Ch MK1, D402	RF100Ch MK2, D402	RF100Ch IK1, D402	RF100Ch IK2, D402
Version								
Housing Ø	100	100	100	100	100	100	100	100
Housing	Stainless steel 304 with bayonet bezel							
Measuring element	Bourdon tube, copper alloy				Bourdon tube, stainless steel 316 Ti/316 L			
Accuracy class	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Connection	G½B	G½B	G½B	G½B	G½B	G½B	G½B	G½B
Contact type	Magnetic spring single	Magnetic spring double	Inductive single	Inductive double	Magnetic spring single	Magnetic spring double	Inductive single	Inductive double
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
-1/0	---	---	87701401	87751401	---	---	87701402	87751402
-1/+0.6	87602401	87652401	87702401	87752401	87602402	87652402	87702402	87752402
-1/+1.5	87603401	87653401	87703401	87753401	87603402	87653402	87703402	87753402
-1/+3	87604401	87654401	87704401	87754401	87604402	87654402	87704402	87754402
-1/+5	87605401	87655401	87705401	87755401	87605402	87655402	87705402	87755402
-1/+9	87606401	87656401	87706401	87756401	87606402	87656402	87706402	87756402
-1/+15	87607401	87657401	87707401	87757401	87607402	87657402	87707402	87757402
Price €								
0/0.6	---	---	87709401	87759401	---	---	87709402	87759402
0/1	---	---	87710401	87760401	---	---	87710402	87760402
0/1.6	87611401	87661401	87711401	87761401	87611402	87661402	87711402	87761402
0/2.5	87612401	87662401	87712401	87762401	87612402	87662402	87712402	87762402
0/4	87613401	87663401	87713401	87763401	87613402	87663402	87713402	87763402
0/6	87614401	87664401	87714401	87764401	87614402	87664402	87714402	87764402
0/10	87615401	87665401	87715401	87765401	87615402	87665402	87715402	87765402
0/16	87616401	87666401	87716401	87766401	87616402	87666402	87716402	87766402
0/25	87617401	87667401	87717401	87767401	87617402	87667402	87717402	87767402
0/40	87618401	87668401	87718401	87768401	87618402	87668402	87718402	87768402
Price €								
0/60	87619401	87669401	87719401	87769401	87619402	87669402	87719402	87769402
0/100	87620401	87670401	87720401	87770401	87620402	87670402	87720402	87770402
0/160	87621401	87671401	87721401	87771401	87621402	87671402	87721402	87771402
0/250	87622401	87672401	87722401	87772401	87622402	87672402	87722402	87772402
0/400	87623401	87673401	87723401	87773401	87623402	87673402	87723402	87773402
Price €								
0/600	87624401	87674401	87724401	87774401	87624402	87674402	87724402	87774402
0/1000	87625401	87675401	87725401	87775401	87625402	87675402	87725402	87775402

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Please specify required switching function (normally closed/ normally open). See page 352 for other versions.

Extra charges for electrical contacts

DG: M

Design			Magnetic spring contact			Inductive contact		
Code			MK 1	MK 2	MK 3	IK 1	IK 2	IK 3
Number of contacts			1	2	3	1	2	3
Switching function: 1 = closes, 2 = opens (pointer moves clockwise)			1 2	11 , 12 21 , 22	As specified	1 2	11 , 12 21 , 22	As specified
The extra charges indicated include mounting; gauge not included								
Version	Nominal size	Housing	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
Bourdon tube pressure gauges for industrial applications type D2	100	No filling						
Bourdon tube pressure gauges for industrial applications type D4 / D8	100	No filling						
Pressure gauges for chemical applications type D4/D8	160	No filling						
Safety pressure gauges type D4/D8	100	With filling						
Stainless steel diaphragm pressure gauges type D4/D8 Diaphragm pressure gauges for differential pressure type D401	160	With filling						
Standard diaphragm pressure gauges type D4/D8	100	No filling						
	160	No filling						
Bourdon tube pressure gauges for high pressure type D4/D8	100	With filling						
	160	With filling						
Diaphragm pressure gauges for chemical applications type D4/D8	100	No filling						
	160	No filling						
Diaphragm pressure gauges for chemical applications for differential pressure type D4/D8	100	With filling						
	160	With filling						

Extra charges for special versions		**NG 100**	**NG 160**
Electronic contact with 3-wire slot initiator (extra over and above magnetic spring contact)	1 contact (EK 1)		
	2 contacts (EK 2)		
	3 contacts (EK 3)		
Separate circuits for double magnetic spring contacts			
Separate circuits for triple magnetic spring contacts			
Cable NYLHY (more than 1 metre) per metre	Up to 4 wires		
	5 wires / 7 wires		
Junction box	For instruments without filling		
Additional cable for junction box, 1 m long			
Single changeover contact (extra charge over and above single magnetic spring contact)			
Double changeover contact (extra charge over and above double magnetic spring contact)			
Contact pins made of special material (per contact)	Gold-silver		
	Platinum-iridium		
Inductive contact, safety version (per contact) (can only be used in conjunction with isolating switching amplifier KHA6-SH-Ex!)	Type IK SN		
	Type IK S1N (NG 100 only 1 contact possible)		

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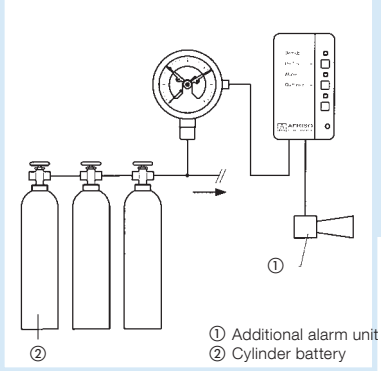
Versions with 4 electrical contacts on request.

Alarm unit for low gas level

- **Logistics made easy: Just in time information on empty gas cylinders**
- **With visual/audible alarms, Test and Acknowledge buttons**
- **Relay output for event reporting system EMS**

A Page 108
A Page 334
A GSM Page 592



Application

For monitoring the pressure in gas-filled containers (e. g. pressure control panels, cylinder batteries or bundle stations).

Function

The alarm signal is generated by a pressure gauge with an electrical contact. The alarm threshold can be set to any value from 5 to 95 % of the range by means of the contact arm of the pressure gauge.

A green LED indicates normal operation. In case of a power failure, the device does not generate an alarm signal; when power becomes available again, the unit immediately resumes operation. If, in the meantime, the gas pressure has fallen below the set limit, an alarm signal is generated. In the case of an alarm, the red LED lights up; in addition, the system generates an audible alarm. The audible alarm can be acknowledged. The red LED remains lit.

The proper functioning of the system can be checked at all times by means of the Test button. If this button is pressed, the system must generate an alarm, i. e. the red LED must light up and the audible alarm must sound.

9

Description

The system consists of one or several pressure gauges with electrical contacts (connected in series), a control unit (alarm unit for low gas level) and, if required, an additional alarm unit.

The pressure gauge is equipped with a magnetic spring contact which is actuated by the pointer of the pressure gauge. The ranges of the pressure gauges can be selected as required. If several gas containers are to be monitored, several pressure gauges with electrical contacts can be connected in series and monitored by a single alarm unit for low gas level; it is also possible to connect a separate alarm unit for each measuring point.
An EMS event reporting system can be connected to the relay output of the alarm unit for low gas level for remote monitoring.

Technical specifications

Operating temperature range
Ambient: -5/+40 °C

Supply voltage
AC 230 V ±10 %

Power consumption
5 VA

Circuit to pressure gauge
Intrinsically safe, U < 16.8 V, I < 57 mA

Switching output
Relay contact: 1 voltage-free normally open contact
Contact rating: Max. 250 V, 2 A,
(resistive load)

Response delay
None

Intrinsic safety
[Ex ia] IIC

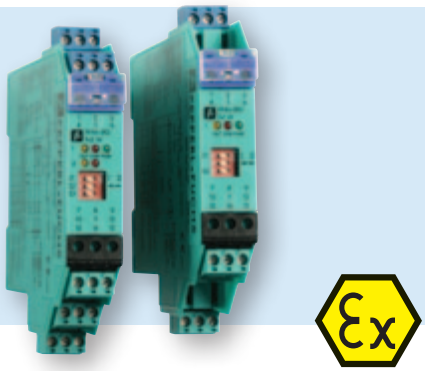
Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm

Degree of protection
IP 30 (EN 60529)

i Suitable pressure gauges with electrical contacts from page 334.

DG: M	Part no.	**Price €**
Alarm unit for low gas level	67006	

Contact protection relays/isolating switching amplifiers for electrical contacts



Contact protection relay MSR/MSR-I

Application and principle of operation

The application of a pulsed voltage to the contacts (e. g. of a pressure gauge with electrical contacts) results load-free switching of the contacts (99 % voltage-free). This protects the contacts and prolongs their service life. If used for measuring instruments with liquid filling, this prevents turbidity of the filling and protects the contact surfaces. Version MSR-I is specially designed for inductive contacts.

Technical specifications

Supply voltage
AC 230 V, 50–60 Hz
Power input approx. 6 VA

Control voltage
MSR DC 35–40 V Pulse
MSR-I DC 10 V

Relay output
1 x voltage-free changeover contact
Switch rating max. 250 V/8 A

Voltage output
DC 24 V, max. 20 mA

Housing
Polyamide 6.6, DIN rail mounting
35 x 7.5 as per DIN 50022
W x H x D: 50 x 75 x 100 mm

Degree of protection
IP 20 as per IEC 529

Operating temperature range
0/70 °C

DG: H	Part no.	Price €
MSR 010, 1 contact	38201	
MSR 020, 2 contacts	38202	
MSR 011, interval	38203	
MSR 010-I, 1 contact	38204	
MSR 020-I, 2 contacts	38205	
MSR 011-I, interval	38206	

Isolating switching amplifier KFA/KHA

Used to isolate an intrinsically safe control current circuit from a non-intrinsically safe current circuit. They are required to operate measuring instruments with electrical contacts in hazardous areas (zones 0, 1 and 2). The isolating switching amplifier must be installed outside of the hazardous area.

Supply voltage
AC 230 V, 50–60 Hz

Open circuit voltage/short circuit current
Standard version approx DC 8 V/8 mA
Safety version approx DC 8.4 V/11.7 mA

Relay output (not intrinsically safe)
1 x voltage-free changeover contact
Standard version
AC 250 V/2 A (DC 40 V)/2 A
Safety version
AC 250 V (DC 24 V)/1 A

Type of protection
[Ex ib] IIC + [Ex ia] IIC

Housing
Makrolon, DIN rail mounting
35 x 7.5 as per DIN EN 50022

Degree of protection
IP 20 as per IEC 529

Operating temperature range
-20/+60 °C

DG: H	Part no.	Price €
KFA6-SR2-Ex1.W	38215	
KFA6-SR2-Ex2.W	38216	
KHA 6-SH-Ex 1	38217	

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Please enquire for complete data sheets for the individual versions.

Stainless steel diaphragm pressure gauges EN 837-3

- Robust and compact design
- Excellent price/performance ratio
- Various process connections possible
- Flush mounting versions without transmission liquid
- GOSSTANDART-certified

Application

For corrosive gaseous and liquid media, also for use in corrosive environments. Also suitable for viscous and polluted media with open connection flange. With clamp connection specially suitable for pharmaceutical processes.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
0/100 mbar to 0/25 bar

Application area
Static load: Full scale value
Dynamic load: 0.9 % x full scale value

Overpressure safety
1.3 x full scale value

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.8 %/10 K
Falling temperature approx. ±0.8 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Stainless steel 316 Ti/316 L, bottom
G½B – spanner size SW 22 (EN 837-3/7.3)

Lower measuring flange
Stainless steel 316 Ti/316 L

Upper measuring flange
Stainless steel 316 Ti/316 L

Measuring element
Diaphragm
100 mbar to 2.5 bar stainless steel 316 Ti/316 L
4 bar to 25 bar Duratherm

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Options

- Glycerine filling (≥ 4 bar)
- Wetted parts with special coating
- Clamp connection
- Flush mounting connection flanges as per EN
- Open connection flanges as per EN/ANSI
- Other connection threads
- Electrical contacts (≥ 0/0.6 bar)

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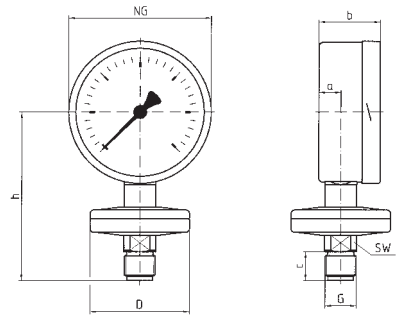
See page 357 for prices.

Stainless steel diaphragm pressure gauges

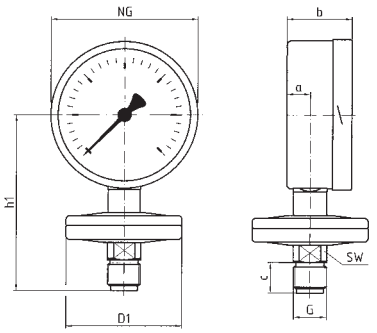
Type D 4 – NG 100/160

Housing types and dimensions

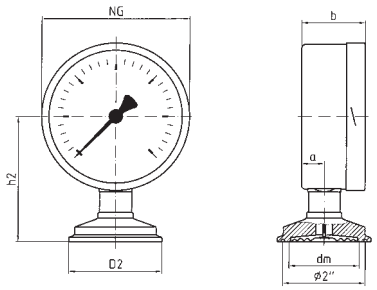
Bottom connection, 0/100 mbar to 0/2.5 bar



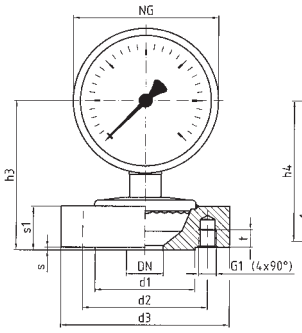
Bottom connection, 0/4 mbar to 0/25 bar



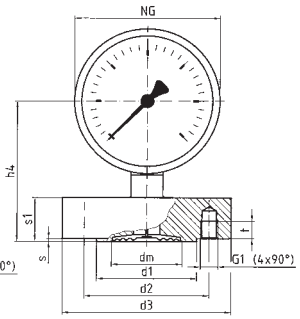
Clamp connection 2" as per ISO 2852, 0/1 bar to 0/6 bar



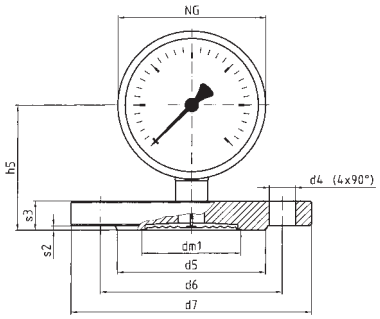
Connection flange as per EN 1092-1/B 1/DN 25/PN 40
Open, 0/100 mbar to 0/25 bar



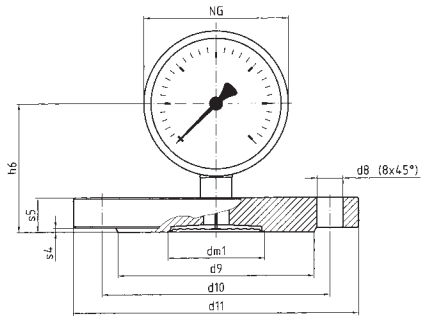
Flush mounting, 0/1 bar to 0/6 bar



Flush mounting connection flange as per EN 1092-1/B 1
DN 50/PN 40, 0/100 mbar to 0/25 bar



Flush mounting connection flange as per EN 1092-1/B 1
DN 80/PN 40, 0/40 mbar to 0/25 bar



Dimensions (mm)

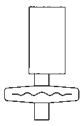
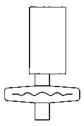
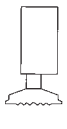
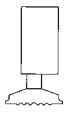
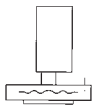
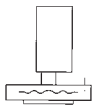
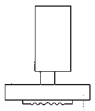
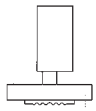
Nominal size (NG)	a	b	c	d1	d2	d3	d4	d5	d6	d7	d8	d9	d10	d11	dm	dm1	D	D1	D2	DN
100	15.6	49	20	68	85	115	4xØ18	102	125	165	8xØ18	138	160	200	48	68	69	78	64	25
160	17.5	50	20	68	85	115	4xØ18	102	125	165	8xØ18	138	160	200	48	68	69	78	64	25

Nominal size (NG)	G	G1	h	h1	h2	h3	h4	h5	h6	s	s1	s2	s3	s4	s5	SW				
100	G½B	4xM12	117	117	86	102	96	86	90	2	30	3	20	3	24	22				
160	G½B	4xM12	148	148	117	133	127	117	121	2	30	3	20	3	24	22				

Stainless steel diaphragm pressure gauges

EN 837-3

DG: H

Type	PF100E, D402	PF160E, D402	PF100CP, D402	PF160CP, D402	PF100E, D402	PF160E, D402	PF100E, D402	PF160E, D402
Version								
Housing Ø	100	160	100	160	100	160	100	160
Housing	Stainless steel 304							
Measuring element	316 Ti/316 L, ≥ 4 bar Duratherm		Stainless steel 316 Ti		Stainless steel 316 L		Stainless steel 316 Ti/316 L, ≥ 4 bar Duratherm	
Flanges	Stainless steel 316 Ti/316 L							
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G½B	G½B	Clamp 2" ISO 2852	Clamp 2" ISO 2852	Open connection flange as per EN 1092-1/ B 1/DN 25/PN 40		Flush mounting connection flange as per EN 1092-1/ B 1/DN 50/PN 40	
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
0/10	---	---	---	---	---	---	---	---
0/16	---	---	---	---	---	---	---	---
0/25	---	---	---	---	---	---	---	---
0/40	---	---	---	---	---	---	---	---
0/60	---	---	---	---	---	---	---	---
0/100	85886402	85926402	---	---	88906402	88926402	88946402	88966402
0/160	85887402	85927402	---	---	88907402	88927402	88947402	88967402
0/250	85888402	85928402	---	---	88908402	88928402	88948402	88968402
0/400	85889402	85929402	---	---	88909402	88929402	88949402	88969402
Range (bar)								
Price €								
0/0.6	85890402	85930402	---	---	88910402	88930402	88950402	88970402
0/1	85891402	85931402	88980402	88990402	88911402	88931402	88951402	88971402
0/1.6	85892402	85932402	88981402	88991402	88912402	88932402	88952402	88972402
0/2.5	85893402	85933402	88982402	88992402	88913402	88933402	88953402	88973402
Price €								
0/4	85894402	85934402	88983402	88993402	88914402	88934402	88954402	88974402
0/6	85895402	85935402	88984402	88994402	88915402	88935402	88955402	88975402
0/10	85896402	85936402	---	---	88916402	88936402	88956402	88976402
0/16	85897402	85937402	---	---	88917402	88937402	88957402	88977402
0/25	85898402	85938402	---	---	88918402	88938402	88958402	88978402

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See page 358 for extra charges.

Extra charges for stainless steel diaphragm pressure gauges

DG: H

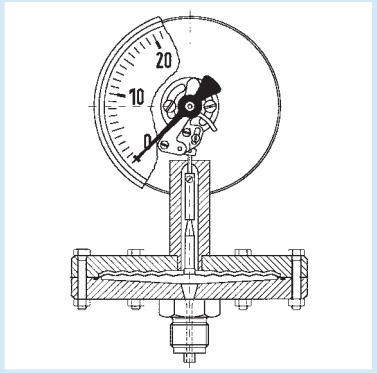
Process connection			**Price €**
Groove/tongue as per EN 1092-1			
Connection G¼B			
Connection ¼ NPT			
Connection ½ NPT			
Connection M 20x1.5			
Other connection threads			
Channel hole Ø 10 mm with connection G½B			
Flush mounting connection flange as per EN 1092-1/B1 (extra charge over and above connection G½B)	Nominal diameter	Nominal pressure	**Price €**
	DN 25 (0/1 bar to 0/6 bar)	PN 40	
	DN 50	PN 40	
	DN 80	PN 40	
Other connection flanges			
Special coating for diaphragm and lower flange (only for flush mounting connection flange)	Nominal diameter	Nominal pressure	**Price €**
PTFE coating	DN 25	PN 40	
PTFE coating	DN 50	PN 40	
PTFE coating	DN 80	PN 40	
PFA coating	DN 25	PN 40	
PFA coating	DN 50	PN 40	
PFA coating	DN 80	PN 40	
Other materials			
Glycerine filling			**Price €**
Nominal size 100			
Nominal size 160			
Miscellaneous			
Overpressure safety 5 x FSD			
Vacuum proof (≥ 0/4 bar)			
Electrical contacts (≥ 0/0.6 bar)			**see page 352**

Standard diaphragm pressure gauges

EN 837-3

- For low pressure ranges
- High overpressure safety
- Robust design
- Optional flange connections

Page 386



Application

For non-corrosive gaseous and liquid media. With open connection flange also suitable for viscous and polluted media.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
0/10 to 0/250 mbar (flange Ø 160)
0/0.4 to 0/25 bar (flange Ø 100)

Application area
Static load: Full scale value
Dynamic load: 0.9 x full scale value

Overpressure safety
1.3 x full scale value
≥ 0.6 bar overpressure safety 5 x FSD, however, 40 bar max.

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.8 %/10 K
Falling temperature approx. ±0.8 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Steel, bottom
G½B – spanner size SW 22
(EN 837-3/7.3)

Lower measuring flange
Steel

Upper measuring flange
Stainless steel

Measuring element
Diaphragm, measuring flange Ø 100:
up to 1.6 bar Duratherm, ≥ 2.5 bar steel
Measuring flange Ø 160: Stainless steel 316 Ti/316 L

Sealing gasket to pressure chamber
Perbunan

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet bezel
Stainless steel 304

Window
Instrument glass

Options

- Safety housing
- Overpressure safety 10 x FSD (measuring flange Ø 100 to max. 40 bar, measuring flange Ø 160 to max. 2.5 bar)
- Electrical contacts
- Glycerine filling (≥ 40 mbar, ≤ 250 mbar accuracy class 2.5)
- Wetted parts with special coating
- Open connection flanges as per EN/ANSI

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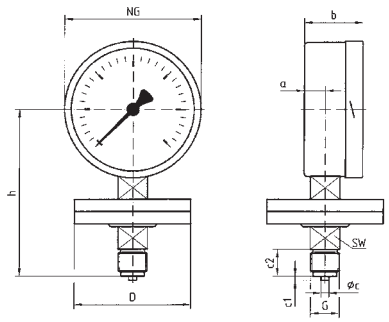
See page 363 for prices.

Standard diaphragm pressure gauges

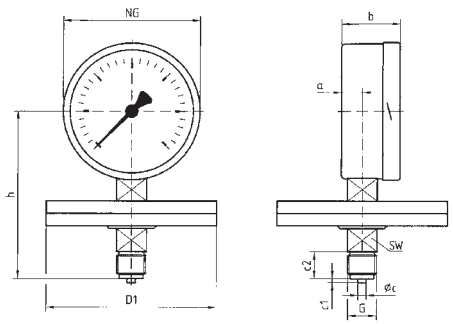
Type D 4 – NG 100/160

Housing types and dimensions

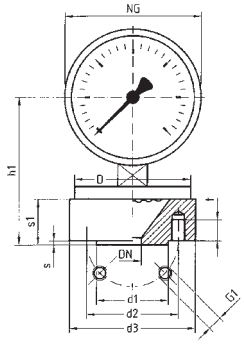
Bottom connection, measuring flange Ø 100



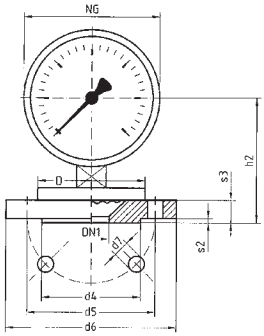
Bottom connection, measuring flange Ø 160



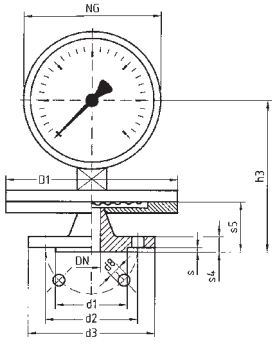
Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 100



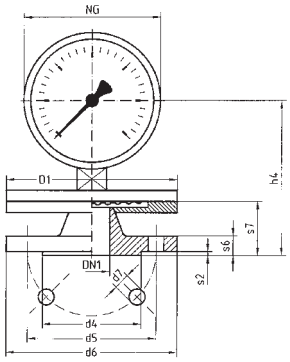
Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 100



Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 160



Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 160



Dimensions (mm)

Nominal size (NG)	a	b	Øc	c1	c2	d1	d2	d3	d4	d5	d6	d7	d8	D	D1	DN	DN1	G	G1	h	h1
100	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G1½B	4xM12	127	111
160	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G½B	4xM12	156	141

Nominal size (NG)	h2	h3	h4	s	s1	s2	s3	s4	s5	s6	s7	t	SW
100	101	129	137	2	30	3	20	18	48	20	56	12	22
160	131	159	167	2	30	3	20	18	48	20	56	12	22

Diaphragm pressure gauges for chemical applications EN 837-3

- For low pressure ranges
- High overload protection
- High resistance
- Optional flange connections

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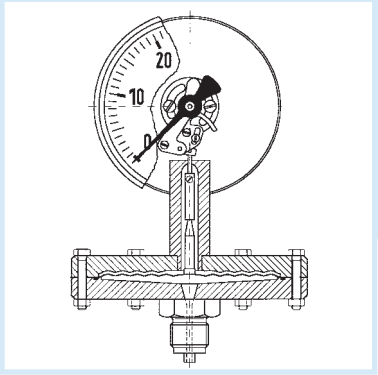


Application

For corrosive gaseous and liquid media, also for use in corrosive environments. With open connection flange also suitable for viscous and polluted media.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 4

Nominal size
100 – 160

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
0/10 to 0/250 mbar (flange Ø 160)
0/0.4 to 0/25 bar (flange Ø 100)

Application area
Static load: Full scale value
Dynamic load: 0.9 % x full scale value

Overpressure safety
1.3 x full scale value
≥ 0.6 bar overpressure safety 5 x FSD, however, 40 bar max.

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.8 %/10 K
Falling temperature approx. ±0.8 %/10 K of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Stainless steel 316 Ti/316 L, bottom
G½B – spanner size SW 22 (EN 837-3/7.3)

Lower measuring flange
Stainless steel 316 Ti/316 L

Upper measuring flange
Stainless steel 316 Ti/316 L

Measuring element
Diaphragm
Measuring flange Ø 100: Duratherm
Measuring flange Ø 160: Stainless steel 316 Ti/316 L

Sealing gasket to pressure chamber
FPM (Viton)

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304 with blow-out

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Options

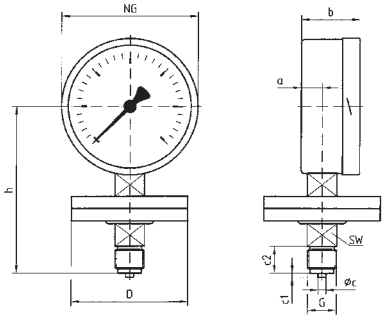
- Safety housing
- Overpressure safety 10 x FSD (measuring flange Ø 100 to max. 40 bar, measuring flange Ø 160 to max. 2.5 bar)
- Electrical contacts
- Glycerine filling (≥ 40 mbar, ≤ 250 mbar accuracy class 2.5)
- Wetted parts with special coating
- Open connection flanges as per EN/ANSI

See page 363 for prices.

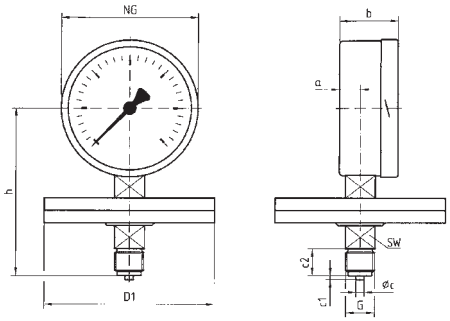
Diaphragm pressure gauges for chemical applications Type D 4 – NG 100/160

Housing types and dimensions

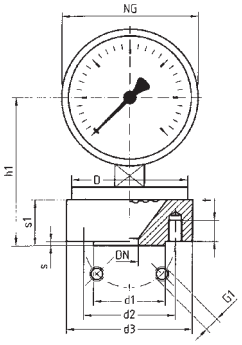
Bottom connection, measuring flange Ø 100



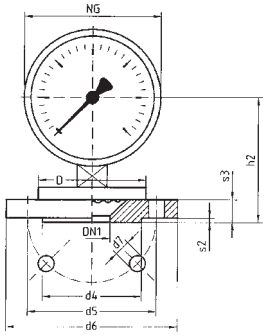
Bottom connection, measuring flange Ø 160



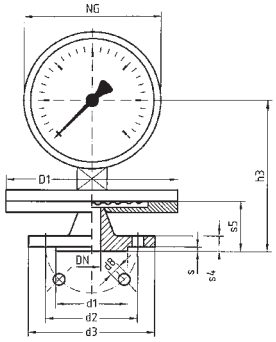
Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 100



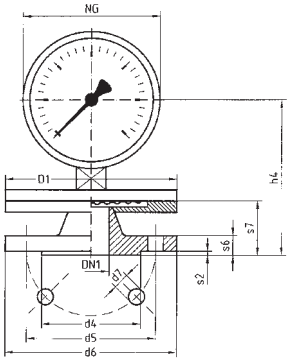
Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 100



Connection flange as per EN 1092-1, DN 25
Measuring flange Ø 160



Connection flange as per EN 1092-1, DN 50
Measuring flange Ø 160



Dimensions (mm)

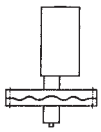
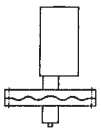
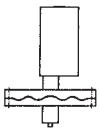
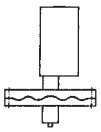
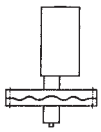
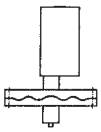
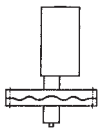
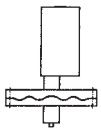
Nominal size (NG)	a	b	Øc	c1	c2	d1	d2	d3	d4	d5	d6	d7	d8	D	D1	DN	DN1	G	G1	h	h1
100	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G½B	4xM12	127	111
160	20	55	6	3	20	68	85	115	102	125	165	4x18	4x14	100	160	25	50	G½B	4xM12	156	141

Nominal size (NG)	h2	h3	h4	s	s1	s2	s3	s4	s5	s6	s7	t	SW
100	101	129	137	2	30	3	20	18	48	20	56	12	22
160	131	159	167	2	30	3	20	18	48	20	56	12	22

Standard diaphragm pressure gauges

Diaphragm pressure gauges for chemical applications

DG: H

			With glycerine filling				With glycerine filling	
Type	PF100, D401	PF160, D401	PF100Gly, D801	PF160Gly, D801	PF100Ch, D402	PF160Ch, D402	PF100ChGly, D802	PF160ChGly, D802
Version								
Housing Ø	100	160	100	160	100	160	100	160
Housing	Stainless steel 304 with bayonet bezel							
Measuring element	Diaphragm, see data sheet.							
Lower flange	Steel				Stainless steel 316 Ti/316 L			
Accuracy class	1.6	1.6	1.6*	1.6*	1.6	1.6	1.6*	1.6*
Connection	G½B	G½B	G½B	G½B	G½B	G½B	G½B	G½B
Range (mbar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
0/10	85901401	85951401	---	---	85901402	85951402	---	---
0/16	85902401	85952401	---	---	85902402	85952402	---	---
0/25	85903401	85953401	---	---	85903402	85953402	---	---
0/40	85904401	85954401	85904801	85954801	85904402	85954402	85904802	85954802
Price €								
0/60	85905401	85955401	85905801	85955801	85905402	85955402	85905802	85955802
0/100	85906401	85956401	85906801	85956801	85906402	85956402	85906802	85956802
0/160	85907401	85957401	85907801	85957801	85907402	85957402	85907802	85957802
0/250	85908401	85958401	85908801	85958801	85908402	85958402	85908802	85958802
Range (bar)	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
0/0.4	85909401	85959401	85909801	85959801	85909402	85959402	85909802	85959802
0/0.6	85910401	85960401	85910801	85960801	85910402	85960402	85910802	85960802
0/1	85911401	85961401	85911801	85961801	85911402	85961402	85911802	85961802
0/1.6	85912401	85962401	85912801	85962801	85912402	85962402	85912802	85962802
0/2.5	85913401	85963401	85913801	85963801	85913402	85963402	85913802	85963802
0/4	85914401	85964401	85914801	85964801	85914402	85964402	85914802	85964802
0/6	85915401	85965401	85915801	85965801	85915402	85965402	85915802	85965802
0/10	85916401	85966401	85916801	85966801	85916402	85966402	85916802	85966802
0/16	85917401	85967401	85917801	85967801	85917402	85967402	85917802	85967802
0/25	85918401	85968401	85918801	85968801	85918402	85968402	85918802	85968802

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* ≤ 250 mbar Cl. 2.5 See page 364 for extra charges.

Extra charges diaphragm pressure gauges / standard and for chemical applications

DG: H

Open connection flanges		Ranges 10 to 250 mbar Measuring flange Ø 160		Ranges 0.4 to 25 mbar Measuring flange Ø 100	
	Material	Steel	Stainless steel	Steel	Stainless steel
Version	Nominal diameter	**Price €**	**Price €**	**Price €**	**Price €**
EN 1092-1, PN 40	DN 15				
	DN 20				
	DN 25				
	DN 50				
ASME B 16.5 150 lbs	DN ½"				
	DN 1"				
	DN 2"				

Special connection	Material steel	Material stainless steel 316 Ti or 316 L
	Price €	**Price €**
Channel hole Ø 10 mm		
Groove/tongue as per EN 1092-1		
RJT groove ANSI B16.5		
Special materials for diaphragms	Ranges 10 to 250 mbar Measuring flange Ø 160	Ranges 0.4 to 25 mbar Measuring flange Ø 100
Material	**Price €**	**Price €**
PTFE film (≥ 40 mbar)		
Silver foil (≥ 160 mbar)		
Tantalum foil (≥ 160 mbar)		
Other materials		

Special materials for lower measuring flange (wetted part) for types D402 and D802	Ranges 10 to 250 mbar Measuring flange Ø 160			Ranges 0.4 to 25 mbar Measuring flange Ø 100		
Connection	G½B	Flange, EN 1092-1, DN 15–25 flange ANSI ½", 1"	Flange, EN 1092-1, DN 50 flange ANSI 2"	G½B	Flange, EN 1092-1, DN 15–25 flange ANSI ½", 1"	Flange, EN 1092-1, DN 50 flange ANSI 2"
Material	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
PTFE lining						
Other materials	On request					
Overpressure safety 10 x FSD (measuring flange Ø 100 to max. 40 bar, measuring flange Ø 160 to max. 2.5 bar)	Ranges 10 to 250 mbar Measuring flange Ø 160			Ranges 0.4 to 25 mbar Measuring flange Ø 100		
	Price €			**Price €**		

See page 352 for extra charges for electrical contacts.

Standard capsule pressure gauges for differential pressure

- Measurement of extremely small differential pressures
- Robust design
- Static pressures up to 400 mbar
- Direct indication of the differential pressure
- Many customised versions available

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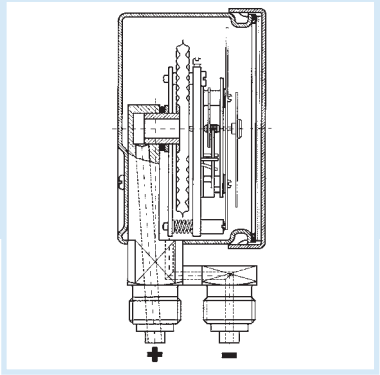


Application

For differential pressure measurement of non-corrosive, gaseous, dry media. Especially suitable for filter loss measurement in air conditioning and ventilation applications.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 9/D 4

Nominal size
63 – 100 – 160

Function
The "plus" pressure (= high pressure) is applied to the inside of the diaphragm. The "minus" pressure (= low pressure) is applied to the inside of the pressure-tight housing. The pressure difference causes the diaphragm to change its shape, thus generating the movement required to measure the pressure.
This displacement is picked up by the movement. The differential pressure is directly indicated by a pointer.

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
NG 63 0/16 to 0/400 mbar
NG 100 0/6 to 0/400 mbar
NG 160 0/4 to 0/400 mbar

Application area
Static load: Full scale value
Dynamic load: 0.9 % x full scale value

Overpressure safety
full scale value

Maximum static pressure
400 mbar

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.6 %/10 K
Falling temperature approx. ±0.6 %/10 K
of full scale value

Degree of protection
IP 66 (EN 60529)

Standard version

Connection (wetted part)
NG 63: 2 x G¼B – spanner size SW 14 centre back (brass)
NG 100: 2 x G½B – spanner size SW 22 bottom (stainless steel)
2 x G½B – spanner size SW 22 centre back (brass)
(EN 837-3/7.3)

Measuring element (wetted part)
Capsule element, CuBe alloy

Movement (wetted part)
Brass

Seal (wetted part)
NBR (Perbunan)

Dial (wetted part)
Aluminium, white
Dial marking black

Pointer (wetted part)
Aluminium, black

Housing (wetted part)
Stainless steel 304

Bayonet bezel/crimped bezel
Stainless steel 304

Window (wetted part)
Plastic (PMMA)

Mounting
Wall mounting by means of back flange or 3-hole fixing, panel mounting bezel (each as option).
Direct mounting to rigid measuring line possible.

Options

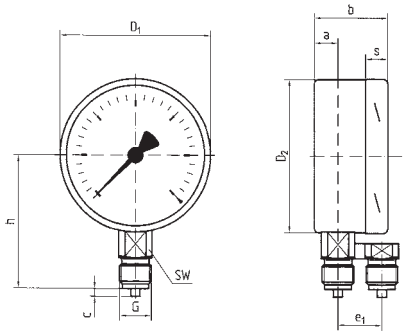
- Back flange
- 3-hole fixing, panel mounting bezel
- Hose connections
- Special scales
- Other process connections

See page 369 for prices.

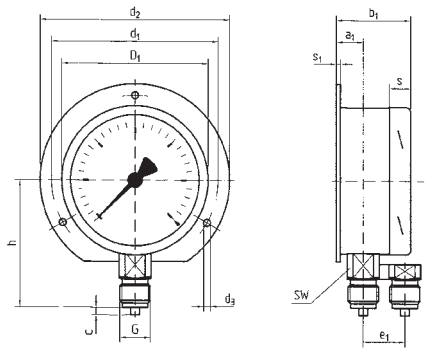
Standard capsule pressure gauges for differential pressure Type D 9 – NG 63/type D 4 – NG 100/160

Housing types and dimensions

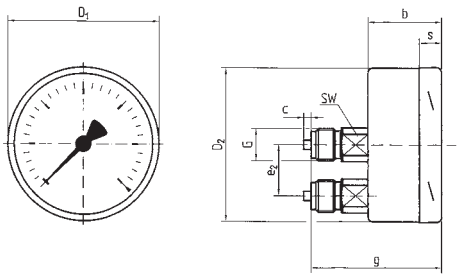
Bottom connection (NG 100/160)



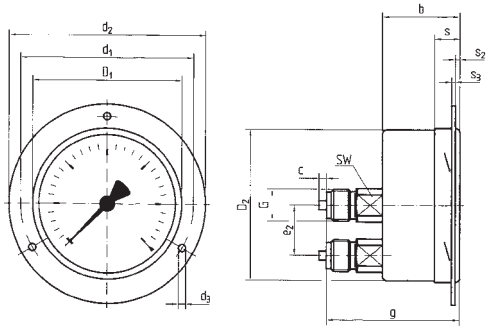
Bottom connection, back flange (NG 100/160)



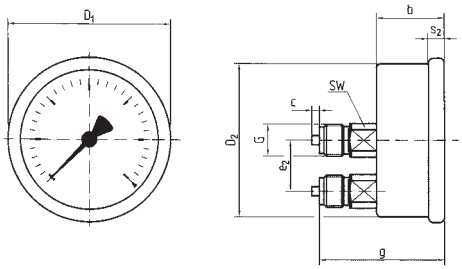
Back connection (NG 100/160)



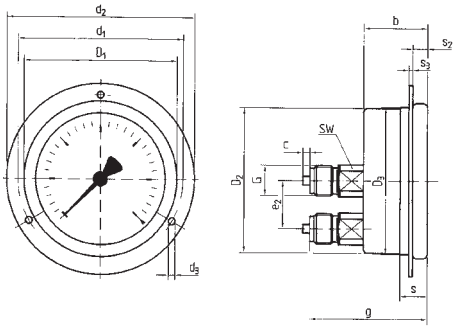
Back connection, 3-hole fixing, panel mounting bezel (NG 100/160)



Back connection (NG 63)



Back connection, 3-hole fixing, panel mounting bezel (NG 63)



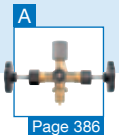
Dimensions (mm)

Nominal size (NG)	a	a1	b	b1	c	d1*	d2	d3*	D1	D2	D3	e1	e2	g	G	h	S	S1	S2	S3	SW
63	-	-	30.5	-	2	75	85	3.6	68	62	64.3	-	20	53	G¼B	-	14	-	6	2	14
100	16	18	49	51	3	116	133	4.5	101	99	-	32	34.5	79	G½B	86	20	5	2.5	3	22
160	16	19	49	52	3	178	196	4.5	161	159	-	32	34.5	79	G½B	118	20	6	4.5	2	22

* Dimensions as per DIN 16063/16064

Standard Bourdon tube pressure gauges for differential pressure

- Indication of plus pressure, minus pressure and differential pressure
- Excellent price/performance ratio
- Two independent Bourdon tube systems
- Housing and wetted parts also available in stainless steel (option)



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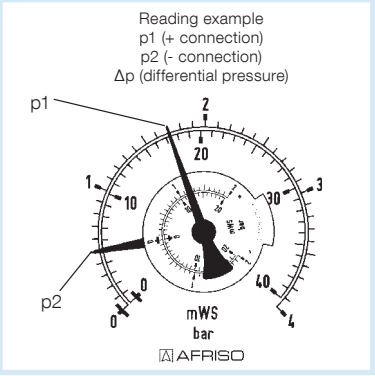


Application

For differential pressure measurement of gaseous and liquid media which are not highly viscous, do not crystallize and do not attack copper alloys. Specially suitable for heating systems (supply and return pipes).
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
D 2

Nominal size
100

Function
The pressures are measured in two independent Bourdon tube systems ("plus" pressure = high pressure,"minus" pressure = low pressure). The pressure is indicated by means of a moving dial and a pointer. The differential pressure scale covers 50 % of the range of the "plus" pressure and 50 % of the range of the "minus" pressure. The black pointer ("plus" connection) and the red pointer ("minus" connection) at the differential pressure gauge scale allow you to read the pressures in both systems on the fixed scale.

Accuracy class (EN 837-1/6)
1.6

Ranges (EN 837-1/5)
0/0.6 to 0/60 bar

Application area
The maximum pressure in the system must not exceed the full scale value. For good readability, the differential pressure to be measured should not be less than approx. 20 % of the full scale value.

Operating temperature range

Medium:	T_{max} =	+60 °C
Ambient:	T_{min} =	-20 °C
	T_{max} =	+60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.4 %/10 K
Falling temperature approx. ±0.4 %/10 K
of full scale value

Degree of protection
IP 32 (EN 60529)

Standard version

Connection
Brass, bottom; parallel in line
2 x G½B – spanner size SW 22 (EN 837-1/7.3)

Measuring element
Bourdon tube, "C" type tube, copper alloy

Movement
Brass

Dial
Aluminium, white
Dial marking black (bar/mWC)

Pointer/dial
Aluminium

Housing
Sheet steel, black

Push on bezel
Sheet steel, black

Window
Instrument glass

Options

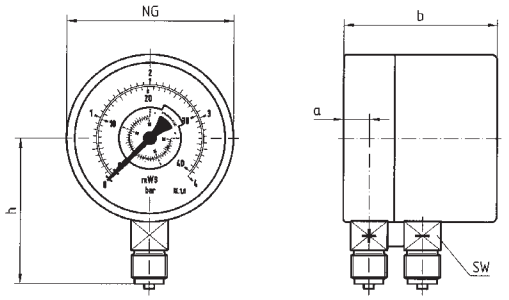
- Wetted parts stainless steel
- Housing and push on bezel stainless steel
- Nominal size 160 (type D1, housing plastic)
- Back flange
- 3-hole fixing, panel mounting bezel
- Damping screw
- Special scales
- Other process connections

See page 369 for prices.

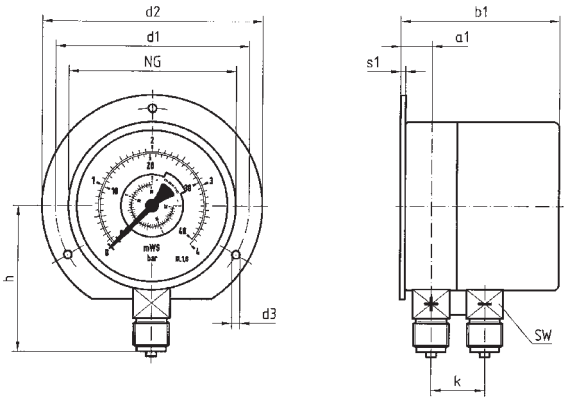
Standard Bourdon tube pressure gauges for differential pressure Type D 2 – NG 100

Housing types and dimensions

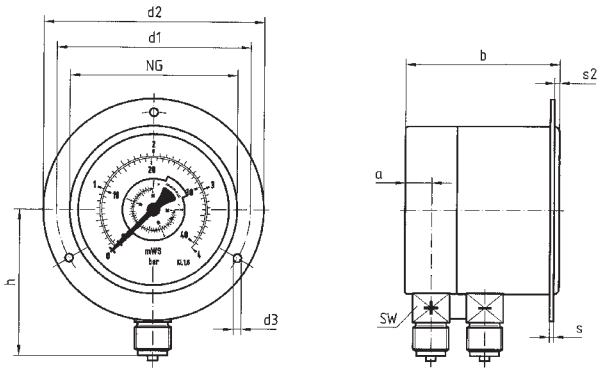
Bottom connection



Bottom connection, back flange



Bottom connection, 3-hole fixing, panel mounting bezel



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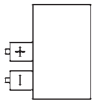
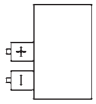
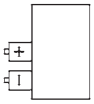
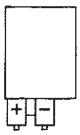
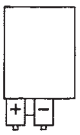
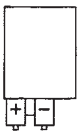
Dimensions (mm)

Nominal size (NG)	a	a_1	b	b_1	Øc	c_1	c_2	d_1*	d_2*	d_3*	G	h	k	s	s_1	s_2	SW
100	15.6	19.1	84	87.5	6	3	20	116	132	4.8	G½B	86	32	2	5.5	3	22

* Dimensions as per DIN 16064

Standard capsule/Bourdon tube pressure gauges for differential pressure

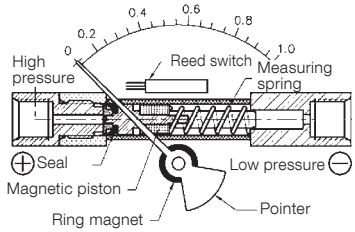
DG: M

Type	KP63Dif, D 911	KP100Dif, D 401	KP100Dif, D 411	KP160Dif, D 401	KP160Dif, D 411	RF100Dif, D 201	RF100Dif, D 301	RF160Dif, D 101
Version								
Housing Ø	63	100	100	160	160	100	100	160
Housing	Stainless steel 304, plastic window					Sheet steel	Stainless steel	Plastic
Measuring element	Capsule element, CuBe alloy					Bourdon tube, copper alloy		
Accuracy class	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Connection	G¼B	G½B	G½B	G½B	G½B	G½B	G½B	G½B
						Dual scale bar/mWC, black		
Range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €								
0/4 mbar	---	---	---	35612401	35612411	---	---	---
0/6 mbar	---	35563401	35563411	35613401	35613411	---	---	---
0/10 mbar	---	35564401	35564411	35614401	35614411	---	---	---
0/16 mbar	35515911	35565401	35565411	35615401	35615411	---	---	---
0/25 mbar	35516911	35566401	35566411	35616401	35616411	---	---	---
0/40 mbar	35517911	35567401	35567411	35617401	35617411	---	---	---
0/60 mbar	35518911	35568401	35568411	35618401	35618411	---	---	---
0/100 mbar	35519911	35569401	35569411	35619401	35619411	---	---	---
0/160 mbar	35520911	35570401	35570411	35620401	35620411	---	---	---
0/250 mbar	35521911	35571401	35571411	35621401	35621411	---	---	---
0/400 mbar	35522911	35572401	35572411	35622401	35622411	---	---	---
Price €								
0/0.6 bar	---	---	---	---	---	85609201	85609301	---
0/1 bar	---	---	---	---	---	**85610201**	85610301	85660101
0/1.6 bar	---	---	---	---	---	**85611201**	85611301	85661101
0/2.5 bar	---	---	---	---	---	**85612201**	85612301	85662101
0/4 bar	---	---	---	---	---	**85613201**	85613301	85663101
0/6 bar	---	---	---	---	---	**85614201**	85614301	85664101
0/10 bar	---	---	---	---	---	**85615201**	85615301	85665101
0/16 bar	---	---	---	---	---	**85616201**	85616301	85666101
0/25 bar	---	---	---	---	---	85617201	85617301	85667101
0/40 bar	---	---	---	---	---	85618201	85618301	85668101
Price €								
0/60 bar	---	---	---	---	---	85619201	85619301	85669101
0/100 bar	---	---	---	---	---	---	---	85670101
0/160 bar	---	---	---	---	---	---	---	85671101
0/250 bar	---	---	---	---	---	---	---	85672101
0/400 bar	---	---	---	---	---	---	---	85673101
Extra charges						**Price €**	**Price €**	**Price €**
Wetted parts stainless steel	---	---	---	---	---			

See page 385 for extra charges for mounting accessories.

Magnetic piston type pressure gauges for differential pressure – high overload protection

- Extremely compact and robust stainless steel measuring system
- Max. static pressure PN 100, 250, 400
- Leak-proof due to mechanical separation of pressure chamber and display
- Various types of connections
- Easy retrofitting of electrical contacts without intervention in the measuring system



Application

For differential pressure measurements at very high static pressures. For gaseous and liquid, non-adhesive media that are not highly viscous. Particularly suitable for monitoring filters, pumps, pipe systems and cooling circuits.

Technical specifications

Type
MAG 80/100 Dif D312

Nominal size
80–100 mm

Function
The pressures act on two pressure chambers separated by a magnetic piston. If there are different pressures in the chambers, the magnetic piston is axially displaced against a compression spring. The magnetic piston transmits this displacement to the pointer by means of a ring magnet mounted to the pointer hub. The differential pressure is directly indicated. The complete mechanical separation of pressure chamber and display excludes the possibility of leaks.

Accuracy
±3 % of full scale value
(at increasing differential pressure)

Ranges (EN 837-3/5)
0/0.25 bar to 0/10 bar

Maximum static pressure
100 bar

Overpressure safety
Up to the maximum static pressure at both sides

Operating temperature range

Medium:	T_{max} =	100 °C
Ambient:	T_{min} =	0 °C
	T_{max} =	80 °C

Degree of protection
IP 65 (EN 60529)

Standard version

Connection (wetted part)
Stainless steel 316, on left and right sides, opposite each other 2 x G¼ female thread – spanner size SW 17
(EN 837-3/7.3)

Connection cover
Plastic, glass-fibre reinforced, black

Measuring element (wetted part)
Compression spring
Stainless steel 301

Magnetic piston (wetted part)
Stainless steel 316/strontium ferrite

Seal (wetted part)
NBR (Perbunan)

Dial
Aluminium, white
Dial marking black/red (bar/psi)
Scale angle 90°

Pointer
Aluminium, black

Housing
Stainless steel 304
with rubber sealing ring at the front

Window
Instrument glass

Mounting
Wall mounting via mounting plate (option) or pipe mounting by means of mounting plate and fixing clamp (option) for 2" pipe

Options

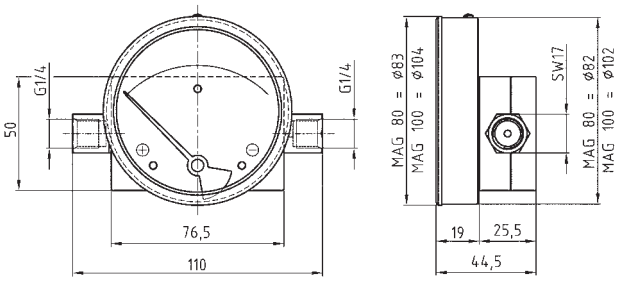
- Mounting plate with fixing clamp
- 3-hole fixing, panel mounting bezel
- Max. static pressure PN 250/400
- Other connection threads
- Other connection designs
- Acrylic glass window
- Electrical contacts (Reed contacts)
- Filter in "plus" connection
- Glycerine filling
- Max. pointer
- Special scales

i
See page 376 for prices.

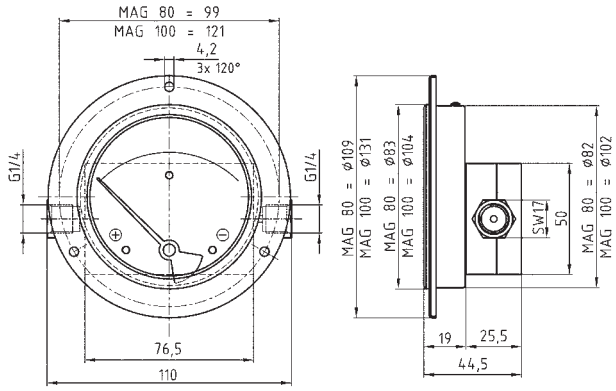
Magnetic piston type pressure gauges for differential pressure – high overload protection Type D 3 NG 80/100

Types and dimensions (mm)

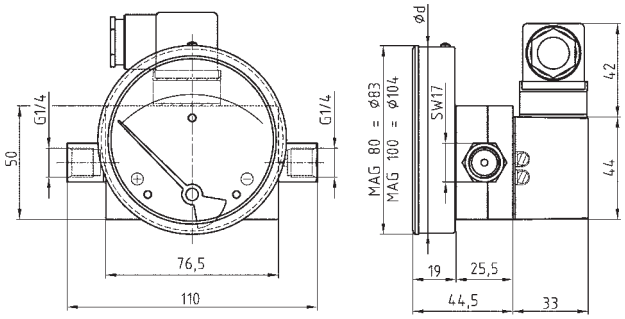
Connection on right and left sides



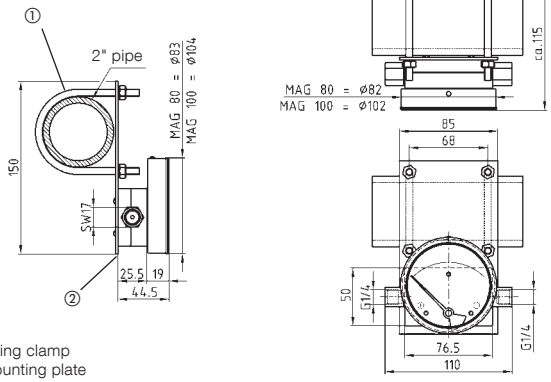
Connection on right and left sides 3-hole fixing, panel mounting bezel



Connection on right and left sides with electrical contact



Mounting plate and fixing clamp



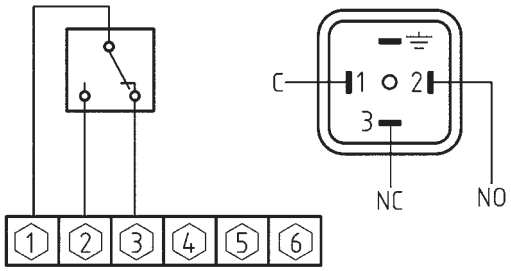
① Fixing clamp
② Mounting plate

Technical specifications electrical contact

Version: Reed contact, single, changeover contact (SPDT)

Max. switching voltage:	AC/DC 175 V
Max. switch rating:	AC 5 VA – DC 5 W
Max. current:	AC/DC 250 mA
Switching hysteresis:	approx. 5 %
Adjustment range:	35–100 % of full scale value
Electrical connection:	ISO 4400 connector (DIN 43650-A)

Wiring diagram

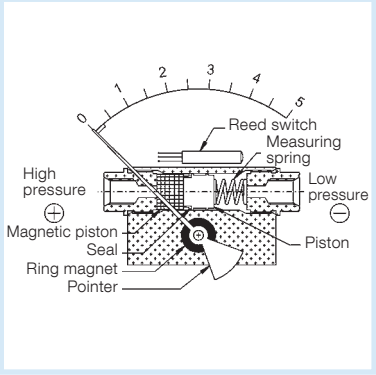


9

Magnetic piston type pressure gauges with displays at both sides for differential pressure – high overload protection

NEW

- **2 displays for site condition independence**
- **Extremely compact and robust stainless steel measuring system**
- **IP 65 degree of protection for pressure gauge and switching contact**
- **Leak-proof due to mechanical separation of pressure chamber and display**



Application

For differential pressure measurements at very high static pressures. For gaseous and liquid, non-adhesive media that are not highly viscous. Particularly suitable for monitoring filter elements in process engineering. Displays on both sides for site condition independence.

Description

The pressures act on two pressure chambers separated by a magnetic piston. If there are different pressures in the chambers, the magnetic piston is axially displaced against a compression spring. The magnetic piston transmits this displacement to the pointers by means of a ring magnet mounted to the pointer hub. The differential pressure is directly indicated on both sides. The complete mechanical separation of pressure chamber and display excludes the possibility of leaks.

Technical specifications

Type
MAG 63/80/100 Dif D301

Nominal size
63–100 mm

Accuracy
±5 % of full scale value
(at increasing differential pressure)
Ranges (EN 837-3/5)
0/0.5 bar to 0/10 bar

Maximum static pressure
350 bar

Overpressure safety
Up to the maximum static pressure at both sides

Operating temperature range
Medium: T_{max} = +80 °C
Ambient: T_{min} = 0 °C
T_{max} = +80 °C

Degree of protection
IP 65 (EN 60529)

Standard version

Connection (wetted part)
2 x G¼ female thread, parallel, bottom, distance 54 mm

Connection block
Aluminium

Measuring element (wetted part)
Compression spring stainless steel 301

Magnetic piston (wetted part)
Aluminium, stainless steel 301, strontium ferrite and sealing materials

Seal (wetted part)
FKM (Viton)

Dial
Aluminium, white
Dial marking black (bar)
Scale angle 90°

Pointer
Aluminium, black

Housing
Stainless steel 304
with rubber sealing ring at the front

Window
Instrument glass

Options

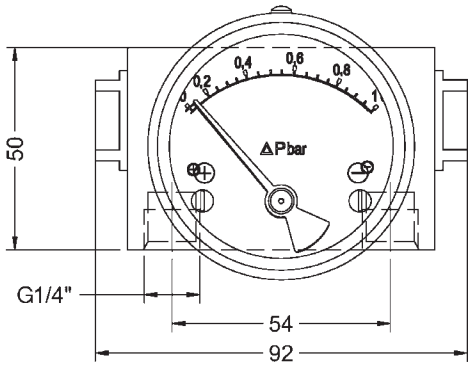
- Other connection threads
- Connection on left and right sides
- Acrylic glass window
- Electrical contacts (Reed contacts)
- Filter in "plus" connection
- Glycerine filling
- Max. pointer
- Special scales

i Prices on request.

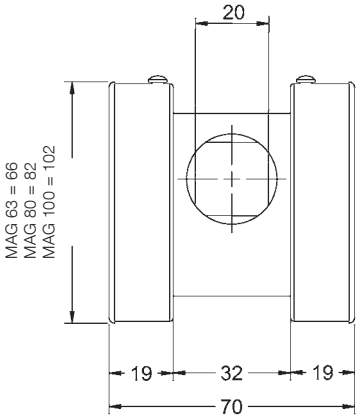
Magnetic piston type pressure gauges for differential pressure – high overload protection Type D 3 NG 63/80/100

Types and dimensions (mm)

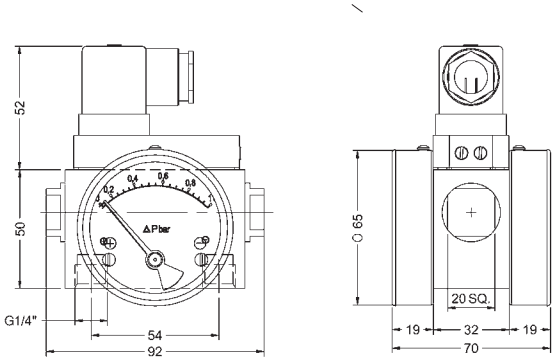
Connection on right and left sides



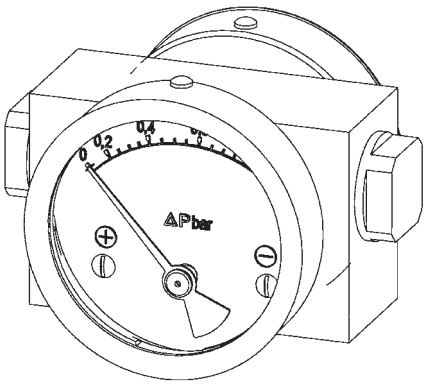
Connection on left and right sides



Connection on right and left sides
with electrical contact



3D view

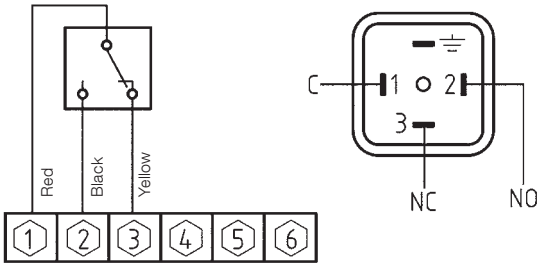


Technical specifications electrical contact

Version: Reed contact, single, changeover contact (SPDT)

Max. switching voltage:	AC/DC 30 V
Max. switch rating:	AC 3 VA – DC 3 W
Max. current:	AC/DC 300 mA
Switching hysteresis:	approx. 5 %
Adjustment range:	35–100 % of full scale value
Electrical connection:	ISO 4400 connector (DIN 43650-A)

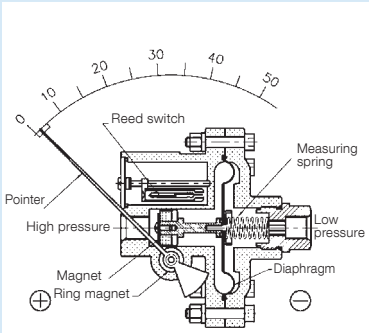
Wiring diagram



9

Magnetic diaphragm pressure gauges for very low differential pressure

- **Differential pressure ranges starting at 0/2.5 mbar**
- **Switching contacts can be retrofitted**
- **IP 65 degree of protection for pressure gauge and switching contact**
- **Side or back connection**
- **Delivery includes adapter for hose connection and brackets for control panel mounting**



Application

For differential pressure measurement at very low differential pressure. Specially for gaseous media. Particularly suitable for monitoring filters and fans in air supply, air conditioning and clean room applications.

Technical specifications

Type
MAG 115 Dif D311

Nominal size
115 mm

Function
The pressures act on two pressure chambers separated by a diaphragm. If there are different pressures in the chambers, a magnet is axially displaced against a compression spring. This displacement is transmitted to the pointer by means of a ring magnet mounted to the pointer hub. The differential pressure is directly indicated.

Accuracy
±3 % of full scale value
(at increasing differential pressure)

Ranges (EN 837-3/5)
0/2.5 mbar to 0/100 mbar

Maximum static pressure
2.4 bar

Overpressure safety
Up to 2.4 bar at both sides

Operating temperature range

Medium:	T_{max}	= +60 °C
Ambient:	T_{min}	= 0 °C
	T_{max}	= +60 °C

Degree of protection
IP 65 (EN 60529)

Standard version

Connection (wetted part)
Plastic, glass-fibre reinforced,
choice of left and right sides,
opposing or back (use enclosed blind plugs)
2 x 1/8 NPT female thread or
2 x hose connection 5 mm
(use enclosed adapters)

Measuring element (wetted part)

Diaphragm:	NBR (Perbunan)
Compression spring:	Stainless steel 301
Transmission unit:	Stainless steel 316

Magnet (wetted part)
Strontium ferrite

Seal (wetted part)
NBR (Perbunan)

Dial
Aluminium, while
Dial marking black
Scale angle 90° (first graduation after zero at 15 % of full scale value)

Pointer
Aluminium, black

Housing
Stainless steel 304
with rubber sealing ring at the front

Window
Instrument glass

Mounting
Panel mounting by means of mounting clips (standard), wall mounting by means of mounting plate (option) or pipe mounting by means of mounting plate and fixing clamp (option) for 2" pipe

Options

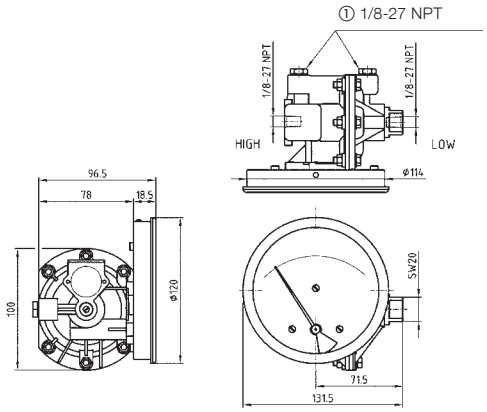
- Mounting plate with fixing clamp
- Acrylic glass window
- Electrical contacts (Reed contacts)
- Special scales

i
See page 376 for prices.

Magnetic diaphragm pressure gauges for very low differential pressure Type D 3 NG 115

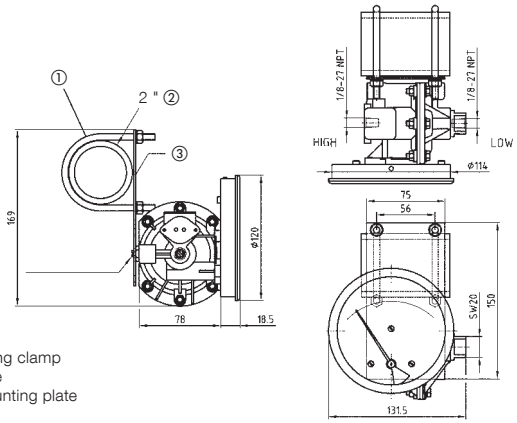
Types and dimensions (mm)

Connection on right and left sides or on rear



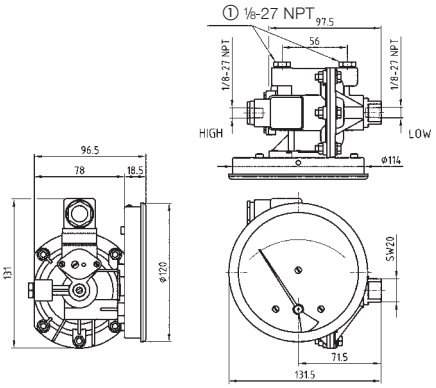
① Plug

Mounting plate and fixing clamp



① Fixing clamp
② Pipe
③ Mounting plate

Connection on right and left sides or on rear, with electrical contact



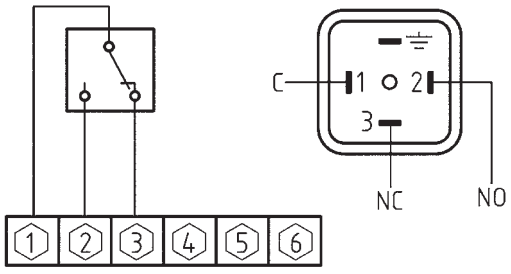
① Plug

Technical specifications electrical contact

Version: Reed contact, single, changeover contact (SPDT)

Max. switching voltage:	AC/DC 175 V
Max. switch rating:	AC 5 VA – DC 5 W
Max. current:	AC/DC 250 mA
Switching hysteresis:	approx. 5 %
Adjustment range:	40–80 % of full scale value
Electrical connection:	ISO 4400 connector (DIN 43650-A)

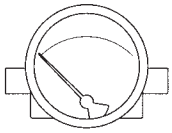
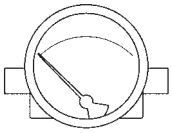
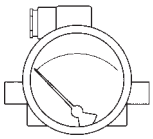
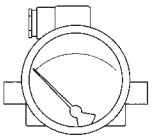
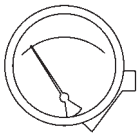
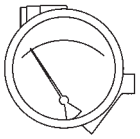
Wiring diagram



9

Magnetic piston type pressure gauges/magnetic diaphragm pressure gauges for differential pressure

DG: M

Type	MAG 80 Dif, D 312	MAG 100 Dif, D 312	MAG 80 Dif, RK1.W, D 312	MAG 100 Dif, RK1.W, D 312	MAG 115 Dif, D 311	MAG 115 Dif, RK1.W, D 311
Version						
Housing Ø	80	100	80	100	115	115
Housing	Stainless steel 304 with rubber sealing ring at the front					
Measuring element	See data sheet					
Accuracy	±3 % of full scale value (at increasing differential pressure)					
Connection	2 x G¼ female thread				2 x ⅛ NPT female thread	
Max. static pressure	PN 100				PN 2.4	
Contact type	---	---	Reed, single, changeover contact*	Reed, single, changeover contact*	---	Reed, single, changeover contact*
Electrical connection	---	---	Connector and junction box as per ISO 4400 (DIN 43650-A)	Connector and junction box as per ISO 4400 (DIN 43650-A)	---	Connector and junction box as per ISO 4400 (DIN 43650-A)
Range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
0/2.5 mbar	---	---	---	---	88002311	88013311
0/4 mbar	---	---	---	---	88003311	88014311
0/6 mbar	---	---	---	---	88004311	88015311
0/10 mbar	---	---	---	---	88005311	88016311
0/16 mbar	---	---	---	---	88006311	88017311
0/25 mbar	---	---	---	---	88007311	88018311
0/40 mbar	---	---	---	---	88008311	88019311
0/60 mbar	---	---	---	---	88009311	88020311
0/100 mbar	---	---	---	---	88010311	88021311
0/160 mbar	---	---	---	---	---	---
Price €						
0/0.25 bar	88002312	88013312	88022312	88033312	---	---
0/0.4 bar	88003312	88014312	88023312	88034312	---	---
0/0.6 bar	88004312	88015312	88024312	88035312	---	---
0/1 bar	88005312	88016312	88025312	88036312	---	---
0/1.6 bar	88006312	88017312	88026312	88037312	---	---
0/2.5 bar	88007312	88018312	88027312	88038312	---	---
0/4 bar	88008312	88019312	88028312	88039312	---	---
0/6 bar	88009312	88020312	88029312	88040312	---	---
0/10 bar	88010312	88021312	88030312	88041312	---	---

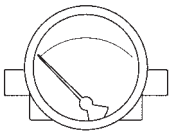
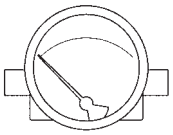
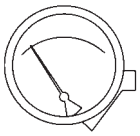
* Please specify required switching point!

i

Please enquire for prices for magnetic piston type pressure gauges with display at both sides.

Extra charges for magnetic piston type pressure gauges / Magnetic diaphragm pressure gauges

DG: M

Type	MAG 80 Dif, D 312	MAG 100 Dif, D 312	MAG 115 Dif, D 311
Version			
	Price €	**Price €**	**Price €**
Maximum static pressure PN 250			---
Maximum static pressure PN 400			---
Centre back connection (electrical contacts not possible)			---
Bottom connection			---
Connection ¼ NPT female thread			---
Connection G¼B male thread (adapter)			---
Connection G½B male thread (adapter)			---
Connection ½ NPT male thread (adapter)			---
Piston seal FKM (Viton)			---
3-hole fixing, panel mounting bezel (can only be factory-fitted)			---
Window acrylic glass			
Window instrument glass, hardened			
Glycerine filling			---
Plus connection right (pointer moves from right to left)			---
Max. pointer			---
Red reference pointer, adjustable			
Filter in plus connection			---
Double Reed contact, changeover contact RK2.W (extra charge relates to basic device with single Reed contact, changeover contact RK1.W!)			---

Accessories

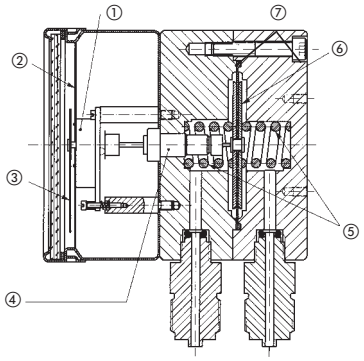
DG: M

Type	MAG 80 Dif, D 312	MAG 100 Dif, D 312	MAG 115 Dif, D 311
	Price € Part no.	**Price €** Part no.	**Price €** Part no.
Aluminium mounting plate and fixing clamp for wall mounting or 2" pipe mounting	38001	38001	38304
Plastic mounting plate for wall mounting	38305	38305	---

Standard spring-diaphragm pressure gauges for differential pressure – overload protected

- Direct indication of the differential pressure
- High overload protection
- Zero correction
- With integrated pressure damping

A
Page 386



Function overview
① Movement
② Dial
③ Pointer
④ Transmission unit
⑤ Measuring spring
⑥ Diaphragm
⑦ Measuring flange

Application

For differential pressure measurement at low differential pressure and high static pressure. For non-corrosive gaseous and liquid media which are not highly viscous. Particularly suitable for monitoring filters, pumps and pipe systems.

Technical specifications

Type
MF 100 Dif D401

Nominal size
100

Function
The pressures act on two pressure chambers separated by an elastic diaphragm. If there are different pressures in the chambers, the diaphragm is axially displaced against a compression spring. This is transmitted to the movement by means of a rod. The differential pressure is directly indicated by a pointer. The diaphragm is held by a metallic support which results in an overpressure safety of up to 25 bar at both sides.

Accuracy class (EN 837-3/6)
2.5

Ranges (EN 837-3/5)
0/250 mbar to 0/6 bar

Maximum static pressure
25 bar

Overpressure safety
Up to 25 bar at both sides

Operating temperature range

Medium:	T_{max} =	+60 °C
Ambient:	T_{min} =	-20 °C
	T_{max} =	+60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.5 %/10 K
Falling temperature approx. ±0.5 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Brass nickel-plated, bottom; parallel in line
2 x G½B – spanner size SW 22 (EN 837-3/7.3) with locked damping screw inside diameter 0.5 mm

Measuring element
Compression spring
Stainless steel 301

Diaphragm
FKM (Viton)

Measuring flange
Aluminium eloxed

Movement
Brass

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Options

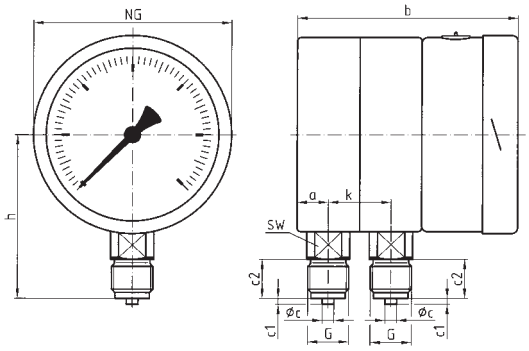
- Glycerine filling (type D 8)
- Back flange
- Special scales
- Other process connections

i
See page 384 for prices.

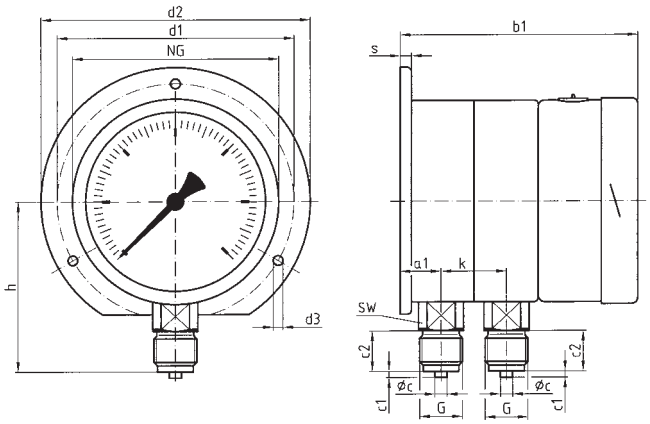
Standard spring-diaphragm pressure gauges for differential pressure Type D 4 – NG 100

Housing types and dimensions

Bottom connection



Bottom connection, back flange



Dimensions (mm)

Nominal size (NG)	a	a_1	b*	b_1	Øc	c_1	c_2	d_1*	d_2	d_3*	G	h	k	s	SW
100	16	19.5	112.5	116	6	3	20	116	132	4.8	G½B	84	32	5.5	22

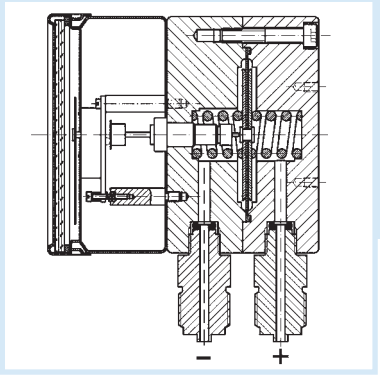
* Dimensions as per DIN 16064

9

Spring-diaphragm pressure gauges for chemical applications for differential pressure – overload protected

- Direct indication of the differential pressure
- High overload protection
- Compact design
- High resistance to chemicals
- Electrical contacts optional

Page 386



Application

For differential pressure measurement at low differential pressure and high static pressure. For corrosive gaseous and liquid media which are not highly viscous, also for use in corrosive environments. Particularly suitable for monitoring filters, pumps and pipe systems.

Technical specifications

Types
MFW 100 Ch Dif D402
MF 100 Ch Dif D402

Nominal size
100

Function
The pressures act on two pressure chambers separated by an elastic diaphragm. If there are different pressures in the chambers, the diaphragm is axially displaced against a compression spring. This is transmitted to the movement by means of a rod. The differential pressure is directly indicated by a pointer. The diaphragm is held by a metallic support which results in an overpressure safety of up to 25 bar at both sides.

Accuracy class (EN 837-3/6)
2.5

Ranges (EN 837-3/5)
MF 100: 0/250 mbar to 0/6 bar
MFW 100: 0/250 mbar to 0/25 bar

Maximum static pressure
25 bar

Overpressure safety
Up to 25 bar at both sides

Operating temperature range
Medium: T_{max} = +60 °C
Ambient: T_{min} = -20 °C
T_{max} = +60 °C

Temperature performance
Indication error when the temperature of the measuring system deviates from the normal temperature of 20 °C:
Rising temperature approx. ±0.5 %/10 K
Falling temperature approx. ±0.5 %/10 K
of full scale value

Degree of protection
IP 54 (EN 60529)

Standard version

Connection
Stainless steel 316 Ti/316 L, bottom, parallel in line 2 x G½B – spanner size SW 22 (EN 837-3/7.3) with locked damping screw, inside diameter 0.5 mm

Measuring element
Compression spring
stainless steel 301

Diaphragm
FKM (Viton)

Measuring flange
Stainless steel 316 Ti/316 L

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

i
See page 384 for prices.

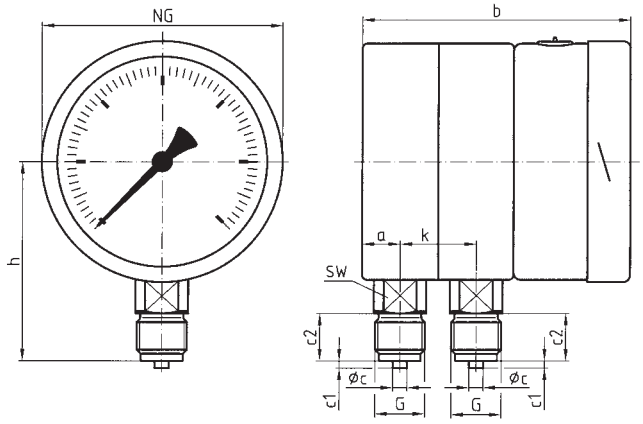
Options

- Back flange (MF 100)
- Special scales
- Other process connections
- Electrical contacts (MFW 100)

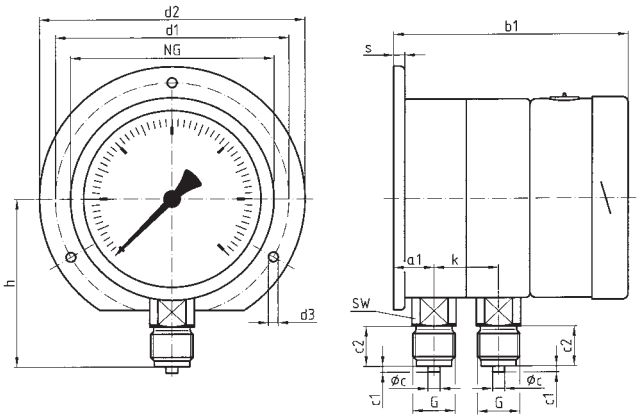
Spring-diaphragm pressure gauges for chemical applications for differential pressure Type D 4 – NG 100

Housing types and dimensions

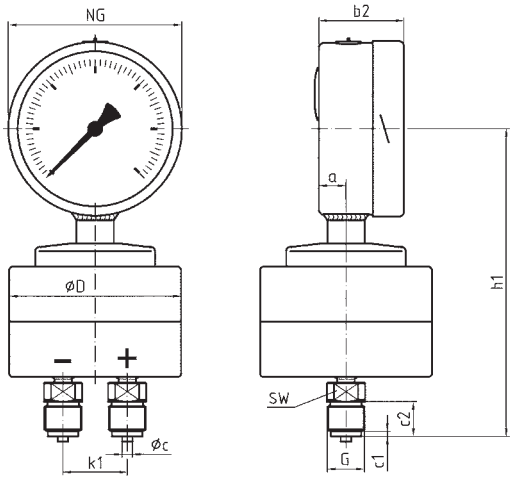
MF 100 Ch Dif D402
Bottom connection



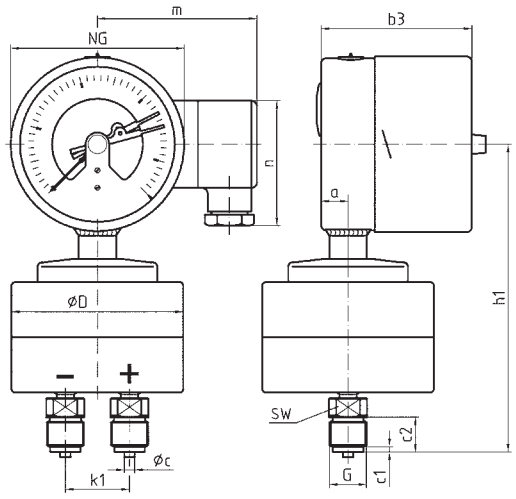
MF 100 Ch Dif D472
Bottom connection, back flange



MFW 100 Ch Dif D402
Bottom connection



MFW 100 Ch Dif D402
Bottom connection, with electrical contact



9

Dimensions (mm)

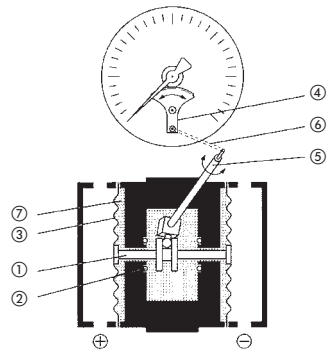
Nominal size (NG)	a	a1	b	b1	b2	b3	Øc	c1	c2	d1*	d2	d3*	ØD	G	h	h1	k	k1	m
100	16	19	84	87.5	49	87	6	3	20	116	132	4.8	99	G½B	86	177	32	37	92
Nominal size (NG)	n	s	s1	s2	SW														
100	72	2	5.5	3	22														

* Dimensions as per DIN 16064

Diaphragm pressure gauges for differential pressure for chemical applications – high overload protection

- Direct indication of the differential pressure
- High overload protection (optionally up to PN 100)
- High resistance to chemicals
- Pressure chambers can be flushed

A
Page 386



Function overview

① Connection rod
② O ring, overpressure-proof
③ Movement
④ Measuring shaft
⑤ Transmission lever
⑥ Diaphragm
⑦ Pressure transmission liquid

Application

For differential pressure measurement at low differential pressure and very high static pressure. For corrosive gaseous and liquid media, also for use in corrosive environments. Since the pressure chambers can be flushed, the gauges are also suitable for polluted media.
! For measuring gas or vapour, these gauges must be used in accordance with the table "Selection Criteria as per EN 837-2" (see appendix)!

Technical specifications

Type
PF 100/160 Dif H D402

Nominal size
100 – 160

Function
Each of the pressures acts on a diaphragm. The diaphragms are connected by means of a rod. To compensate for the static pressure, the chamber between the diaphragms is filled with pressure transmission liquid. At identical pressures, both diaphragms are in "rest" position. If the pressures are different, this causes a displacement in the direction of the lower pressure. This displacement is picked up by the movement. The differential pressure is directly indicated by a pointer.

Accuracy class (EN 837-3/6)
1.6

Ranges (EN 837-3/5)
NG 100 0/0.6 to 0/25 bar
NG 160 0/40 mbar to 0/25 bar

Maximum static pressure
40 bar/100 bar

Overpressure safety
Up to the maximum static pressure at one side

Operating temperature range
Medium: T_{max} = +100 °C
Ambient: T_{min} = -20 °C
T_{max} = +80 °C

Degree of protection
IP 54 (EN 60529

Standard version

Connection
Stainless steel, bottom
Flange connection based on EN 61518
2 x G½ female thread

Measuring element
Diaphragm,
≤ 400 mbar stainless steel 316 Ti/316 L
> 400 mbar Duratherm

Intermediate block
AlMgSiPb – HART-COAT®

Pressure transmission liquid
Acid-free oil

Zero correction
Through top housing opening ±25 % of full scale value

Seals
FKM (Viton)

Movement
Stainless steel

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Housing
Stainless steel 304

Bayonet bezel
Stainless steel 304

Window
Laminated safety glass

Mounting
Wall mounting by means of mounting plate (standard) or pipe mounting by means of mounting plate and fixing clamp (option) for 2" pipe

Options

- Fixing clamp for 2" pipe
- Glycerine filling (type D 802)
- Electrical contacts (≥ 100 mbar)

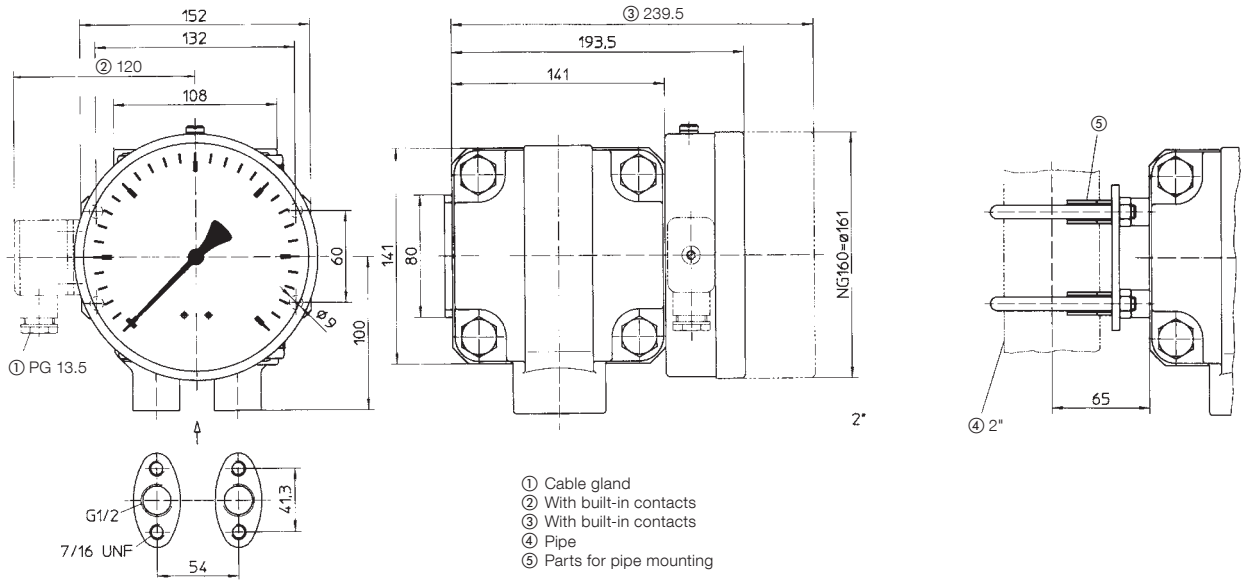
i
See page 384 for prices.

Diaphragm pressure gauges for differential pressure for chemical applications – high overload protection

Type D 4 – NG 100/160

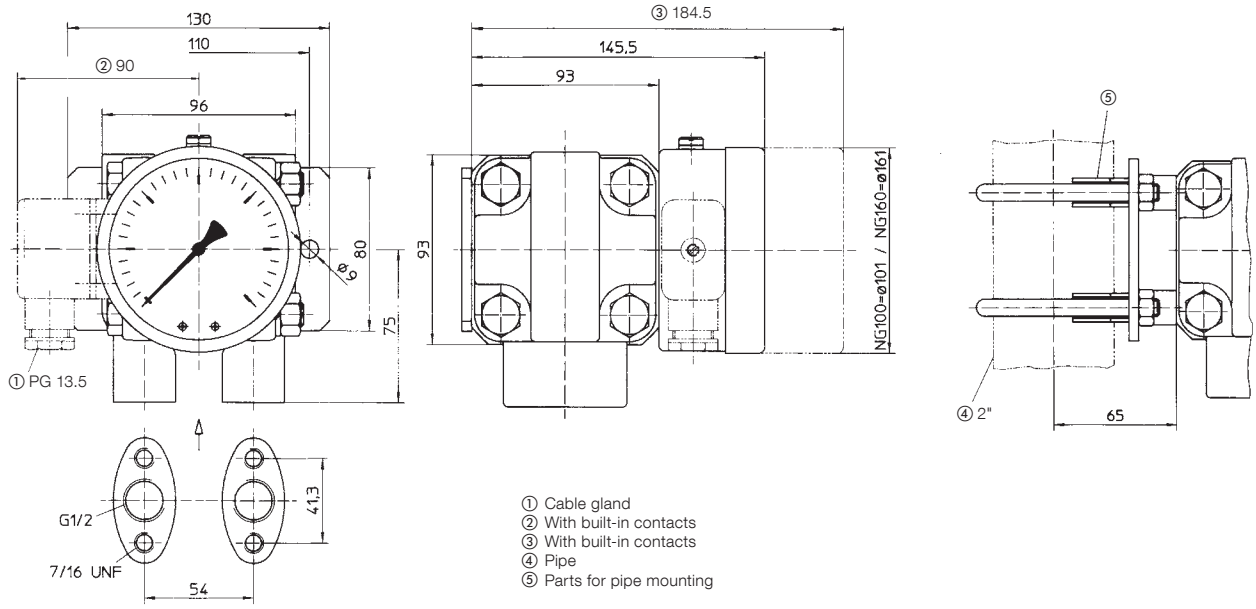
Housing types and dimensions (in mm)

Ranges 0/40 to 0/400 mbar NG 160



① Cable gland
② With built-in contacts
③ With built-in contacts
④ Pipe
⑤ Parts for pipe mounting

Ranges 0/0.6 to 0/25 bar NG 100/160

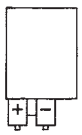
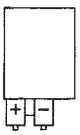
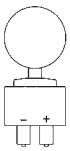
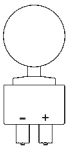


① Cable gland
② With built-in contacts
③ With built-in contacts
④ Pipe
⑤ Parts for pipe mounting

9

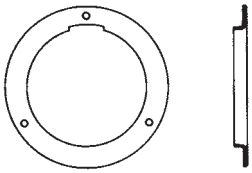
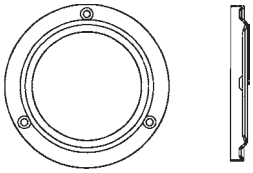
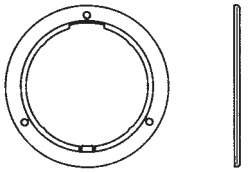
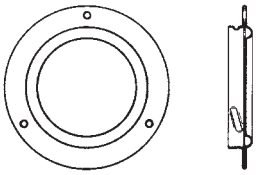
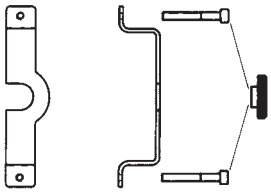
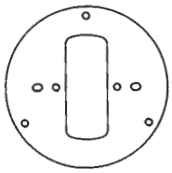
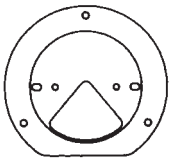
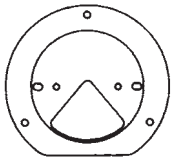
Spring-diaphragm pressure gauges / diaphragm pressure gauges for differential pressure

DG: H

Type	MF 100 Dif, D401	MF 100 Ch Dif, D402	MFW 100 Ch Dif, D402	MFW 100 Ch Dif, MK1 D402	MFW 100 Ch Dif, IK1 D402	PF 100 Ch Dif H, D402	PF 160 Ch Dif H, D402
Version							
Housing Ø	100	100	100	100	100	100	160
Housing	Stainless steel 304, bayonet bezel stainless steel 304						
Measuring element	See data sheet					Stainless steel/Duratherm	
Accuracy class	2.5	2.5	2.5	2.5	2.5	1.6	1.6
Connection	2 x G½B	2 x G½B	2 x G½B	2 x G½B	2 x G½B	Flange connection based on EN 61518 2 x G½ female thread	
Max. static pressure	25 bar	25 bar	25 bar	25 bar	25 bar	40 bar	40 bar
Range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €							
0/40 mbar	---	---	---	---	---	---	88022402
0/60 mbar	---	---	---	---	---	---	88023402
0/100 mbar	---	---	---	---	---	---	88024402
0/160 mbar	---	---	---	---	---	---	88025402
0/250 mbar	88086401	88086402	88106402	88126402	88146402	---	88026402
0/400 mbar	88087401	88087402	88107402	88127402	88147402	---	88027402
0/600 mbar	88088401	88088402	88108402	88128402	88148402	88008402	88028402
Price €							
0/1 bar	88089401	88089402	88109402	88129402	88149402	88009402	88029402
0/1.6 bar	88090401	88090402	88110402	88130402	88150402	88010402	88030402
0/2.5 bar	88091401	88091402	88111402	88131402	88151402	88011402	88031402
0/4 bar	88092401	88092402	88112402	88132402	88152402	88012402	88032402
0/6 bar	88093401	88093402	88113402	88133402	88153402	88013402	88033402
0/10 bar	---	---	88114402	88134402	88154402	88014402	88034402
0/16 bar	---	---	88115402	88135402	88155402	88015402	88035402
0/25 bar	---	---	88116402	88136402	88156402	88016402	88036402
Extra charges	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
Max. static pressure PN 100	---	---	---	---	---		
Glycerine filling							
Wall mounting	Back flange		Connection piece for instrument bracket = standard. See page 391 for instrument brackets.			Standard	
Pipe mounting (2")	---	---	---	---	---		

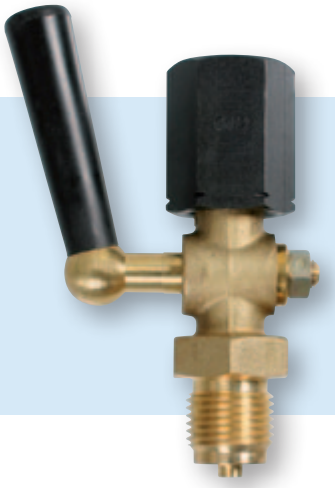
Accessories for panel mounting and wall mounting

DG: M

Type	Housing diameter (mm)	50	63	100	160
	Description	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	3-hole fixing, panel mounting bezel Stainless steel 304, bare metal surface, for retrofitting (with mounting aid) to RF 63, 100 centre back D7/D9 (stainless steel housing with crimped bezel)	---	38015	38017	---
	3-hole fixing, panel mounting bezel Stainless steel 304, bare metal surface, for retrofitting (front side) to RF 63 centre back or bottom D6/D7/D9 (plastic or stainless steel housing with crimped bezel)	---	38019	---	---
	3-hole fixing, panel mounting bezel Plastic, black, for retrofitting to RF 63 back D611 (plastic housing with crimped bezel)	---	38003	---	---
	3-hole fixing, panel mounting bezel (bayonet type) Stainless steel 304, polished, for factory-fitting to RF 100, 160 D4/D8 KP 63, 100, 160 D4 (stainless steel housing with bayonet bezel)	---	38054	38056	38057
	Clamp fixing Stainless steel 304, bare metal surface, with 2 screws M4 and knurled knob as mounting aid for retrofitting to RF 50, 63 D611 (plastic housing) RF 50, 63 D711 (stainless steel housing)	38033	38034	---	---
	Back flange Plastic, black, for retrofitting to RF 63 bottom D601 (plastic housing with crimped bezel)	---	38018	---	---
	Back flange Stainless steel 304, bare metal surface, for factory-fitting to RF 63, 100, 160 D3/D4/D7/D8/D9 KP 63, 100, 160 D3/D4 (stainless steel housing)	---	38048	38050	38051
	Back flange Steel sheet, black, for factory-fitting to RF 100, 160 D2 KP 63, 100, D2 (steel sheet housing)	---	38042	38044	38045

9

Stop cocks and shut-off valves



Pressure gauge stop cocks

Application

Shut-off element between pipe and pressure gauge. Stop cocks with test port allow you to connect both pressure gauges and testers to the pipe. Suitable for liquids, gases and vapour.

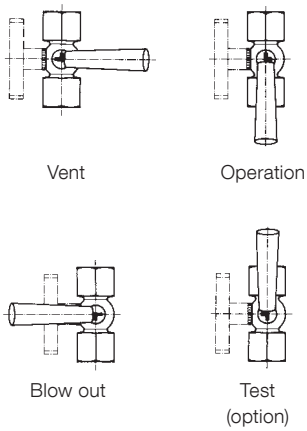
Technical specifications

Version
DIN 16261 to 16263
(or based on DIN)

Operating temperature range
Medium: -10/+50 °C

Connection and nominal pressure
See price list

Housing and tap
Brass bare metal surface or stainless steel bare metal surface. The tap contains two holes which are arranged in the shape of a T.
The function depends on the tap position:
1. Vent pressure gauge
2. Apply pressure to pressure gauge
3. Blow out measuring line
4. Apply pressure to tester



Pressure gauge shut-off valves

Shut-off or reducing element between pipe and pressure gauge. Stop valves with test port allow you to connect both pressure gauges and testers to the measuring line. Suitable for liquids, gases and vapour.

Version

DIN 16270	without test port
DIN 16271	with test port, male M 20 x 1.5
DIN 16272	with test port which can be closed separately, male, see 16271
Type A	female/female x male connection
Type B	loose female coupling x male connection and shaft for instrument bracket

Operating temperature range

Brass	-10/+120 °C
Steel SA202 (A)	-10/+120 °C
Stainless steel 316 Ti	-20/+200 °C

Connection and nominal pressure
See price list

Materials

Parts	Brass	Steel	Stainless steel
Housing	Brass	SA 202 (A	316 Ti
Valve spindle	Brass	430 F	316 Ti
Valve cone	Brass	430 F	316 Ti
Packing	PTFE	PTFE	PTFE
Cap	Brass	Steel	Stainless steel
Union nut	Brass	Steel	Stainless steel
Female/female connection	Brass	Steel	Stainless steel
Loose female coupling	Brass	Steel	Stainless steel
Vent screw	316 Ti	316 Ti	316 Ti
Wheel	Plastic	Plastic	Plastic

i
See page 388 for prices.

Overpressure safety device/ push-button stop cock

Overpressure safety device

Overpressure safety device

Application

Adjustable overpressure safety device used to protect the system against peak pressures exceeding the range of the pressure gauge. At measuring points which are subject to great pressure variations, you can install different pressure gauges with different ranges in order to precisely measure even the lower pressures. The overpressure safety devices are adjusted according to the maximum permissible pressure ratings of the various pressure gauges installed.

Technical vspecifications

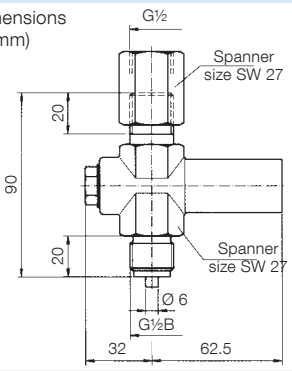
Function
When the set pressure is reached, a piston valve shuts off the port to the pressure gauge. After the pressure has dropped to a value of approx. 25 % below the closing pressure, the valve opens again.

Operating temperature range
Max. +80 °C

Overpressure safety
Brass: 600 bar
Stainless steel: 1000 bar
Max. vacuum range up to -1 bar, no adjustment function

Connection
G½ female/female connection x male connection

Dimensions (in mm)



Materials overpressure safety device

Parts	Brass	Stainless steel
Housing	Brass	316 Ti
Piston	316 Ti	316 Ti
Female/female connection	Steel	303
Diaphragm	FKM	FKM
O ring	FKM	FKM

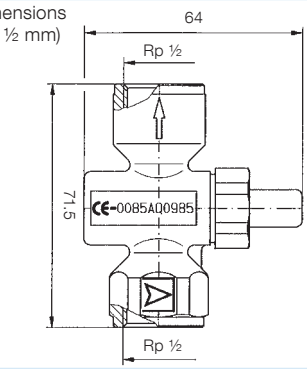
Push-button stop cock

Push-button stop cock

Application

Shut-off element between measuring line and pressure gauge. Normally, the push-button stop cock is closed. In this state, there is no pressure applied to the pressure gauge. Push the button to apply pressure to the pressure gauge and to display the operating pressure. Suitable for gases as per DVGW G260.

Dimensions (Rp ½ mm)



Technical specifications

Tested
DVGW- and SVGW-tested, with EC Type Examination Certificate, product ID number CE-0085AQ0985

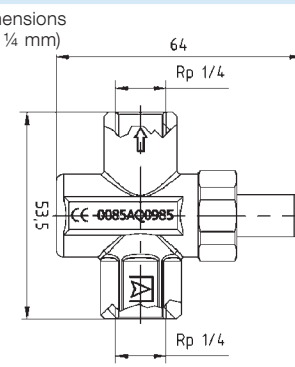
Operating temperature range
Medium: 0/+70 °C
Ambient: -20/+60 °C

Connection
2 x female thread Rp ½, DIN 2999
Rp ¼ DIN 2999
¼ NPT (without test)

Nominal pressure
5 bar (MOP 5)

Housing
Brass, nickel-plated

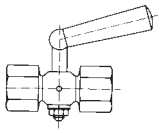
Dimensions (Rp ¼ mm)

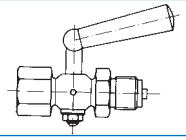


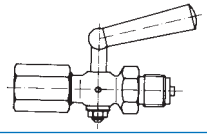
i
See page 389 for prices.

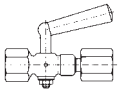
Accessories for pressure gauges

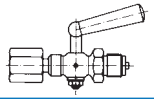
DG: E

Pressure gauge stop cock female x female					
	Connection	Nominal pressure	Material	Part no.	
	G¼	PN 6	Brass	**63001**	
	G⅜	PN 16	Brass	**63002**	
	G½	PN 16	Brass	**63003**	
With round test flange 40 x 5	G½	PN 16	Brass	63004	
With test flange 60 x 25 x 10	G½	PN 16	Brass	**63005**	
With sealing gland	G½	PN 16	Brass	**63006**	

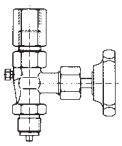
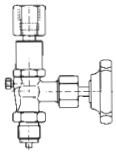
Pressure gauge stop cock female x male					
	Connection	Nominal pressure	Material	Part no.	**Price €**
	G¼	PN 6	Brass	**63011**	
	G⅜	PN 16	Brass	**63012**	
	G½	PN 16	Brass	**63013**	
With round test flange 40 x 5	G½	PN 16	Brass	63009	
With test flange 60 x 25 x 10	G½	PN 16	Brass	63010	

Pressure gauge stop cock female/female connection x male					
	Connection	Nominal pressure	Material	Part no.	**Price €**
	G¼	PN 6	Brass	63014	
	G½	PN 16	Brass	**63027**	
	G½	PN 16	1.4571	63090	
With test flange 60 x 25 x 10	G½	PN 16	Brass	**63028**	
With test flange 60 x 25 x 10	G½	PN 16	1.4571	63091	
With male test connection M20 x 1.5	G½	PN 16	Brass	63015	
With male test connection M20 x 1.5	G½	PN 16	1.4571	63016	

Pressure gauge stop cock loose female coupling x female					
	Connection	Nominal pressure	Material	Part no.	**Price €**
	G½	PN 16	Brass	63017	
With test flange 60 x 25 x 10	G½	PN 16	Brass	63018	

Pressure gauge stop cock loose female coupling x male					
	Connection	Nominal pressure	Material	Part no.	**Price €**
	G½	PN 16	Brass	63107	
With test flange 60 x 25 x 10	G½	PN 16	Brass	63024	

Pressure gauge shut-off valve DIN 16270
Type A – female/female x male connection
Type B – loose female coupling x male connection and shaft for instrument bracket

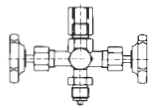
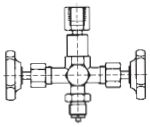
Type A	Type B	Connection	Nominal pressure	Material	Type A	**Price €**	Type B	**Price €**
					Part no.		Part no.	
		G¼	PN 125	Brass	**63094**		---	**---**
		G½	PN 250	Brass	**63092**		63046	
		G½	PN 400	Steel	63040		63047	
		G½	PN 400	1.4571	**63093**		63048	
Test connection male M20 x 1.5 **DIN 16271**		G½	PN 250	Brass	**63041**		63049	
		G½	PN 400	Steel	63042		63108	
		G½	PN 400	1.4571	63044		63109	
Extra charge oil-free and grease-free*					63045		63110	
Extra charge DVGW-tested							---	**---**

* Only for brass and stainless steel.

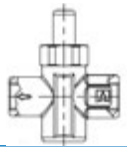
Accessories for pressure gauges

DG: E

Pressure gauge dual stop valve DIN 16272 with male test connection M 20 x 1.5
Type A – female/female x male connection
Type B – loose female coupling x male connection and shaft for instrument bracket

Type A	Type B	Connection	Nominal pressure	Material	Type A	Price €	Type B	Price €
					Part no.		Part no.	
		G½	PN 250	Brass	63111		63115	
		G½	PN 400	Steel	63112		63116	
		G½	PN 400	1.4571	63113		63117	
Extra charge oil-free and grease-free (only for brass and stainless steel)					63114		63118	

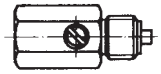
Push-button stop cock female x female – DVGW- and SVGW-tested/CE-0085AQ0985



Connection	Nominal pressure	Material	Part no.	Price €
Rp ½, DIN 2999	MOP 5	Brass, nickel-plated	**63031**	
NEW Rp ¼, DIN 2999	MOP 5	Brass, nickel-plated	**63191**	
¼-18 NPT*	MOP 5	Brass, nickel-plated	**63193**	

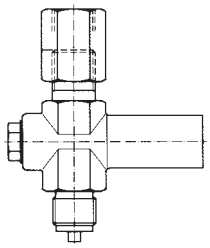
* Without DVGW and SVGW approval

Damping device (pressure surge protection) female x male – adjustable



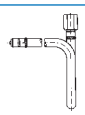
Connection	Nominal pressure	Material	Part no.	Price €
G½	PN 400	Brass	**63074**	
G½	PN 400	Steel	63075	
G½	PN 400	316 Ti	**63076**	

Overpressure safety device G½ female/female connection x male – adjustable, vacuum-tight



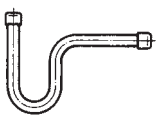
Adjustment range in bar	Material	Part no.	Price €	Material	Part no.	Price €
0.4–2.5	Brass	63131		316 Ti	63139	
2–6	Brass	63132		316 Ti	63140	
5–25	Brass	63133		316 Ti	63141	
20–60	Brass	63134		316 Ti	63142	
50–250	Brass	63135		316 Ti	63143	
240–400	Brass	63136		316 Ti	63144	
Extra charge oil-free and grease-free		63137			63145	
Extra charge DVGW-tested		63138			63146	

Siphon DIN 16282 – outlet female/female connection G½

	Design	Inlet	Material	Nominal pressure	Part no.	Price €
U shape 	A*	G½B	Steel	PN 100	63147	
	B	Without thread, welded end 20 x 2.6 mm	Steel	PN 100	**63148**	
	A*	G½B	316 Ti	PN 100	63149	
Circular shape	C*	G½B	Steel	PN 100	63150	
	D	Without thread, welded end 20 x 2.6 mm	Steel	PN 100	**63151**	
	C*	G½B	316 Ti	PN 100	63152	

* Types A and C are no longer provided for in the new DIN edition

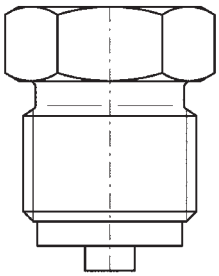
Siphon – standard – inlet G½

U shape	Circular shape	Design	Outlet	Material	Nominal pressure	Part no.	Price €
		U	G½B	Steel	PN 25	**63085**	
		U	Female/female connection G½B	Steel	PN 25	**63153**	
		Circular	G½B	Steel	PN 25	**63081**	
		Circular	Female/female connection G½B	Steel	PN 25	63154	

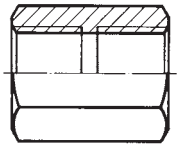
Accessories for pressure gauges

DG: E

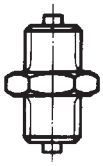
Reducers and adapters



Female connection	Male connection	Material	Part no.	Price €
G1/8	G1/4	Brass	**63050**	
G1/4	G1/8	Brass	**63052**	
G1/4	G3/8	Brass	**63053**	
G1/4	G1/2	Brass	**63054**	
G1/4	G1/2	316 Ti	63051	
G3/8	G1/4	Brass	**63056**	
G3/8	G1/2	Brass	**63057**	
G1/2	G1/4	Brass	**63058**	
G1/2	G3/8	Brass	**63059**	
G1/2	G3/8	316 Ti	**63062**	
G1/2	M 20 x 1.5	Brass	63155	
M 20 x 1.5	G1/2	Brass	63156	

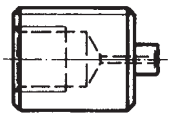


Female connection	Female connection	Material	Part no.	Price €
G1/4	G1/8	Brass	63158	
G1/4	G1/4	Brass	63159	
G1/2	G1/4	Brass	63160	
G1/2	G1/2	Brass	63161	



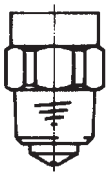
Male connection	Male connection	Material	Part no.	Price €
G1/2	G1/2	Brass	63164	
G1/2	G1/2	316 Ti	63165	

Connection nipple – self-sealing



Female connection	Male connection	Material	Part no.	Price €
G1/8	G1/4	Brass	**63067**	
G1/4	G3/8	Brass	**63068**	
G1/4	G1/2	Brass	**63069**	
G3/8	G1/2	Brass	**63065**	

Mounting valve with self-sealing coating – automatically closes when the pressure gauge is replaced

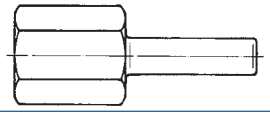


Female connection	Male connection	Material	Part no.	Price €
G1/4	G1/4	Brass	**77907**	
G1/4	G3/8	Brass	**77908**	
G3/8	G3/8	Brass	**77917**	
G1/4	G1/2	Brass	**77914**	
G3/8	G1/2	Brass	77918	

Accessories for pressure gauges

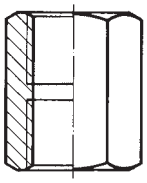
DG: E

Union nut + nipple DIN 16284



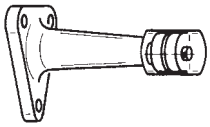
Female connection	Male connection	Material	Part no.	
G¼	6 mm	Brass	**63072**	
G½	12 mm	Brass	**63084**	
G½	12 mm	316 Ti	63070	

Female/female connection DIN 16283



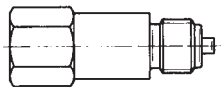
Female connection	Female connection	Material	Part no.	**Price €**
G¼ left	G¼	Brass	63101	
G¼ left	G¼	Steel	63102	
G¼ left	G¼	316 Ti	63103	
G½ left	G½	Brass	63104	
G½ left	G½	Steel	63105	
G½ left	G½	316 Ti	63106	

Instrument bracket DIN 16281 – type H



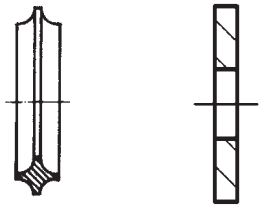
Female connection	Protrusion	Material	Part no.	**Price €**
26 mm	60 mm	Aluminium	**63077**	
26 mm	100 mm	Aluminium	**63078**	
26 mm	160 mm	Aluminium	63079	
26 mm	100 mm	316 Ti	63080	

Adapter DIN 16281



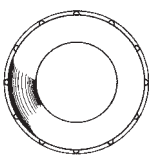
Female connection	Male connection	Material	Part no.	**Price €**
G½	G½	Brass	**63095**	
G½	G½	Steel	63097	
G½	G½	316 Ti	63096	

Seals



Design	For thread	Material	Part no.	**Price €**
Profile seal for inner centering	G¼ M 12 x 1.5	Copper	**39205**	
Profile seal for inner centering	G½ M 20 x 1.5	Copper	**39206**	
Flat gasket DIN 16258	G¼ M 12 x 1.5	Copper	**39209**	
Flat gasket DIN 16258	G½ M 20 x 1.5	Copper	**39210**	
Flat gasket DIN 16258	G½ M 20 x 1.5	316 Ti	39211	
Flat gasket DIN 16258	G½ M 20 x 1.5	PTFE	**39212**	

Protective caps



Nominal size*	Colour*	Material	Part no.	**Price €**
63	Blue	Rubber	**63029**	
63	Red	Rubber	**63100**	
63	Black	Rubber	63019	
80	Black	Rubber	63071	
100	Black	Rubber	**63030**	

* Other nominal sizes and colours on request.

Piston type diaphragm seals

Diaphragm seals

In-line chemical seals

CHAPTER 10

Chemical seals: Diaphragm seals, in-line chemical seals, piston type chemical seals

OVERVIEW

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DIAPHRAGM

Diaphragm seals MD 10 – plastic version 398

Diaphragm seals MD 21/22 – compact version 399

Diaphragm seals MD 30 – standard version 403

Diaphragm seals MD 40 – for the paper and pulp industries 404

Diaphragm seals MD 50/51 – for screwed pipe connections (food) 406

Diaphragm seals MD 60–62 – for hygienic processes 408

Diaphragm seals MD 56 – NEUMO BioControl® 411

Diaphragm seals MD 63 – for VARINLINE® housing 413

Diaphragm seals MD 70 – for homogenising machines 415

Diaphragm seals MD 80 – flange version 416

Diaphragm seals MD 81 – "tubus" flange version 418

PISTON

Piston type diaphragm seals KD 21 402

IN-LINE

In-line chemical seals RD 50/51/60 – for hygienic processes 421

In-line chemical seals RD 80 – intermediate flange version 422

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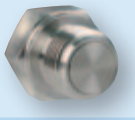
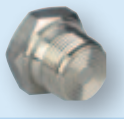
Mounting options 424

							
		MD 10	KD 21	MD 21	MD 22	MD 30	MD 40
Design		Diaphragm seal	Piston type diaphragm seal	Diaphragm seal	Diaphragm seal	Diaphragm seal	Diaphragm seal
Connection type	Nominal diameter / process connection	**Connection thread**	**Connection thread**	**Connection thread**	**Connection thread**	**Connection thread**	**Paper flange**
¼"		•			•		
½"		•	•	•	•	•	
¾"			•	•			
1"			•	•			
1½"			•	•			
2"			•	•			
2½"							
3"							
3½"							
4"							
DN 25							
DN 32							
DN 40							**DN 48**
DN 50							
DN 65							
DN 80							
DN 100							
PN 10	Pressure ratings	•					
PN 16		•					
PN 25						•	
PN 40					•		•
PN 65							
PN 80							
PN 100						•	
PN 160							
PN 250					•	•	
PN 600			•	•			
PN 1000				•			
-10/+40 (50) °C	Application areas	•	•	•	•	•	•
With cooling element > 100 °C				•	•	•	•
With capillary tube > 100 °C				•	•	•	•
Paraffin oil (FDA)	Filling fluid	•	•	•	•	•	•
Neobee (FDA)				•	•	•	•
Glycerine		•		•	•	•	•
Glycerine / water		•		•	•	•	•
Silicone oil				•	•	•	•
Halocarbon				•	•	•	•
High-temperature oil				•	•	•	•
Measurement of water and waste water	Application areas	•	•	•	•	•	
Measurement of oils				•	•	•	
Measurement of heavy fuel oil					•	•	
Measurement of chemicals		•		•	•	•	
Measurement of pulp materials			•				•
Measurement of food							
Measurement of pharmaceuticals							
Measurement of suspensions			•	•	•	•	•
Measurement of abrasive suspensions			•				
Measurement of crystallising media				•		•	•
Special materials	Options		•	•	•	•	•
Coatings				•		•	•
Other designs			•			•	•
Mating flanges							•
Seals			•			•	•
* See product description on the catalogue page or in the operating instructions		From page 398	From page 402	From page 399	From page 399	From page 403	From page 404

MD 50/51	MD 56	MD 60/61/62	MD 63	MD 80/81	RD 50	RD 60	RD 80
Diaphragm seal	Diaphragm seal	Diaphragm seal	Diaphragm seal	Diaphragm seal	In-line chemical seal	In-line chemical seal	In-line chemical seal
DIN 11851 / 11887 SMS 1147	**NEUMO BioCon-trol®**	**Clamp ISO 2852 Clamp DIN 32676 Tri-Clamp**	**VARIVENT/VARIN-LINE®**	**Flange connec-tion**	**DIN 11851 / 11887**	**Clamp ISO 2852**	**Flange connec-tion**
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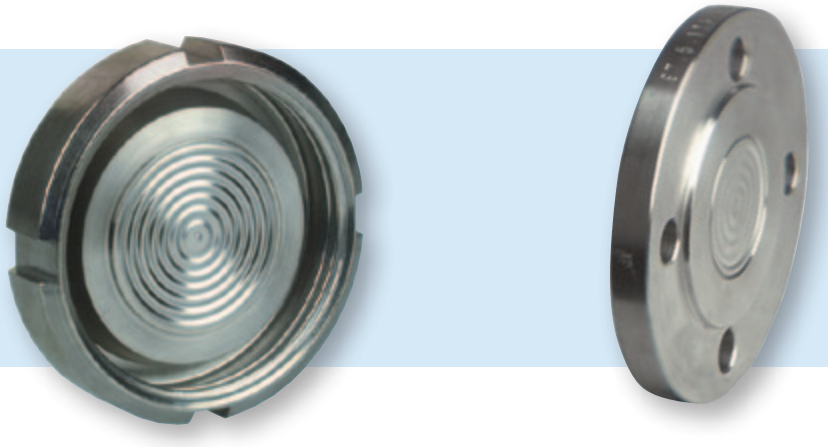
From page 406	From page 411	From page 408	From page 413	From page 416	From page 421	From page 421	From page 422

10

Chemical seals



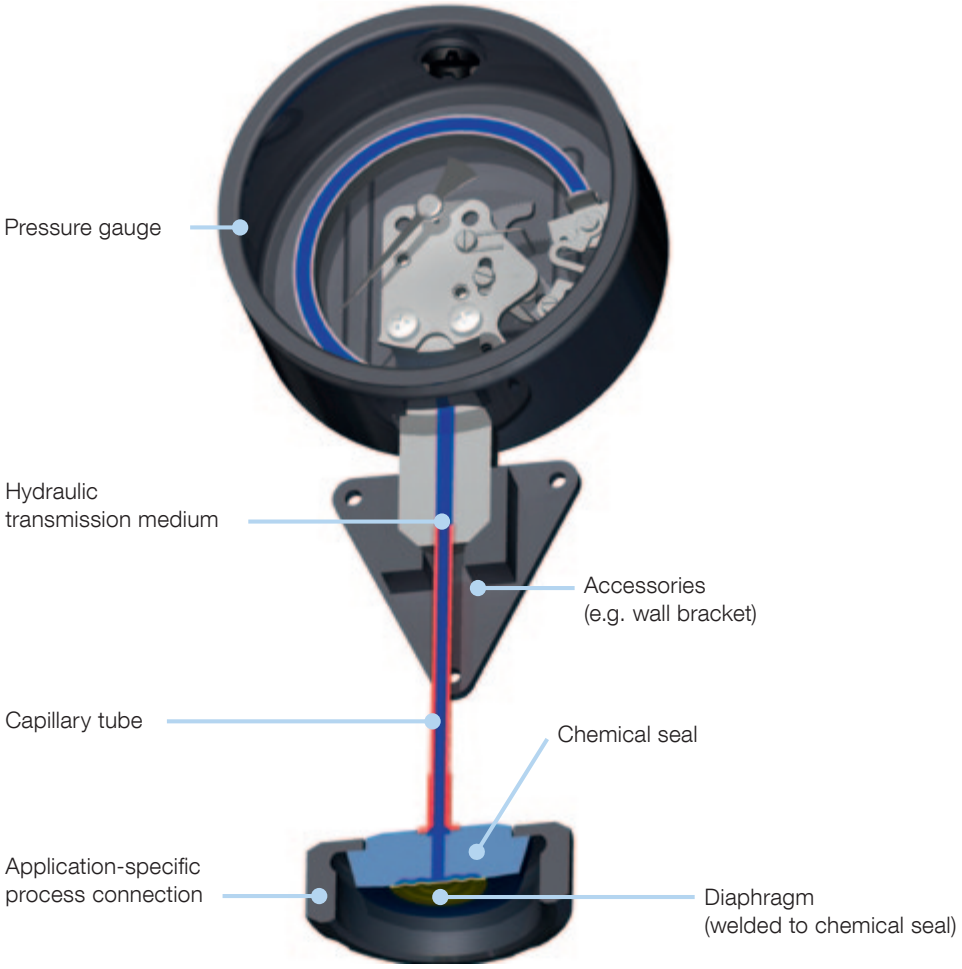
Application

Chemical seals are process connections with a separating diaphragm which separate the measuring system and the medium to be measured.
Chemical seals expand the application ranges of pressure gauges, pressure switches and pressure transducers.

Description

Chemical seals are used e.g. in the following situations:

- The medium must not come into contact with the measuring element, for example, because the medium is polluted, highly viscous, crystallises or hardens
- The medium is corrosive and the special materials which are sufficiently corrosion-resistant cannot be used for elastic measuring elements
- The ambient temperature at the measuring point or the temperature of the medium are extremely high
- For hygienic reasons, there must be no dead space
- The site conditions do not allow for direct installation of a pressure gauge



Chemical seals

Principle of operation

Chemical seals are used in conjunction with Bourdon tube pressure gauges, pressure transducers or pressure switches. They are either mounted directly to the measuring instrument or connected via a cooling element or a capillary tube. The separating element - a diaphragm or a pipe - is the main component of a chemical seal. The diaphragm seal is the most commonly used chemical seal. A chemical seal is always a sealed system; the space between the separating element and the measuring device (e.g. Bourdon tube) is evacuated and then filled with a pressure transmission liquid. The medium to be measured is in contact with the separating element and causes it to bend. This, in turn, causes a change of the volume within the system. The element must have a displacement capacity which is sufficient to move the measuring element. The deflection must always take place in the elastic area of the separating element. This is determined by the diameter, the material and the shape.

Temperature performance

The system is filled at room temperature. Different temperatures will change the volume of the filling liquid. This would have a negative impact on the accuracy. If you specify the operating temperatures, we can counteract this effect by selecting the most suitable filling liquid.
If the temperature exceeds 100 °C, the gauge and the chemical seal at the measuring point should be separated by means of a capillary tube or the system should be equipped with a cooling element.

Response time

Using a chemical seal will generally result in a delayed response of the pressure gauge. This effect may be used for additional damping.

Pressure transmission liquid

The filling liquid must be selected according to the minimum and maximum operating temperatures. In addition, the filling liquid and the medium must be compatible as it is possible that they will come into contact if the separating element is damaged.

Diaphragm seal MD 10 plastic version

- Robust plastic version
- Suitable for many chemicals
- Perfect solution for waste water
- Different materials available

Chapter 9

Chapter 11

Application

For use with Bourdon tube pressure gauges or pressure switches.
Specially for polluted waste water, fertilisers, corrosive media.

Technical specifications

Process connection
PVC, PP or PVDF
female thread G½ or G¼

Diaphragm
EPDM, PTFE-coated, internal

Instrument connection
Female thread G½ or G¼

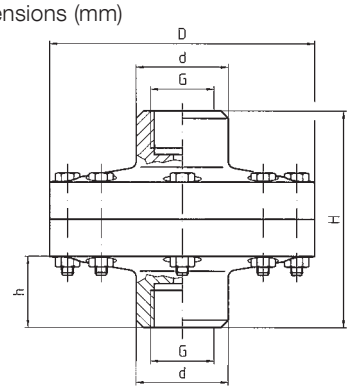
Screws and nuts
Stainless steel 304

Pressure transmission liquid
Glycerine (FM 03)

Pressure ranges
See price list section

Operating temperature range
PVC, PP -10/+40 °C
PVDF -10/+50 °C

Dimensions (mm)



G	d	D	h	H
G¼	25	72	15	71
G½	32	100	22	90

Options

- Other process connections
- Other materials

DG: M

MD 10 plastic version
Diaphragm EPDM PTFE-coated, PN 10 (PVDF PN 16)

Chemical seal body	Process connection	Instrument connection	Minimum range* (in bar) at nominal size				Part no.	**Price €**
			63	100	160	DMU		
PVC	G¼	G¼	1.6	1.6	1.6	---	31411	
PVC	G½	G½	1.6	1.6	1.6	---	31412	
PP	G¼	G¼	1.6	1.6	1.6	---	31900	
PP	G½	G½	1.6	1.6	1.6	---	31901	
PVDF	G¼	G¼	4	4	4	---	31902	
PVDF	G½	G½	4	4	4	---	31903	

Diaphragm seals MD 21/22 compact version

Type MD 21

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, hot and polluted media at high pressures. Specially suitable for mechanical engineering and chemical industry applications.

Technical specifications

Process connection
Stainless steel 316 L
G½B to G2B, DIN 3852 type A
fixed male thread

Diaphragm
Stainless steel 316 L,
welded flush to upper body,
no dead space

Instrument connection
Welded connection

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 600 to PN 1000

Options

- Adapter for instrument connection G¼B/G½B
- Cooling element (> 100 °C)
- Capillary tube
- Other threads
- Other materials
- Other filling liquids

Type MD 22

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, hot and polluted media at medium pressures. Specially suitable for the mechanical engineering and the chemical industry.

Process connection
Stainless steel 316 L
G½B, fixed male thread

Upper body and lower body
Stainless steel 316 L

Diaphragm
Stainless steel 316 L,
internal, welded

Instrument connection
Welded connection

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 40 to PN 250

- Adapter for instrument connection G¼B/G½B
- Cooling element (> 100 °C)
- Capillary tube
- Other threads
- Other materials
- Other filling liquids

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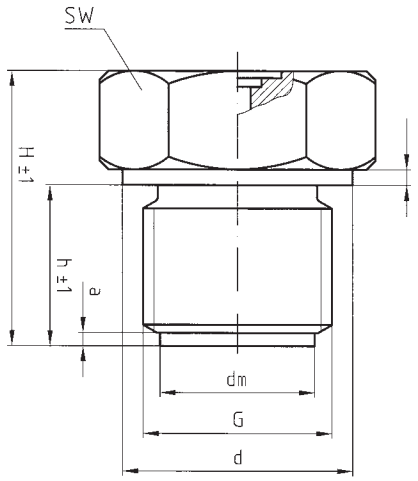
See page 401 for prices.

Diaphragm seals MD 21/22

Types and dimensions (mm)

Type MD 21



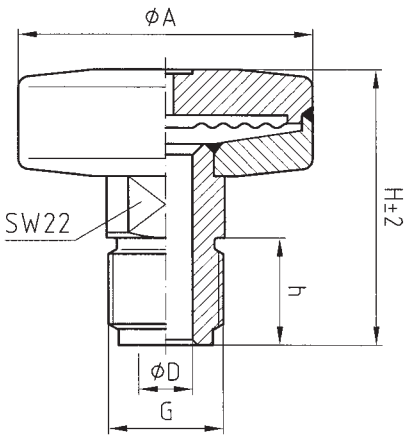
Pipe thread as per DIN 3852 type A
or ISO 228-1

G	d	dm	h	H	a	b	SW
G½B	26	17.2	17	33.5	3	3	27
G¾B	32	23.5	19	34	3	3	32
G1B	39	28	21	36	3	3	41
G1½B	55	40	25	48	3	3	55
G2B	68	50	27	56	3	3.5	70

Pipe thread as per ANSI/ASME B1.20.1

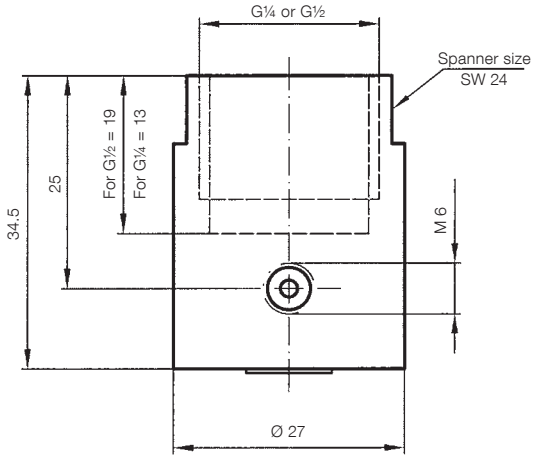
G	d	dm	h	H	a	b	SW
1"NPT	-	23.5	24	36	-	-	41
1½"NPT	-	35	25	45	-	-	55
2"NPT	-	48	26	50	-	-	70

Type MD 22

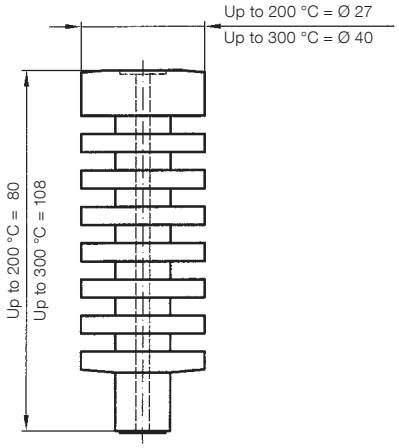


PN	G	ØA	ØD	h	H
40	G¼B	55	6	13	44.5
40	G⅜B	55	6	16	47.5
40	G½B	55	10	20	51.5
40	¼"NPT	55	6	15	46.5
40	½"NPT	55	10	20	51.5
250	G¼B	40	6	13	44.5
250	G⅜B	40	6	16	47.5
250	G½B	40	10	20	51.5
250	¼"NPT	40	6	15	46.5
250	½"NPT	40	10	20	51.5

Adapter for instrument connection G¼/G½
with filling port



Cooling element, can be welded at both ends



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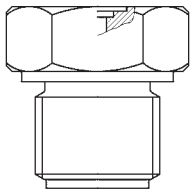
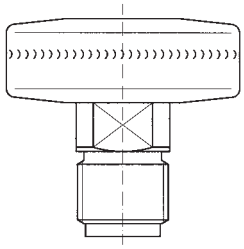
Diaphragm seals MD 21/22

DG: M



MD 21 compact version
diaphragm stainless steel 316 L, welded

Nominal pressure	Process connection	Instrument connection	Minimum range* (in bar) at nominal size				Part no.	**Price €**
			63	100	160	DMU		
PN 600	G½B	welded	10	100	100	1	31415W	
PN 1000	G¾B	welded	4	100	100	1	31416W	
PN 1000	G1B	welded	4	4	4	1	31328W	
PN 600	G1½B	welded	0.6	1.6	1.6	0.6	31329W	
PN 600	G2B	welded	0.6	0.6	0.6	0.6	31330W	**On request**



MD 22 compact version
diaphragm stainless steel 316 L, internal, welded

Nominal pressure	Process connection	Instrument connection	Minimum range* (in bar) at nominal size				Part no.	**Price €**
			63	100	160	DMU		
PN 40	G¼B	welded	0.6	0.6	0.6	0.6	31997W	
PN 40	G½B	welded	0.6	0.6	0.6	0.6	31998W	
PN 40	½-14 NPT	welded	0.6	0.6	0.6	0.6	31999W	
PN 250	G¼B	welded	4	4	4	4	32000W	
PN 250	G½B	welded	4	4	4	4	32001W	
PN 250	½-14 NPT	welded	4	4	4	4	32002W	

* Valid for standard pressure transmission liquid with direct mounting (without capillary tube) at a room temperature and temperature of the medium of 20 °C.

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See page 424 for extra charges for options, mounting and accessories.

Piston type chemical seal KD 21

NEW

- **Piston instead of diaphragm: For extremely rough conditions with abrasive media**
- **For pressures from 10 bar to 600 bar**
- **Robust and reliable pressure measurement**
- **Shock- and vibration-resistant**

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, polluted and abrasive suspensions at high pressures. Specially for pressure measurements of waste water, drilling water, sludge, concrete, plaster and minerals.

Technical specifications

Process connection
Stainless steel 316 L
Thread G½B to G2B, ½-14 NPT to 2-11½ NPT

Seal
FKM (Viton)

Pressure connection
Stainless steel 316 L
Flush

Instrument connection
Welded connection

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

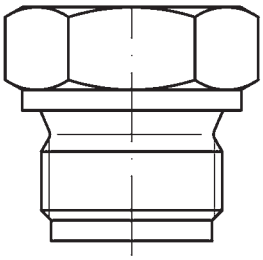
Pressure ranges
0/10 bar to 0/600 bar

Nominal pressure
PN 600

Accuracy
With pressure gauge cl. 2.5
With pressure transducer 1.0 % FS

Operating temperature ranges
Ambient: -10/+55 °C
Medium: -10/+80 °C

Can be mounted to
- Bourdon tube pressure gauges NG 50, 63, 80, 100, 160 and RF 130 PG
- Pressure transducer DMU
- Pressure switch DS



Options

- Adapter for instrument connection G¼/G½
- Capillary tube
- Flange connections EN, ANSI, JIS
- Other process connections
- Other materials
- Other filling liquids, except for Neobee M20 (FM 10)
- Other measuring ranges

DG: M

Nominal pressure	Process connection	Instrument connection	Minimum range* (in bar) at nominal size				Part no.	**Price €**
			63	100	160	DMU		
PN 600	G½B	welded	10	16	16	10	31420W	
PN 600	G¾B	welded	10	16	16	10	31421W	
PN 600	G1B	welded	10	16	16	10	31422W	
PN 600	G1½B	welded	10	16	16	10	31423W	
PN 600	G2B	welded	10	16	16	10	31424W	
PN 600	½–14 NPT	welded	10	16	16	10	31425W	
PN 600	¾–14 NPT	welded	10	16	16	10	31426W	
PN 600	1–11½ NPT	welded	10	16	16	10	31427W	
PN 600	1½–11½ NPT	welded	10	16	16	10	31428W	
PN 600	2–11½ NPT	welded	10	16	16	10	31429W	

* Valid for standard pressure transmission liquid with direct mounting (without capillary tube) at a room temperature and temperature of the medium of 20 °C.

Diaphragm seal MD 30 standard version with threaded connection

- Can be disassembled and cleaned
- Applications up to 250 bar
- Welded diaphragm
- Many process connections available

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, viscous, polluted or hot media.

Technical specifications

Process connection/lower body
Stainless steel 316 L
G½B or ½ NPT
Female or male thread

Diaphragm
Stainless steel 316 L

Seal
FKM (Viton)

Instrument connection/upper body
Stainless steel 316 L
Welded connection

Retaining flanges
Stainless steel 316 L

Spacer ring
Stainless steel 316 L

Screws and nuts
Stainless steel 304

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 25 to PN 250

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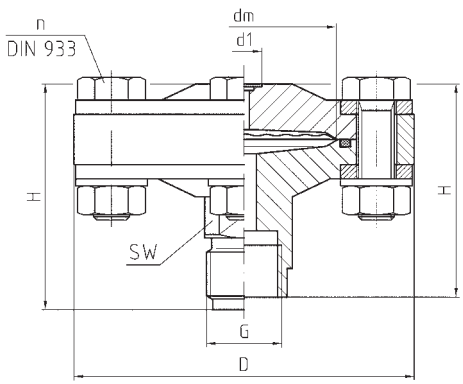
Dimensions (mm)



G	d1	PN	dm	D	H	n	SW
G½	10	25	36	95	60	4xM10	22
G½B	10	25	36	95	63	4xM10	22
½-14NPT	10	25	36	95	63	4xM10	22
G½	10	100	36	95	60	4xM10	22
G½B	10	100	36	95	63	4xM10	22
½-14NPT	10	100	36	95	63	4xM10	22
G½	10	250	56	95	56	8xM10	22
G½B	10	250	56	95	79	8xM10	22
½-14NPT	10	250	56	95	76	8xM10	22

Options

Process connection/lower body
- Special materials/coatings
- Other connection threads

Diaphragm
- Special materials/coatings

Seal
- Other materials

Instrument connection/upper body
- Adapter for instrument connection G¼B/G½B
- Cooling element (> 100 °C)
- Capillary tube

Screws/nuts/spacer ring
- Other materials

Miscellaneous
- Other filling liquids

i
See page 405 for prices.

Diaphragm seal MD 40 for the paper and pulp industries

- **Special flange connection for the pulp and paper industries**
- **Compact design**
- **Can be welded directly to the pressure gauge**
- **Various tubus lengths available**

A Chapter 9

A Chapter 11

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, highly viscous, polluted or hardening media. Typical applications areas:
- Paper industry
- Pulp industry
- Lacquer industry

Technical specifications

Process connection/tubus
Stainless steel 316 L, DN 48
loose retaining flange,
stainless steel 304

Diaphragm
Stainless steel 316 L

Seal
NBR (Perbunan)

Instrument connection
Stainless steel 316 L
Welded connection

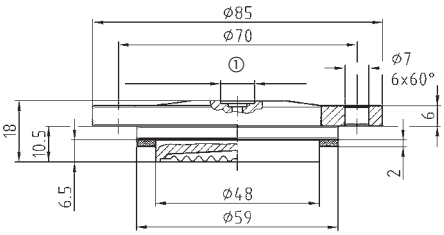
Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 40

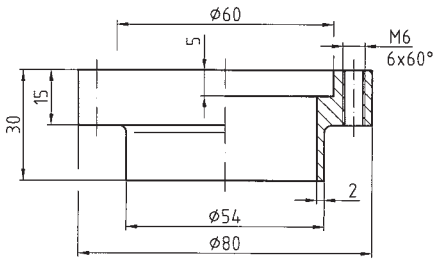
Scope of delivery
- Diaphragm seal
- Screws M 6 x 20 (galvanised steel)
- Seal (NBR) 59 x 48 x 2 mm

MD 40
Dimensions (mm)



① Welded connection Ø 10 for instrument

Welding flange (option)
Dimensions (mm)



Options

Process connection/tubus
- Extended tubus 18 mm (also suitable for O ring seal)
- Special materials
- Silicone-free version

Diaphragm
- Special materials

Instrument connection
- Adapter for instrument connection G¼ B/G½B
- Cooling element (> 100 °C)
- Capillary tube

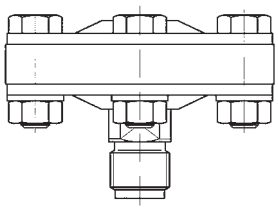
Miscellaneous
- Other filling liquids

Mounting accessories
- Welding flange stainless steel 304

i See page 405 for prices.

Diaphragm seals MD 30/40

DG: M



MD 30 standard version

Nominal pressure	Process connection	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
PN 25	Stainless steel 316 L, G½B	0.6	0.6	0.6	0.6	31417W	
PN 100	Stainless steel 316 L, G½B	0.6	0.6	0.6	0.6	31331W	
PN 250	Stainless steel 316 L, G½B	0.6	0.6	0.6	0.6	31332W	

Extra charges	
Process connection G½B, PFA-coated	
Process connection ½-14 NPT	
Process connection ½-14 NPT, PFA-coated	
Process connection G½ female thread	**Without extra charge**
Process connection G½ female thread, PFA-coated	

MD 40 version for the paper and pulp industries

Instrument connection stainless steel 316 L, welded connection
Process connection stainless steel 316 L, DN 48, PN 40 (including seal and screws)
Retaining flange stainless steel 304, ranges 0/1.6 to 0/40 bar*

	Part no.	**Price €**
Direct connection	31347W	
Spare parts/accessories		
6 screws M6 x 20	31418	
Spare seal, Perbunan 59 x 48 x 2	31419	

* Valid for standard pressure transmission liquid with direct mounting (without capillary tube) at a room temperature and temperature of the medium of 20 °C.

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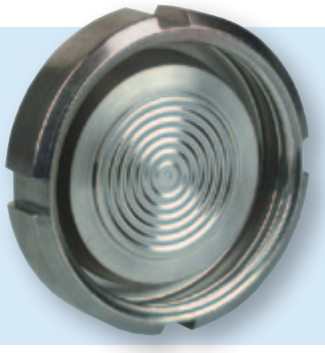
Diaphragm seal MD 50/51 for screwed pipe connections (food)



- **All materials FDA-listed**
- **Suitable for SIP/CIP**
- **No dead space**
- **Various standards available**

Application

Diaphragm seals MD 50/51 with food law compliant screwed pipe connection for hygienic process separation of pressure measuring and control units in pipes or tanks. For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For installation in hygienic processes without dead spaces. Typical applications areas:

- Food and beverages industry
- Dairies
- Beverage machines
- Breweries

Description

All materials used are FDA-listed. The chemical seal and the measuring instrument are welded together, resulting in an inseparable single, shock- and vibration-resistant unit that does not require additional external protection. The chemical seals are available with various nominal diameters; due to their compact design, they are suitable for a wide range of applications.

Technical specifications

Type
MD 50 and 51

Process connections
MD 50: DIN 11851/11887 DN 25 to DN 80
MD 51: SMS 1147 1" to 3"

Material
Stainless steel 316 L, FDA-listed

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
0.6 bar to 40 bar

Can be mounted to

- Bourdon tube pressure gauges NG 50, 63, 80, 100, 160
- Pressure transducers (DMU)
- Pressure switches (DS)

Options

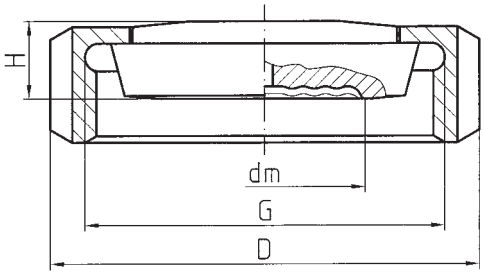
- Other designs (Südmo, Guth)
- Other materials
- Cooling element
- Capillary
- Other pressure transmission liquids
- Accessories such as union nuts and seals
- Other process connections:
  MD 52: DIN 11864-1/11853-1 DN 25 to DN 80
  MD 53: APV-RJT 1" to 3"
  MD 54: IDF 1" to 3"
  MD 55: APV-ISS 1" to 3"

i
See page 410 for prices.

Diaphragm seals MD 50/51

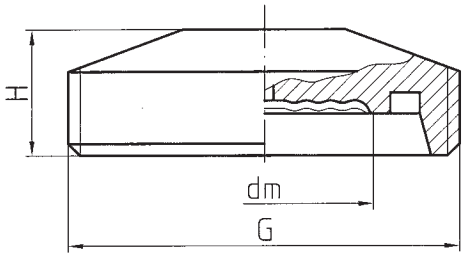
Types and dimensions (mm)

Tapered socket DIN 11851 type D/ DIN 11887 type B with grooved union nut DIN 11851 type F (female)



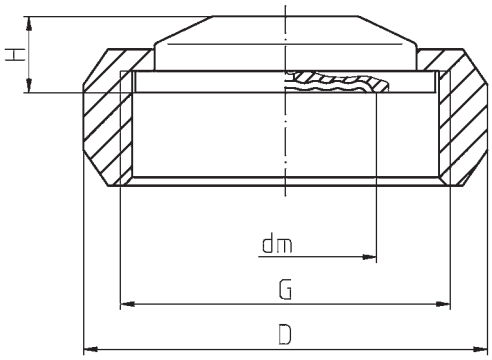
Version	DN	PN	dm	G	D	H
DIN 11851	25	40	23.5	Rd52x1/6	63	14
	32	40	28	Rd58x1/6	70	14
	40	40	36	Rd65x1/6	78	14
	50	25	48	Rd78x1/6	92	15
	65	25	48	Rd95x1/6	112	16
	80	25	48	Rd110x1/4	127	80

Threaded socket DIN 11851 type C/DIN 11887 type A (male)



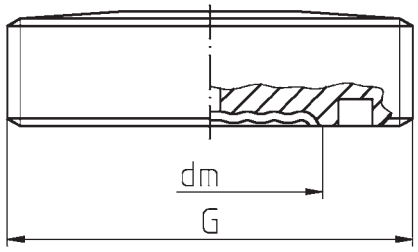
Version	DN	PN	dm	G	H
DIN 11851	25	40	23.5	Rd52x1/6	21
	32	40	28	Rd58x1/6	21
	40	40	36	Rd65x1/6	21
	50	25	48	Rd78x1/6	21
	65	25	-	Rd95x1/6	-

Socket and union nut SMS 1147 (female)



Version	DN	PN	dm	G	D	H
SMS standard	1½"	40	36	Rd60x1/6	74	14
	2''	40	48	Rd70x1/6	84	14
	2½"	25	48	Rd85x1/6	100	14

Threaded socket SMS 1147 (male)



Version	DN	PN	dm	G	H
SMS standard	1½"	40	36	Rd60x1/6	17
	2''	40	48	Rd70x1/6	17
	2½"	25	48	Rd85x1/6	17

Diaphragm seals MD 60–62 for hygienic processes

- 3-A-certified
- All materials FDA-listed
- Suitable for SIP/CIP
- No dead space

A Chapter 9

A Chapter 11

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For viscous, perishable or hot media. Typical applications areas:
- Food and beverages industry
- Beverages industry
- Pharmaceutical industry
- Biotechnology

Description

All materials used are FDA-listed. The chemical seal and the measuring instrument are welded together, resulting in an inseparable single, shock- and vibration-resistant unit that does not require additional external protection. The chemical seals are available with various nominal diameters; due to their compact design, they are suitable for a wide range of applications.

Technical specifications

Type
MD 60: Clamp ISO 2852
MD 61: Clamp DIN 32676
MD 62: Tri-Clamp

Process connection
Stainless steel 316 L
Clamp ¾" to 3"

Diaphragm
Stainless steel 316 L,
welded to upper body, no dead space

Instrument connection
Welded connection

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 25 to 40

Options

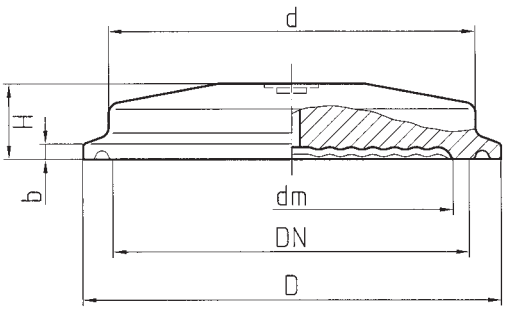
- Adapter for instrument connection G¼B/G1½B
- Special materials/coatings
- Electropolished
- Cooling element (> 100 °C)
- Capillary tube
- Other filling liquids
- Accessories (retainer ring, seal, socket)

i See page 410 for prices.

Diaphragm seals MD 60–62

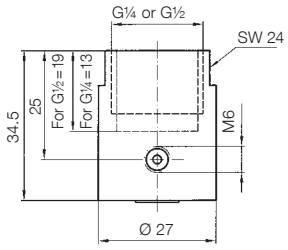
Types and dimensions (mm)

Clamp connection ISO 2852

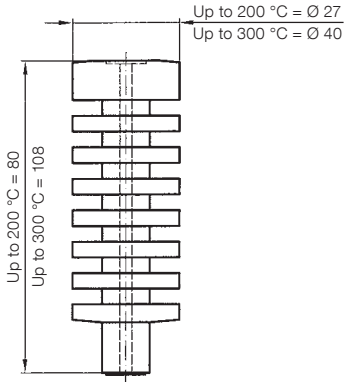


DN	PN	D	dm	d	H	b
¾"	40	25	17.2	19	14	3.6
1"	40	50.5	28	42	14	2.85
1½"	40	50.5	36	42	14	2.85
2"	40	64	48	55	14	2.85
2½"	25	77.5	59	68	14	2.85
3"	25	91	72	81	14	2.85

Adapter for instrument connection G¼B/G½B with filling port



Cooling element, can be welded at both ends



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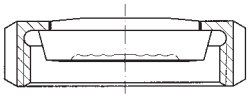
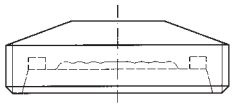
Diaphragm seals MD 50/51/60

DG: M



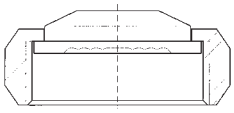
MD 50 for hygienic processes, grooved union nut DIN 11851 (female)

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
25	40	4	4	4	1	31300W	
32	40	0.6	1.6	1.6	1	31301W	
40	40	0.6	0.6	0.6	1	31302W	
50	25	0.6	0.6	0.6	0.6	31303W	
65	25	0.6	0.6	0.6	0.6	31304W	



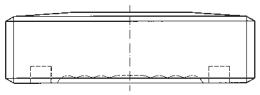
MD 50 for hygienic processes, threaded socket DIN 11851 (male)

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
25	40	4	4	4	1	31306W	
32	40	0.6	1.6	1.6	1	31307W	
40	40	0.6	0.6	0.6	1	31308W	
50	25	0.6	0.6	0.6	0.6	31309W	
65	25	0.6	0.6	0.6	0.6	31310W	



MD 51 for hygienic processes, grooved union nut SMS 1147 (female)

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
1½"	40	0.6	0.6	0.6	1	31314W	
2"	40	0.6	0.6	0.6	0.6	31315W	
2½"	25	0.6	0.6	0.6	0.6	31316W	



MD 51 for hygienic processes, threaded socket SMS 1147 (male)

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
1½"	40	0.6	0.6	0.6	1	31320W	
2"	40	0.6	0.6	0.6	0.6	31321W	

MD 60 clamp connection ISO 2852

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
¾"	40	6	---	---	1.6	31913W	
1"	40	4	4	---	1	31914W	
1½"	40	0.6	0.6	1.6	1	31324W	
2"	40	0.6	0.6	0.6	0.6	31325W	
2½"	25	0.6	0.6	0.6	0.6	31326W	

* Valid for standard filling liquid with direct mounting (without capillary tube) at a room temperature and temperature of the medium of 20 °C.

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See page 424 for extra charges for options, mounting and accessories.

Diaphragm seal
MD 56 NEUMO BioControl®

- **Defined installation and compacting due to metal stop**
- **Hygienic design as per EHEDG recommendations**
- **No risk of fluid getting behind the seal**
- **Suitable for SIP/CIP**

A Chapter 9

A Chapter 11

Application

Flange type diaphragm seal MD 56 for sterile process separation of pressure measuring and control units in pipes or tanks. For use with Bourdon tube pressure gauges, pressure transducers and pressure switches. For installation in sterile processes without dead spaces. Typical applications areas:

- Sterile applications in process engineering
- Pharmaceutical industry
- Biotechnology
- Food and beverages industry
- Beverage machines
- Dairies
- Breweries

Description

All materials used are FDA-listed. Defined installation as per EHEDG recommendations. The chemical seal and the measuring instrument are welded together, resulting in an inseparable single, shock- and vibration-resistant unit without external edges that might collect dirt. The chemical seals are available with nominal diameters 25, 50, 65, 80; due to their compact design, they are suitable for a wide range of applications.

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Technical specifications

Type
MD 56

Process connection
NEUMO BioControl®
D25, D50, D65, D80

Material
Stainless steel 316 L, seal EPDM; FDA-listed

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
0.6 bar to 16 bar

Can be mounted to

- Bourdon tube pressure gauges NG 50, 63, 80, 100, 160
- Pressure transducers (DMU)
- Pressure switches (DS)

Options

- Other materials
- Electropolished
- Cooling element
- Capillary
- Other filling liquids
- Accessories such as housing, block flange and seals

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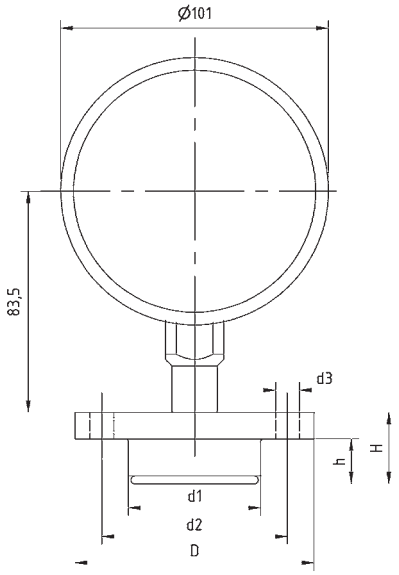
See page 412 for prices.

Diaphragm seal MD 56

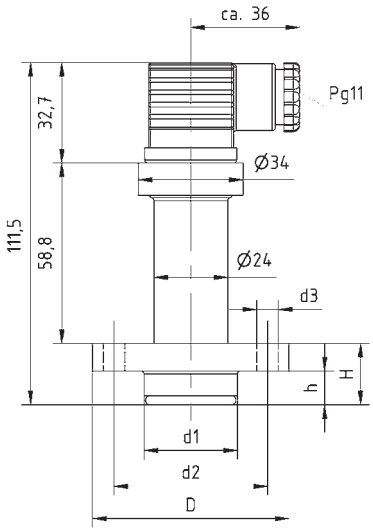
NEW

Types and dimensions (mm)

Pressure gauge NG 100 with MD 56



Pressure transducer DMU 02 Vario BC



DG: M

Type	D	d1	d2	d3	H	h	Part no.	**Price €**
BioControl® D25	Ø 64	Ø 30.4	Ø 50	4 x Ø 7	20	11	31410W	
BioControl® D50	Ø 90	Ø 49.9	Ø 70	4 x Ø 9	27	17	31411W	
BioControl® D65	Ø 120	Ø 67.9	Ø 95	4 x Ø 11	27	17	31412W	
BioControl® D80	Ø 140	Ø 87.4	Ø 115	4 x Ø 11	37	25	31413W	

Diaphragm seal MD 63 for VARINLINE® housings

FDA NEW

- **Defined installation and compacting due to metal stop**
- **Hygienic design as per EHEDG recommendations**
- **No risk of fluid getting behind the seal**
- **Suitable for SIP/CIP**

A Chapter 9

A Chapter 11

Application

Diaphragm seal MD 63 for sterile process separation of pressure measuring and control units in pipes or tanks. For use with Bourdon tube pressure gauges, pressure transducers and pressure switches. For installation in sterile processes without dead spaces. Typical applications areas:

- Sterile applications in process engineering
- Pharmaceutical industry
- Biotechnology
- Food and beverages industry
- Beverage machines
- Dairies
- Breweries

Description

All materials used are FDA-listed and comply with the EHEDG recommendations. The chemical seal and the measuring instrument are welded together, resulting in an inseparable single, shock- and vibration-resistant unit without external edges that might collect dirt. The chemical seal is available for type F and type N; due to its compact design, it is suitable for a wide range of applications.

Technical specifications

Type
MD 63

Process connection
For VARINLINE®/VARIVENT® In-line housing
Type F for housing DN 25 and 1"
(nominal installation diameter 50 mm)
Type N for housing DN 40–125 and 1½"–6"
(nominal installation diameter 68 mm)

Material
Stainless steel 316 L, seal FKM (Viton);
FDA-listed

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
0.6 bar to 25 bar

Can be mounted to

- Bourdon tube pressure gauges NG 50, 63, 80, 100, 160
- Pressure transducers (DMU)
- Pressure switches (DS)

Options

- Other materials
- Cooling element, electropolished (> 100 °C)
- Capillary tube
- Other filling liquids
- Accessories (brackets, housings and seals)

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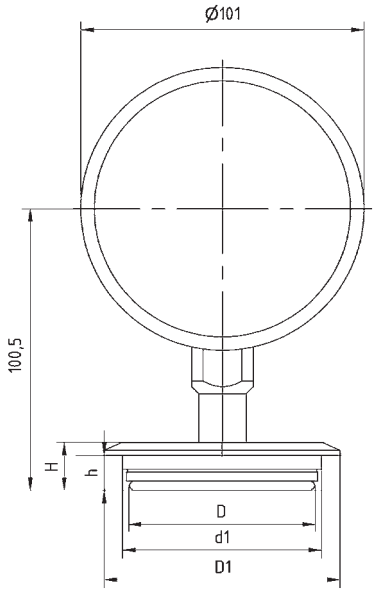
See page 414 for prices.

Diaphragm seal MD 63

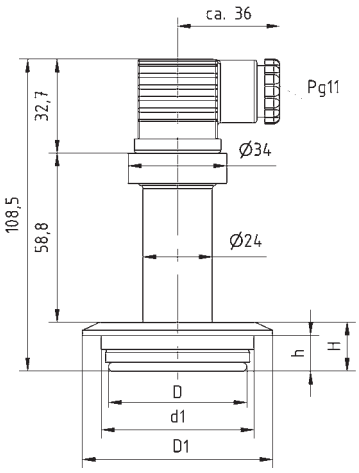
NEW

Types and dimensions (mm)

Pressure gauge NG 100 with MD 63



Pressure transducer DMU 02 Vario VT



DG: M

Type	D	D_1	d_1	H	h	D	Part no.	**Price €**
VARIVENT® MD 63 type F	50	Ø 66	Ø 53	17	12.3	DN 25; 1"	31340W	
VARIVENT® MD 63 type N	68	Ø 84	Ø 71	17	12.3	DN 40-125; 1½"-6"	31341W	

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Chemical seal MD 70 for homogenising machines

- For high pressures
- Ideal for high dynamic loads
- Compact and robust design
- Easy integration into existing systems

Application

For use with Bourdon tube pressure gauges and pressure transducers. For highly viscous media at high pressures. Specially for homogenising machines.

Technical specifications

Process connection
Stainless steel 316 L
loose retaining flange,
Stainless steel

Diaphragm
Stainless steel 316 L,
welded to upper body, no dead space

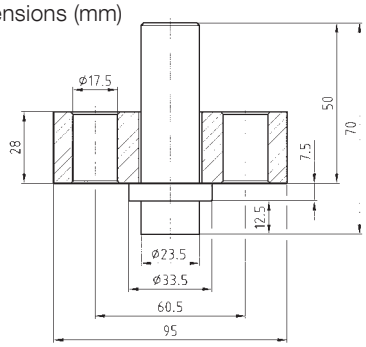
Instrument connection
Stainless steel 316 L
Welded connection

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 600

Dimensions (mm)



Options

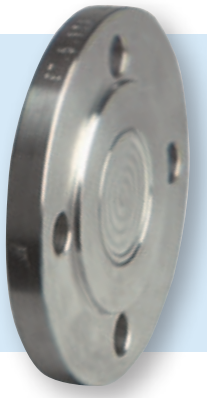
- Nominal pressure PN 1600
- Other filling liquids

DG: M

MD 70 version for homogenising machines		
Instrument connection stainless steel 316 L Process connection stainless steel 316 L, DN 23.9, PN 600 Ranges 0/100 to 0/600 bar*	Part no.	**Price €**
	31352W	
Price reduction without retaining flange	Net	

* Valid for standard pressure transmission liquid with direct mounting (without capillary tube) at a room temperature and temperature of the medium of 20 °C.

Diaphragm seal MD 80
Flange version



- **Flush, laser-welded diaphragm**
- **For DIN and ASME flange connections**
- **Numerous special materials and coatings (option)**
- **With bottom instrument connection as cell design (option)**

A Chapter 9

A Chapter 11

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, highly viscous, polluted, crystallising or hot media. Typical applications areas:

- Chemical industry
- Petrochemistry
- Refineries
- Power plant engineering

Technical specifications

Type
MD 80

Process connection
Stainless steel 316 L,
Flange connection as per EN 1092-1 type B 1
DN 25 to 100 or ASME B 16.5 DN 1" to 4"

Diaphragm
Stainless steel 316 L

Instrument connection
Welded connection

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 40
Class 150 to 300

Options

Process connection

- Special materials/coatings
- Other sealing surfaces
- Cell design

Diaphragm

- Special materials: Hastelloy, Monel, nickel, Inconel, Incoloy, platinum, titanium, tantalum, zirconium, other chrome-nickel-steel alloys
- Coatings/linings:
  PFA (up to 200 °C), ECTFE (up to 150 °C)
  PTFE (up to 150 °C, up to 100 bar)
  Silver (up to 150 °C), gold (up to 200 °C)

Miscellaneous

- Higher nominal pressures
- Cell design
- Adapter for instrument connection G¼B/G½B
- Cooling element (> 100 °C)
- Capillary tube (back or bottom)
- Other filling liquids
- Customer-specific flanges
- Other nominal diameters

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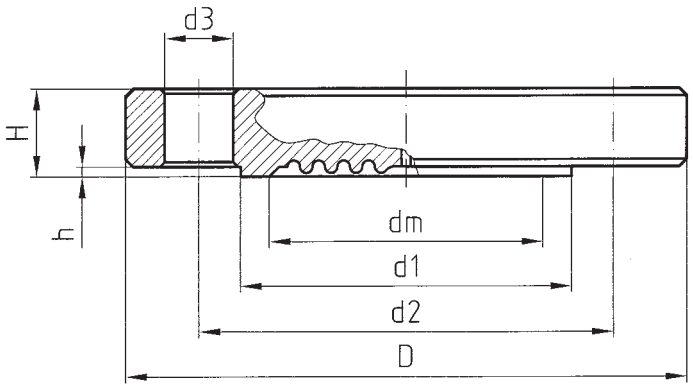
See page 419 for prices.

Diaphragm seal MD 80

Types and dimensions (mm)



Flange connection as per EN 1092-1 type B 1

DN	PN	D	d1	d2	d3	H	h	dm
25	40	115	68	85	4x14	18	3	28
40	40	150	88	110	4x18	18	3	48
50	40	165	102	125	4x18	18	3	48
80	40	200	138	160	8x18	24	3	48
100	40	235	162	190	8x22	24	3	48

Flange connection as per ASME B 16.5

DN	CL	D	d1	d2	d3	H	h	dm
1"	150	108	50.8	79.4	4x15.9	14.3	1.6	28
	300	123.9	50.8	88.9	4x19.1	17.5	1.6	28
1½"	150	127	73.2	98.6	4x15.9	17.5	1.6	36
	300	155.6	73.2	114.3	4x22.4	22.4	1.6	36
2"	150	152.4	92.1	120.7	4x19.1	19.1	1.6	48
	300	165.1	92.1	127	8x19.1	25.4	1.6	48
3"	150	190.5	127	152.4	4x19.1	23.9	1.6	48
	300	209.6	127	168.3	8x22.4	31.8	1.6	48
4"	150	228.6	157.2	190.5	8x19.1	23.9	1.6	48
	300	254	157.2	200.1	8x22.3	31.7	1.6	48

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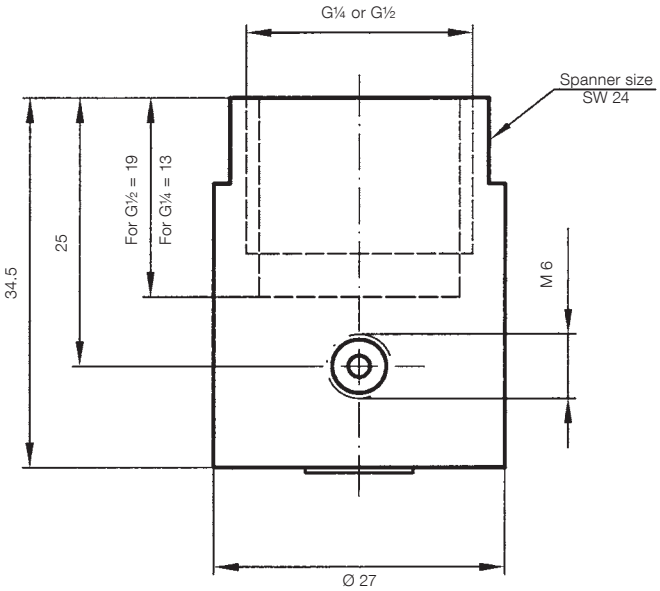
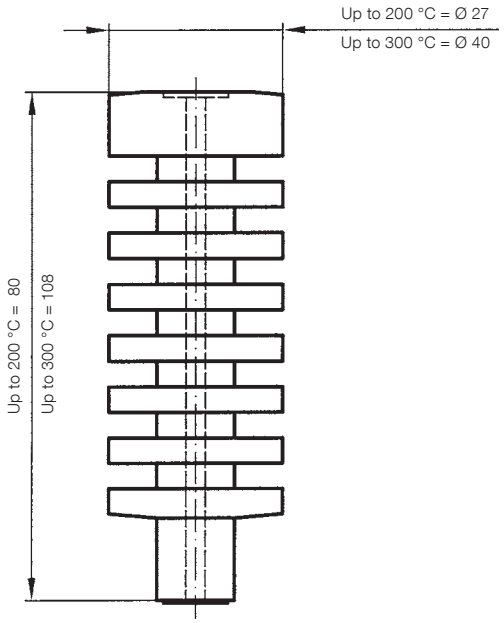
Adapter for instrument connection G¼ / G½
with filling port

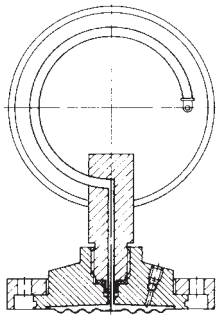


Cooling element, can be welded at both ends



Diaphragm seal MD 81
Tubus flange version

- For tanks with thick walls
- For higher block flanges and increased insulation
- Connection as per DIN or ASME
- Tubus length can be adapted as required



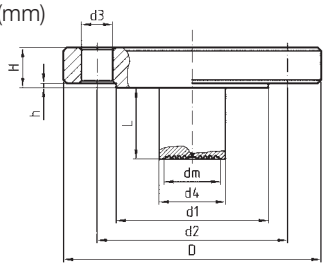
Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For corrosive, highly viscous, polluted, crystallising or hot media. Ideal for insulated or thick-walled tanks. Specially designed for use in the chemical and petrochemical industries, in refineries or power plant engineering.

Technical specifications

Process connection
Stainless steel 316 L,
Flange connection as per EN 1092-1 type B 1
DN 50 to 100 or ASME B 16.5 DN 1" to 3"
Tubus lengths 50, 100, 150 mm

Dimensions (mm)



Diaphragm/sealing surface
Stainless steel 316 L, welded

Instrument connection
Stainless steel 316 L, welded connection

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

Nominal pressure
PN 40
Class 150

Flange connection as per EN 1092-1 type B 1

DN	PN	D	d_1	d_2	d_3	d_4	H	h	dm	L
50	40	165	102	125	4x18	48	20	3	48	50, 100, 150
80	40	200	138	160	8x18	76	24	3	75	
100	40	235	162	190	8x22	94	24	3	93	

Flange connection as per ASME B 16.5

DN	CL	D	d_1	d_2	d_3	d_4	H	h	dm	L
1"	150	108	51	79.5	4x16	25	14.5	1.5	27	50, 100, 150
2"	150	152	92	121	4x19	48	19	1.5	48	
3"	150	190	127	152	4x19	76	24	1.5	75	

Options

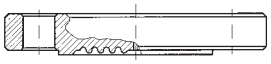
Process connection
- Other tubus lengths
- Special materials/coatings
- Other sealing surfaces

Diaphragm
- Special materials: Hastelloy, Monel, nickel, Inconel, Incoloy, platinum, titanium, tantalum, zirconium, other chrome-nickel-steel alloys
- Coatings/linings:
  PFA (up to 200 °C), ECTFE (up to 150 °C)
- PTFE (up to 150 °C, up to 100 bar)
  Silver (up to 150 °C), gold (up to 200 °C)

Miscellaneous
- Adapter for instrument connection G¼B/G½B
- Capillary tube (back or bottom)
- Cooling element (> 100 °C)
- Other filling liquids
- Customer-specific flanges
- Other nominal diameters

Diaphragm seals MD 80/81

DG: M

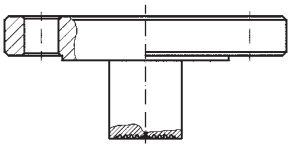


MD 80 flange version, flange connection as per EN 1092-1 type B 1

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
25	40	4	4	4	0.6	31333W	
40	40	4	4	4	0.6	31336W	
50	40	0.6	0.6	0.6	0.6	31339W	
80	40	0.6	0.6	0.6	0.6	31385W	
100	40	0.6	0.6	0.6	0.6	31388W	

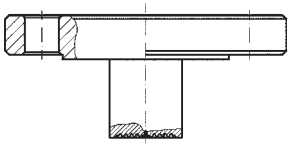
MD 80 flange version, flange connection as per ASME B 16.5

Nominal diameter DN	Nominal pressure PN	Minimum range*				Part no.	**Price €**
		63	100	160	DMU		
1"	150	4	4	4	1	31393W	
	300	4	4	4	1	31394W	
1½"	150	4	4	4	1	31396W	
	300	4	4	4	1	31397W	
2"	150	0.6	0.6	0.6	0.6	31399W	
	300	0.6	0.6	0.6	0.6	31400W	
3"	150	0.6	0.6	0.6	0.6	31402W	
	300	0.6	0.6	0.6	0.6	31403W	
4"	150	0.6	0.6	0.6	0.6	31405W	
	300	0.6	0.6	0.6	0.6	31406W	



MD 81 tubus flange version, tubus length 50 mm, flange connection as per EN 1092-1 type B 1

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
50	40	1	2.5	---	1	31917W	
80	40	0.6	0.6	1	1	31921W	
100	40	0.6	0.6	1	1	31924W	



MD 81 tubus flange version, tubus length 50 mm, flange connection as per ASME B 16.5

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
1"	150	4	4	---	1	31938W	
2"	150	1	2.5	---	1	31929W	
3"	150	0.6	0.6	1	1	31931W	

Extra charges €

	Nominal diameter DN		
Tubus length	50/2"	80/3"	100
100 mm			
150 mm			

* Valid for standard pressure transmission liquid with direct mounting (without capillary tube) at a room temperature and temperature of the medium of 20 °C.

i

See page 420/424 for extra charges for options, mounting and accessories.

Extra charges for diaphragm seals MD 80/81

DG: M

Type of sealing surface		MD 80	MD 81
		Extra charges €	**Extra charges €**
Groove, type D EN 1092-1 (for stainless steel)			
Tongue, type C EN 1092-1 (for stainless steel)			
Groove, type RJF ASME B 16.5			
Capillary connection			
Capillary connection back			
Capillary connection bottom			
Special materials for wetted parts*	Nominal diameter		
Hastelloy C276	DN 25		
	DN 40		
	DN 50		
	DN 80		
	DN 100		
Tantalum	DN 25		
	DN 40		
	DN 50		
	DN 80		
	DN 100		
Monel 400, nickel, Inconel, platinum, titanium			
Coatings*			
PFA (up to 200 °C)	DN 25		
	DN 40		
	DN 50		
	DN 80		
	DN 100		
ECTFE (up to 150 °C)	DN 25		
	DN 40		
	DN 50		
	DN 80		
	DN 100		
PTFE, silver, gold	All nominal diameters		

* Please enquire for special materials for groove or tongue version.

In-line chemical seals RD 50/51/60 for hygienic processes

- **For dairy fitting DIN 11851 and clamp connection ISO 2852**
- **No T piece required in pipe**
- **Easy, fast installation in pipe**

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For flowing, corrosive and highly viscous media; designed for direct installation in pipes. Typical applications areas:

- Biochemical applications
- Food and beverages industry
- Beverages industry
- Pharmaceutical industry

Technical specifications

Process connection
RD 50: DIN 11851, 316 L,
male thread DN 15 to DN 100,
RD 51: SMS 1147 1" to 3"
RD 60: Clamp ISO 2852, 316 L 1/2" to 3"

Diaphragm
Stainless steel 316 L, no dead space, welded to body

Instrument connection
Stainless steel 316 L
Welded connection

Pressure transmission liquid
Paraffin oil (FM 09), FDA-listed

Pressure ranges
See price list section

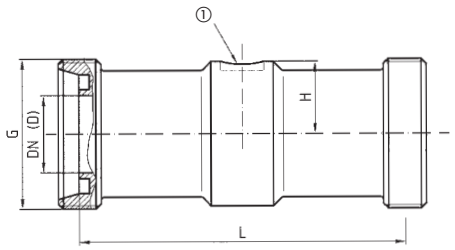
Nominal pressure
PN 25 and PN 40

Options

- Cooling element (> 100 °C)
- Capillary tube

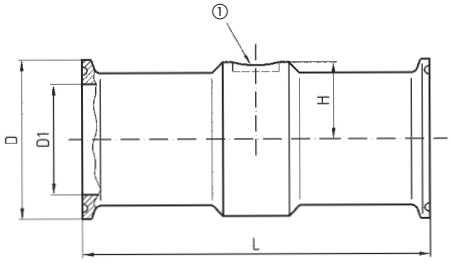
10

Type RD 50 DIN 11851/DIN 11887



① Welded connection Ø 10 for instrument

Type RD 60 Clamp ISO 2852



① Welded connection Ø 10 for instrument

DN	PN	G	L	D	H
15	40	Rd34x1/8"	240	16	20
25	40	Rd52x1/6"	110	26	24
32	40	Rd58x1/6"	110	32	29
40	40	Rd65x1/6"	110	38	31.5
50	25	Rd78x1/6"	110	50	37
65	25	Rd95x1/6"	110	66	45
80	25	Rd110x1/4"	60	81	51.5
100	25	Rd130x1/4"	60	100	64

DN	PN	D	D1	L	H
1"	16	50.5	22.2	110	24
1½"	16	50.5	34.8	110	31.5
2"	16	64	47.8	110	37
2½"	16	77.5	60.3	110	45
3"	10	91	72.9	60	51.5
4"	10	119	97.6	60	51.5

i
See page 423 for prices.

In-line chemical seal RD 80 intermediate flange version

- Easy intermediate flange installation in the pipe
- Various nominal sizes
- Various nominal pressures
- Special materials (option)

Application

For use with Bourdon tube pressure gauges, pressure transducers or pressure switches. For flowing, corrosive and highly viscous media, for direct installation in pipes.

Technical specifications

Process connection
Stainless steel 316 L,
for flanges as per EN 1092-1
Type B 2,
DN 25 to DN 100 or
ASME B 16.5, 1" to 4"

Diaphragm
Stainless steel 316 L,
welded to body, no dead space

Instrument connection
Stainless steel 316 L
Female thread G½

Pressure transmission liquid
Paraffin oil (FM 09)

Pressure ranges
See price list section

Nominal pressure
PN 4 to 400
Class 150 to 6000

Dimensions (mm)
Flange connection as per EN 1092-1 type B 2

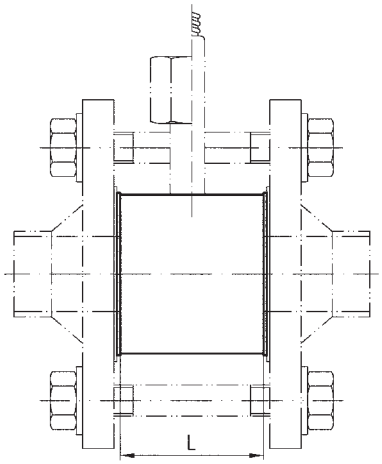
DN	Di	PN	Da	L	H
25	28.5	4-400	68	100	29
40	43.1	4-400	88	100	29
50	54.5	4-400	100	100	29
65	70.3	4-400	120	100	29
80	82.5	4-400	138	60	29
100	107.1	4-400	160	60	29

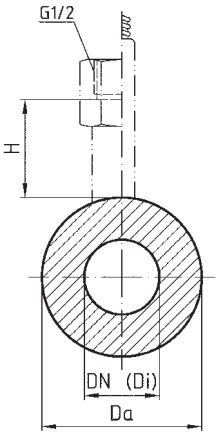
Flange connection as per ASME B 16.5

DN	Di	PN	Da	L	H
1"	28.5	150–6,000	50	100	29
1½"	43.1	150–6,000	73.2	100	29
2"	54.5	150–6,000	91.9	100	29
3"	82.5	150–6,000	127	60	29
4"	107.1	150–6,000	157.2	60	29

Options

- Coatings
- Cooling element (> 100 °C)
- Capillary tube
- Other filling liquids





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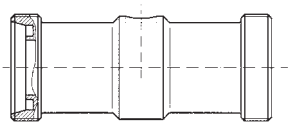
See page 423 for prices.

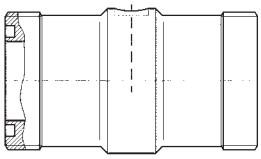
In-line chemical seals RD 50/51/60/80

DG: M



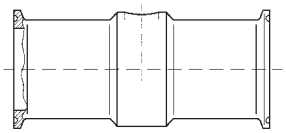
RD 50 for hygienic processes, male thread DIN 11851

Nominal diameter DN	Nominal pressure PN	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
15	40	1.6	---	---	4	31952W	
25	40	1.6	2.5	---	1	31365W	
32	40	1	2.5	---	1	31953W	
40	40	1	2.5	4	1	31366W	
50	25	1	2.5	4	0.6	31367W	
80	25	1	2.5	4	0.6	31369W	



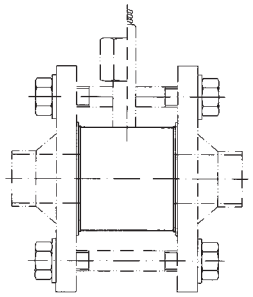
RD 51 for hygienic processes, threaded socket SMS 1147

Nominal diameter	Nominal pressure	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
1"	40	1.6	2.5	---	1.6	31371W	
1½"	40	1.6	2.5	4	1.6	31372W	
2"	40	1	1.6	2.5	1.6	31373W	
2½"	25	1	1.6	2.5	1.6	31374W	
3"	25	1	1.6	1.6	1.6	31375W	



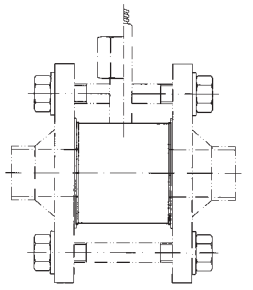
RD 60 clamp connection ISO 2852

Nominal diameter	Nominal pressure	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
1"	16	1.6	2.5	---	1.6	31377W	
1½"	16	1.6	2.5	4	1.6	31378W	
2"	16	1.6	2.5	2.5	1	31379W	
2½"	16	1.6	2.5	2.5	1	31380W	
3"	10	1.6	2.5	2.5	1	31381W	



RD 80 intermediate flange version for flanges as per EN 1092-1 type B 2

Nominal diameter	Nominal pressure	Minimum range* (in bar) at nominal size				Part no.	**Price €**
		63	100	160	DMU		
25	4–400	1.6	2.5	---	1.6	31355	
40	4–400	1.6	2.5	4	1.6	31356	
50	4–400	1.6	2.5	2.5	1	31357	
65	4–400	1.6	2.5	2.5	1	31956	
80	4–400	1.6	2.5	2.5	1	31358	



RD 80 intermediate flange version for flanges as per ASME B 16.5

Nominal diameter	Nominal pressure	Minimum range*				Part no.	**Price €**
		63	100	160	DMU		
1"	150–6,000	1.6	2.5	---	1.6	31360	
1½"	150–6,000	1.6	2.5	4	1.6	31361	
2"	150–6,000	1.6	2.5	2.5	1	31362	
3"	150–6,000	1.6	2.5	2.5	1	31363	
4"	150–6,000	1.6	2.5	2.5	1	31364	

* Valid for standard pressure transmission liquid with direct mounting (without capillary tube) at a room temperature and temperature of the medium of 20 °C.

See page 424 for extra charges for options, mounting and accessories.

Chemical seals – fitting prices and accessories

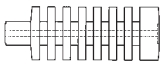
DG: M

The fitting price includes fitting of the pressure gauge or pressure transducer to the chemical seal, filling of the system with transmission liquid, closing and securing the screw connections and calibration of the system at room temperature (20 °C).
The final price consists of the price for the pressure gauge, the price for the chemical seal, the fitting price and the price for options and/or accessories, if applicable.

Fitting prices € [1]	Length of capillary tube	Fitting to AFRISO Bourdon tube pressure gauge [2]		Fitting to AFRISO pressure transducer [2]	
Direct mounting (at >100 °C it is advisable to use a cooling element or a capillary tube)		Part no.	**Price €**	Part no.	**Price €**
	---	32007		32016	
Fitting with capillary tube Capillary tube stainless steel, screwed or welded to chemical seal, with kink protection and connection piece for instrument bracket	1 metre	32008		32017	
	2 metres	32009		32018	
	3 metres	32010		32019	
	4 metres	32011		32020	
	5 metres	32012		32021	
	6 metres	32013		32022	
	8 metres	32014		32023	
	10 metres	32015		32052	
	Other				

Extra charges	**Price €**
Metal spiral protection hose Per metre	
Calibration of the filled system at operating temperatures other than +20 °C (between +20 and +100 °C), with dial marking tA = x °C	
Calibration of the filled system at operating temperatures other than +20 °C (between > +100 and +180 °C), with dial marking t_A = x °C	

	Other pressure transmission liquids	Operating temperature range [3]	
FM 01	Silicone oil	-20/+200 °C	
FM 02	Silicone oil	-90/+100 °C	
FM 03	Glycerine	0/230 °C	
FM 04	Glycerine/water	-10/+120 °C	
FM 05	Almond oil	-10/+250 °C	
FM 06	High-temperature oil	-10/+300 °C	
FM 07	High-temperature oil	-10/+400 °C	
FM 08	Halocarbon [4] (for oxygen or chlorine)	-40/+175 °C	
FM 09	Paraffin oil (FDA-compliant)	-10/+220 °C	**Standard**
FM 10	Neobee® M20 (FDA-compliant)	-20/+200 °C	

Accessories		Version	Part no.	**Price €**	Version	Part no.	**Price €**
Adapter for instrument connection with thread and filling port, for welding to chemical seal		Instrument connection G¼ female	32003		Instrument connection G½ female	32004	
Cooling element, can be welded at both ends (only suitable for factory-fitting)		Up to T_{max} medium 200 °C (Ø 27)	32005		Up to T_{max} medium 300 °C (Ø 40)	32006	
Cooling element, screw connection at both ends G½ female x male		Up to T_{max} medium 200 °C (Ø 27)	31420		Up to T_{max} medium 300 °C (Ø 40)	31421	

1) For differential pressure measuring devices = twice the fitting price
2) Please enquire for other makes or measuring instruments
3) Only at positive overpressure
4) Up to a maximum of 160 bar

SIL
Protect your process!

Pressure transducers
with SIL assessment

Pressure transducers
with flush connection

HydroFox® for
level measurement

Pressure transducers
OEM version

CHAPTER 11

Electronic pressure measuring instruments: pressure transducers, digital pressure gauges, pressure switches

OVERVIEW

Selection table pressure transducers 428

Technical information pressure transducers 430

OEM VERSION

Pressure transducers DMU 600/20 – compact version 432

Pressure transducers DMU 01K – compact version 433

MECHANICAL ENGINEERING

Pressure transducers DMU 01 – standard version 434

PROCESS ENGINEERING

Pressure transducers DMU 02 – industrial version 438

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Pressure transducers HydroFox® DMU 07 – for level measurement 457

Pressure transducers HydroFox® DMU 08 – level probe 459

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Pressure transducers DeltaFox® DMU 10 D – version for differential pressure measurement 463

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PROCESS ENGINEERING

Pressure transducers DMU 12 – intelligent version 469

Pressure transducers DMU 13 – with local display 471

Pressure transducers DMU 14 – version with field housing 473

QUALITY ASSURANCE

Universal digital pressure gauge DIM 20 – service instrument 475

		DMU 600/20	DMU 01	DMU 02	DMU 02 Vario	DMU 03	DMU 04	DMU 05
Smallest measuring range		0/1 mbar	0/1 bar	0/600 mbar	0/1 bar	0/100 mbar	0/100 mbar	0/100 mbar
Largest measuring range		0/50 bar	0/400 bar	0/2,000 bar	0/1000 bar	0/600 bar	0/400 bar	0/600 bar
4–20 mA/HART	Output	•/-	•/-	•/-	•/-	•/-	•/-	•/-
0–10 V	Output	•	•	•		•	•	
≤ ± 1% FSO	Accuracy	•						
≤ ± 0.5% FSO	Accuracy		•	•				
≤ ± 0.35% FSO	Accuracy				•	•	•	
≤ ± 0.1% FSO	Accuracy							•
Stainless steel	Wetted parts			•	•		•	•
Stainless steel, FKM	Wetted parts					•		
Stainless steel, ceramic (AL_2O_3), FKM	Wetted parts		•					
Stainless steel, silicon, glass, silicone	Wetted parts	•						
Aluminium, silicon, glass, silicone, PUR	Wetted parts							
No pressure transmission liquid	Pressure transmission	•	•	•				
Paraffin oil, FDA	Pressure transmission				•		•	
Silicone oil	Pressure transmission					•		•
Connection thread	Process connection	•	•	•	•	•	•	•
Hygienic connections	Process connection				•		•	
Flanges	Process connection				•			
ISO 4400 connector	Electrical connection	•	•	•	•	•	•	•
M12 x 1	Electrical connection	•	•	•	•	•	•	
Fixed cable connection	Electrical connection	•	•	•		•	•	
Cable gland	Electrical connection						•	
Temperature of the medium ≥ 100 °C	Application area		•	•		•	•	•
Temperature of the medium < 100 °C	Application area	•			•			
Temperature of the medium < -25 °C	Application area		•	•		•		•
Temperature of the medium ≥ -25 °C	Application area	•			•		•	
Measuring range spread	Evaluation				•			
Indication of measured values	Evaluation							
ATEX certificate	Evaluation			•		•	•	•
SIL assessment	Evaluation					•	•	
Negative pressure (vacuum)	Application areas	•	•	•	•	•	•	•
Relative pressure measurement	Application areas	•	•	•	•	•	•	•
Absolute pressure measurement	Application areas		•			•	•	•
Differential pressure measurement	Application areas							
Measurement of water / waste water	Application areas	•	•	•	•	•	•	•
Measurement of oils	Application areas	•	•	•	•	•	•	•
Measurement of chemicals	Application areas			•	•		•	•
Measurement of food	Application areas				•		•	
Measurement of pharmaceuticals	Application areas				•		•	
Measurement of crystallising media	Application areas				•		•	
Measurement of gases	Application areas	•	•	•	•	•	•	•
Measurement of liquids	Application areas	•	•	•	•	•	•	•
		From page 432	From page 434	From page 438	From page 440	From page 447	From page 451	From page 453

* Depending on measuring range
** Accuracy of mechanical local display

DMU 07	DMU 08	DMU 09	DMU 10 D	DMU 11 D	DMU 12	DMU 13	DMU 14	DIM 20
0/40 mbar	0/100 mbar	0/40 mbar	0/6 mbar	0/400 mbar	0/160 mbar	0/600 mbar	0/250 mbar	0/2.5 bar
0/20 bar	0/25 bar	0/10 bar	0/1 bar	0/16 bar	0/400 bar	0/40 bar	0/600 bar	0/700 bar
•/-	•/-	•/-	•/-	•/-	•/•	•/-	•/•	
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From page 457	From page 459	From page 461	From page 463	From page 465	From page 469	From page 471	From page 473	From page 475

11

Pressure transducers

Application

Pressure transducers are used for electronic pressure measurement in many industrial and building applications. Various measuring principles, output signals, materials, pressure transmission liquids and process connections allow pressure transducers to be used in almost any application. Pressure transducer versions are available for abrasive, pure, highly viscous, viscous or crystallising media as well as special models for hygienic processes.

Typical applications areas

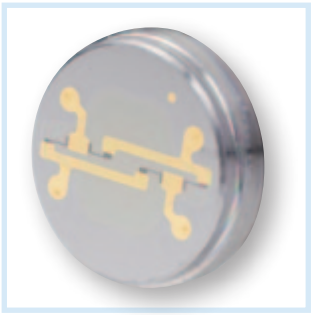
- Pneumatic/hydraulic
- Gas industry
- Process engineering
- Pharmaceutical and biotechnology applications
- Chemical industry and petrochemical industry
- Medical technology
- Laboratory applications
- Food applications
- Water treatment
- Waste water applications
- Mechanical and plant engineering
- Automation
- Filter monitoring
- Heating, refrigeration, air conditioning
- Automotive industry

Connection technology with numerous versions, diffusion-tight and extremely robust: pressure transducer DMU 02 Vario

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. Different pressure transducer versions are available which use a variety of measuring principles serving as the basis for sensing the pressure.

Measuring principle and measuring cell

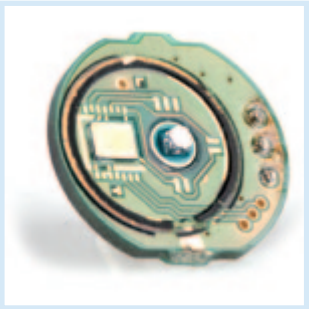


Piezo-resistive polysilicon stainless steel measuring cell
An isolation layer made of non-conductive silicon oxide is coated to the stainless steel diaphragm (a high-precision part calculated in view of the force path) on the side facing away from the medium; after that, polysilicon is deposited. Semiconductor resistors are etched from this layer; a gold layer provides contacts. When pressure is applied and causes a deflection, the resistance changes. As compared to conventional strain gauges (conductors), polysilicon semiconductor sensors have a higher output signal.
Since the measuring cell is made of stainless steel, it can be directly welded to the process connection. This helps to prevent leaks caused by fatigue of the sealing material. These robust measuring cells are insensitive to shock and vibration and have a high resistance to overloads. They are used for pressure measurements from 600 mbar up to several thousand bar.

Pressure transducers with polysilicon stainless steel measuring cells:
DMU 02, 02 Vario

Benefits
- Robust measuring cell
- High resistance to chemicals
- No seal
- No internal transmission liquid
- High output signal
- High long-term stability
- Shock- and vibration-resistant

Measuring principle and measuring cell



Piezo-resistive silicon measuring cells

The function principle of piezo-resistive silicon measuring cells is based on a silicon chip with measuring resistors in the diaphragm. When pressure is applied and causes a deflection of the diaphragm, the resistance changes.

As opposed to open measuring cells which can only be used with certain, non-corrosive media, the silicon chips of encapsulated measuring cells are contained in a gas-evacuated protective housing filled with transmission liquid; this housing is closed with an elastic diaphragm at the pressure side.

If the diaphragm is deflected as a result of the application of pressure, the transmission liquid is displaced towards the sensor.
Silicon measuring cells are highly sensitive and have a high output signal. This allows for measurements at very low pressures and provides for high chemical resistance.

Pressure transducers with encapsulated silicon stainless steel measuring cells:
DMU 03, 04, 05, 08, 11, 12, 13, 14

Pressure transducers with open silicon measuring cells:
DMU 10 D, 600/20

Benefits
- High resistance to chemicals
- High output signal
- Very small measuring ranges possible
- High accuracy

Measuring principle and measuring cell

Ceramic measuring cells

Aluminium oxide (Al_2O_3) that is resistant to almost all chemicals is used for ceramic measuring cells. Piezo-resistive thick-film measuring cells consist of a base and a diaphragm made of aluminium oxide ceramic. During the production process, measuring resistors are burnt into the side of the diaphragm facing away from the medium; they change when pressure is applied to the diaphragm and causes a deflection. Ceramic thick-film measuring cells are used for medium pressure from 1 bar to up to 400 bar.

Capacitance ceramic measuring cells use a ceramic base and a ceramic diaphragm which are gold-coated on the side facing away from the pressure. The gold coating forms the electrode pair of a capacitor; they are positioned at a distance of just a few µm away from each other. Pressure causes a deflection of the diaphragm and the capacitance changes. Capacitance ceramic measuring cells are used for low pressures from 100 mbar to up to 60 bar; they have a high overload resistance.

Both measuring cell types are mounted to the process connection via elastomer seals. The use of ceramic measuring cells is only limited by the chemical resistance of the seals. Different pressure loads and pressure measuring ranges can be obtained by varying the thickness of the diaphragm.

Pressure transducers with piezo-resistive thick-film measuring cell:
DMU 01K, 01, 01 VM and DIM 20

Pressure transducers with capacitance ceramic measuring cell:
DMU 07, 09

Benefits
- Robust measuring cell
- High resistance to chemicals
- Abrasion-resistant
- No internal transmission liquid
- No chemical seal required

Pressure transducers DMU 600/20 Compact version

NEW

- Special OEM unit
- Compact design
- Superior price/performance ratio due to automated large-scale production
- High pressure resistance
- No transmission liquid

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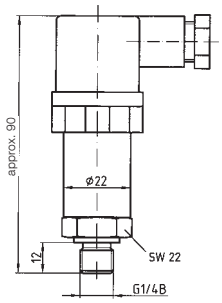
Dimensions (mm)



Application

Electronic pressure measurement for media such as air, chemical gases (humidity: 0 to 85 % rH, not condensing), water, oil, petrol. Not suitable for media which react with glass, silicon, stainless steel 304 or silicone glue.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 600/20 is equipped with a piezo-resistive silicon measuring cell.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): <±1 % FSO

Measuring ranges
Relative pressure: 0/4 mbar to 0/40 bar

Overpressure safety
At least 2 x FS
(burst pressure at least 3 x FS)

Operating temperature range

Medium:	-25/+85 °C
Ambient:	-25/+85 °C
Storage:	-40/+85 °C

Temperature error band
In compensated range
0/70 °C < 0.5 % FSO/10 K

Dynamic characteristics
Response time < 1 ms

Process connection
G¼B, DIN 3852 type E

Materials

Housing:	Stainless steel 304
Pressure connection:	Stainless steel 304
Diaphragm:	Silicon, glass
Seal:	Silicone

Supply voltage
DC 10–32 V

Output signal
4–20 mA, 2-wire

Load
4–20 mA $\leq \frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
4–20 mA < 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

- Other measuring ranges
- Other process connections
- Other electrical connections
- Fixed cable connection
- Other output signals

DG: H

Measuring range			Part no.	Price €
0/4 bar	50	-	33005	
0/6 bar	50	-	33006	
0/10 bar	50	-	33007	
0/16 bar	50	-	33008	
0/25 bar	50	-	33009	
0/40 bar	50	-	33010	

Other measuring ranges on request

Pressure transducers DMU 01K
Compact version

- Special OEM unit
- Proven ceramic technology
- No mechanical ageing of the measuring cell
- Superior price/performance ratio due to automated large-scale production
- Compact design
- No transmission liquid

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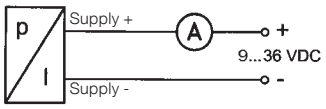
Wiring diagram
(4–20 mA, 2-wire)



Application

For electronic pressure measurement in industrial or HVAC applications (such as hydraulic, pneumatic, automation, heating or air conditioning).

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 01K is equipped with a piezo-resistive thick-film ceramic measuring cell.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): < ±1 % FSO

Measuring ranges
Relative pressure: 0/1.6 to 0/250 bar

Overpressure safety
At least 1.5 x FS
(burst pressure at least 3 x FS)

Operating temperature range
Medium: -40/+125 °C
Ambient: -40/+85 °C
Storage: -40/+85 °C

Temperature error band
In compensated range
-25/+85 °C ≤ 0.5 % FSO/10 K

Dynamic characteristics
Response time: < 10 ms
Voltage: < 3 ms

Process connection
G¼B, DIN 3852 type E

Material

Housing:	Stainless steel 304
Pressure connection:	Stainless steel 304
Diaphragm:	Ceramic (Al_2O_3 96 %)
Seal:	FKM (Viton)

Supply voltage
2-wire DC 8–32 V

Output signal
4–20 mA, 2-wire

Load
4–20 mA ≤ $\frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
4–20 mA < 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

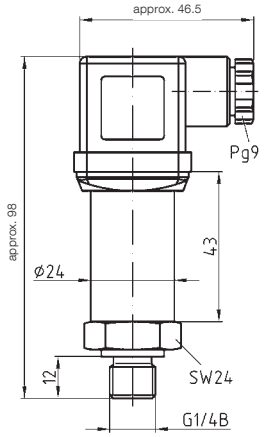
Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

- Fixed cable connection
- Other output signals
- Other connection threads
- Output signal 0–10 V, 3-wire

Dimensions (mm)



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See page 436 for prices.

11

Pressure transducers DMU 01
Standard version

- Proven ceramic technology
- No mechanical ageing of the measuring cell
- No transmission liquid
- Versions for relative pressure and absolute pressure
- Small temperature error

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Application

For electronic pressure measurement in industrial applications (such as hydraulic and pneumatic applications as well as mechanical and plant engineering).

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 01 is equipped with a piezo-resistive thick-film ceramic measuring cell.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): < ±0.5 % FSO
(measuring range -1/0 bar < ± 1 % FSO)

Measuring ranges
Relative pressure: -1/0 to 0/400 bar
Absolute pressure: 0/1 to 0/400 bar

Overpressure safety
At least 1.5 x FS
(burst pressure at least 2 x FS)

Operating temperature range

Medium:	-40/+125 °C
Ambient:	-40/+85 °C
Storage:	-40/+85 °C

Temperature error band
In compensated range
-25/+85 °C ≤ ± 0.3 % FSO/10 K

Dynamic characteristics
Response time

2-wire	< 10 ms
3-wire	< 3 ms

Process connection
G½B (EN 837-1/7.3) or G½ DIN 3852 type E with flush diaphragm (DMU 01 VM up to max. 0/25 bar)

Materials

Housing:	Stainless steel 304
Pressure connection:	Stainless steel 304
Diaphragm:	Ceramic (Al_2O_3 96 %)
Seal:	FKM (Viton)

Supply voltage
2-wire DC 8–32 V
3-wire DC 14–30 V

Output signal
4–20 mA, 2-wire
0–10 V, 3-wire

Load
4–20 mA ≤ $\frac{U_B - U_{Bmin}}{0.02\ A}$
0–10 V > 10 kOhm

Current input

4–20 mA	< 25 mA
0–10 V	< 5 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A, EN 175301-803), IP 65)

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

- Fixed cable connection
- Other output signals
- Other connection threads
- Fitting of chemical seal (measuring range ≥ 0/10 bar)

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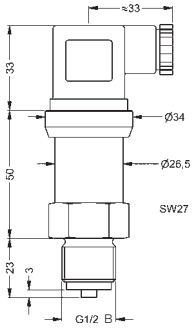
See page 436 for prices.

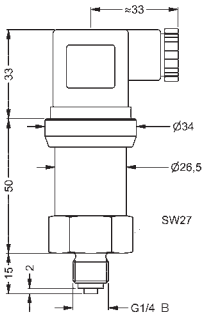
Pressure transducers DMU 01

Dimensions (mm) and electrical connections

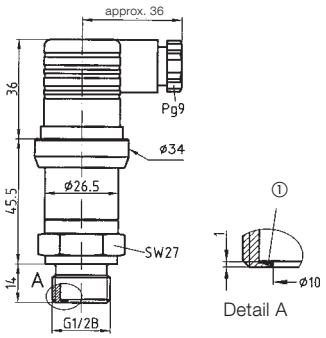
Connection G½B
EN 837



Connection G¼B
EN 837

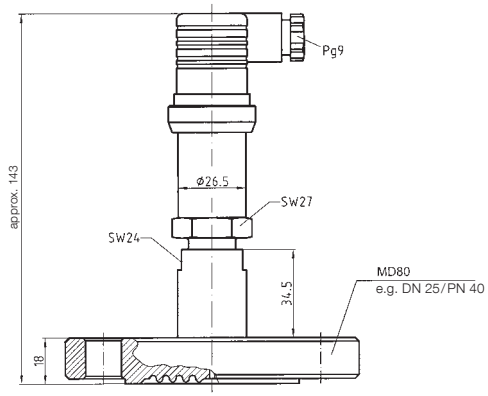


DMU 01 VM with connection G½B DIN 3852 type E
with flush diaphragm DMU 01 VM

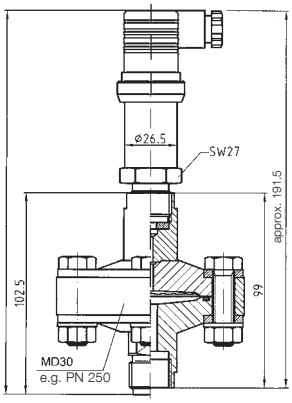


① Flat gasket FKM (Viton)

With chemical seal MD 80 – flange connection EN 1092-1

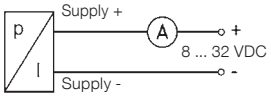


With chemical seal MD 30 – connection G½B

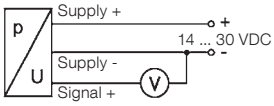


Wiring diagram

2-wire
4–20 mA



3-wire
0–10 V



Pin assignment table

		Connector ISO 4400	Cable colours (DIN 47100)
2-wire system: (4–20 mA)	Supply + Supply – Earth	1 2 Earth pin	White Brown Cable shield
3-wire system: (0–10 V)	Supply + Supply – Signal + Earth	1 2 3 Earth pin	White Brown Green Cable shield

The units are shipped with a detailed connection diagram.

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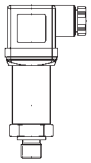
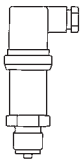
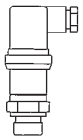
Pressure transducers DMU 01

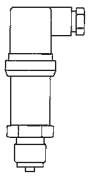
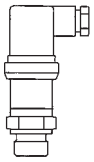
DG: H

Type	DMU 01 K	DMU 01	DMU 01 VM
Version			
Measuring principle	Piezo-resistive thick film ceramic measuring cell		
Measuring accuracy (IEC 60770)	1 % FSO	0.5 % FSO (-1/0 bar 1 % FSO)	0.5 % FSO
Wetted parts	Ceramic/stainless steel 304		
Connection	G¼B DIN 3852 type E	G½B EN 837	G½ DIN 3852 type E with flush diaphragm
Safety integrity level			SIL 2
Supply voltage	DC 8–32 V	DC 8–32 V	DC 8–32 V
Output	4–20 mA	4–20 mA	4–20 mA
System	2-wire	2-wire	2-wire
Electrical connection	Connector and junction box as per ISO 4400 (DIN 43650-A)		
Measuring range	Part no.	Part no.	Part no.
Price €			
-1/0 bar	---	**31114**	31619
-1/+1.5 bar	31608	31616	31620
-1/+3 bar	31609	31617	31621
-1/+5 bar	31610	31618	31622
Price €			
0/1 bar	---	**31115**	31623
0/1.6 bar	31511	31116	31624
0/2.5 bar	31512	**31117**	31625
0/4 bar	31513	**31118**	31626
0/6 bar	31514	**31119**	31627
0/10 bar	31515	**31120**	31628
0/16 bar	31516	**31121**	31629
0/25 bar	31517	**31122**	31630
0/40 bar	31518	31123	---
0/60 bar	31611	31124	---
0/100 bar	31612	31125	---
Price €			
0/160 bar	31613	**31126**	---
0/250 bar	31614	**31127**	---
0/400 bar	---	**31128**	---
0/600 bar	---	---	---

* Delivery only in packing units of 10 pieces per measuring range

Extra charges for pressure transducers DMU 01

DG: H

Type	DMU 01	DMU 01 VM
Version		
	Price €	**Price €**
Connection G½B DIN 3852 type E		
Connection G¼B EN 837 type E		
Connection ¼-18 NPT		
Connection ½-14 NPT		
Other connections		
Suitable for oxygen (≤ 25 bar)		
Fixed cable connection 2 metres		
Cable extension per metre		
Output 0–10 V, 3-wire		
Other output signals		
Absolute pressure (measuring ranges according to data sheet)		
Fitting of chemical seal	For measuring range ≥ 0/10 bar	

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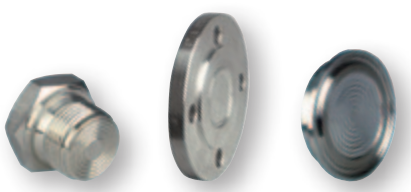
See chapter 15 for digital display units and signal processing.

i

See chapter 10 for chemical seals.



Pressure transducers DMU 02
Industrial version

NEW

- **Extremely resistant to shock, pulsation and vibration**
- **High overload safety**
- **Dynamic pressure resistance at high load changes**
- **Wetted area without seals due to welding**
- **No transmission liquid**

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Application

For electronic pressure measurement in industrial applications, e.g. hydraulic, pneumatic, gas industry, refrigeration, automation, medical, as well as general mechanical and plant engineering applications.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 02 is equipped with a piezo-resistive polysilicon thin-film measuring cell.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): <±0.5 % FSO

Measuring ranges
Relative pressure:
-1/0 to -1/+24 bar
0/0.6 to 0/2000 bar

Overpressure safety
≤ 250 bar at least 2 x FS
(burst pressure at least 3 x FS)
≤ 250 bar at least 1.5 x FS
(burst pressure at least 2 x FS)
≥ 1,000 bar at least 1.2 x FS
(burst pressure at least 1.5 x FS)

Operating temperature range

Medium:	-40/+125 °C
Ambient:	-40/+105 °C
Storage:	-40/+125 °C

Temperature error band
In compensated range
-20/+85 °C ≤ 0.05 % FSO/10 K

Dynamic characteristics
Response time < 1 ms

Process connection
G½B (EN 837-1/7.3)

Material

Housing:	Stainless steel 304
Pressure connection:	Stainless steel 630
Seal:	Without

Supply voltage
DC 12–32 V

Output signal
4–20 mA, 2-wire
0–10 V, 3-wire

Load
$4–20\ mA \leq \frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
4–20 mA < 25 mA
0–10 V < 20 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

- Other connection threads
- Fixed cable connection
- Other connectors
- Other output signals
- Cleaned for oxygen
- EX version (II 1G Ex ia IIB T4)

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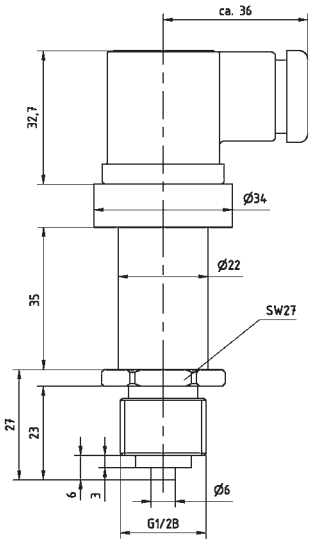
See page 443 for prices.

Pressure transducers DMU 02

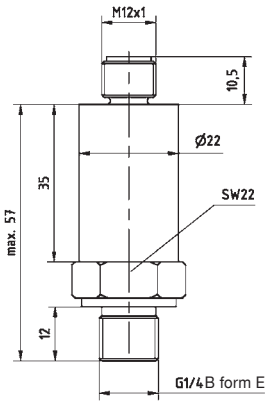
NEW

Dimensions (mm) and electrical connections

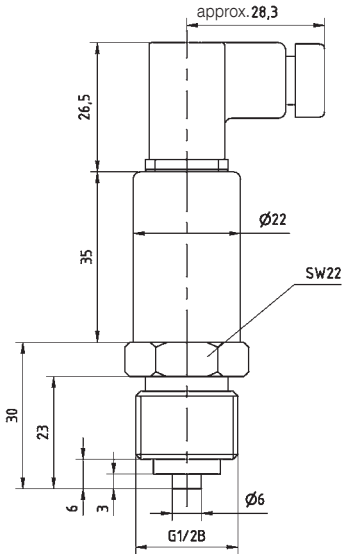
Connector ISO 4400 (DIN 43650-A)



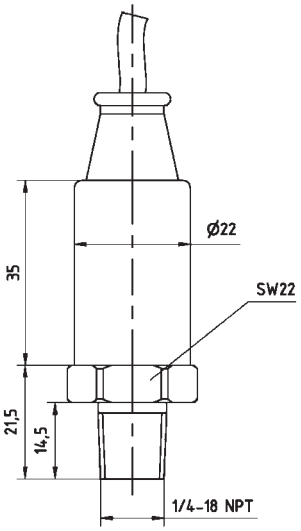
M12 connector



Connector DIN 43650-C



Fixed cable connection



Pin assignment table

	Electrical connections		
	ISO 4400 (DIN 43650-A, EN 175301-803)	M 12 x 1 (4-pin) EN 61076-2-101	Cable outlet
2-wire system: Supply +	1	1	Red
Supply –	2	3	Black
Earth	Earth contact	–	–
3-wire system: Supply +	1	1	Red
Supply –	2	3	Black
Signal	3	4	White
Earth	Earth pin	–	–

The units are shipped with a detailed connection diagram.

Pressure transducers
DMU 02 Vario (programmable)

NEW

- Connection technology with numerous versions
- Extremely resistant to shock, pulsation and vibration
- Best dynamic pressure resistance at high load changes
- Measuring cell welded, no seals
- Without transmission medium
- Turn down 1:4
- Zero correction via magnet

A Page 585

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A Page 587

Application

For electronic pressure measurement in mechanical and plant engineering applications, gas applications and medical technology. Particularly suitable for pure media.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 02 Vario is equipped with a piezo-resistive polysilicon thin-film measuring cell. All standard electrical connection types are available. The measuring ranges can be changed via optional parameterisation hardware and software. The zero point can be corrected from the outside via a permanent magnet after voltage has been supplied and within a given time window.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): <±0.3 % FSO

Measuring ranges
Relative pressure:
-1/0 to -1/+24 bar
0/1 bar to 0/1,000 bar

Overpressure safety
≤ 250 bar at least 2 x FS
(burst pressure at least 3 x FS)
> 250 bar at least 1.5 x FS
(burst pressure at least 2 x FS)
1000 bar at least 1.2 x FS
(burst pressure at least 1.5 x FS)

Operating temperature range

Medium:	-40/+125 °C
Ambient:	-40/+105 °C
Storage:	-40/+125 °C

Temperature error band
In compensated range -10/+80 °C < 0.5 % FSO/10 K

Dynamic characteristics
Response time < 1 ms
(without flush diaphragm)

Process connection
G½B (EN 837-1/7.3)

Material

Housing:	Stainless steel 304
Pressure connection:	Stainless steel 630
Seal:	Without

Supply voltage
DC 12–32 V

Output signal
4–20 mA, 2-wire

Load
$4–20\ mA < \frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
< 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

- Other process connections
- Other electrical connections
- Field housing (stainless steel)
- Cleaned for oxygen
- Fitting of chemical seal
- Customer-specific setting (damping, unit)
- Programmable hardware and software

i

See page 442 for dimensions.
See page 443 for prices.

Pressure transducers DMU 02 Vario (flush)

NEW

- Ideal for hygienic processes
- Connection technology with numerous versions
- Extremely resistant to shock, pulsation and vibration
- Best dynamic pressure resistance at high load changes
- Measuring cell welded, no seals
- Zero correction via magnet

A Page 585

A Page 586

A Page 587

Application

For electronic pressure measurement in mechanical and plant engineering, gas and medical applications. With flush diaphragm, the pressure transducers are also suitable for use with viscous, highly viscous or crystallising media.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 02 Vario is equipped with a piezo-resistive polysilicon thin-film measuring cell. DMU 02 Vario is available in a virtually unlimited number of versions. All standard and customer-specific connections can be connected to the electronic precision measuring system. All standard electrical connection types are available. The zero point can be corrected from the outside via a permanent magnet after voltage has been supplied and within a given time window.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): <±0.3 % FSO

Measuring ranges
Relative pressure:
-1/0 to -1/+24 bar
0/1 bar to 0/600 bar

Overpressure safety
≤ 250 bar at least 2 x FS
(burst pressure at least 3 x FS)
> 250 bar at least 1.5 x FS
(burst pressure at least 2 x FS)

Operating temperature range

Medium:	-10/+85 °C
Ambient:	-10/+105 °C
Storage:	-10/+125 °C

Temperature error band
In compensated range 0/70 °C
< 1.5 % FSO/10 K

Dynamic characteristics
Response time < 20 ms

Process connection
G½B DIN 3852 A with O ring (FBO);
Clamp (CP); dairy fitting (MR);
Varivent (VT); NEUMO BioControl (BC);
Flange connection (FT)

Material

Housing:	Stainless steel 304
Pressure connection:	Stainless steel 316 L
Seal:	Without

Pressure transmission liquid
Multi-grade oil, FDA-compliant

Supply voltage
DC 12–32 V

Output signal
4–20 mA, 2-wire

Load
$4–20\ mA < \frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
< 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity (EMC)
EMC Directive 2004/108/EC

i
See page 442 for dimensions.
See page 443 for prices.

Options

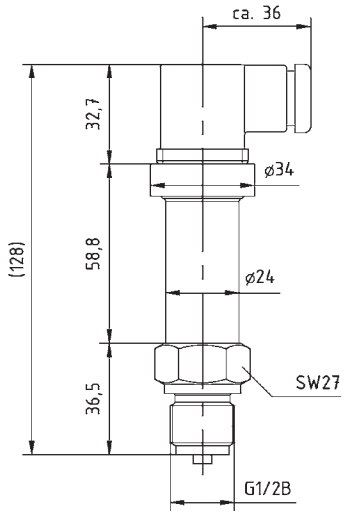
- Other process connections
- Other electrical connections
- Field housing (stainless steel)
- Filling for oxygen
- Customer-specific setting (damping, unit)
- Hygienic weld-in socket for G½B DIN 3852-A

Pressure transducers DMU 02 Vario

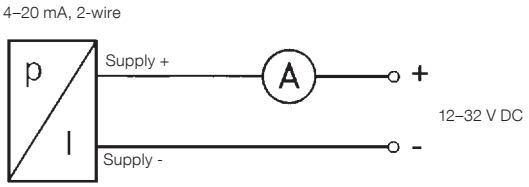
NEW

Dimensions (mm) and electrical connections

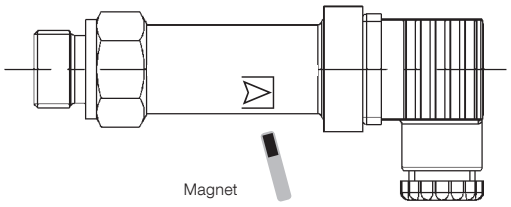
Connection G½B EN 837



Wiring diagram

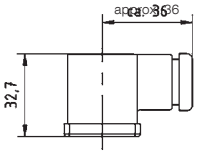


Setting the zero point

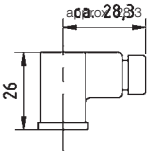


Modular system for great variety of versions

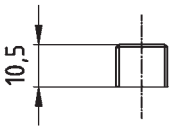
Connector



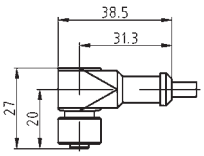
ISO 4400



DIN 43650-C



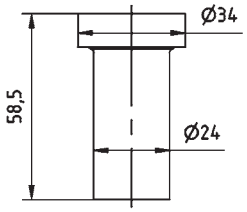
M12 x 1



M12 x 1
with junction box

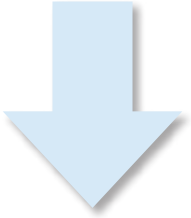
Housing

Transducer electronics

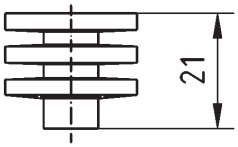


Thermal isolation

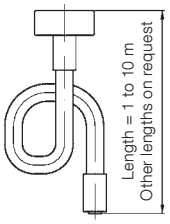
Direct mounting



Cooling element up to 180 °C

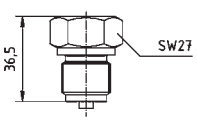


Capillary

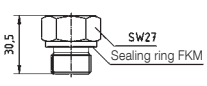


Process connections

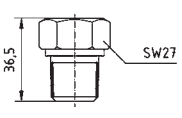
G½B EN 837



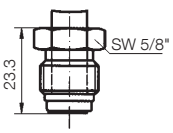
G½B DIN 3852-E



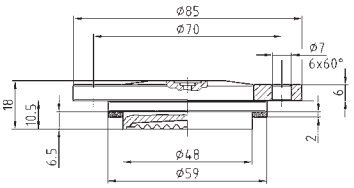
½–14 NPT



VCR 9/16-18 UNF



Chemical seals



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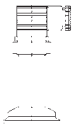
AFRISO EURO-INDEX

Pressure transducers DMU 02/DMU 02 Vario

NEW

DG: H

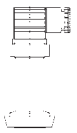
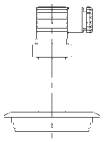
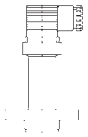
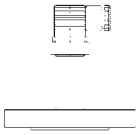
Type	DMU 02	DMU 02 HD High pressure	DMU 02 Vario Programmable*	DMU 02 Vario FBO flush with O ring	DMU 02 Vario CP Clamp
Version					
Measuring principle	Piezo-resistive polysilicon stainless steel measuring cell (thin film)				
Measuring accuracy (IEC 60770)	0.5 % FSO	0.5 % FSO	0.3 % FSO		
Wetted parts	Stainless steel 630	Stainless steel 630	Stainless steel 630	Stainless steel 316 Ti/ FKM	Stainless steel 316 L
Connection	G½B EN 837	M18 x 1.5 male	G½B EN 837	G½B DIN 3852-A	ISO 2852 1"
Supply voltage	DC 12–32 V				
Output	4–20 mA				
System	2-wire				
Electrical connection	Connector and junction box as per ISO 4400 (DIN 43650-A)				
Offset error compensation	---	---	Subsequent zero correction via magnet from the outside		
Measuring range	Part no.	Part no.	Part no.	Part no.	Part no.
Price €					
-1/0 bar	32801	---	32833	32863	32892
-1/-1.5 bar	32802	---	32834	32864	32893
-1/+3 bar	32803	---	32835*	32865	32894
-1/+5 bar	32804	---	32836	32866	32895
-1/+9 bar	32805	---	32837*	32867	32896
-1/+24 bar	32806	---	32838*	32868	32897
Price €					
0/600 mbar	32807		32841	---	---
Price €					
0/1 bar	32808	---	32842*	32872	32901
0/1.6 bar	32809	---	32843	32873	32902
0/2.5 bar	32810	---	32844*	32874	32903
0/4 bar	32811	---	32845	32875	32904
0/6 bar	32812	---	32846	32876	32905
0/10 bar	32813	---	32847*	32877	32906
0/16 bar	32814	---	32848	32878	32907
0/25 bar	32815	---	32849	32879	32908
0/40 bar	32816	---	32850*	32880	32909
0/60 bar	32817	---	32851	32881	---
0/100 bar	32818	---	32852	32882	---
Price €					
0/160 bar	32819	---	32853*	32883	---
0/250 bar	32820	---	32854	32884	---
0/400 bar	32821	---	32855	32885	---
0/600 bar	32822	---	32856	32886	---
0/1,000 bar	32823	---	32857*	---	---
0/1,600 bar	---	32829	---	---	---
0/2,000 bar	---	32830	---	---	---

* Programmable turn down 1:4 via optional programming tool
(no asterisk = fixed measuring range)

Pressure transducers DMU 02 Vario

NEW

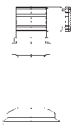
DG: H

Type	DMU 02 Vario MR Dairy fitting	DMU 02 Vario VT VARIVENT®	DMU 02 Vario BC NEUMO BioControl®	DMU 02 Vario FL Flange
Version				
Measuring principle	Piezo-resistive polysilicon stainless steel measuring cell (thin film)			
Measuring accuracy (IEC 60770)	0.3 % FSO			
Wetted parts	Stainless steel 316 L	Stainless steel 316 L	Stainless steel 316 L	Stainless steel 316 L
Connection	DIN 11851 DN 25	VARIVENT® F (DN 25 and 1")	BioControl® DN 25	EN 1092-1 type B1 DN 25 PN 40
Supply voltage	DC 12–32 V			
Output	4–20 mA			
System	2-wire			
Electrical connection	Connector and junction box as per ISO 4400 (DIN 43650-A)			
Offset error compensation	Subsequent zero correction via magnet from the outside			
Measuring range	Part no.	Part no.	Part no.	Part no.
Price €				
-1/0 bar	32915	32938	32960	32981
-1/-1.5 bar	32916	32939	32961	32982
-1/+3 bar	32917	32940	32962	32983
-1/+5 bar	32918	32941	32963	32984
-1/+9 bar	32919	32942	32964	32985
-1/+24 bar	32920	32943	32965	32986
Price €				
0/1 bar	32924	32947	32969	32990
0/1.6 bar	32925	32948	32970	32991
0/2.5 bar	32926	32949	32971	32992
0/4 bar	32927	32950	32972	32993
0/6 bar	32928	32951	32973	32994
0/10 bar	32929	32952	32974	32995
0/16 bar	32930	32953	32975	32996
0/25 bar	32931	32954	---	32997
0/40 bar	32932	---	---	32998
0/60 bar	---	---	---	On request
0/100 bar	---	---	---	On request
Price €				
0/160 bar	---	---	---	On request
0/250 bar	---	---	---	On request

Extra charges for DMU 02/DMU 02 Vario

NEW

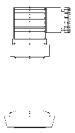
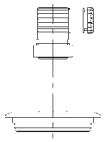
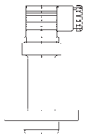
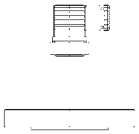
DG: H

Type	DMU 02	DMU 02 HD High pressure	DMU 02 Vario Programm-able	DMU 02 Vario FBO flush with O ring	DMU 02 Vario CP Clamp
Version					
	Price €	**Price €**	**Price €**	**Price €**	**Price €**
EX protection II 1 G Ex ia IIC T4					
Connection G¼B EN 837		---		---	---
Connection G½B DIN 3852 type E		---		---	---
Connection G¼B DIN 3852 type E		---		---	---
Connection G½B DIN 3852 type A		---		---	---
Connection G¼B DIN 3852 type A		---		---	---
Connection ¼–18 NPT		---		---	---
Connection ½–14 NPT		---		---	---
High pressure connection M16 x 1.5 female	---		---	---	---
Connection VCR 9/16–18 UNF pressure screw for ¼" pipes	---	---		---	---
Connection VCR ½" pressure screw	---	---		---	---
Connection VCR 9/16–18 UNF union nut for ¼" pipes	---	---		---	---
Connection VCR ½" union nut	---	---		---	---
Other VCR screw connections	---	---		---	---
Connection G½B (flush DIN 3852-A)	---	---	---		---
Connection G1B (flush DIN 3852 A)	---	---	---		---
Connection G1B (flush with O ring DIN 3852 A)	---	---	---		---
Connection clamp ISO 2852 1½"	---	---	---	---	
Connection clamp ISO 2852 2"	---	---	---	---	
Connection clamp ISO 2852 2½"	---	---	---	---	
Other connections and designs (chemical seals)	---	---	See chapter 10	---	---
Other materials					
Coatings					
Surface roughness ≤ 0.4 µm	---	---	---		
Weld-in socket G½"	---	---	---		---
Weld-in socket G1"	---	---	---		---
High temperature version up to 180 °C		---			
Capillary tube with spiral hose	---	---			
Cleaned for oxygen					
Socket DIN 43650-C			---	---	---
Field housing (stainless steel)	---	---			
Circular connector M12x1, 4-pin, A-coded DIN-EN 61076-2-101					
Fixed cable connection 2 metres			---	---	---
Cable extension per metre			---	---	---
Right angle socket M12 x 1.5 with 2 m PUR cable, shielded	---	---			
Right angle socket M12 x 1.5 with 5 m PUR cable, shielded	---	---			
Output 0–20 mA, 3-wire					
Output 0–10 V, 3-wire					
CANopen 2.0A			---	---	---
Ratiometric 0.5–4.5 V @ 5 VDC					
Other output signals					
Calibration report (for measuring accuracy up to 0.3 % FSO)					
Programming hardware and software for DMU 02 Vario	---	---		---	---

Extra charges for DMU 02/DMU 02 Vario

NEW

DG: H

Type	DMU 02 Vario Dairy fitting	DMU 02 Vario VT VARIVENT®	DMU 02 Vario BC NEUMO BioControl®	DMU 02 Vario FL Flange
Version				
	Price €	**Price €**	**Price €**	**Price €**
Connection DIN 11851 DN 32 / PN 40		---	---	---
Connection DIN 11851 DN 40 / PN 40*		---	---	---
Connection DIN 11851 DN 50 / PN 25*		---	---	---
Connection DIN 11851 DN 65 / PN 25		---	---	---
Connection DIN 11851 DN 80 / PN 25		---	---	---
Connection VARIVENT® type N DN 40-125 and 1½"–6"	---		---	---
NEUMO BioControl® DN 50	---	---		---
NEUMO BioControl® DN 65	---	---		---
NEUMO BioControl® DN 80	---	---		---
Connection EN 1092-1 type B1 DN 40 PN 40	---	---	---	
Connection EN 1092-1 type B1 DN 50 PN 40	---	---	---	
Connection EN 1092-1 type B1 DN 80 PN 40	---	---	---	
Connection EN 1092-1 type B1 DN 100 PN 40	---	---	---	
Connection ASME B 16.5 DN 1" class 150	---	---	---	
Connection ASME B 16.5 DN 1½" class 150	---	---	---	
Connection ASME B 16.5 DN 2" class 150	---	---	---	
Connection ASME B 16.5 DN 3" class 150	---	---	---	
Connection ASME B 16.5 DN 4" class 150	---	---	---	
Other connections and designs	---	---	---	
Other materials				
Coatings				
Surface roughness ≤ 0.4 µm				
High temperature version up to 180 °C				
Capillary tube with spiral hose				
Cleaned for oxygen				
Socket DIN 43650-C	---	---	---	---
Field housing (stainless steel)				
Circular connector M12 x 1, 4-pin, A-coded EN 61076-2-101				
Right angle socket M12 x 1.5 with 2 m PUR cable, shielded				
Right angle socket M12 x 1.5 with 5 m PUR cable, shielded				
Output 0–20 mA, 3-wire				
Output 0–10 V, 3-wire				
CANopen 2.0A	---	---	---	---
Ratiometric 0.5–4.5 V @ 5 VDC				
Other output signals				
Calibration report (for measuring accuracy up to 0.3 % FSO)				

*See extra charges DMU 04 for sep. union nut

Pressure transducers DMU 03 Industrial version

SIL
Protect your process!

- SIL 2
- For low pressure ranges
- Versions for relative pressure and absolute pressure
- Excellent long-term stability
- Optional ATEX version

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Application

For electronic pressure measurement in mechanical and plant engineering as well as process engineering applications. With flush diaphragm, the pressure transducers are also suitable for use with viscous, highly viscous media.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 03 is equipped with an oil-filled piezo-resistive silicon measuring cell. DMU 03 has safety integrity level SIL 2 (IEC 61508/61511).

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): < ±0.35 % FSO
(measuring ranges 0/100 mbar to 0/400 mbar ≤ ±0.5 % FSO)

Long-term stability
≤ ±0.1 % FSO/year

Measuring ranges
Relative pressure: 0/100 mbar to 0/600 bar
Absolute pressure: 0/100 mbar to 0/600 bar

Overpressure safety
At least 2 x FS
(burst pressure at least 5 x FS)

Operating temperature range
Medium: -40/+125 °C
Ambient: -40/+85 °C
Storage: -40/+100 °C

Temperature error band
In compensated range
0–70 °C < 1 % FSO

Dynamic characteristics
Response time < 10 ms

Process connection
G½B (EN 837-1/7.3 / DIN 3852)
with flush diaphragm
(0/100 mbar to 0/40 bar)

Materials

Housing:	Stainless steel 316 L
Pressure connection:	Stainless steel 316 L
Diaphragm:	Stainless steel 316 L
Seal:	FKM (Viton)

Pressure transmission liquid
Silicone oil

Output signal/supply voltage

4–20 mA, 2-wire	DC 8–32 V
ATEX version	DC 10–28 V
0–20 mA, 3-wire	DC 14–30 V
0–10 V, 3-wire	DC 14–30 V

Load
4–20 mA ≤ $\frac{U_B - U_{Bmin}}{0.02\ A}$
0–20 mA ≤ 500 Ohm
0–10 V > 10 kOhm

Current input
4–20 mA < 25 mA
0–20 mA < 25 mA
0–10 V < 5 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

Safety integrity level
SIL 2 (IEC 61508/61511) 2-wire only

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

- EX version (II 1 G Ex ia IIC T4)
- Other process connections
- Other electrical connections
- Field housing (stainless steel 304)
- Other seal materials
- Higher accuracy
- Greater overpressure safety
- Fitting of chemical seal

i See page 449 for prices.

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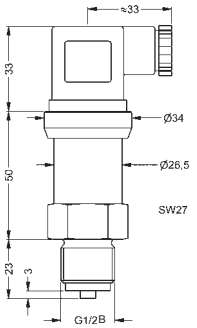
Pressure transducers DMU 03

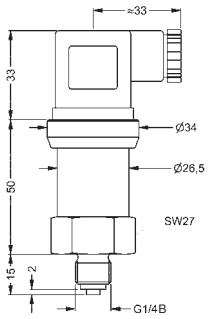
Dimensions (mm) and electrical connections

Connection G½B
EN 837 and ISO 4400

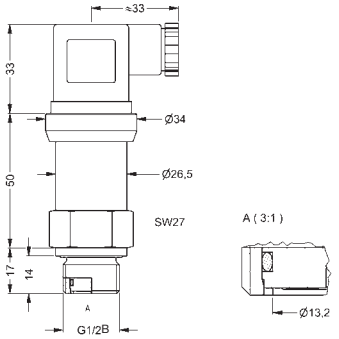


The Ex version is 20 mm longer.

Connection G¼B
EN 837 and ISO 4400

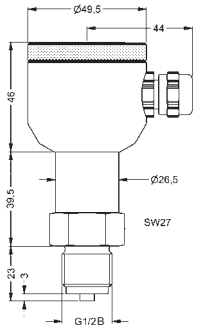


Connection G½B DIN 3852 type E with
flush diaphragm



The Ex version is 20 mm longer.

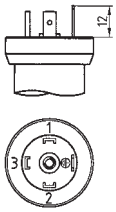
DMU 03 with G½B EN 837 and field housing



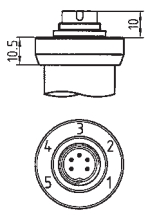
The Ex version is 26.5 mm longer.
(cable gland M12 x 1.5 brass, nickel-plated)

Electrical connections

ISO 4400
(DIN 43650)



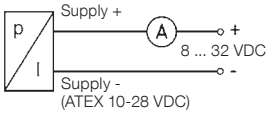
Binder 723



Wiring diagram

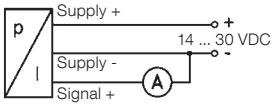
2-wire

4–20 mA

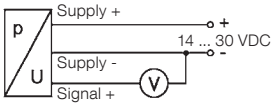


3-wire

0–20 mA



0–10 V



Pin assignment table

	Connector ISO 4400 (DIN 43650)	Binder Series 723	Cable colours (DIN 47100)
2-wire system:			
Supply +	1	3	White
(4–20 mA) Supply –	2	4	Brown
Earth	Earth pin	5	Cable shield
3-wire system:			
Supply +	1	3	White
Supply –	2	4	Brown
Signal +	3	1	Green
Earth	Earth pin	5	Cable shield

The units are shipped with a detailed connection diagram.

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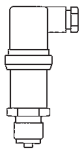
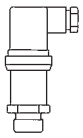
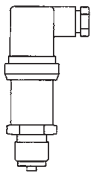
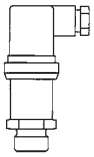
Pressure transducers DMU 03

DG: H

Type	DMU 03	DMU 03 VM
Version		
Measuring principle	Piezo-resistive stainless steel measuring cell	
Measuring accuracy (IEC 60770)	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)
Wetted parts	Stainless steel 316 L	
Connection	G½B EN 837	G½B DIN 3852 type E with flush diaphragm
Safety integrity level	SIL 2	
Supply voltage	DC 8–32 V	DC 8–32 V
Output	4–20 mA	4–20 mA
System	2-wire	2-wire
Electrical connection	Connector and junction box as per ISO 4400 (DIN 43650-A)	
Measuring range	Part no.	Part no.
Price €		
-1/0 bar	31634	---
-1/+1.5 bar	31635	---
-1/+3 bar	31636	---
-1/+5 bar	31637	---
Price €		
0/40 mbar	---	---
0/60 mbar	---	---
0/100 mbar	31638	31643
0/160 mbar	31639	31644
0/250 mbar	31145	31165
0/400 mbar	31146	31166
0/600 mbar	31147	31167
Price €		
0/1 bar	31148	31168
0/1.6 bar	31149	31169
0/2.5 bar	31150	31170
0/4 bar	31151	31171
0/6 bar	31152	31172
0/10 bar	31153	31173
0/16 bar	31154	31174
0/25 bar	31155	31175
0/40 bar	31156	32026
0/60 bar	31157	---
0/100 bar	31158	---
Price €		
0/160 bar	31159	---
0/250 bar	31160	---
0/400 bar	31161	---
0/600 bar	31162	---

Extra charges for pressure transducers DMU 03

DG: H

Type	DMU 03	DMU 03 VM
Version		
	Price €	**Price €**
EX protection II 1 G Ex ia IIC T4		
Connection G¼B DIN 3852 type E		---
Connection G½B DIN 3852 type E		
Connection G¼B EN 837 type E		---
Connection ¼-18 NPT		---
Connection ½-14 NPT		---
Other connections		
Field housing (stainless steel 304)		
Binder connector 723		
Fixed cable connection 2 metres		
Cable extension per metre		
Output 0–20 mA, 3-wire		
Output 0–10 V, 3-wire		
Other output signals		
Absolute pressure (measuring ranges according to data sheet)		
Measuring accuracy 0.25 % FSO		
Calibration report (for measuring accuracy 0.25 % FSO)		
Fitting of chemical seal	All measuring ranges, minimum range depends on design of chemical seal	

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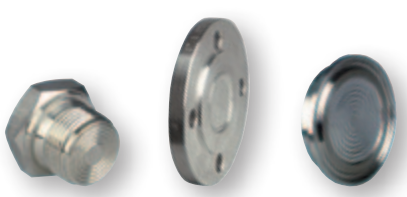
i

See chapter 14 for digital display units and signal processing.

i

See chapter 10 for chemical seals.



AFRISO EURO-INDEX

Pressure transducers DMU 04 industrial version

SIL
Protect your process!

- SIL 2
- DMU 04 CP/MR for hygienic processes
- Small temperature error
- Optional: ATEX, field housing or high temperature version (up to 300 °C)

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Application

For applications requiring hygienic process connections, materials or processing, especially food technology, pharmaceutical and biotechnology applications.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 04 is equipped with an oil-filled piezo-resistive silicon measuring cell. DMU 04 has safety integrity level SIL 2 (IEC 61508/61511).

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): < ±0.35 % FSO
(measuring ranges ≤ 0/400 mbar
< ±0.5 % FSO)

Measuring ranges
Relative pressure:
-1/0 bar, 0/100 mbar to 0/40 bar
Absolute pressure:
0/400 mbar to 0/400 bar

Overpressure safety
At least 2 x FS
(burst pressure at least 5 x FS)

Operating temperature range

Medium:	-10/+125 °C
	Short-term (60 min) up to 150 °C
Ambient:	-40/+85 °C
Storage:	-40/+100 °C

Temperature error band
In compensated range
0–70 °C < 0.75 % FSO
(0–50 °C ≤ 0.40 bar < 1.5 % FSO)

Dynamic characteristics
Response time < 10 ms

Process connections
G½B DIN 3852 with flush diaphragm
G1B DIN 3852 with flush diaphragm,
Clamp 1"/1½"/2" ISO 2852,
conical dairy fitting DIN 11851
DN 25/40/50 (without union nut)

Materials

Housing:	Stainless steel 316 L
Pressure connection:	Stainless steel 316 L
Diaphragm:	Stainless steel 316 L

Pressure transmission liquid
Food oil (FDA-compliant)

Output signal/supply voltage

4–20 mA, 2-wire	DC 8–32 V
EX version	DC 10–28 V
0–20 mA, 3-wire	DC 14–30 V
0–10 V, 2-wire	DC 14–30 V

Load
4–20 mA $< \frac{U_B - U_{Bmin}}{0.02\ A}$
0–20 mA ≤ 500 Ohm
0–10 V > 10 kOhm

Current input
4–20 mA < 25 mA
0–20 mA < 25 mA
0–10 V < 5 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

Safety integrity level
SIL 2 (IEC 61508/61511)

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

- EX version (II 1 G Ex ia IIC T4)
- Other process connections
- Other electrical connections
- Field housing
- High temperature version
- Higher accuracy
- Union nut DN 25/40/50

i See page 455 for prices.

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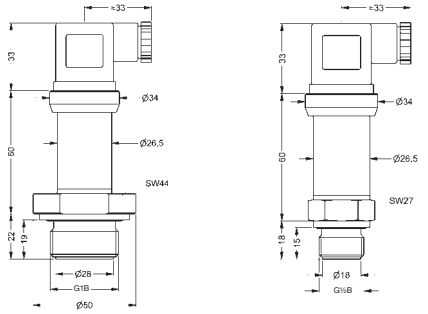
Pressure transducers DMU 04

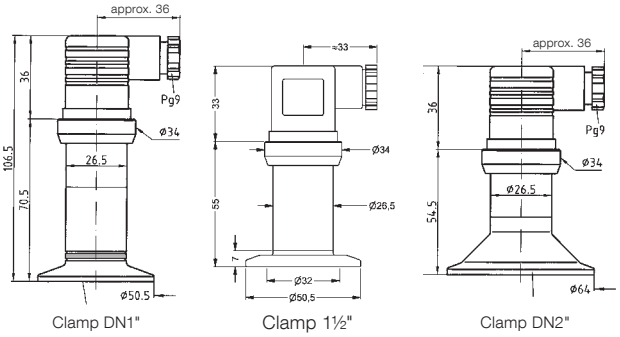
Dimensions (mm) and electrical connections

Threaded connections with flush diaphragm

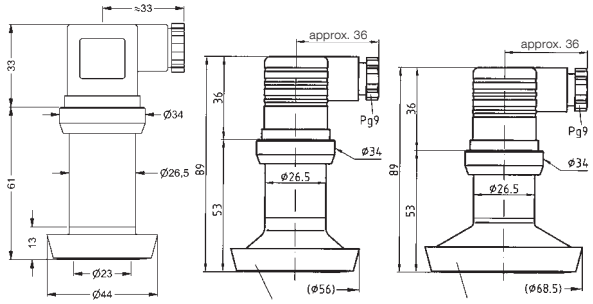


The EX version is 33 mm longer.

Clamp connections ISO 2852

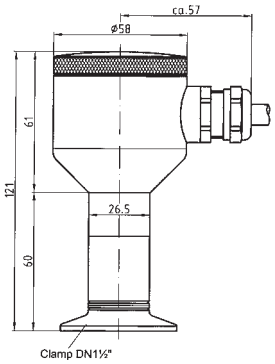


Conical dairy fitting DIN 11851



Conical dairy fitting DN 2

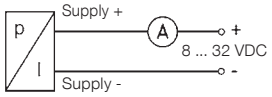
Field housing



Wiring diagram

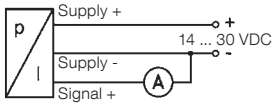
2-wire

4–20 mA

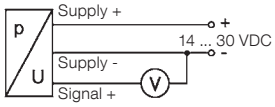


3-wire

0–20 mA



0–10 V



Pin assignment table

	Connector ISO 4400 (DIN 43650)	Cable colours (DIN 47100)
2-wire system: Supply + (4–20 mA) Supply – Earth	1 2 Earth pin	White Brown Cable shield
3-wire system: Supply + (0–10 V) Supply – (0–20 mA) Signal + Earth	1 2 3 Earth pin	White Brown Green Cable shield

The units are shipped with a detailed connection diagram.

Pressure transducers DMU 05 P precision version

- **Precision version with outstanding measurement performance**
- **For applications requiring superior measuring accuracy and long-term stability**
- **Optional RS 232 programming interface and version**

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Application

For electronic pressure measurement in applications requiring high measuring accuracy and long-term stability, such as process engineering, water treatment, laboratory applications as well as measurements of gas consumption and heat energy.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 05 P is equipped with an oil-filled piezo-resistive silicon measuring cell. The intelligent DMU 05 pressure transducers are equipped with digital amplifier electronics (microprocessor and 16 bit A/D converter). DMU 05 P actively compensates for sensor-specific deviations (non-linearity and temperature error), allowing for superior measuring characteristics. DMU 05 can also be supplied with an optional digital RS 232 programming interface for setting offset, range and damping.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): < ± 0.1 % FSO

Long-term stability
≤ +0.1 % FSO/year

Measuring ranges
Relative pressure: 0/100 mbar to 0/600 bar
Absolute pressure: 0/400 mbar to 0/600 bar

Overpressure safety
At least 2 x FS
(burst pressure at least 5 x FS)

Operating temperature range

Medium:	-40/+125 °C
Ambient:	-40/+85 °C
Storage:	-40/+100 °C

Temperature error band
In compensated range
-20/+80 °C ≤ 0.2 % FSO/10 K

Dynamic characteristics
Response time < 40 ms

Process connection
G½B (EN 837-1/7.3) or G½ DIN 3852 type E with flush diaphragm
(0/400 mbar to 0/40 bar)

Materials

Housing:	Stainless steel 316 L
Pressure connection:	Stainless steel 316 L
Diaphragm:	Stainless steel 316 L
Seal:	FKM (Viton)

Pressure transmission liquid
Silicone oil

Output signal/supply voltage

4–20 mA 2-wire	DC 10–32 V
EX version	DC 12–28 V

Load
4–20 mA $< \frac{U_B - U_{Bmin}}{0.02\ A}$

Current input

4–20 mA	< 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity (EMC)
EMC Directive 2004/180/EC

Options

- RS 232 programming interface (interface and software required) in conjunction with Binder connector 723
- EX version (II 1 G Ex ia IIC T4)
- Other process connections
- Other electrical connections
- Other seal materials

i See page 455 for prices.

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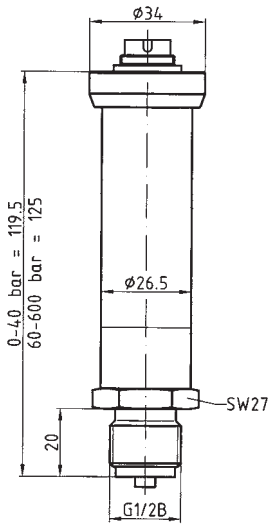
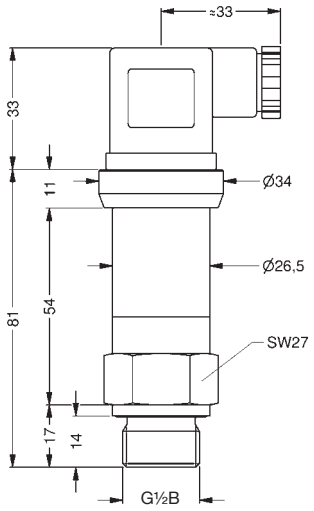
Pressure transducers DMU 05 P

Dimensions (mm) and electrical connections

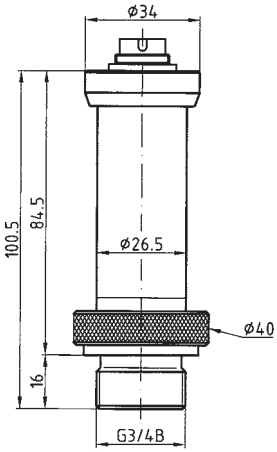
Connection G½B EN 837



Connection G½B DIN 3852 type E with flush diaphragm

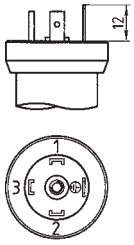


G¾B DIN 3852 type E
Screw-in version for level measurement

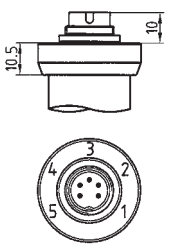


Electrical connections / cable outlet

ISO 4400
(DIN 43650-A)



Binder 723



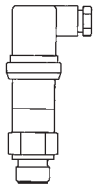
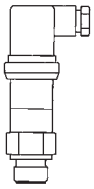
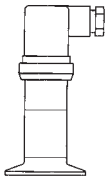
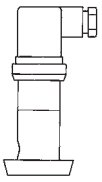
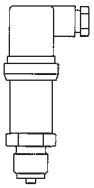
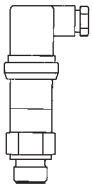
Pin assignment table

	Electrical connections			
	ISO 4400 (DIN 43650)	Binder 723 (5-pin)	Binder 723 (7-pin)	Cable outlet
2-wire system: Supply +	1	3	3	White
Supply –	2	4	1	Brown
Earth	Earth contact	5	2	Cable shield
RS 232 [1]: RxD	–	–	4	–
TxD			5	
CTS			6	
GND			7	

[1] Software, interface and cable must be ordered separately.
The units are shipped with a detailed connection diagram.

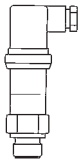
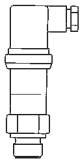
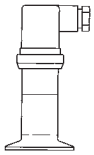
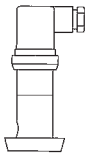
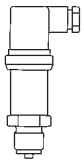
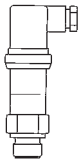
Pressure transducers DMU 04/DMU 05 P

DG: H

Type	DMU 04	DMU 04	DMU 04 CP	DMU 04 MR	DMU 05 P	DMU 05 P VM
Version						
Measuring principle	Piezo-resistive stainless steel measuring cell					
Measuring accuracy (IEC 60770)	0.35 % FSO (> 40 bar 0.5 % FSO)	0.35 % FSO (> 40 bar 0.5 % FSO)	0.35 % FSO (< 0.4 bar 0.5 % FSO)	0.35 % FSO (< 0.4 bar 0.5 % FSO)	0.1 % FSO	0.1 % FSO
Wetted parts	Stainless steel 316 L				Stainless steel 316 L/FKM	
Connection	G½B DIN 3852-E with flush diaphragm	G1B DIN 3852-E with flush diaphragm	Clamp 1" ISO 2852	Conical dairy fitting DIN 11851 DN 25 (without union nut)	G½B EN 837	G½B DIN 3852 with flush diaphragm
Safety integrity level	SIL 2	SIL 2	SIL 2	SIL 2		
Supply voltage	DC 8–32 V	DC 8–32 V	DC 8–32 V	DC 8–32 V	DC 10–32 V	DC 10–32 V
Output	4–20 mA	4–20 mA	4–20 mA	4–20 mA	4–20 mA	4–20 mA
System	2-wire	2-wire	2-wire	2-wire	2-wire	2-wire
Electrical connection	Connector and junction box as per ISO 4400 (DIN 43650-A)					
Measuring range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
-1/0 bar	---	31663	31686	31719	31742	---
-1/+1.5 bar	31647	31664	31687	31720	31743	---
-1/+3 bar	31648	31665	31688	31721	31744	---
-1/+5 bar	31649	31666	31689	31722	31745	---
Price €						
0/100 mbar	---	33021	---	---	33026	33027
0/160 mbar	---	33022	---	---	31747	31771
0/250 mbar	33016	31669	33023	33025	31748	31772
0/400 mbar	33017	31670	33024	31726	31749	31773
0/600 mbar	33018	31671	31694	31727	31750	31774
Price €						
0/1 bar	33019	31672	31695	31728	31751	31775
0/1.6 bar	33020	31673	31696	31729	31752	31776
0/2.5 bar	31651	31674	31697	31730	31753	31777
0/4 bar	31652	31675	31698	31731	31754	31778
0/6 bar	31653	31676	31699	31732	31755	31779
0/10 bar	31654	31677	31710	31733	31756	31780
0/16 bar	31655	31678	31711	31734	31757	31781
0/25 bar	31656	31679	31712	31735	31758	31782
Price €						
0/40 bar	31657	31680	31713	31736	31759	33028
0/60 bar	31658	31681	---	---	31760	---
0/100 bar	31659	31682	---	---	31761	---
0/160 bar	31660	31683	---	---	31762	---
0/250 bar	31661	31684	---	---	31763	---
0/400 bar	31662	31685	---	---	31764	---
0/600 bar	---	---	---	---	31765	---

Extra charges for DMU 04/DMU 05 P

DG: H

Type	DMU 04	DMU 04	DMU 04 CP	DMU 04 MR	DMU 05 P	DMU 05P VM
Version						
	Price €	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
EX protection II 1 G Ex ia IIC T4						
Clamp 1½" ISO 2852	---	---		---	---	---
Clamp 2" ISO 2852	---	---		---	---	---
Conical dairy fitting DIN 11851 DN 40	---	---	---		---	---
Conical dairy fitting DIN 11851 DN 50	---	---	---		---	---
Sep. union nut DIN 11851 DN 25	---	---	---		---	---
Sep. union nut DIN 11851 DN 40	---	---	---		---	---
Sep. union nut DIN 11851 DN 50	---	---	---		---	---
G1B with conical seal	---		---	---	---	---
Other process connections						
High temperature version up to +300 °C					---	---
Field housing (stainless steel 304)					---	---
Binder connector 723						
Fixed cable connection 2 metres						
Cable extension per metre						
Output 0–20 mA, 3-wire					---	---
Output 0–10 V, 3-wire					---	---
Other output signals						
Absolute pressure (measuring ranges according to data sheet)						
Measuring accuracy 0.25 % FSO					---	---
Calibration report (for measuring accuracy 0.25 % FSO)					---	---
RS 232 interface*	---	---	---	---		
Programming interface and software	---	---	---	---		

*Only in conjunction with Binder connector 723

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See chapter 14 for digital display units and signal processing.

Pressure transducers HydroFox® DMU 07 for level measurement

- Flush diaphragm
- No transmission liquid
- Mechanically insensitive ceramic sensor
- Small temperature error
- High overpressure safety

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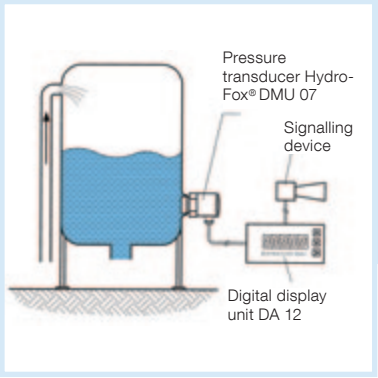

Application

For continuous electronic level measurement of liquids and for pressure measurement of liquids and gases in plant engineering.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. HydroFox® DMU 07 uses a capacitance ceramic measuring cell.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): <±0.35 % FSO

Measuring ranges
Relative pressure: 0/40 mbar to 0/20 bar

Overpressure safety
≤ 400 mbar at least 15 x FS
> 400 mbar at least 3 x FS

Operating temperature range

Medium:	-25/+125 °C
Ambient:	-25/+85 °C
Storage:	-40/+100 °C

Temperature error band
In compensated range
-20/+80 °C < 0.5 % FSO/10 K

Dynamic characteristics
Response time < 200 ms

Process connection
G1½B flush diaphragm

Materials

Housing:	Stainless steel 316 L
Pressure connection:	Stainless steel 316 L
Diaphragm:	Ceramic (Al_2O_3 96 %)
Seal:	FKM (Viton)

Output signal/supply voltage
4–20 mA DC 9–36 V
2-wire

Load
4–20 mA ≤ $\frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
4–20 mA < 21 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

- Pressure connection made of PVDF
- Other seal materials
- Field housing (stainless steel 304)
- Higher accuracy
- Other output signals

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See chapter 1 for the complete "Level Measurement" range.
See page 467 for prices.

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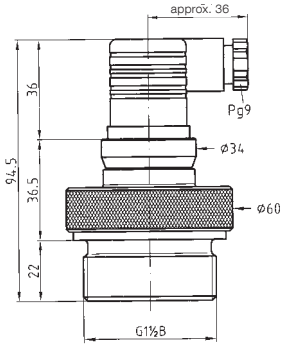
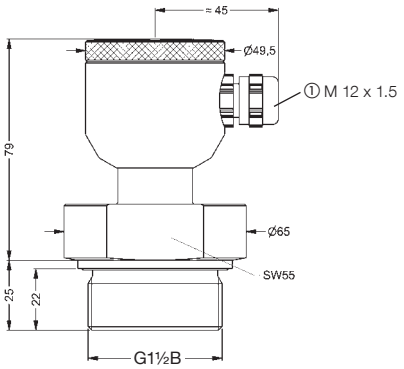
Pressure transducers HydroFox® DMU 07

Dimensions (mm) and electrical connections

Connection G1½B DIN 3852 type E –
Connector and junction box ISO 4400

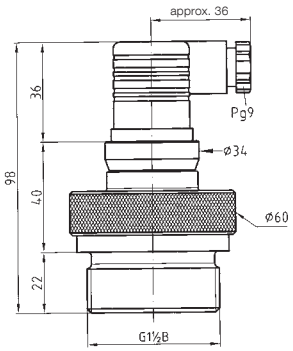


Connection G1½B – field housing



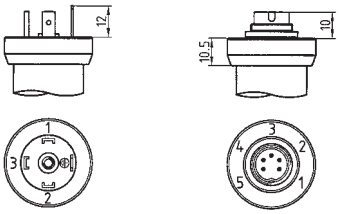
① Cable outlet

Connection G1½B DIN 3852 type E –
Pressure connection made of PVDF



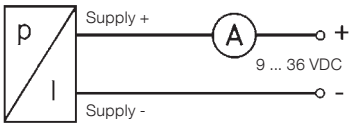
Electrical connections

DIN 43650 Binder 723



Wiring diagram

2-wire 4–20 mA



Pin assignment table

	Electrical connections	
	Connector ISO 4400	Cable colours (DIN 47100)
2-wire system: Supply + (4–20 mA) Supply – Earth	1 2 Earth pin	White Brown Cable shield

The units are shipped with a detailed connection diagram.

Pressure transducers HydroFox® DMU 08 – level probe

SIL
Protect your process!

- SIL 2
- Compact and sturdy stainless steel design
- Integrated overvoltage protection
- Special calibration for all standard pressure units possible
- Optional ATEX version

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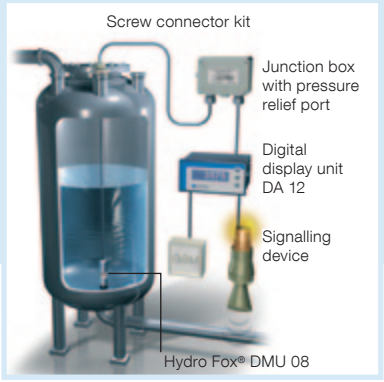
A GSM Page 592



Application

For electronic, continuous level measurement, e.g. in wells, drilling holes, water, containers or in waste water systems. Suitable for groundwater, drinking water, waste water (with optional FEP cable), diesel fuel and fuel oil.

Description

Pressure transducers HydroFox® DMU 08 convert physical pressure into an electrical signal proportional to the pressure. HydroFox® DMU 08 uses a piezo-resistive silicon measuring cell. DMU 04 has safety integrity level SIL 2 (IEC 61508/61511).

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): <±0.35 % FSO
(measuring ranges 0/100 mbar to 0/400 mbar < ±0.5 % FSO)

Measuring ranges
Relative pressure: 0/100 mbar to 0/25 bar

Overpressure safety
At least 2 x FS
400 mbar at least 3 x FS

(burst pressure at least 3 x FS)

Operating temperature range
Medium: -10/+70 °C
Ambient: -10/+70 °C
Storage: -25/+70 °C
EX version max. +60 °C

Temperature error band
In compensated range
0/70 °C < 1 % FSO/10 K

Dynamic characteristics
Response time < 10 ms

Materials
Housing: Stainless steel 316 L
Diaphragm: Stainless steel 316 L
Seals: FKM (Viton)

Pressure transmission liquid
Silicone oil

Supply voltage
DC 8–32 V EX version DC 10–28 V

Output signal
4–20 mA, 2-wire

Load
4–20 mA $\leq \frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
4–20 mA < 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
PUR cable (IP 68)

CE conformity (EMC)
EMC Directive 2004/108/EC

Safety integrity level
SIL 2 (IEC 61508/61511)

Accessories (options)
- Screw connector kit
- Junction box
- Overvoltage protection
- Anchor clamp

Options

- EX version (II 1 G Ex ia IIC T4)
- FEP cable

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See chapter 1 for the complete "Level Measurement" range.
See page 467 for prices.

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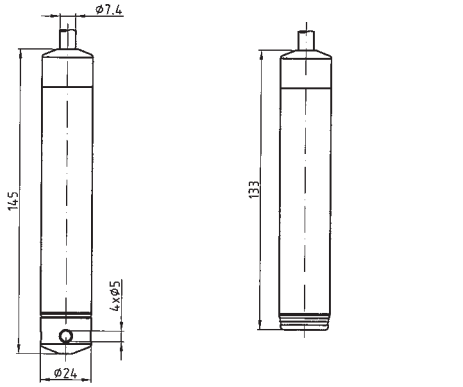
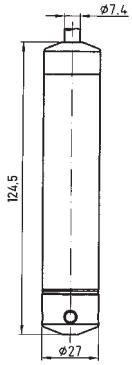
Pressure transducers HydroFox® DMU 08

Dimensions (mm) and electrical connections

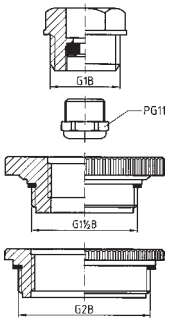
Standard version



EX version

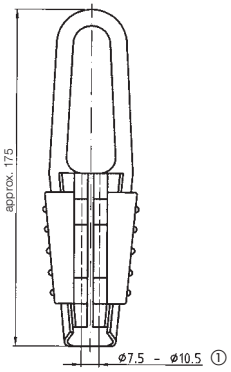


Screw connector kit

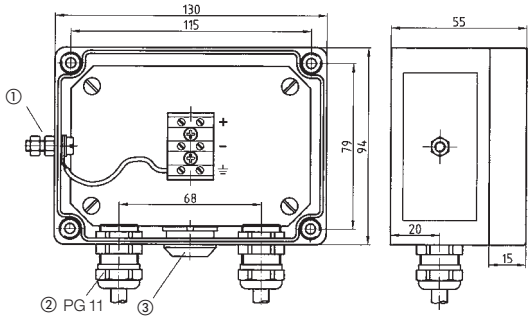


① Cable diameter

Anchor clamp



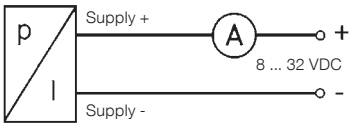
Junction box with pressure relief port



① Earth ② Cable gland ③ Pressure compensation element

Wiring diagram

2-wire 4–20 mA



Pin assignment table

	Cable colours (DIN 47100)
2-wire system: Supply + (4–20 mA) Supply – Earth	White Brown Cable shield

The units are shipped with a detailed connection diagram.

Pressure transducers HydroFox® DMU 09 Level probe – for chemical applications

- Chemical-resistant plastic version
- Robust ceramic diaphragm without transmission liquid
- Highly resistant FEP cable
- Special calibration for all standard pressure units possible

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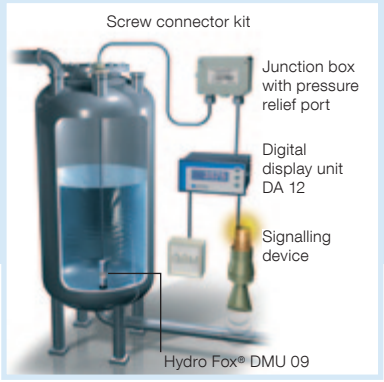

Application

For electronic, continuous level measurement in extremely corrosive liquids, e.g. chemicals or waste water from landfill sites.

Description

Pressure transducers HydroFox® convert physical pressure into an electrical signal proportional to the pressure. HydroFox® DMU 09 uses a capacitance ceramic measuring cell.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): <±0.35 % FSO

Measuring ranges
Relative pressure: 0/40 mbar to 0/10 bar

Overpressure safety
≤ 400 mbar at least 15 x FS
> 400 mbar at least 4 x FS

Operating temperature range
Medium: 0/70 °C
Ambient: -10/+70 °C
Storage: -10/+70 °C

Temperature error band
In compensated range
0/70 °C < 0.5 % FSO/10 K

Dynamic characteristics
Response time < 200 ms

Materials
Housing: PP
Diaphragm: Ceramic (Al_2O_3 96 %)
Seals: FKM (Viton)

Output signal/supply voltage
4–20 mA DC 11–32 V
2-wire

Load
4–20 mA ≤ $\frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
4–20 mA < 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
FEP cable (IP 68)

CE conformity (EMC)
EMC Directive 2004/108/EC

Accessories (options)
- Screw connector kit
- Junction box
- Lightning protection
- Anchor clamp

Options

- Housing PVDF
- Cable protection conduits
- FFKM seals
- Diaphragm pure ceramic (Al_2O_3 99.9 %)

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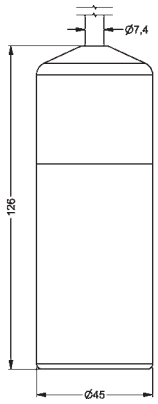
See chapter 1 for the complete "Level Measurement" range.
See page 467 for prices.

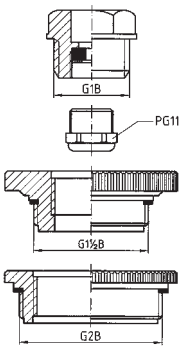
Pressure transducers HydroFox® DMU 09

Dimensions (mm) and electrical connections

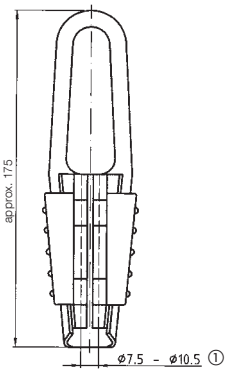
Standard version



Screw connector kit

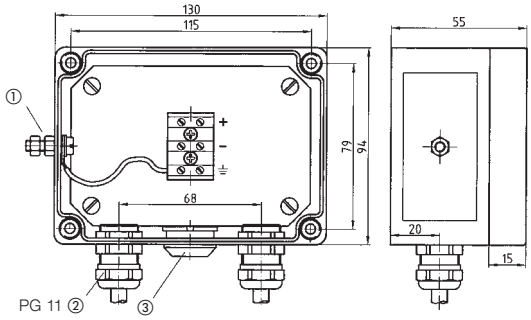


Anchor clamp



① Cable diameter

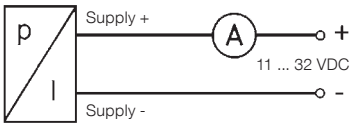
Junction box with pressure relief port



① Earth ② Cable gland PG 11 ③ Pressure compensation element

Wiring diagram

2-wire 4–20 mA



Pin assignment table

	Cable colours (DIN 47100)
2-wire system: Supply + (4–20 mA) Supply – Earth	White Brown Cable shield

The units are shipped with a detailed connection diagram.

Pressure transducers DeltaFox® DMU 10 D
Version for differential pressure measurment

- Compact design
- Robust aluminium housing
- High long-term stability
- High overpressure safety
- Long service life

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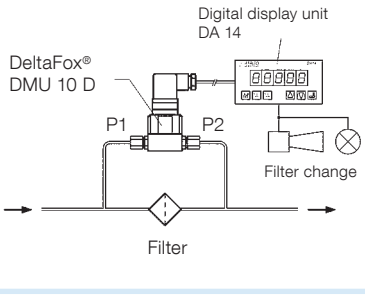


Application

For electronic differential pressure measurement at very low differential pressure. For non-corrosive gaseous media. Particularly suitable for monitoring filters and fans in air and air conditioning applications.

Description

The DeltaFox® DMU 10 D pressure transducers feature piezo-resistive silicon measuring cells. When pressure is applied, the pressure difference between the positive side and the negative side is converted into a current or voltage signal which is proportional to the differential pressure.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve as per IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability):
> 0/160 mbar: < ±0.35 % FSO
0/40–0/160 mbar: ≤ ±1 % FSO
< 0/40 mbar: ≤ ±2 % FSO

Long-term stability
≤ +0.2 % FSO/year

Measuring ranges

Differential pressure measuring range	Max. static pressure
0/6 mbar to 0/10 mbar	100 mbar
0/25 mbar	200 mbar
0/40 mbar to 0/60 mbar	350 mbar
0/100 mbar to 0/400 mbar	1000 mbar
0/600 mbar to 0/1000 mbar	3000 mbar

Operating temperature range
Medium: -25/+125 °C
Ambient: -25/+85 °C
Storage: -40/+100 °C

Temperature error band

Differential pressure measuring range	In compensated range 0/60 °C
< 0/10 mbar	≤ ±2.0 % FSO
< 0/25 mbar	≤ ±1.5 % FSO
< 0/250 mbar	≤ ±1.0 % FSO
> 0/250 mbar	≤ ±0.5 % FSO

Dynamic characteristics
Response time < 5 ms

Process connection
2 x G⅛B female thread

Materials
Housing: Aluminium
Process connection: Aluminium
Sensor: Silicon, glass, RTV, Ceramic (Al_2O_3, nickel)
Seal: PUR glued

Output signal/supply voltage
4–20 mA, 2-wire DC 12–36 V
0–20 mA, 3-wire DC 14–36 V
0–10 V, 3-wire DC 14–36 V

Load
4–20 mA ≤ $\frac{U_B - U_{Bmin}}{0.02\ A}$
0–20 mA < 500 Ohm
0–10 V > 10 kOhm

Current input
0/4–20 mA max. 25 mA
0–10 V max. 7 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

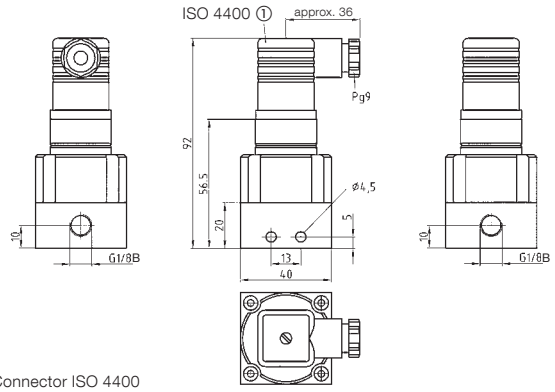
- Other process connections
- Other electrical connections
- Digital plug-in display DA 06

i See page 467 for prices.

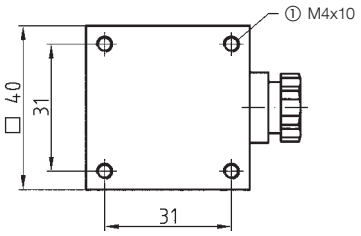
Pressure transducers DeltaFox® DMU 10 D

Dimensions (mm) and electrical connections

Connection 2 x G1/8 female thread

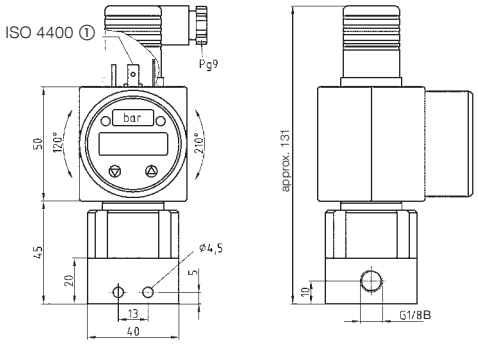


① Connector ISO 4400



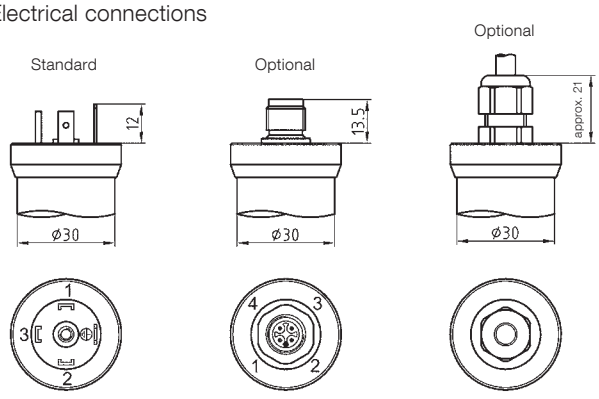
① Screw

DMU 10 D with plug-in display DA 06



① Connector ISO 4400

Electrical connections

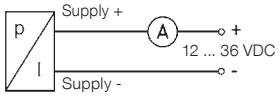


ISO 4400 (IP 65) | M12x1 4-pin (IP 67) | Cable outlet (IP 67)

Wiring diagram

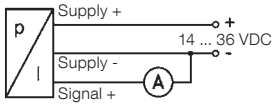
2-wire

4–20 mA

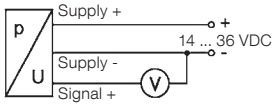


3-wire

0–20 mA



0–10 V



Pin assignment table

Pin assignment	ISO 4400 (DIN 43650)	M 12 x 1	Cable colours
2-wire system:			
Supply +	1	1	White
(4–20 mA) Supply –	2	2	Brown
Earth	Earth pin	4	Yellow/green shield
3-wire system:			
Supply +	1	1	White
Supply –	2	2	Brown
Signal +	3	3	Green
Earth	Earth pin	4	Cable shield

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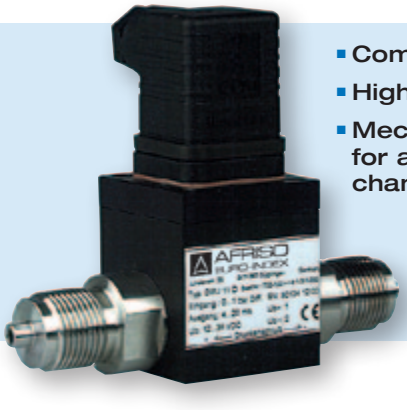
Pressure transducers DeltaFox® DMU 11 D
Version for differential pressure measurment



- Compact design
- High overload safety
- Mechanically robust and reliable, suitable for applications involving dynamic pressure changes as well as shock and vibration

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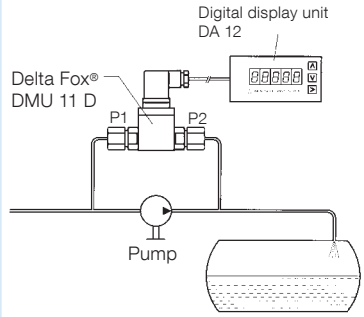


Application

For electronic differential pressure measurement in industrial applications. For corrosive gaseous and liquid media which are not highly viscous and do not crystallise.

Description

The DeltaFox® DMU 11 D pressure transducers feature two oil-immersed piezo-resistive stainless steel measuring cells. When pressure is applied, the pressure difference between the positive side and the negative side is converted into a current or voltage signal which is proportional to the differential pressure.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability): < ± 0.5 % FSO

Measuring ranges/overload safety

Nominal pressure (bar)	Differential pressure measuring range (bar)	Max. static pressure at one end (bar)
0.4	0/0.04 to 0/0.4	1
1.0	0/0.1 to 0/1.0	3
2.5	0/0.25 to 0/2.5	6
6.0	0/0.6 to 0/6.0	20
16	0/1.6 to 0/16	60

Operating temperature range
Medium: -25/+125 °C
Ambient: -25/+85 °C
Storage: -40/+100 °C

Temperature error band
In compensated range
0–70 °C ≤ 1.5 % FSO
at nominal pressure 0.4 bar ≤ 2 % FSO

Dynamic characteristics
Response time < 5 ms

Process connection
2 x G½B (837-1/7.3)

Materials
Housing: Aluminium
Pressure connection: Stainless steel 316 Ti
Diaphragm: Stainless steel 316 Ti
Seal: FKM (Viton)

Output signal/supply voltage
4–20 mA, 2-wire DC 12–36 V
0–10 V, 3-wire DC 14-36 V

Load
4–20 mA ≤ $\frac{U_B - U_{Bmin}}{0.02\ A}$
0–10 V > 10 kOhm

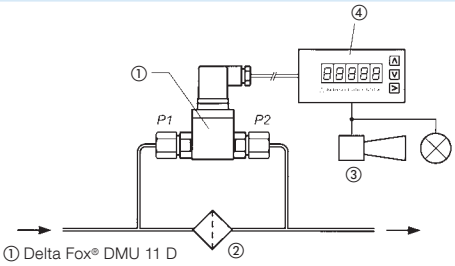
Current input
4–20 mA < 25 mA
0–10 V < 7 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection/degree of protection
Connector and junction box as per ISO 4400 (DIN 43650-A), IP 65

CE conformity (EMC)
EMC Directive 2004/108/EC

Scope of delivery
Pressure measuring instrument with mounting bracket



① Delta Fox® DMU 11 D
② Filter
③ Alarm signal filter change
④ Digital display unit DA 12

Options

- Other process connections
- Other electrical connections
- Other seal materials
- Other output signals
- Fitting of chemical seal

i See page 467 for prices.

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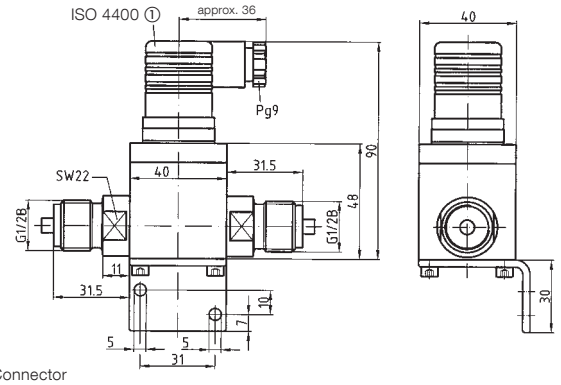
Pressure transducers DeltaFox® DMU 11 D

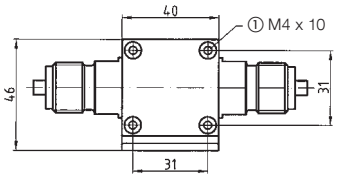
Dimensions (mm) and electrical connections

Connection 2 x G½B (EN 837)



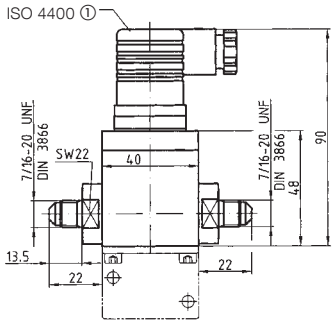
① Connector

Connection 2 x G½B (EN 837)



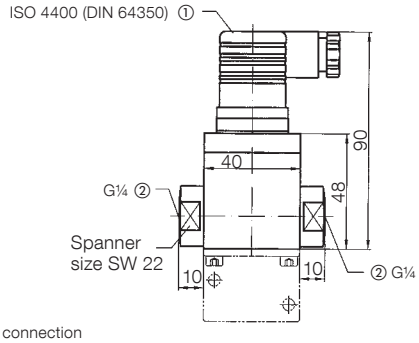
① Screw

Connection 2 x $^{7}/_{16}$ UNF



① Connector

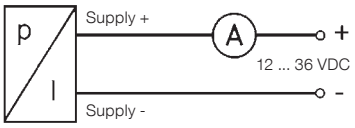
Connection 2 x G¼ female thread



① Plug connection
② Pressure connection (female thread)

Wiring diagram

2-wire 4–20 mA



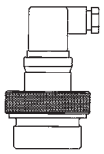
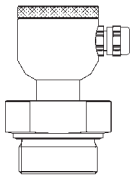
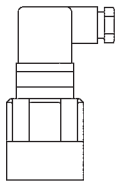
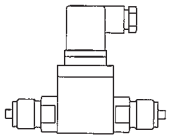
Pin assignment table

Pin assignment	ISO 4400 (DIN 43650)
2-wire system: Supply +	1
(4–20 mA) Supply –	2
Earth	Earth pin
3-wire system: Supply +	1
Supply –	2
(0...10 V) Signal +	3
Earth	Earth pin

The units are shipped with a detailed connection diagram.

Pressure transducers DMU 07 – DMU 11 D

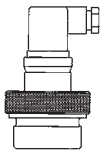
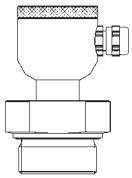
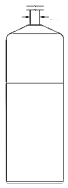
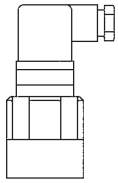
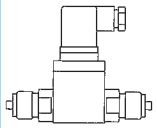
DG: H

Type	DMU 07	DMU 07 FG	DMU 08	DMU 09	DMU 10 D	DMU 11 D*
Version						
Measuring principle	Capacitance ceramic measuring cell		Piezo-resistive stainless steel measuring cell	Piezo-resistive ceramic measuring cell	Piezo-resistive silicon measuring cell	Piezo-resistive stainless steel measuring cell
Measuring accuracy (IEC 60770)	0.35 % FSO	0.35 % FSO	0.35 % FSO (≤ 0.4 bar 0.5 % FSO)	0.35 % FSO	> 160 mbar = 0.35 % FSO 40–160 mbar = 1 % FSO < 40 mbar = 2 % FSO	0.5 % FSO (with ref. to nominal pressure)
Wetted parts	Ceramic/FKM Stainless steel 316 L	Ceramic/FKM Stainless steel 316 L	Stainless steel/ FKM 316 L	PP/ceramic/FKM	Aluminium/silicon/glass RTV/ceramic, nickel/PUR (glued)	Stainless steel/ FKM 316 Ti
Connection	G1½B with flush diaphragm	G1½B with flush diaphragm	---	---	2 x G$^{1}/_{8}$B female thread	2 x G½B EN 837
Safety integrity level	---	---	SIL 2	---	---	---
Supply voltage	DC 9–36 V	DC 9–36 V	DC 12–36 V	DC 9–36 V	DC 12–36 V	DC 12–36 V
Output	4–20 mA	4–20 mA	4–20 mA	4–20 mA	4–20 mA	4–20 mA
System	2-wire	2-wire	2-wire	2-wire	2-wire	2-wire
Electrical connection	Connector ISO 4400 (43650-A)	Field housing M12 x 1.5	5 m PUR cable	5 m FEP cable	Connector ISO 4400 (43650-A)	
Measuring range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
0/6 mbar	---	---	---	---	31861	---
0/10 mbar	---	---	---	---	31862	---
0/25 mbar	---	---	---	---	31863	---
0/40 mbar	31789	31821	---	31767	31864	31830
0/60 mbar	31790	31805	---	31768	31865	31831
0/100 mbar	31791	31547	**31555**	31571	31866	31813
0/160 mbar	31792	31806	**31556**	31572	31867	31814
0/200 mbar	31793	31548	**31557**	31573	---	---
0/250 mbar	31794	31807	**31558**	31574	31868	31815
0/300 mbar	---	---	**31519**	31812	---	---
0/400 mbar	31795	31549	31559	31575	31869	31832
0/600 mbar	31796	31808	31560	31576	31870	31833
0/1 bar	31797	31550	31561	31577	31871	31816
0/1.6 bar	31798	31809	31562	31578	---	31834
0/2 bar	31799	31551	31563	31579	---	---
0/2.5 bar	---	---	31564	31580	---	31817
0/4 bar	31800	31552	31565	31581	---	31835
0/6 bar	31801	31810	31566	31582	---	31818
0/10 bar	31802	31553	31567	31583	---	31836
0/16 bar	---	---	31568	---	---	31837
0/20 bar	---	---	31569	---	---	---
0/25 bar	---	---	31570	---	---	---

* Please specify required nominal pressure/maximum static pressure when ordering.

Extra charges/accessories for DMU 07 – DMU 11 D

DG: H

Type	DMU 07	DMU 07 FG	DMU 08	DMU 09	DMU 10 D	DMU 11 D
Version						
	Price €	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
EX protection II 1 G EEx ia IIC T4	---	---		---	---	---
2 x G¼ female thread	---	---	---	---	---	
2 x hose connection 6 mm	---	---	---	---		
2 x 7/16 UNF	---	---	---	---	---	
Other connections			---	---		
Cable connection per metre PUR cable	---	---		---	---	---
Cable connection per metre FEP cable	---	---			---	---
Binder connector		---	---	---	---	---
Fixed cable connection 2 metres		---	---	---		---
Cable extension per metre		---	---	---		---
Output 0–20 mA, 3-wire	---	---		---		---
Output 0–10 V, 3-wire						
Other output signals						
Measuring accuracy 0.25 % FSO			---	---	---	---
Calibration report (for measuring accuracy 0.25 % FSO)			---	---	---	---

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Accessories for DMU 08/ DMU 09

DG: H

	Part no.	**Price €**
Screw connector kit, plastic G2" – 1½" – 1"	**52125**	
Screw connector kit stainless steel G1"	**31822**	
Adapter stainless steel G1" to G1½"	**31823**	
Junction box with pressure relief port (IP 65)	**31824**	
Anchor clamp	**31825**	

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See chapter 14 for digital display units and signal processing.

Pressure transducers DMU 12
Intelligent version

- **Level measurement version with adjustable function tables**
- **Text-based user interface via graphic display**
- **Turn down 20:1**
- **HART protocol optional**

Application

For high-precision electronic measurement of pressure or differential pressure, with integrated digital display. Robust design for use in rough operating conditions, e.g. chemical industry, process engineering and food industry.

Description

The DMU 12 pressure transducers feature a calibrated, amplified sensor signal which is available as a standardised current output, also via HART protocol.

Technical specifications

Graphic display
Text-oriented user interface
Display versions (standard):
Measured value and pressure unit plus choice of one of the following:
1. Bar chart
2. Sensor temperature
3. Measured value in %
4. Output current in mA

Mounting position
Any position; housing can be rotated by 170° to the left or to the right; the display and control panel can be factory-set at angles of 90°, 180° or 270°.

Measuring accuracy
< 0/200 bar ≤ ±0.2 % FSO
≥ 0/200 bar ≤ ±0.5 % FSO

Range selection/range spread
User-adjustable without test bench
Maximum spread 1:20
(at: differential pressure max. 1:10)

Operating temperature range
Medium: -10/+90 °C
Ambient: -10/+55 °C
Storage: -25/+60 °C

Temperature error band
In compensated range
-10/+30 °C < ±0.1 FSO %/10 K

Dynamic characteristics
Suitable for static and dynamic measurements; measuring cycle max. 0.8 s

Process connection
Stainless steel 316 L
G½B (EN 837-1/7.3)

Wetted parts
Stainless steel 316 L

Pressure transmission liquid
Silicone oil

Output signal/supply voltage
4–20 mA, 2-wire DC 12–50 V
(optional with HART protocol)
Short circuit protected,
protected against reverse polarity
Maximum ± supply voltage

Load
4–20 mA ≤ $\frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
4–20 mA max. 20.8 mA

Housing (degree of protection)
Stainless steel 303 (IP 65), window safety glass

Electrical connections
Cable gland

CE conformity (EMC)
EN 50081-1 and EN 50082-2

Options

- HART protocol
- Version for differential pressure measurment
- Version for level measurement
- Fitting of chemical seal
- Wall bracket
- EX version (II 2 G Ex ia II C T4/T5/T6)

i For menu types and measuring ranges, see table on page 470. See page 476 for prices.

Pressure transducers DMU 12

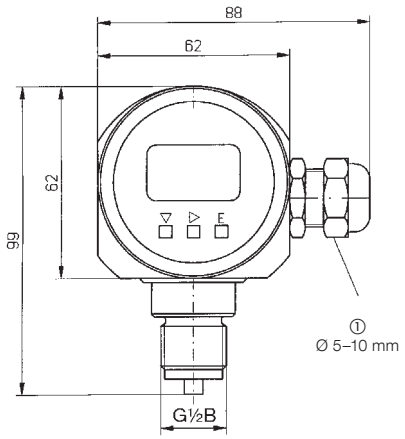
Menu types The following menus are available for displaying information and selecting parameters:			
Menu type	**Meaning**	**Menu type**	**Meaning**
Measuring range selection	Specify pressure range, without indication of pressure	Alarm condition	Specify output current for fault
Damping	Select signal damping	Calibrate	Specify pressure range, with indication of pressure
Min./max. values	Display min./max. pressure/level and temperature values	Current balancing	Adapt output signal to connected devices
Output functions	Select output function (linear, inverted, root, table)	Factory defaults	Reset to factory defaults
Pressure units	Select physical unit with conversion, e.g. mWC, mmHg, mbar, psi	Lock	Protection against unauthorised use
Measurement cycle test	Create a defined output signal (current)	Language	Select language (English/German)

Measuring ranges	**Overpressure safety**	**Measuring ranges**	**Overpressure safety (one side)**	**Max. static pressure**
Relative pressure:		Differential pressure:		
-160/+160 mbar	2 bar			
-1/+1 bar	6 bar	0/1 bar	6 bar	75 bar
-1/+4 bar	16 bar	0/4 bar	16 bar	75 bar
-1/+16 bar	60 bar	0/16 bar	30 bar	75 bar
-1/ +40 bar	100 bar			
-1/ +100 bar	150 bar			
-1/+400 bar	500 bar			
Absolute pressure:				
0/1 bar	3 bar absolute			
0/ 4 bar	10 bar absolute			
0/16 bar	60 bar absolute			

11

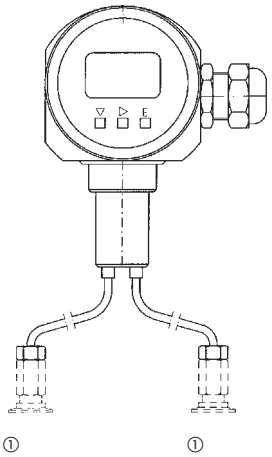
Dimensions (mm) and electrical connections

Standard version – connection G½B

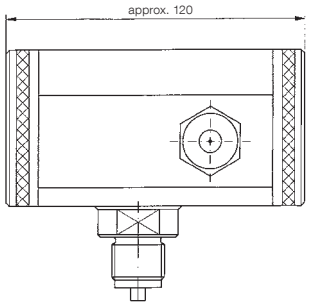


① Cable gland for cable

Version for differential pressure measurment – fitting of chemical seal

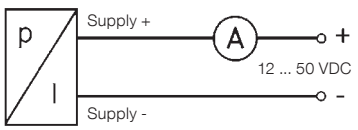


① Chemical seals



Wiring diagram

2-wire 4–20 mA



AFRISO EURO-INDEX

Pressure transducers DMU 13 with local display

- Robust stainless steel housing (safety housing)
- High-precision measurements with integrated transducer
- Mechanical, power-independent local display

A Chapter 10

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Application

For pressure measurements with a power-independent local display in combination with an electrical output signal.

Description

The DMU 13 pressure transducers consist of a mechanical Bourdon tube measuring element and a piezo-resistive stainless steel measuring cell. The Bourdon tube measuring element is used to provide an easy-to-read analogue local display. The display is power-independent. Due to the integrated pressure transducer, high-precision measurement in parallel is possible. A standardised current output is available for signal transmission and recording of measured data. The robust stainless steel housing has a solid baffle wall and blow out (safety housing).

Technical specifications

Nominal size
100

Measuring accuracy
Pressure gauge: class 1.0 (EN 837-1/6)
Transducer: Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability):
< ± 0.5 % FSO

Measuring ranges
Relative pressure: 0/0.6 to 0/40 bar

Application area
Static load: full scale value
Dynamic load:
0.9 x full scale value
Short term: 1.3 x full scale value

Operating temperature range

Medium:	-20/+100 °C
Ambient:	-20/+60 °C
Storage:	-40/+70 °C

Housing (safety housing)
Housing with solid baffle wall and blow-out at back

Window
Laminated safety glass

Degree of protection
IP 54 (EN 60529)

Process connection
G½B – spanner size SW 22, bottom
(EN 837-1/7.3)

Materials

Housing:	Stainless steel 304
Pressure connection:	Stainless steel 316 L
Diaphragm:	Stainless steel 316 L
Seal:	FKM (Viton)

Pressure transmission liquid
Silicone oil

Electrical connection
Junction box

Additional data transducer

Output signal/supply voltage
4–20 mA DC 12–36 V
2-wire

Load
4–20 mA ≤ $\frac{U_B - U_{Bmin}}{0.02\ A}$

Current input
4–20 mA < 25 mA

Long-term stability
≤ ±0.2 % FSO/year

Temperature error band
In compensated range
0–70 °C ≤ 1 % FSO/10 K

Pressure transmission liquid
Silicone oil

Options

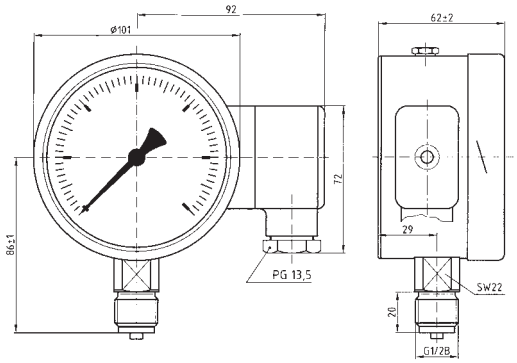
- Housing filling (paraffin oil)
- Electrical contacts
- Other process connections
- Fitting of chemical seal

i See page 476 for prices.

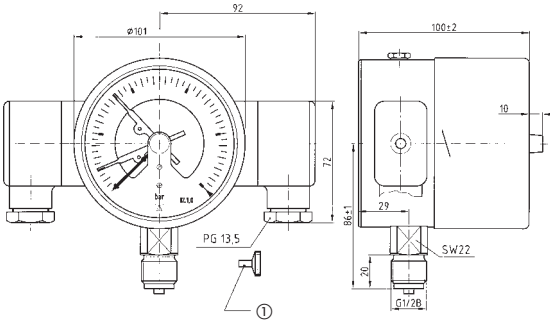
Pressure transducers DMU 13

Dimensions (mm) and electrical connections

Bottom connection



Bottom connection, with electrical contact



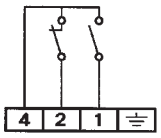
① Removable key, delivered loose with the unit.

Pin assignment table for pressure measuring cell (right junction box)

Supply +	1
Supply -	2
Earth	Earth pin

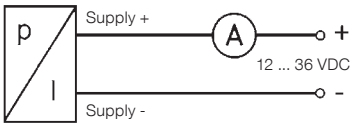
Pin assignment table for electrical contact (left junction box). Example: Magnetic spring contact MK2.12

Normally open contact	1
Normally closed contact	2
Common	4



Wiring diagram

2-wire, 4–20 mA



11

Pressure transducers DMU 14
Version with field housing

- Robust housing design
- High measuring accuracy
- High overpressure safety
- Turn down 1:10
- High long-term stability
- Long service life
- Optional display

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DMU 14 FG with display

Application

For electronic pressure measurement in applications requiring high measuring accuracy and long-term stability, especially under rough operating conditions. With aluminium die cast housing, the transducers are particularly suitable for process engineering applications. With stainless steel field housing and hygienic process connection, the transducers are also ideally suited for applications in the food industry.

Description

Pressure transducers convert physical pressure into an electrical signal proportional to the pressure. DMU 14 is equipped with an oil-filled piezo-resistive silicon measuring cell.

Technical specifications

Measuring accuracy
Deviation from the characteristic curve according to IEC 60770 – limit point calibration (non-linearity, hysteresis, repeatability)
250 mbar: ≤ ± 0.2 % FSO
≥ 0/1 bar: ≤ ± 0.1 % FSO

Long-term stability
± 0.1 % x turn down FSO/year

Measuring ranges/overpressure safety
Relative pressure:

Measuring range	Max. overpressure
0/ 250 mbar	1000 mbar
0/1 bar	3 bar
0/1.6 bar	6 bar
0/6 bar	20 bar
0/16 bar	60 bar
0/25 bar	100 bar
0/60 bar	140 bar
0/160 bar	340 bar
0/250 bar	600 bar
0/600 bar	1000 bar

Operating temperature range
Without display
Medium: -40/+125 °C
Ambient: -40/+80 °C
Storage: -40/+80 °C

With display
Medium: -40/+125 °C
Ambient: -20/+70 °C
Storage: -30/+80 °C

Temperature error
-20/+80 °C < 0.3 % FSO

Dynamic characteristics
Response time < 100 ms

Process connection
G½B (EN 837-1/7.3)

Materials
Housing: Stainless steel 316 L
Process connection: Stainless steel 316 Ti
Diaphragm: Stainless steel 316 L
Seal: FKM

Pressure transmission liquid
Silicone oil

Adjustable parameters
Electrical damping: 0/100 s
Offset: 0/90 %
Turn down (of span): 1:10

Output signal/ supply voltage
4–20 mA, 2-wire DC 10–30 V
4–20 mA, 2-wire DC 10–28 V
with Ex version/HART communication

Load
$R_{max} = [(U_B - U_{Bmin})/0.02]\ \Omega$
HART communication $R_{min} = 250\ \Omega$

Current input
4–20 mA max. 25 mA

Electrical protection
Short circuit proof and protected against reverse polarity

Electrical connection (degree of protection)
Connection terminals in terminal box (IP 67)

CE conformity (EMC)
EMC Directive 2004/108/EC

Options

- Other process connections
- EX version with HART communication
- High temperature version
- Integrated display in housing

i See page 476 for prices.

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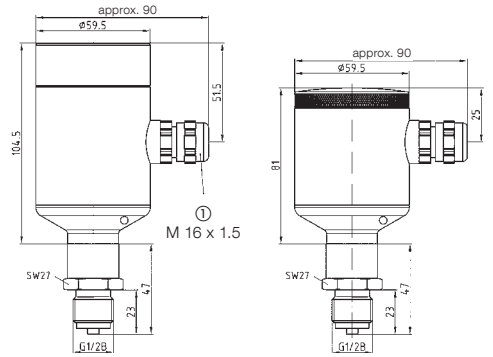
Pressure transducers DMU 14

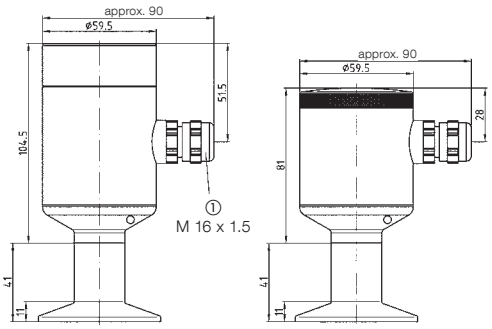
Dimensions (mm) and electrical connections

DMU 14 FG ½“ with and without display



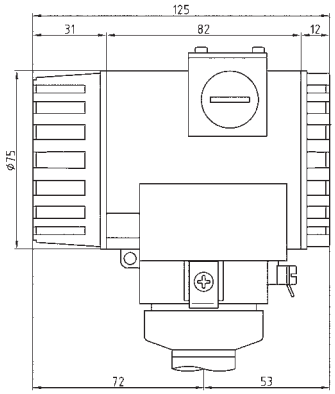
① Cable gland

DMU 14 FG Clamp 1½" with and without display

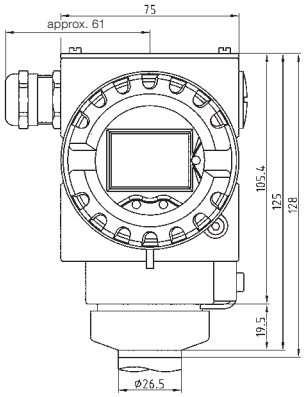


① Cable gland

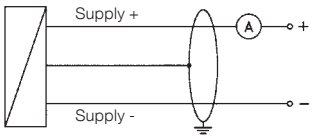
DMU 14 DG



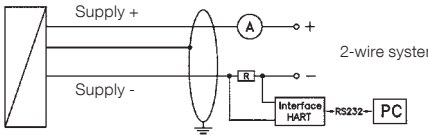
DMU 14 DG



Wiring diagrams



2-wire system (current)



2-wire system (current) HART

Pin assignment table

	Stainless steel field housing Connection terminals	Aluminium die cast housing Connection terminals
Supply + Supply – Test	1 2 Test	2 4 3
Earth	6	1
By connecting an ammeter between supply + and test, you can check the output signal without disconnecting the supply voltage.		

Universal digital pressure gauge DIM 20 Service instrument

- High flexibility due to selectable units
- Min./max. memory
- Intuitive operation via menus
- Display can be rotated by 330°
- Zero and full scale can be calibrated

Application

For high-precision electronic pressure measurement with local digital display, for applications such as hydraulics, pneumatics, mechanical and plant engineering.

Description

Compact microprocessor-controlled pressure gauge with thick film ceramic measuring cell. The signal received from the pressure sensor is processed by the microprocessor, converted and displayed. Each device is shipped with its own measurement log.

Technical specifications

Functions
Selection of units, min./max. memory, zero and full scale calibration, adjustable auto-off function, adjustable decimal point, battery status indication

Displayed values
Selectable pressure unit:
bar/mbar/psi/InHg/mmHg/hPa/kPa/MPa/mWC

Display
Multi-line display
Line 1:
4.5 digit, numeric, for displaying the measured value (character height 9.5 mm)

Line 2:
6-digit, alphanumeric, for displaying additional information (character height 6.8 mm) and additional symbols

Display can be rotated by 330°

Measuring accuracy
±0.5 % FSO as per IEC 60770
±1 % FSO (-1/0 bar)

Measuring ranges
Relative pressure: -1/0 bar, 0/2.5 bar to 0/700 bar

Overpressure safety
At least 1.5 x FS

Burst pressure
< 160 bar at least 2.5 x FS
> 160 bar at least 1.5 x FS

Operating temperature range
Medium: -20/+125 °C
Ambient: -20/+45 °C
Storage: -30/+80 °C
Temperature error
In compensated range 0/70 °C < 0.5 % FSO/10 K

Dynamic characteristics
Measuring rate 5/s

Process connection
G¼B (EN 837-1/7.3), bottom

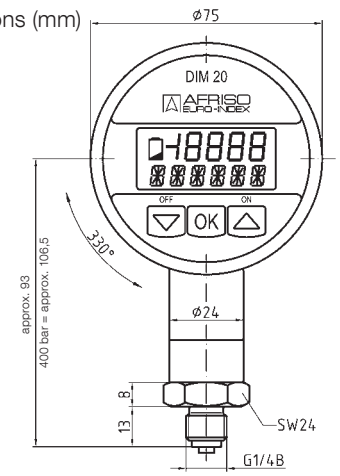
Materials

Housing:	PA6, glass-loaded
Pressure connection:	Stainless steel 304
Diaphragm:	Ceramic (Al_2O_3 96 %)
Seal:	FKM

Degree of protection
IP 51 (EN 60529)

Supply voltage
1 x lithium battery 3.6 V (included),
battery life depends on usage (max. 5 years)

Dimensions (mm)

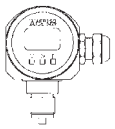
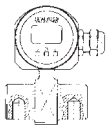
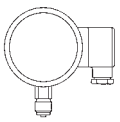
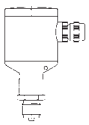
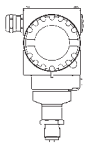


i
See page 476 for prices.

11

Pressure transducers/digital pressure gauges

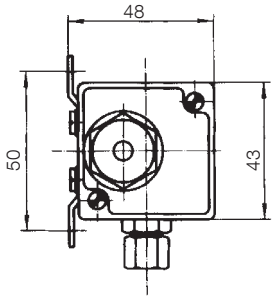
DG: H

Type	DMU 12	DMU 12 Dif	DMU 13	DMU 14 FG	DMU 14 DG	DIM 20
Version						
Housing Ø	62	62	100	60	75	75
Housing	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Aluminium	Plastic
Measuring accuracy	0.2 % FSO	0.2 % FSO	0.35 % FSO	See data sheet	See data sheet	0.5 % FSO (-1/0 bar = 1% FSO)
Wetted parts	Stainless steel 316 L	Stainless steel 316 L	Stainless steel 316 Ti/316 L	Stainless steel 316 Ti/316 L	Stainless steel 316 Ti/316 L	Stainless steel 304 ceramic/FKM
Connection	G½B	EN 61518	G½B	G½B	G½B	G¼B
Supply voltage	DC 12–50 V	DC 12–50 V	DC 12–36 V	DC 10–30 V	DC 10–30 V	DC 3.6 V
Output	4–20 mA	4–20 mA	4–20 mA	4–20 mA	4–20 mA	---
Measuring range	Part no.	Part no.	Part no.	Part no.	Part no.	Part no.
Price €						
0/250 mbar	---	---	---	31977	31987	---
Price €						
-1/0 bar	---	---	---	---	---	**32500**
0/0.6 bar	---	---	31076	---	---	---
0/1 bar	31040*	31049	31077	31978	31988	---
Price €						
0/1.6 bar	---	---	31078	31979	31989	---
0/2.5 bar	---	---	31079	---	---	**32503**
0/4 bar	31041*	31050	31080	---	---	---
0/6 bar	---	---	31081	31980	31990	**32505**
0/10 bar	---	---	31082	---	---	**32506**
0/16 bar	31042*	31051	31083	31981	31991	---
0/25 bar	---	---	31084	31982	31992	**32508**
0/40 bar	31043*	---	31085	---	---	**32509**
Price €						
0/60 bar	---	---	---	31983	31993	---
0/100 bar	31044*	---	---	---	---	**32511**
0/160 bar	---	---	---	31984	31994	**32512**
0/250 bar	---	---	---	31985	31995	**32513**
0/400 bar	31045*	---	---	---	---	**32514**
0/600 bar	---	---	---	31986	31996	---
Price €						**245.50**
0/700 bar	---	---	---	---	---	**32516**
Extra charges**	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**	**Spare battery**
EX protection/HART communication			---			**Part no. 68309**
Housing filling	---	---		---	---	
Display			---			**Price €**
Clamp connection 1" or 1½"	---	---	---			
Clamp connection 2"	---	---	---			
Dairy fitting DIN 11851 DN 25	---	---	---			
Dairy fitting DIN 11851 DN 40	---	---	---			
Dairy fitting DIN 11851 DN 50	---	---	---			
High-temperature version +300 °C	---	---	---			

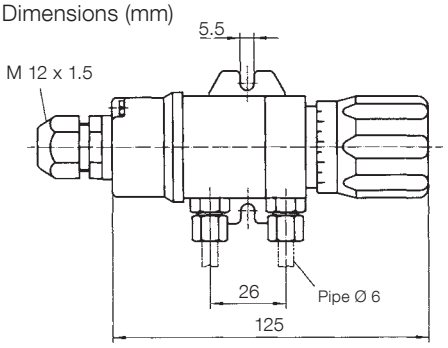
* Measuring range -1/+x bar
** Wetted parts of clamp connection and dairy fitting version = stainless steel (316 L)

Differential pressure switches DS 01

Dimensions (mm)



Dimensions (mm)



Application

Suitable for all practically neutral media such as process water, heating water, neutral gases, oils. Suitable for two-point control by means of a continuously adjustable switching point (between 10 and 100% of pressure range).

Description

A robust diaphragm type movement serves as the basis for this unit. It is suitable for overpressure, vacuum and differential pressure measurements. The unit uses the same principle of operation for all three measuring applications. The pressure or the differential pressure applies a force to one side of the diaphragm. This force displaces the diaphragm system and moves the measurement range spring. A switching pin mounted to the diaphragm actuates an electrical switching element. The switching point is adjusted by means of a knurled knob according to the scale.

Technical specifications

Pressure ranges
0/0.6 to 0/4 bar

Maximum static pressure
16 bar, device is overpressure-proof up to 16 bar and vacuum-proof

Operating temperature range
Medium: T_{max} = +80 °C
Ambient: T_{max} = +80 °C

Connection
2 x G$^1/_8$ female thread

Pressure chamber
Brass

Diaphragm
NBR (Perbunan)

Mounting
Bracket for wall-mounting

Electrical connection
Cable gland M 12 x 1.5

Switching point
10–100 % of pressure range, continuously adjustable

Contact
Microswitch, normally closed contact or normally open contact (please specify desired switching function)

Hysteresis
Approx. 2 %

Maximum rating
U ... AC 250 V, I ... 3 A, P ... 500 VA

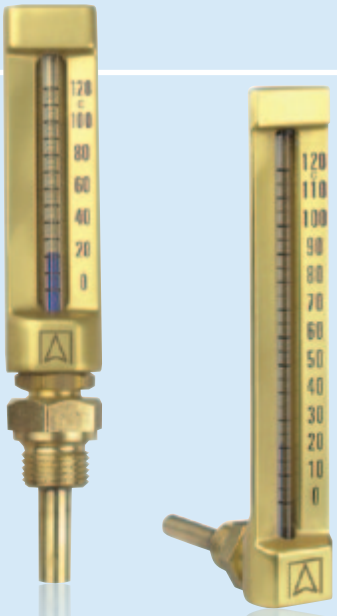
DG: H

Pressure range	Part no.	**Price €**
0/0.6 bar	88103	
0/1 bar	88104	
0/1.6 bar	88105	
0/2.5 bar	88107	
0/4 bar	88106	
Extra charges – options		
Diaphragm FKM (Viton)	88125	
Fixed cable 2.5 m	88126	
2 x compression fitting for 6 mm pipes, steel	88120	
2 x compression fitting for 6 mm pipes, brass	88108	
2 x compression fitting for 8 mm pipes, brass	88114	

Thermometers for heating installations

Thermometers for industrial applications

Resistance thermometers



Industrial thermometers

CHAPTER 12

Temperature measuring instruments and temperature controllers

HEATING/PLUMBING

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Thermometers with capillary tube THK 507

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Accessories for TRT, STB, ETB, STW 512

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Bimetal thermometers for heating and plumbing applications

	BiTh 40 K	BiTh 50 K	BiTh 63 K
Application	Heating, plumbing, distribution systems, underfloor heating manifolds	Heating, plumbing, distribution systems, underfloor heating manifolds	Heating, plumbing
Technical specifications	**Nominal size** 40 **Measuring element** Bimetal spiral **Accuracy class** 2 (EN 13190) **Ranges** 0/60 °C **Working temperature** Full scale value **Operating pressure** No pressure	**Nominal size** 50 **Measuring element** Bimetal helix **Accuracy class** 2 (EN 13190) **Ranges** 0/60 °C **Working temperature** Full scale value **Operating pressure at thermowell** Max. 6 bar	**Nominal size** 63 – 80 – 100 **Measuring element** Bimetal helix **Accuracy class** 2 (EN 13190) **Ranges** -20/+60, 0/60, 0/120 °C **Working temperature** Full scale value **Operating pressure at thermowell** Max. 6 bar
Standard version	**Connection** Plastic, plug-on, Ø 15 mm, no thermowell **Mounting position** Centre back **Dial** Plastic, white – dial marking black **Pointer** Plastic, black **Housing** ABS, white **Window** Clip-in plastic	**Connection** Stem plastic, Ø 9 mm, thermowell G½B, plastic, removable **Mounting position** Centre back **Dial** Plastic, white – dial marking black **Pointer** Plastic, black **Housing** ABS, white **Window** Clip-in plastic	**Connection** Stem brass, Ø 9 mm, thermowell G½B, brass, removable, stem length 40 mm optional self-sealing thread with PTFE sealing ring **Mounting position** Centre back (NG 63 excentric back optional) **Dial** Plastic, white – dial marking black **Pointer** Plastic, black **Housing** ABS, black **Window** Clip-in plastic

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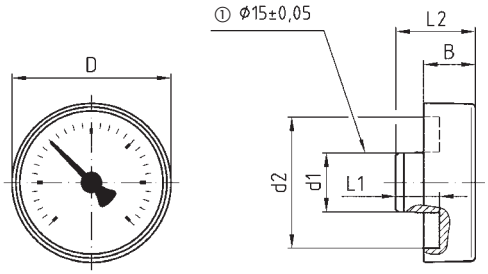
See page 482 for prices.

Bimetal thermometers for heating and plumbing applications

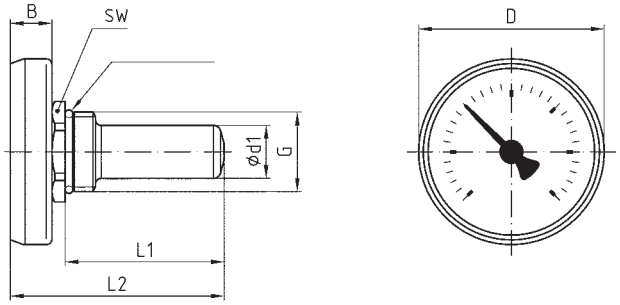
Housing types and dimensions (mm)

Centre back connection, NG 40

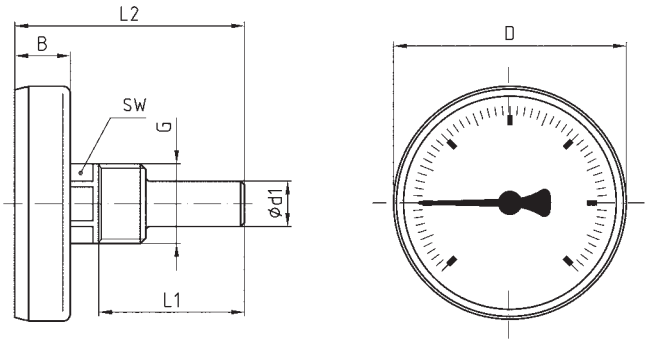


① Mounting hole

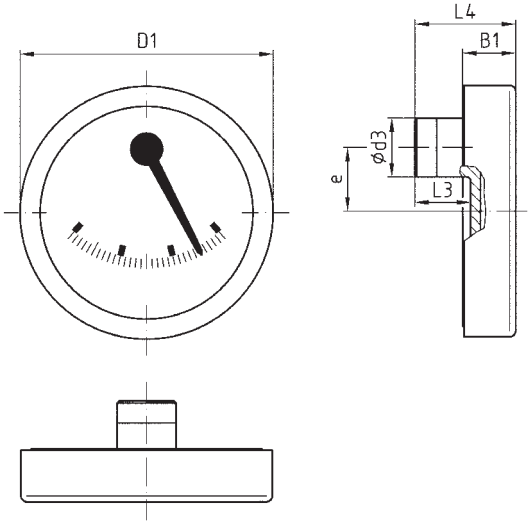
Centre back connection, NG 50



Centre back connection, NG 63 – 80 – 100



Bottom excentric connection, NG 63

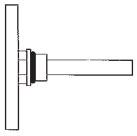
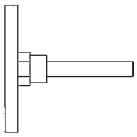
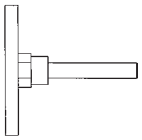
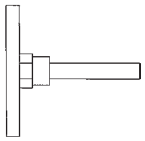


Dimensions (mm)

Nominal size (NG)	B	B_1	D	D_1	d_1	d_2	d_3	e	G	L1	L_2	L_3	L_4	SW
40	13	–	40	–	14.8	33	–	–	–	11	50	–	–	–
50	11	–	49	–	14	–	–	–	G½B	42	56.5	–	–	24
63	14.7	13	62	63.5	12	–	15	16	G½B	40/63/100/ 150/200	61/85/122/ 172/222	14	25	19
80	14.8	–	79	–	12	–	–	–	G½B			–	–	19
100	15	–	100	–	12	–	–	–	G½B			–	–	19

Bimetal thermometers for heating and plumbing applications

DG: G

Type	BiTh 40 K		BiTh 50 K		BiTh 63 K		BiTh 80 K		BiTh 100 K	
Version										
Housing Ø	40		50		63		80		100	
Housing	ABS, white		ABS, white		ABS, black, plastic clip-in window					
Stem	Plastic, Ø 15 mm		Plastic, Ø 9 mm		Brass or aluminium, Ø 9 mm					
Connection	Plastic, plug-on, no thermowell		Thermowell G½B, plastic		Thermowell G½B, brass, Ø 12 mm outside, removable					
Accuracy class	Class 2 as per EN 13190									
Range (bar)	-20/+60 °C		-20/+60 °C		-20/+60 °C		-20/+60 °C		-20/+60 °C	
Stem length		PU*		PU*	**Price €** Part no.	PU*	**Price €** Part no.	PU*	**Price €** Part no.	PU*
40 mm	---		---		**63763**	100	**63776**	100	**63676**	50
63 mm	---		---		**63769**	100	**63777**	100	**63677**	50
100 mm	---		---		63770	100	63778	50	**63678**	50
150 mm	---		---		63771	50	63779	40	63679	25
Range	0/60 °C		0/60 °C		0/60 °C		0/60 °C		0/60 °C	
Stem length	**Price €** Part no.		**Price €** Part no.		**Price €** Part no.		**Price €** Part no.		**Price €** Part no.	
40 mm	64066 (See drawing for stem)	100	63749	100	**63760**	100	**63765**	100	**63698**	50
63 mm			---		**63761**	100	63766	100	**63699**	50
100 mm	---		---		63762	100	63767	50	**63700**	50
150 mm	---		---		63764	50	63768	40	63701	52
Range	0/120 °C		0/120 °C		0/120 °C		0/120 °C		0/120 °C	
Stem length	**Price €** Part no.		**Price €** Part no.		**Price €** Part no.		**Price €** Part no.		**Price €** Part no.	
40 mm with PTFE sealing ring	---		----		**63702**	100	**63706**	100	**63684**	50
40 mm	---		---		**63704**	100	**63708**	100	**63997**	50
63 mm	---		---		**63710**	100	**63715**	100	**63695**	50
100 mm	---		---		**63711**	100	**63716**	50	**63696**	50
150 mm	---		---		**63714**	50	**63717**	40	**63697**	25
200 mm	---		---		---				**63671**	10

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* Minimum order quantity for non-stock items 1 PU (packing unit); delivery only in packing units.

Spare thermowells

Connection G½B, brass		
Stem length	Part no.	**Price €**
40 mm with PTFE sealing ring	**63685**	
40 mm	**63856**	
63 mm	**63686**	
100 mm	**63687**	
150 mm	**63688**	

Bimetal standard thermometers/surface mount thermometers/flue gas thermometers

	Bimetal standard thermometers	Surface mount thermometers	RT / RTC
Application	Heating, plumbing	Heating, plumbing	Flue gas thermometer RT and flue gas temperature controller RTC for gas and oil fired systems
Technical specifications	**Nominal size** 50 – 63 – 80 – 100 – 160 **Measuring element** Bimetal helix **Accuracy class** 2 (EN 13190) **Ranges °C** -20/+60, 0/60, 0/120, 0/160 **Working temperature** Full scale value **Operating pressure at thermowell** Max. 6 bar	**Nominal size** 63 – 80 **Measuring element** Bimetal spiral **Accuracy class** 2 (EN 13190) **Ranges °C** 0/60, 0/120 **Working temperature** Full scale value	**Nominal size** 80 **Measuring element** Bimetal helix **Accuracy class** 2 (EN 13190) **Ranges °C** RT: 0/300, 0/500 RTC: 0/350 **Working temperature** Full scale value
Standard version	**Connection** Stem brass, Ø 9 mm Thermowell G½B, brass, removable **Mounting position** NG 50 – 63 – 80 – 100 – 160 centre back NG 63 – 80 – 100 bottom **Dial** Up to 120 °C plastic, greater than 160 °C aluminium, white Dial marking black **Pointer** Plastic, black **Housing** Sheet steel galvanised **Push on bezel** Sheet steel nickel-plated **Window** Plastic	**Connection** NG 63 with heat-conducting element and fastening spring or universal clamp for pipes ⅜" to 1½" NG 80 with heat-conducting element and fastening spring **Mounting position** NG 63 – 80 centre back **Dial** Aluminium, white – Dial marking black **Pointer** Plastic, black **Housing** Sheet steel galvanised **Push on bezel** Sheet steel nickel-plated **Window** Plastic	**Connection** RT: Stem stainless steel 316 L, plain, with adjustable cone, brass RTC: Stem stainless steel 316 L, plain, with ring magnet bracket **Mounting position** centre back **Dial** Aluminium, grey – dial marking black; RTC with green and red reference zones **Pointer** Aluminium, black RTC with additional max. pointer **Housing** Sheet steel galvanised **Push on bezel** Sheet steel nickel-plated **Window** Plastic
Options	▪ Other ranges ▪ Nominal size 34	▪ Other ranges ▪ Plastic housing	

i See page 485 for prices.

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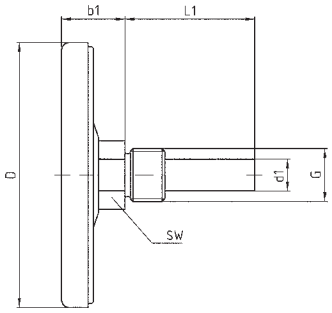
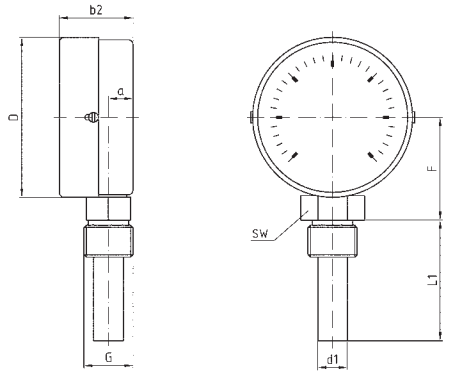
Bimetal standard thermometers/surface mount thermometers/flue gas thermometers

Housing types and dimensions (mm)

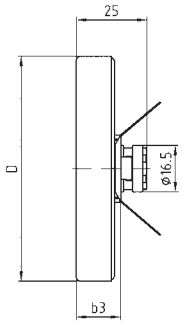
Bimetal standard thermometers
Centre back connection



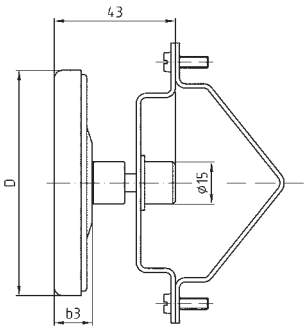
Bimetal standard thermometers
Bottom connection



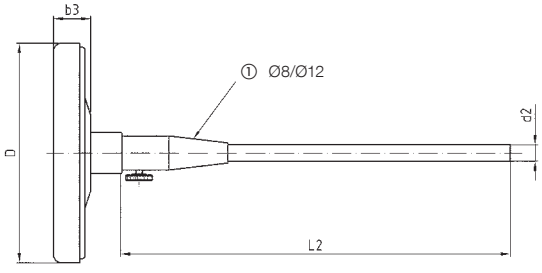
Surface mount thermometers
Centre back connection, with fastening spring



Surface mount thermometers
Centre back connection, with universal clamp for pipes 3/8" to 1½"

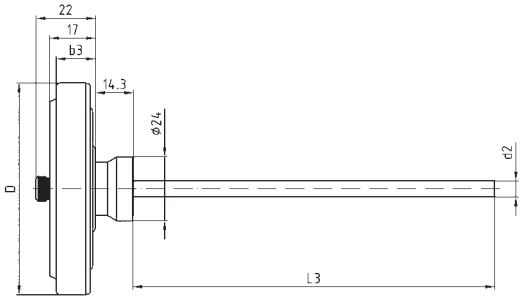


Flue gas thermometers RT
Centre back connection



① For hole

Flue gas temperature controller RTC
Centre back connection

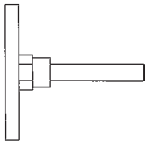
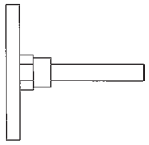
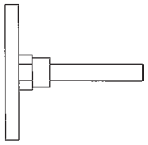
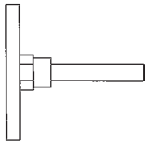
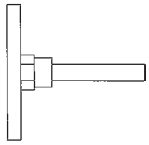


Dimensions (mm)

Nominal size (NG)	a	b1	b2	b3	D	d1	d2	F	G	L1	L2	L3	SW
50	–	18	–	–	50	12	–	–	G½B	40			19/22
63	10	20	35	15	63	12	-	29.3	G½B	63	141		19/22
80	10	21	33	15	80	12	6	47.3	G½B	100	191	86	19/22
100	10	23.7	40.5	–	100	12	–	59.3	G½B	150	291	136	19/22
160	10	22	–	–	160	12	–	-	G½B	200			19/22

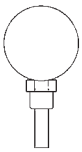
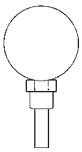
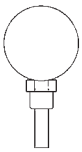
Bimetal standard thermometers

DG: G

Type	BiTh 50 ST	BiTh 63 ST	BiTh 80 ST	BiTh 100 ST	BiTh 160 ST
Version					
Housing Ø	50	63	80	100	160
Housing	Sheet steel galvanised, push on bezel nickel-plated, plastic window				
Stem	Brass or aluminium, Ø 9 mm				
Connection	Thermowell G½B, brass, Ø 12 mm outside, removable				
Accuracy class	Class 2 as per EN 13190				
	Minimum order quantity for non-stock items = 10 pieces				
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length		**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	---	**63951**	**63955**	**63959**	63963
63 mm	---	**63952**	**63956**	**63960**	63964
100 mm	---	63953	63957	**63961**	63981
150 mm	---	63954	63958	**63962**	63982
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	**64027**	**63860**	**63865**	63869	3873
63 mm	64028	63861	63866	63870	63874
100 mm	64029	63862	63867	**63871**	63875
150 mm	64030	63864	63868	**63872**	63876
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	**64031**	**63801**	**63806**	**63811**	63816
63 mm	64032	**63802**	**63807**	**63812**	63817
100 mm	64033	**63803**	**63808**	**63813**	63818
150 mm	64034	**63804**	**63809**	**63814**	63819
200 mm	---	---	---	**63815**	---
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
Stem length		**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	---	**63983**	63987	64015	64019
63 mm	---	63984	63988	64016	64020
100 mm	---	63985	63989	64017	64021
150 mm	---	63986	63990	64018	64022

Bimetal standard thermometers

DG: H

Type	BiTh 63 ST	BiTh 80 ST	BiTh 100 ST
Version			
Housing Ø	63	80	100
Housing	Sheet steel galvanised, push on bezel nickel-plated, plastic window		
Stem	Brass or aluminium, Ø 9 mm		
Connection	Thermowell G½B, brass, Ø 12 mm outside, removable		
Accuracy class	Class 2 as per EN 13190		
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	64039	64055	64073
63 mm	64040	64056	64074
100 mm	64041	64057	64075
150 mm	64042	64058	64076
Range	0/60 °C	0/60 °C	0/60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	64043	64059	64077
63 mm	64044	64060	64078
100 mm	64045	64061	64079
150 mm	64046	64062	64080
Range	0/120 °C	0/120 °C	0/120 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	64047	64063	64081
63 mm	64048	64064	64082
100 mm	64049	64067	64083
150 mm	64050	64068	64084

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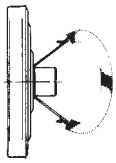
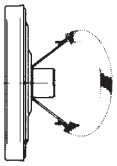
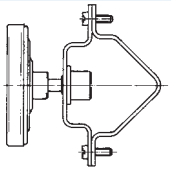
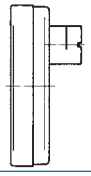
Spare thermowells

DG: G

Connection G½B, brass (only for bottom connection)		
Stem length	Part no.	**Price €**
40 mm	63850	
63 mm	63851	
100 mm	63852	
150 mm	63853	

Surface mount thermometers/eccentric thermometers

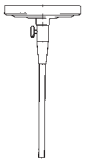
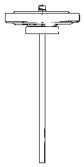
DG: G

Type	ATh 63 F*	ATh 80 F*	ATh 63 S	BiTh 63 exz
Version				
Housing Ø	63	80	63	63
Housing	Sheet steel galvanised, push on bezel nickel-plated, plastic window			Plastic
Connection	Heat-conducting element with fastening spring for pipes ⅜" to 1½"		Universal clamp for pipes ⅜" to 1½"	Eccentric male connector Ø 15 mm
Accuracy class	Class 2 as per EN 13190			
Range	0/120 °C	0/120 °C	0/120 °C	20/100 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Dial black	**63822**	**63821**	**63820**	68895
Dial red	---	---	---	**63920**
Dial blue	---	---	---	**63921**
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C
	63826	63943	**---**	**---**

*ATh 63 F/ATh 80 F are also available with plastic housing.

Flue gas thermometers/thermometers for heating installations

DG: G

Type	RT 80		RTC 80	HTh 160 G	HTh 160 W
Version					
Housing Ø	80		80	160	160
Housing	Sheet steel galvanised, push on bezel nickel-plated, plastic window			Aluminium, brass-coloured, straight version	Aluminium, brass-coloured, angled version 90°
Connection	Plain stem stainless steel 316 L, adjustable cone		Plain stem stainless steel 316, magnet	Screw-in pocket G½B, brass	
Accuracy class	Class 2 as per EN 13190				
Range	0/300 °C	0/500 °C	0/350 °C	0/130 °C	0/130 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	**---**	**---**	**---**	**63931**	**63932**
100 mm	**---**	**---**	**63833**	Glass insert	Glass insert
150 mm	**64238**	**63830**	**63832**	**63941**	**63942**
300 mm	**64239**	**63831**	**---**	**---**	**---**

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Bimetal thermometers for industrial applications
Bimetal air duct thermometers

Bimetal thermometers for industrial applications

Technical specifications

Mechanical engineering, plant engineering, pipelines, boilers, heating technology

Type
D2

Nominal size
63 – 80 – 100 – 160

Measuring element
Bimetal helix

Accuracy class
1 (EN 13190)

Ranges °C
-20/+60, 0/60, 0/120, 0/160

Working temperature
Full scale value

Operating pressure at thermowell
Max. 6 bar

Degree of protection
IP 41 (EN 60529)

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Standard version

Connection
Stem brass, Ø 9 mm
Thermowell G½B, brass, removable

Mounting position
NG 63 – 80 – 100 – 160 centre back
NG 63 – 80 – 100 – 160 bottom

Dial
Aluminium, white, dial marking black

Pointer
Aluminium, black

Housing
Sheet steel galvanised

Push on bezel
Sheet steel nickel-plated

Window
Instrument-grade glass

Options

- Other connection types
- Other ranges
- Other stem lengths

i
See page 490 for prices.

Bimetal air duct thermometers

Air conditioning, ventilation

Type
D2

Nominal size
63 – 80 – 100

Measuring element
Bimetal helix

Accuracy class
2 (EN 13190)

Ranges °C
-30/+50, -20/+60, -20/+40, 0/60

Working temperature
Full scale value

Degree of protection
IP 41 (EN 60529)

Connection
Stem brass, Ø 9 mm, mounting flange, plastic Ø 60 mm, or back flange, steel

Mounting position
NG 63 – 80 – 100 centre back

Dial
Aluminium, white, dial marking black

Pointer
Plastic, black

Housing
Sheet steel galvanised

Push on bezel
Sheet steel nickel-plated

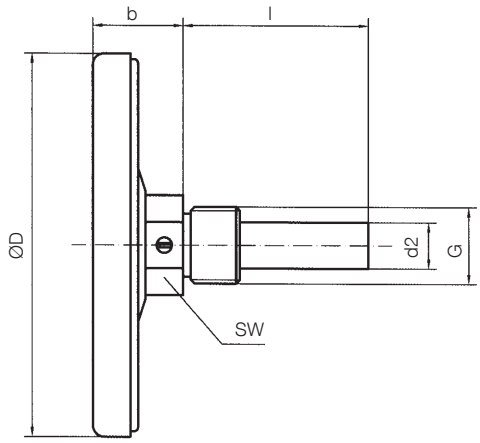
Window
Plastic

- Other ranges
- Other stem lengths
- Accuracy class 1
- Steel flange Ø 40/80 mm

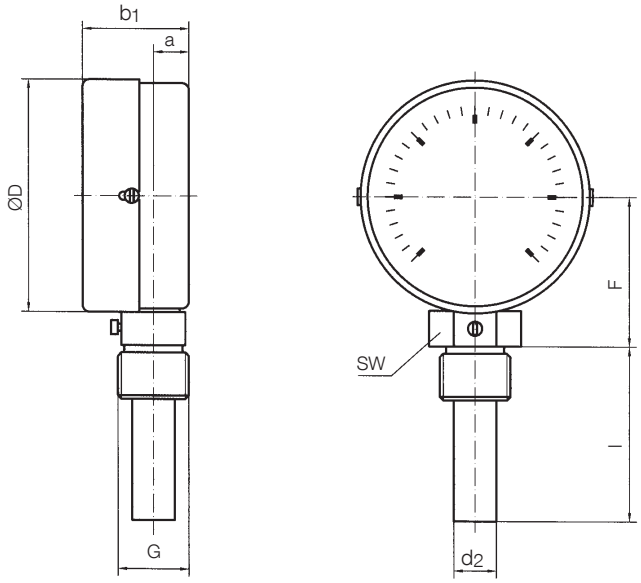
Bimetal thermometers for industrial applications/ Bimetal air duct thermometers

Housing types and dimensions (mm)

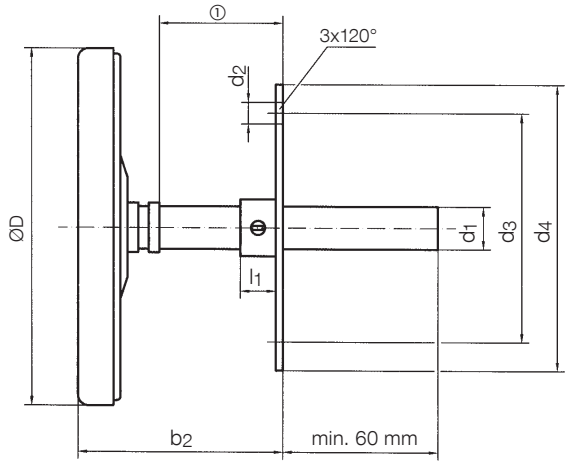
Bimetal thermometers for industrial applications
Centre back connection



Bottom connection



Bimetal air duct thermometers
Centre back connection



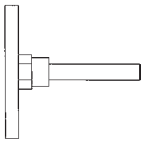
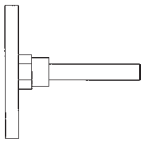
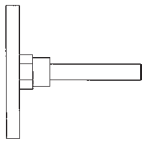
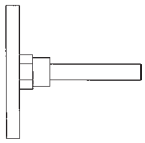
① Adjustable

Dimensions (mm)

Nominal size (NG)	a	b	b1	b2	D	d1	d2	d3	d4	F	G	l	l1	SW
63	10	24	34	Adjustable	63	9	3.6	51	60	43.5	G½B	40	10	22
80	10	24	36		80	9	3.6	51	60	52	G½B	63	10	22
100	10	26	36		100	9	3.6	51	60	62	G½B	100	10	22
160	-	32	37		160	-	-	-	-	92	G½B	150	-	22

Bimetal thermometers for industrial applications

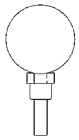
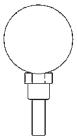
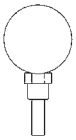
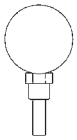
DG: H

Type	BiTh 63 I D211	BiTh 80 I D211	BiTh 100 I D211	BiTh 160 I D211
Version				
Housing Ø	63	80	100	160
Housing	Sheet steel galvanised, push on bezel nickel-plated, instrument-grade glass window			
Stem	Brass, Ø 9 mm			
Connection	Thermowell G½B, brass, Ø 12 mm outside, removable			
Accuracy class	Class 1 as per EN 13190			
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	65106211	65206211	65306211	65406211
63 mm	65107211	65207211	**65307211**	65407211
100 mm	65108211	65208211	**65308211**	65408211
150 mm	65109211	65209211	65309211	65409211
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	65131211	65231211	65331211	65431211
63 mm	**65132211**	65232211	**65332211**	65432211
100 mm	65133211	65233211	**65333211**	65433211
150 mm	65134211	65234211	**65334211**	65434211
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	**65146211**	65246211	65346211	65446211
63 mm	**65147211**	**65247211**	**65347211**	65447211
100 mm	**65148211**	**65248211**	**65348211**	65448211
150 mm	65149211	**65249211**	**65349211**	65449211
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	65151211	65251211	65351211	65451211
63 mm	65152211	65252211	**65352211**	65452211
100 mm	65153211	65253211	65353211	65453211
150 mm	65154211	65254211	65354211	65454211

See page 502 for options/extra charges.

Bimetal thermometers for industrial applications

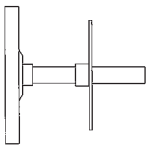
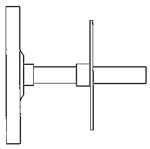
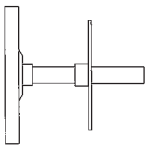
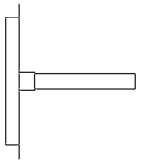
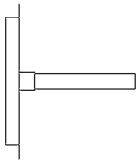
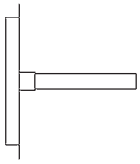
DG: H

Type	BiTh 63 I D201	BiTh 80 I D201	BiTh 100 I D201	BiTh 160 I D201
Version				
Housing Ø	63	80	100	160
Housing	Sheet steel galvanised, push on bezel nickel-plated, instrument-grade glass window			
Stem	Brass, Ø 9 mm			
Connection	Thermowell G½B, brass, Ø 12 mm outside, removable			
Accuracy class	Class 1 as per EN 13190			
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	65106201	65206201	65306201	65406201
63 mm	65107201	65207201	65307201	65407201
100 mm	65108201	65208201	65308201	65408201
150 mm	65109201	65209201	65309201	65409201
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	65131201	65231201	65331201	65431201
63 mm	65132201	65232201	65332201	65432201
100 mm	65133201	65233201	65333201	65433201
150 mm	65134201	65234201	65334201	65434201
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	65146201	65246201	65346201	65446201
63 mm	65147201	65247201	65347201	65447201
100 mm	65148201	65248201	65348201	65448201
150 mm	65149201	65249201	65349201	65449201
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	65151201	65251201	65351201	65451201
63 mm	65152201	65252201	65352201	65452201
100 mm	65153201	65253201	65353201	65453201
150 mm	65154201	65254201	65354201	65454201

See page 502 for options/extra charges.

Bimetal air duct thermometers

DG: H

Type	BiTh 63 LKF D211	BiTh 80 LKF D211	BiTh 100 LKF D211	BiTh 63 LKB D271	BiTh 80 LKB D271	BiTh 100 LKB D271
Version						
Housing Ø	63	80	100	63	80	100
Housing	Sheet steel galvanised, push on bezel nickel-plated, plastic window			Sheet steel galvanised, push on bezel nickel-plated, with back flange Instrument-grade glass window		
Stem	Brass, Ø 9 mm					
Connection	Flange, plastic, Ø 60 mm			plain		
Accuracy class	Class 2 as per EN 13190					
Range	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
100 mm	65613211	65713211	65813211	65613271	65713271	65813271
150 mm	65614211	65714211	**65814211**	65614271	65714271	65814271
200 mm	65615211	65715211	**65815211**	65615271	65715271	65815271
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
100 mm	65608211	65708211	65808211	65608271	65708271	65808271
150 mm	65609211	65709211	**65809211**	65609271	65709271	65809271
200 mm	65610211	65710211	**65810211**	65610271	65710271	65810271
Range	-20/+40 °C	-20/+40 °C	-20/+40 °C	-20/+40 °C	-20/+40 °C	-20/+40 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
100 mm	65623211	65723211	65823211	65623271	65723271	65823271
150 mm	65624211	65724211	65824211	65624271	65724271	65824271
200 mm	65625211	65725211	65825211	65625271	65725271	65825271
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
100 mm	65633211	65733211	65833211	65633271	65733271	65833271
150 mm	65634211	65734211	**65834211**	65634271	65734271	65834271
200 mm	65635211	65735211	**65835211**	65635271	65735271	65835271

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See page 502 for options/extra charges.

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Bimetal stainless steel thermometers/ Bimetal thermometers for chemical applications

	Bimetal stainless steel thermometers	Bimetal thermometers for chemical applications
Application	For corrosive media. Suitable for a great variety of industrial applications.	For corrosive media. Meets exacting measuring demands, e.g. in process engineering as well as chemical and food industry applications.
Technical specifications	**Type:** D3 **Nominal size:** 63 – 80 – 100 **Measuring element:** Bimetal helix **Accuracy class:** 1 (EN 13190) **Ranges °C** -20/+60, 0/60, 0/120, 0/160 **Working temperature** full scale value **Operating pressure at thermowell** Max. 6 bar **Degree of protection:** IP 43 (EN 60529)	**Type:** D4 **Nominal size:** 63 – 100 – 160 **Measuring element:** Bimetal helix **Accuracy class:** 1 (EN 13190) **Ranges °C** -20/+60, 0/60, 0/120, 0/160 **Working temperature** Continuous: Full scale value Short-term: 1.1 x full scale value **Operating pressure at thermowell** Max. 6 bar **Degree of protection:** IP 65 (EN 60529)
Standard version	**Connection** Stem stainless steel 316 L, Ø 8 mm, plain **Mounting position** NG 63 – 80 – 100 centre back NG 63 – 100 bottom **Dial** Aluminium, white – Dial marking black **Pointer:** Aluminium, black **Housing and push on bezel** Stainless steel 304 **Window:** Instrument-grade glass	**Connection** Stem stainless steel 316 Ti, Ø 8 mm, plain, closed **Mounting position** NG 63 – 100 – 160 centre back NG 63 – 100 – 160 bottom **Dial** Aluminium, white Dial marking black **Pointer:** Aluminium, black **Housing:** Stainless steel 304 **Bayonet type bezel:** Stainless steel 304 **Window:** Instrument-grade glass
Options	▪ Thermowell G½B, stainless steel 316 Ti ▪ Other connection designs ▪ Other ranges ▪ Other stem lengths	▪ Thermowell G½B, stainless steel 316 Ti ▪ Grooved nut connection as per DIN 11851 ▪ Other connection designs ▪ Other ranges ▪ Other stem lengths ▪ Laminated safety glass window ▪ Glycerine filling ▪ Every angle version (type D4 only) ▪ 3-hole fixing, panel mounting bezel ▪ Back flange ▪ Special materials ▪ Electrical contacts

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See page 495 for prices.

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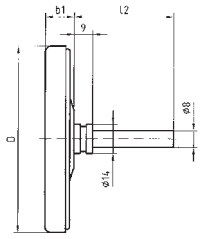
Bimetal stainless steel thermometers/ Bimetal thermometers for chemical applications

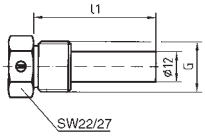
Housing types and dimensions (mm)

Bimetal stainless steel thermometers – centre back connection

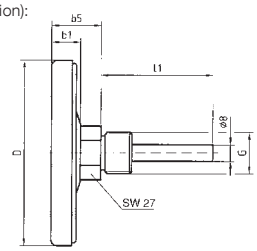
Plain stem (standard):



Separate thermowell (option):

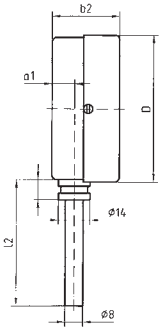


Fixed male connection (option):

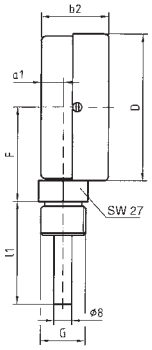


Bimetal stainless steel thermometers – bottom connection

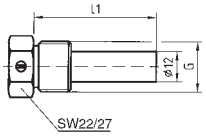
Plain stem (standard):



Fixed male connection (option):

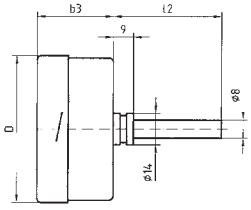


Separate thermowell (option):

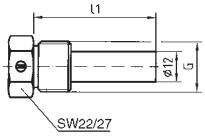


Bimetal thermometers for chemical applications – centre back connection

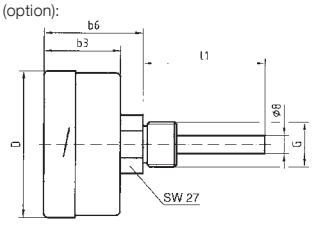
Plain stem (standard):



Separate thermowell (option):

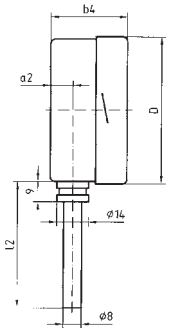


Fixed male connection (option):

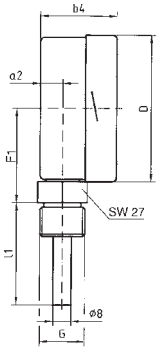


Bimetal thermometers for chemical applications – bottom connection

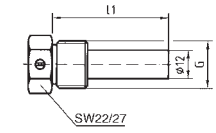
Plain stem (standard):



Fixed male connection (option):



Separate thermowell (option):

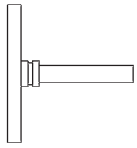
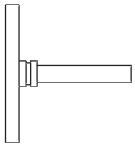
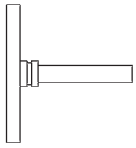
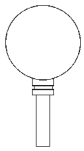
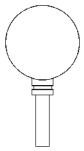


Dimensions (mm)

Nominal size (NG)	D	a_1	a_2	b_1	b_2	b_3	b_4	b_5	b_6	F	F_1	G	l_1	l_2
63	63	10	15.5	15	34	32	45	27	62	46.5	58.5	G½B	40	49
80	80	-	-	15	-	-	-	28	-	-	-	G½B	63	67
100	100	10	17.5	17	36	27.5	49.5	29	57.5	65	77.5	G½B	100	104
160	160	10	15.5	18	-	34	48	32	64	95	107.5	G½B	150 200	154 204

Bimetal stainless steel thermometers

DG: H

Type	BiTh 63 E D312	BiTh 80 E D312	BiTh 100 E D312	BiTh 63 E D302	BiTh 100 E D302
Version					
Housing Ø	63	80	100	63	100
Housing	Stainless steel 304 with push on bezel 304, instrument-grade glass window				
Stem	Stainless steel 316, Ø 8 mm				
Connection	Plain stem (without thermowell)				
Accuracy class	Class 1 as per EN 13190				
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
For thermowell with length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66107312	66207312	**66307312**	6610730	66307302
100 mm	66108312	66208312	**66308312**	66108302	66308302
150 mm	66109312	66209312	**66309312**	66109302	66309302
200 mm	66110312	66210312	66310312	66110302	66310302
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
For thermowell with length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66132312	66232312	**66332312**	66132302	66332302
100 mm	66133312	66233312	**66333312**	66133302	66333302
150 mm	66134312	66234312	**66334312**	66134302	66334302
200 mm	66135312	66235312	66335312	66135302	66335302
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
For thermowell with length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	66146312	66246312	66346312	---	---
63 mm	66147312	66247312	**66347312**	66147302	66347302
100 mm	66148312	66248312	**66348312**	66148302	66348302
150 mm	66149312	66249312	**66349312**	66149302	66349302
200 mm	66150312	66250312	66350312	66150302	66350302
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
For thermowell with length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66152312	66252312	6635212	66152302	66352302
100 mm	66153312	66253312	66353312	66153302	66353302
150 mm	66154312	66254312	66354312	66154302	66354302
200 mm	66155312	66255312	66355312	66155302	66355302

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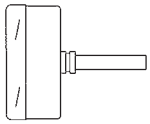
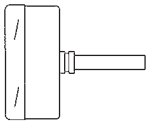
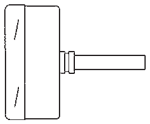
* See page 502 for other connection types, options/extra charges.

Bimetal thermometers for chemical applications

DG: H

Type	BiTh 63 Ch D412	BiTh 100 Ch D412	BiTh 160 Ch D412	BiTh 63 Ch D402	BiTh 100 Ch D402	BiTh 160 Ch D402
Version						
Housing Ø	63	100	160	63	100	160
Housing	Stainless steel 304 with bayonet type bezel, instrument-grade glass window					
Stem	Stainless steel 316, Ø 8 mm					
Connection	Plain stem (without thermowell)*					
Accuracy class	Class 1 as per EN 13190					
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
For thermowell with length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66607412	66807412	66907412	66607402	66807402	66907402
100 mm	66608412	66808412	66908412	66608402	66808402	66908402
150 mm	66609412	66809412	66909412	66609402	66809402	66909402
200 mm	66610412	66810412	66910412	66610402	66810402	66910402
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
For thermowell with length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66632412	66832412	66932412	66632402	66832402	66932402
100 mm	66633412	66833412	66933412	66633402	66833402	66933402
150 mm	66634412	66834412	66934412	66634402	66834402	66934402
200 mm	66635412	66835412	66935412	66635402	66835402	66935402
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
For thermowell with length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66647412	66847412	66947412	66647402	66847402	66947402
100 mm	66648412	66848412	66948412	66648402	66848402	66948402
150 mm	66649412	66849412	66949412	66649402	66849402	66949402
200 mm	66650412	66850412	66950412	66650402	66850402	66950402
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
For thermowell with length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
63 mm	66652412	66852412	66952412	66652402	66852402	66952402
100 mm	66653412	66853412	66953412	66653402	66853402	66953402
150 mm	66654412	66854412	66954412	66654402	66854402	66954402
200 mm	66655412	66855412	66955412	66655402	66855402	66955402

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* See page 502 for other connection types, options/extra charges.

Gas filled thermometers for chemical applications

- For chemical, process engineering and food industry applications
- High measuring accuracy
- Fast response

Page 504

Application

For corrosive media. Meets the most exacting measuring demands, e.g. in process engineering as well as chemical and food industry applications.

Technical specifications

Type
D4

Nominal size
100 – 160

Measuring principle
Pressurised gas filling

Accuracy class
1 (EN 13190)

Ranges °C
-20/+60, 0/60, 0/120, 0/160, 0/200, 0/300, 0/400, 0/500

Working temperature
Continuous: Full scale value
Short-term: 1.1 x full scale value

Operating pressure at thermowell
Max. 10 bar (up to 300 °C)

Degree of protection
IP 65 (EN 60529)

Standard version

Connection
Stem stainless steel 321,
100 x 10 mm, plain

Mounting position
Centre back or bottom or with joint

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Zero correction
At side of housing

Movement
Brass

Housing
Stainless steel 304

Bayonet type bezel
Stainless steel 304

Window
Instrument-grade glass

Options

- Every angle version
- Thermowell G½B, stainless steel 321
- Grooved nut connection as per DIN 11851
- Nominal size 250
- Other connection designs
- Other ranges
- Special scales
- Glycerine filling (type D 8)
- 3-hole fixing, panel mounting bezel
- Back flange
- Capillary (stainless steel 321)
- Special materials
- Electrical contacts

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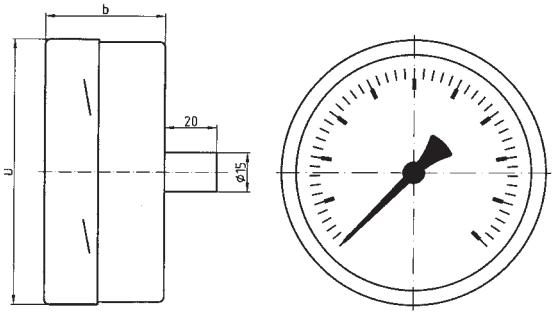
See page 499 for prices.

Gas filled thermometers for chemical applications

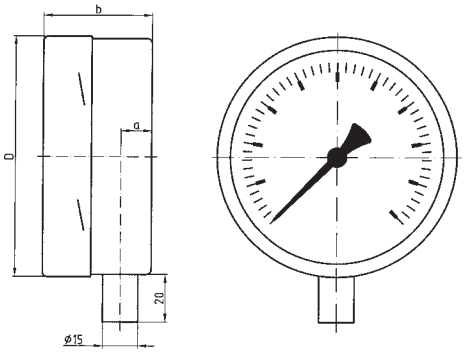
Type D4 – NG 100 / 160

Housing types and dimensions (mm)

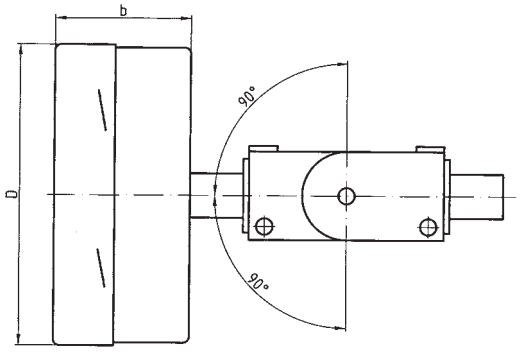
Centre back connection



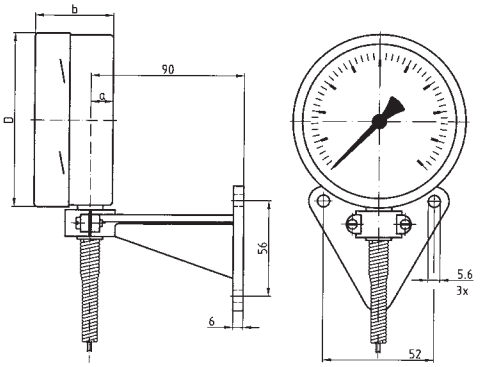
Bottom connection



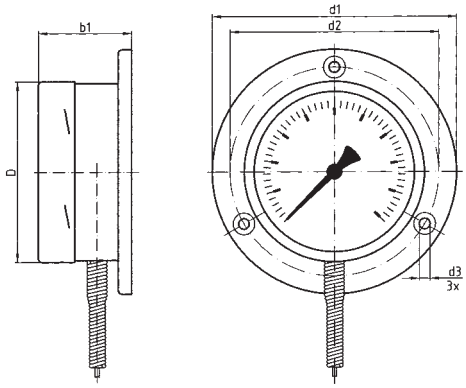
Every angle version



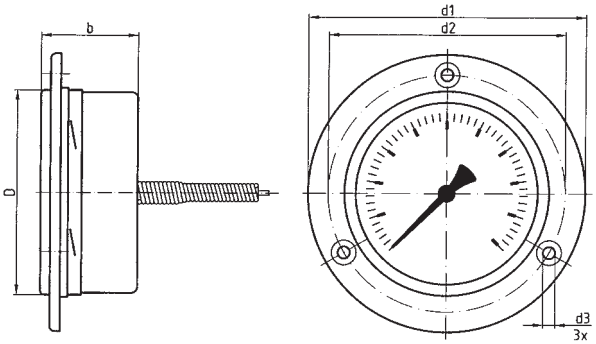
Version with capillary and wall bracket



Version with capillary and back flange



Version with capillary and 3-hole fixing, panel mounting bezel

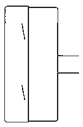
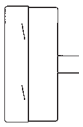
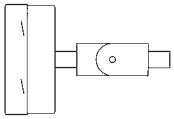
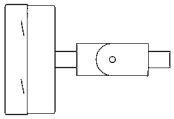


Dimensions (mm)

Nominal size	a	b	b1	Ø D	Ø d1	Ø d2	Ø d3
100	13	45	51	101	132	116	5.5
160	13	45	51	161	196	178	6
250	13	55	57	252	285	270	6

Gas filled thermometers for chemical applications

DG: H

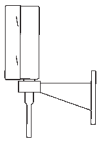
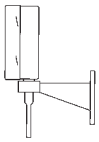
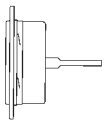
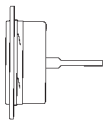
Type	FTh 100 Ch D412	FTh 160 Ch D412	FTh 100 Ch D402	FTh 160 Ch D402	FTh 100 Ch D482	FTh 160 Ch D482
Version						
Housing Ø	100	160	100	160	100	160
Housing	Stainless steel 304 with bayonet type bezel, instrument-grade glass window					
Stem	Stainless steel 321, 100 x 10 mm					
Connection	Plain stem (without thermowell)					
Filling	Pressurised gas filling					
Accuracy class	Class 1 as per EN 13190					
					Every angle version	
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64341412	64343412	64341402	64343402	64341482	64343482
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64361412	64363412	64361402	64363402	64361482	64363482
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64373412	64375412	64373402	64375402	64373482	64375482
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64377412	64379412	64377402	64379402	64377482	64379482
Range	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64381412	64383412	64381402	64383402	64381482	64383482
Range	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64389412	64391412	64389402	64391402	64389482	64391482
Range	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64397412	64399412	64397402	64399402	64397482	64399482
Range	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64401412	64403412	64401402	64403402	64401482	64403482

*Other connection types, see page 502.

See page 502 for options/extra charges.

Gas filled thermometers for chemical applications

DG: H

Type	FTh 100 Ch D442	FTh 160 Ch D442	FTh 100 Ch D472	FTh 160 Ch D472	FTh 100 Ch D432	FTh 160 Ch D432
Version						
Housing Ø	100	160	100	160	100	160
Housing	Stainless steel 304 with bayonet type bezel, instrument-grade glass window					
Stem	Stainless steel 321, 100 x 10 mm					
Connection	Plain stem (without thermowell)					
Filling	Pressurised gas filling					
Capillary	Stainless steel 321, 1 metre					
Mounting	Wall bracket		Back flange		3-hole fixing, panel mounting bezel, 304	
Accuracy class	Class 1 as per EN 13190					
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64341442	64343442	64341472	64343472	64341432	64343432
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64361442	64363442	64361472	64363472	64361432	64363432
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64373442	64375442	64373472	64375472	64373432	64375432
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64377442	64379442	64377472	64379472	64377432	64379432
Range	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C
	Price € Part no.	**Price** Part no.**€**	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64381442	64383442	64381472	64383472	64381432	64383432
Range	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64389442	64391442	64389472	64391472	64389432	64391432
Range	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64397442	64399442	64397472	64399472	64397432	64399432
Range	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
	64401442	64403442	64401472	64403472	64401432	64403432

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* See page 502 for other connection types, options/extra charges.

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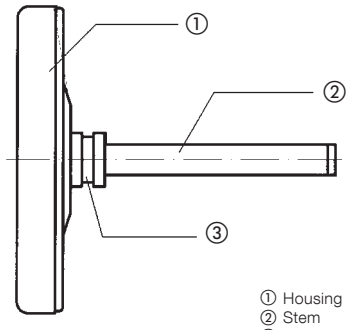
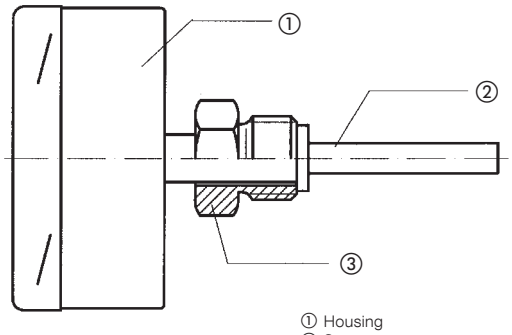
Connection types for bimetal and gas filled thermometers (industrial, stainless steel and chemical versions)

Plain



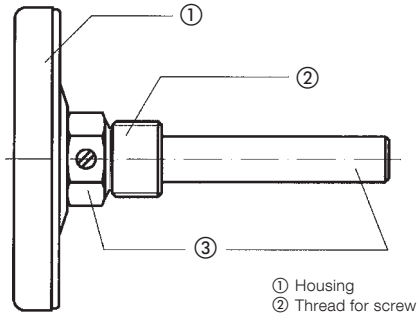
① Housing
② Stem
③ Recess for locking screw

Loose male connection



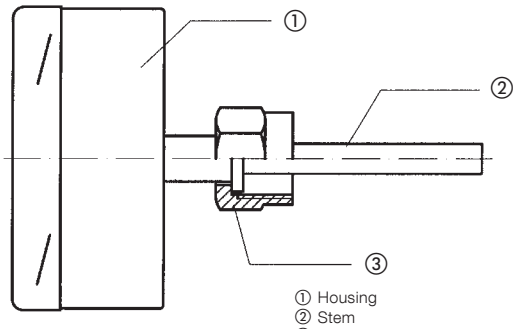
① Housing
② Stem
③ Loose connection, with thread for screw connection

Separate screw-in thermowell (with locking screw)



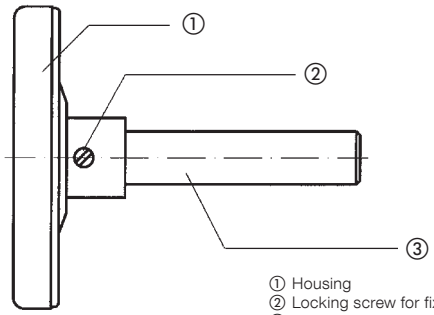
① Housing
② Thread for screw connection
③ Thermowell pushed on, with fixed with locking screw

Loose union nut



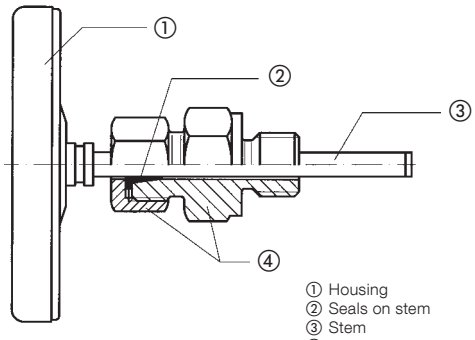
① Housing
② Stem
③ Loose union nut, with female thread

Separate weld-in thermowell (with locking screw)



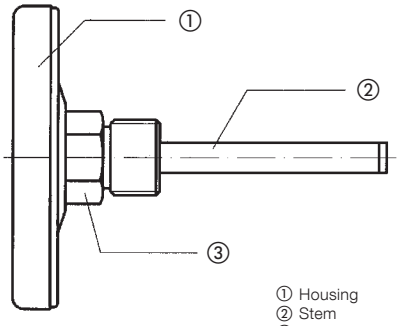
① Housing
② Locking screw for fixing.
③ Thermowell pushed on, for welding

Compression fitting, adjustable on stem



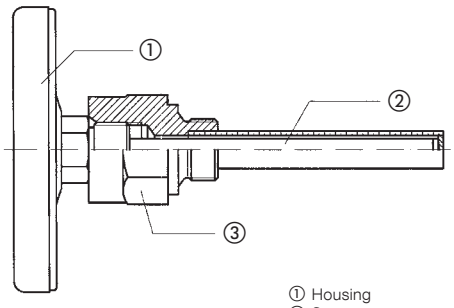
① Housing
② Seals on stem
③ Stem
④ Compression fitting adjustable

Fixed male connection



① Housing
② Stem
③ Fixed male connection, with thread for screw connection

DIN thermowell



① Housing
② Stem
③ Thermowell as per DIN 43772 with thread for screw connection

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Extra charges – connection types for bimetal and gas filled thermometers (industrial, stainless steel and chemical versions)

DG: H

Type		Bimetal thermometers			Gas filled thermometers			
Material		Brass	Steel	Stainless steel 316 Ti	Brass	Steel	Stainless steel 321 (1.4541)	Stainless steel 316 Ti
	Stem length mm	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Separate screw-in thermowell (with locking screw) G½B for stem up to Ø 8 mm for BiTh Ø 10 mm for FTh	45	**64506**	64511	64501	---	---	---	---
	63	**64507**	64512	64502	---	---	---	---
	100	**64508**	64513	64503	---	---	64463	
	150	**64509**	64514	64504	---	---	---	---
	200	**64510**	64515	64505	---	---	---	---
Separate weld-in thermowell (with locking screw) for stem up to Ø 8 mm for BiTh Ø 10 mm for FTh	45	---	64516	64520	---	---	---	---
	63	---	64517	64521	---	---	---	---
	100	---	64450	64453	---	---	64435	
	150	---	64518	64522	---	---	---	---
	200	---	64519	64523	---	---	---	---
Stem extension per 100 mm [1]		64524	64525	64526	---	---	64527	---
Thermowell extension per 100 mm [1]		64528	64529	64530	---	---	64531	---
Fixed male connection G¼B		64532	64533	64534	---	---	---	---
Fixed male connection G½B		64447	64451	64454	---	---	64460	---
Fixed male connection G¾B		64535	64536	64537	---	---	64538	---
Loose male connection G¼B		64539	64540	64541	---	---	---	---
Loose male connection G½B		64542	64543	64544	---	---	64545	---
Loose male connection G¾B		64546	64547	64548	---	---	64549	---
Loose union nut G½, female		64448	64436	64455	---	---	64461	---
Loose union nut G¾, female		64551	64552	64553	---	---	64554	---
Compression fitting adjustable G½B		---	64555	64556	---	---	64557	---
Compression fitting adjustable G¾B		---	---	64558	---	---	64559	---
Capillary per metre Stainless steel 316 Ti		---	---	---	---	---	64464	---
Stem Ø 6 mm [2]			---		---	---	---	---
Stem Ø 4 mm [2]			---		---	---	---	---
Injection tip for Ø 8 mm [2]			---		---	---	---	---
Injection tip for Ø 4 mm [2]		---	---		---	---	---	---

1) Only applies to standard lengths 45/63/100/150/200/250/300/400 mm – extra charge for special lengths: €
2) Only for centre back connection, limited measuring ranges

Extra charges for bimetal thermometers and gas filled thermometers (industrial, stainless steel, chemical versions)

DG: H

	Bimetal thermometers			Gas filled thermometers	
Housing diameter (mm)	< 100	100	160	100	160
	Price € Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
Red mark on dial	64465	64470	64478	64487	64492
1 reference pointer red, external rotary knob adjustment (window = plastic T_{max} 160 °C only for instruments without filling)	64467	64471	64479	64488	64493
Maximum pointer, external rotary knob adjustment (window = plastic T_{max} 160 °C only for instruments without filling)	64468	64473	64481	64489	64494
Glycerine filling (only for instruments with bayonet type bezel housing)	---	64475	64483	64490	64495
Silicone oil filling (only for instruments with bayonet type bezel housing)	---	64476	64484	64491	64496

Other ranges for bimetal thermometers (extra charge as compared to version 0/120 °C)	Minimum stem length centre back (in mm)*	Minimum stem length bottom (in mm)*	**Price €**
-20/+40 °C	63	100	
-20/+60 °C	63	63	
-30/+50 °C	63	63	
-40/+40 °C	63	63	
-40/+60 °C	63	63	
0/60 °C	63	100	
0/80 °C	63	63	
0/100 °C	63	63	
0/200 °C	63	63	
0/250 °C	100	100	
0/300 °C	75	63	
0/400 °C	75	75	
0/500 °C	63	63	
0/600 °C	75	175	

* For version with separate thermowell

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Electrical contacts (only for gas filled thermometers)

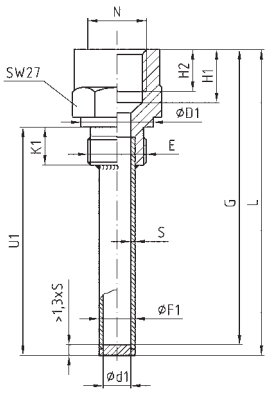
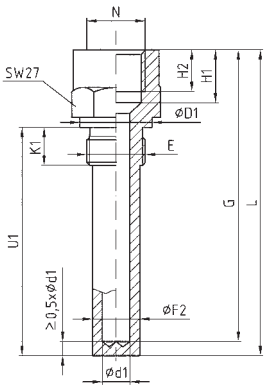
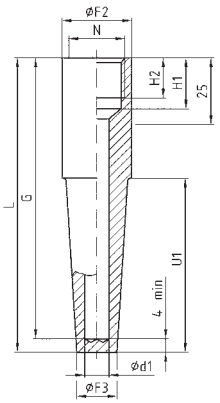
DG: H

Design			Magnetic spring contact		Inductive contact	
Code			MK 1	MK 2	IK 1	IK 2
Number of contacts			1	2	1	2
Switching function: 1 = closes, 2 = opens (pointer moves clockwise)			1 2	11, 12 21, 22	1 2	11, 12 21, 22
The extra charges indicated include fitting, without thermometer						
Version	Nominal size	Housing	**Price €**	**Price €**	**Price €**	**Price €**
Gas filled thermometers for chemical applications	100	No filling				
	100	With filling				
	160	No filling				
	160	With filling				

See page 582 for contact protection relays and isolating switching amplifiers.

Thermowells according to DIN 43772

DG: H

Type	Design 5									Design 6									Design 4							
																										
	d_1	d_2	E	N	D_1	F_1	K_1	H_1	H_2	d_1	d_2	E	N	D_1	F_2	K_1	H_1	H_2	d_1	d_2	F	N	F_3	H_1	H_2	
Dimensions (mm)	10	8	G½B	G½	26	12	14	19	15	10	8	G½B	G½	26	17	14	19	15	9	8	26	G½	15	19	15	
	11	10	G½B	G½	26	13	14	19	15	11	10	G½B	G½	26	17	14	19	15	11	10	26	G½	17	19	15	
	d_2 = probe diameter of instrument																									
Connection	To thermometer G½ female Process connection G½B																		To thermometer G½ female							
Version	Welded, screw-in									Bar stock, screw-in									Bar stock, weld-in							
Material			Brass		Stainless steel							Steel		Stainless steel								Steel		Stainless steel		
Pmax*			25 bar		40 bar							160 bar		150 bar								160 bar		150 bar		
Tmax*			160 °C		400 °C							300 °C		400 °C								300 °C		400 °C		
For stem diameters up to 8 mm																										
	Lengths mm		**Price €** Part no.		**Price €** Part no.					Lengths mm		**Price €** Part no.		**Price €** Part no.					Lengths mm			**Price €** Part no.		**Price €** Part no.		
	L 110 U1 82 G 105		64670		64674					L 110 U1 82 G 105		64678		64682					L 110 U1 82 G 105			64686		64690		
	L 170 U1 142 G 165		64671		64675					L 170 U1 142 G 165		64679		64683					L 170 U1 142 G 165			64687		64691		
	L 210 U1 182 G 205		64672		64676					L 210 U1 182 G 205		64680		64684					L 210 U1 182 G 205			64688		64692		
	L 260 U1 232 G 255		64673		64677					L 260 U1 232 G 255		64681		64685					L 260 U1 232 G 255			64689		64693		
For stem diameters up to 10 mm																										
	Lengths mm		**Price €** Part no.		**Price €** Part no.					Lengths mm		**Price €** Part no.		**Price €** Part no.					Lengths mm			**Price €** Part no.		**Price €** Part no.		
	L 110 U1 82 G 105		64694		64698					L 110 U1 82 G 105		64702		64706					L 110 U1 82 G 105			64710		64714		
	L 170 U1 142 G 165		64695		64699					L 170 U1 142 G 165		64703		64707					L 170 U1 142 G 165			64711		64715		
	L 210 U1 182 G 205		64696		64700					L 210 U1 182 G 205		64704		64708					L 210 U1 182 G 205			64712		64716		
	L 260 U1 232 G 255		64697		64701					L 260 U1 232 G 255		64705		64709					L 260 U1 232 G 255			64713		64717		

* Applies to static load (load always depends on medium, pressure and temperature of medium, flow rate, installation length and material of thermowell).
The stem length of the thermometer is calculated as follows (for fixed male connection, G½B): L = minus 10 mm

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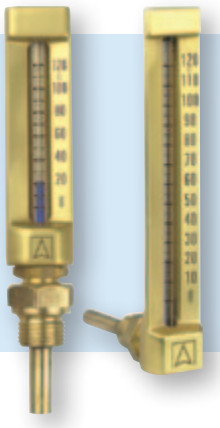
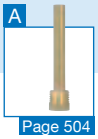
Industrial thermometers



- **Extremely robust due to full metal housing**
- **Vibration-resistant glass thermometer**
- **Stainless steel version possible**
- **Excellent readability due to blue thermometer filling**



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Application

Heating, industry, mechanical engineering

Technical specifications

Nominal size
110 x 30 – 150 x 36 – 200 x 36

Upper part
Aluminium, V-shaped, polished, anodised brass-coloured. Numbers of the measuring range on the right scale side below the anodised layer, printed, black. Adjustable by means of brass nut (spanner size SW 22) so that readings from any angle are possible.

Glass insert (capillary)
Prismatic capillary, completely made of glass, Ø 6 mm. Graduation marks of the capillary burnt in, black, completely resistant.
Main graduation marks corresponding to the numbers printed on the housing are especially bold and easy to read.

Thermometer filling
Standard version:
Blue liquid indicating from -60 to +200 °C.

Stem
Brass, Ø 10 mm, with fixed thread G½B.
Stainless steel version on request.

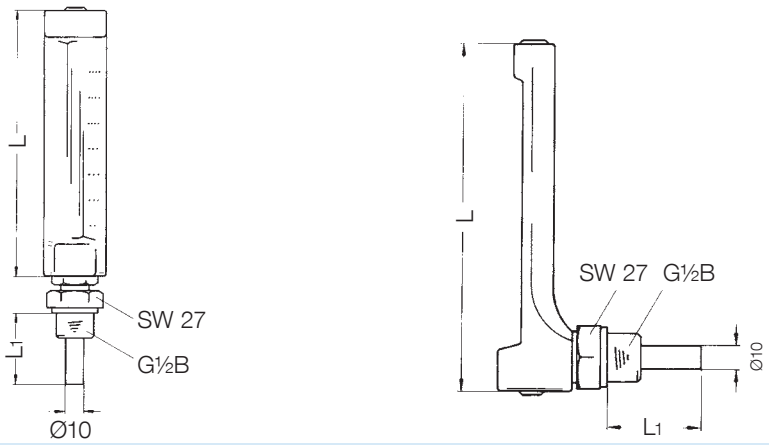
Accuracy
DIN 16195

Ranges °C
-30/+50, 0/60, 0/120, 0/160

Mounting position
Straight
Angled 90°
Angled 135°

Stem lengths (mm)
40, 63, 100, 160

Housing types and dimensions (mm)



Options

- Other ranges
- Other stem lengths
- Other stem materials
- Other connection threads
- Upper part anodised aluminium-coloured
- Upper part made of plastic
- Thermowells

Type	L	L1
VMTh 110	110	40
VMTh 150	150	63
VMTh 200	200	100
		160

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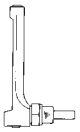
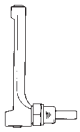
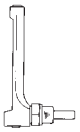
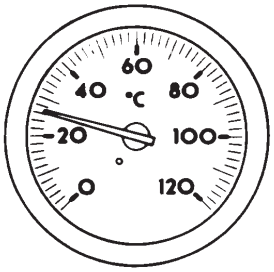
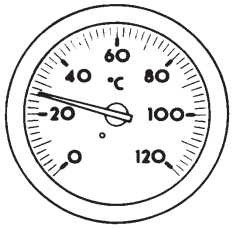
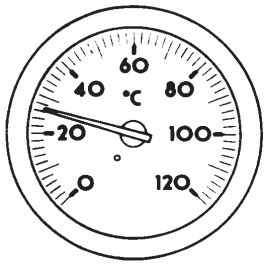
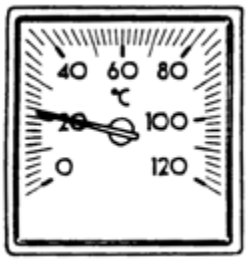
See page 506 for prices.

Industrial thermometers

DG: H

Type	VMTh 110	VMTh 110	VMTh 150	VMTh 150	VMTh 200	VMTh 200
Version						
Nominal size	110 x 30	110 x 30	150 x 36	150 x 36	200 x 36	200 x 36
DIN	16181	16182	16185	16186	16189	16190
Mounting position	Straight	Angled 90°	Straight	Angled 90°	Straight	Angled 90°
Housing	Aluminium, anodised brass-coloured					
Stem	Brass, Ø 10 mm					
Connection	Version B with screw-in socket G½B, brass					
Accuracy	As per DIN 16195					
Range	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C	-30/+50 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	64101	64120	64136	64150	---	---
63 mm	64102	64121	64137	64151	64165	64181
100 mm	64103	64122	64138	64152	64166	64182
160 mm	64104	64123	64139	64153	64167	64183
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	64106	64124	64140	64154	---	---
63 mm	64107	64125	64141	64155	64169	64185
100 mm	64108	64126	64142	64156	64170	64186
160 mm	64109	64127	64143	64157	64171	64187
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	**64111**	**64128**	**64100**	**64110**	---	---
63 mm	**64112**	**64129**	**64105**	**64115**	64173	64189
100 mm	64113	**64130**	**64144**	**64158**	64174	64190
160 mm	64114	64131	64145	64159	64175	64191
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
Stem length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
40 mm	64116	**64132**	64146	**64160**	---	---
63 mm	64117	**64133**	64147	**64161**	64177	64193
100 mm	64118	**64134**	64148	**64162**	64178	64194
160 mm	64119	64135	64149	64163	64179	64195

Thermometers with capillary tube THK

DG: G	Description	Capillary length	Part no.*	**Price €**
 THK 113/37 S	Nominal size 37 mm, range -40/+40 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white), Cu probe Ø 8.5 x 30 mm	1,000 mm	67510115	
		1,500 mm	67510125	
		2,000 mm	67510135	
	Nominal size 37 mm, range 0/120 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey), Cu probe Ø 6.5 x 30 mm	1,000 mm	67512115	
		1,500 mm	**67512125**	
		2,000 mm	67512135	
 THK 115/40 S	Nominal size 40 mm, range -40/+40 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white), Cu probe Ø 8.5 x 30 mm	1,000 mm	67650115	
		1,500 mm	67650125	
		2,000 mm	67650135	
	Nominal size 40 mm, range 0/120 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey), Cu probe Ø 6.5 x 30 mm	1,000 mm	67652115	
		1,500 mm	**67652125**	
		2,000 mm	67652135	
 THK 110/52 S	Nominal size 52 mm, range -40/+40 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white), Cu probe Ø 8.5 x 30 mm	1,000 mm	67500115	
		1,500 mm	67500125	
		2,000 mm	67500135	
	Nominal size 52 mm, range 0/120 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey), Cu probe Ø 6.5 x 30 mm	1,000 mm	67502115	
		1,500 mm	**67502125**	
		2,000 mm	67502135	
 THK 130/45 S	Nominal size 45 x 45 mm, range -40/+40 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white), Cu probe Ø 8.5 x 30 mm	1,000 mm	67520115	
		1,500 mm	67520125	
		2,000 mm	67520135	
	Nominal size 45 x 45 mm, range 0/120 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey), Cu probe Ø 6.5 x 30 mm	1,000 mm	67522115	
		1,500 mm	**67522125**	
		2,000 mm	67522135	

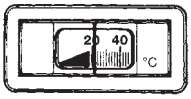
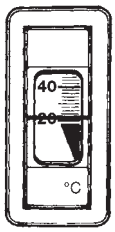
* Minimum order quantity for non-stock items = 300 pieces

i

Additional product details and other capillary lengths on request.

12

Thermometers with capillary tube THK

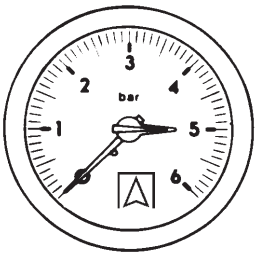
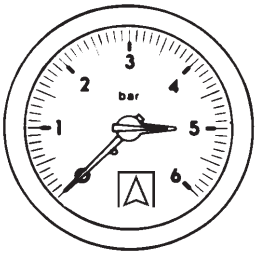
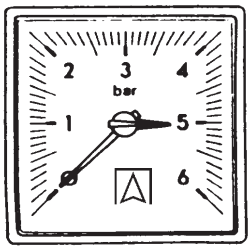
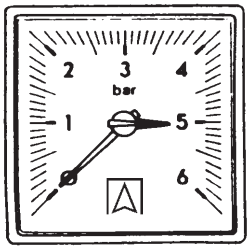
DG: G	Description	Capillary length	Part no.*	Price €
 THK 150/58 S	Nominal size (W x H) 58 x 25 mm, mounting position horizontal, range -40/+40 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white), Cu probe Ø 8.5 x 30 mm	1,000 mm	67540115	
		1,500 mm	67540125	
		2,000 mm	67540135	
	Nominal size (W x H) 58 x 25 mm, mounting position horizontal, range 0/120 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey), Cu probe Ø 6.5 x 30 mm	1,000 mm	67542115	
		1,500 mm	**67542125**	
		2,000 mm	67542135	
		3,500 mm	**67542155**	
 THK 150 S/58 S	Nominal size (W x H) 25 x 58 mm, mounting position vertical, range -40/+40 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white), Cu probe Ø 8.5 x 30 mm	1,000 mm	67540115s	
		1,500 mm	67540125s	
		2,000 mm	67540135s	
	Nominal size (W x H) 25 x 58 mm, mounting position vertical, range 0/120 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey), Cu probe Ø 6.5 x 30 mm	1,000 mm	67542115s	
		1,500 mm	**67542125s**	
		2,000 mm	67542135s	
THK 171/62 S	Nominal size (W x H) 62 x 11 mm, mounting position horizontal, range -40/+40 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white), Cu probe Ø 8.5 x 30 mm	1,000 mm	67560115	
		1,500 mm	67560125	
		2,000 mm	67560135	
	Nominal size (W x H) 62 x 11 mm, mounting position horizontal, range 0/120 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey), Cu probe Ø 6.5 x 25 mm	1,000 mm	67562115	
		1,500 mm	67562125	
		2,000 mm	67562135	
THK 181/62 S	Nominal size (W x H) 62 x 11 mm, mounting position horizontal, range -40/+40 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white), Cu probe Ø 8.5 x 30 mm	1,000 mm	67580115	
		1,500 mm	67580125	
		2,000 mm	67580135	
	Nominal size (W x H) 62 x 11 mm, mounting position horizontal, range 0/120 °C, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey), Cu probe Ø 6.5 x 25 mm	1,000 mm	67582115	
		1,500 mm	67582125	
		2,000 mm	67582135	

* Minimum order quantity for non-stock items = 300 pieces

i

Additional product details and other capillary lengths on request.

Pressure gauges with capillary tube RFK

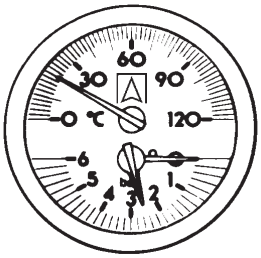
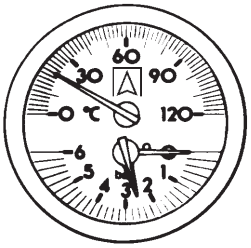
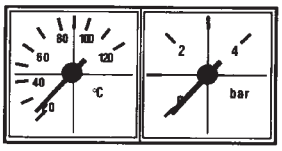
DG: G	Description	Capillary length	Part no.*	**Price €**
 RFK 360/40 S	Nominal size Ø 40 mm, range 0/4 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white)	1,000 mm	67665115	
		1,500 mm	67665125	
		2,000 mm	67665135	
	Nominal size Ø 40 mm, range 0/6 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white)	1,000 mm	67666115	
		1,500 mm	67666125	
		2,000 mm	67666135	
 RFK 320/52 S	Nominal size Ø 52 mm, range 0/4 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white)	1,000 mm	67595115	
		1,500 mm	67595125	
		2,000 mm	67595135	
	Nominal size Ø 52 mm, range 0/6 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white)	1,000 mm	67596115	
		1,500 mm	67596125	
		2,000 mm	67596135	
 RFK 340/45 S	Nominal size 45 x 45 mm, range 0/4 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white)	1,000 mm	67615115	
		1,500 mm	67615125	
		2,000 mm	67615135	
	Nominal size 45 x 45 mm, range 0/6 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white)	1,000 mm	67616115	
		1,500 mm	67616125	
		2,000 mm	67616135	
 RFK 343/37 S	Nominal size 45 x 45 mm, range 0/4 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white)	1,000 mm	67625115	
		1,500 mm	67625125	
		2,000 mm	67625135	
	Nominal size 45 x 45 mm, range 0/6 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, white)	1,000 mm	67626115	
		1,500 mm	67626125	
		2,000 mm	67626135	

* Minimum order quantity for non-stock items = 300 pieces

i

Additional product details and other capillary lengths on request.

Combined thermometer/pressure gauges with capillary tube THMK

DG: G	Description	Capillary length	Part no.*	Price €
 THMK 560/40 S	Nominal size Ø 40 mm, range 0/120 °C and 0/4 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey)	1,000 mm	67675115	
		1,500 mm	67675125	
		2,000 mm	67675135	
	Nominal size Ø 40 mm, range 0/120 °C and 0/6 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey)	1,000 mm	67676115	
		1,500 mm	67676125	
		2,000 mm	67676135	
 THMK 520/52 S	Nominal size Ø 52 mm, range 0/120 °C and 0/4 bar, black dia – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey)	1,000 mm	67635115	
		1,500 mm	**67635125**	
		2,000 mm	67635135	
	Nominal size Ø 52 mm, range 0/120 °C and 0/6 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey)	1,000 mm	67636115	
		1,500 mm	67636125	
		2,000 mm	67636135	
 THMK 540/73 S	Nominal size (W x H) 73 x 37 mm, range 0/120 °C and 0/4 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey)	1,000 mm	67645115	
		1,500 mm	67645125	
		2,000 mm	67645135	
	Nominal size (W x H) 73 x 37 mm, range 0/120 °C and 0/6 bar, black dial – numbers white, plastic housing (black), Cu capillary with PVC coating (R3, grey)	1,000 mm	67646115	
		1,500 mm	67646125	
		2,000 mm	67646135	

* Minimum order quantity for non-stock items = 300 pieces

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Additional product details and other capillary lengths on request.

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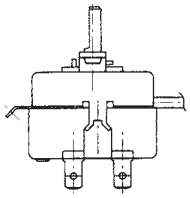
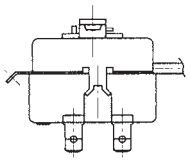
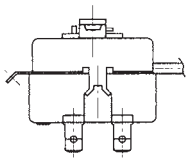
Thermostats TRT

DG: G	Description	Capillary length	Part no.*	**Price €**
 TRT 200/711	Operating range 0/90 °C, adjustable changeover contact, liquid filled probe element, T_{max} = 120 °C, degree of protection IP 00	500 mm	67215	
		1,000 mm	**67216**	
		1,500 mm	**67217**	
	Operating range 0/90 °C, adjustable single contact, liquid filled probe element, T_{max} = 120 °C, degree of protection IP 00	500 mm	67212	
		1,000 mm	67213	
		1,500 mm	67214	
 TRT 200/712	Operating range 0/90 °C, adjustable changeover contact, slotted adjustment spindle, liquid filled probe element, T_{max} = 120 °C, degree of protection IP 00	500 mm	67245	
		1,000 mm	67246	
		1,500 mm	67247	
	Operating range 0/90 °C, adjustable single contact, slotted adjustment spindle, liquid filled probe element, T_{max} = 120 °C, degree of protection IP 00	500 mm	67242	
		1,000 mm	67243	
		1,500 mm	67244	
 TRT 200/716	Operating range 30/100 °C, adjustable changeover contact, factory-preset, liquid filled probe element, T_{max} = 120 °C, degree of protection IP 00	500 mm	67251	
		1,000 mm	67252	
		1,500 mm	67253	
	Operating range 30/100 °C, adjustable single contact, factory-preset, liquid filled probe element, T_{max} = 120 °C, degree of protection IP 00	500 mm	67248	
		1,000 mm	67249	
		1,500 mm	67250	

* Minimum order quantity for non-stock items = 300 pieces

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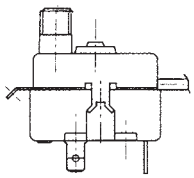
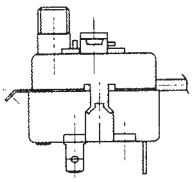
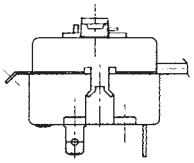
Additional product details on request.

Safety temperature cut outs, safety temperature switches

DG: G	Description	Capillary length	Part no.*	Price €
 Temperature switches STB 400/971	Switching point 100 °C, factory-preset, changeover contact, liquid filled probe element, T_{max} = 135 °C, degree of protection IP 00	500 mm	67275	
		1,000 mm	**67276**	
		1,500 mm	**67277**	
	Switching point 100 °C, factory-preset, single contact, liquid filled probe element, T_{max} = 135 °C, degree of protection IP 00	500 mm	67272	
		1,000 mm	67273	
		1,500 mm	67274	
 Temperature switches ETB 400/961	Operating range 90/110 °C, adjustable switching point (changeover contact), liquid filled probe element, T_{max} = 135 °C, degree of protection IP 00	500 mm	67281	
		1,000 mm	67282	
		1,500 mm	67283	
	Operating range 90/110 °C, adjustable switching point (single contact), liquid filled probe element, T_{max} = 135 °C, degree of protection IP 00	500 mm	67278	
		1,000 mm	67279	
		1,500 mm	67280	
 Safety temperature switches STW 400/972	Switching point 110 °C, factory-preset, single contact, liquid filled probe element, T_{max} = 135 °C, degree of protection IP 00	500 mm	67284	
		1,000 mm	67285	
		1,500 mm	67286	

* Minimum order quantity for non-stock items = 300 pieces

Accessories for TRT, STB, ETB, STW

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DG: G	Part no.*	Price €
Rotary knob 42 mm for TRT 200, -35/+35 °C	67339	
Rotary knob 42 mm for TRT 200, 0/40 °C	67340	
Rotary knob 42 mm for TRT 200, 0/90 °C	**67341**	
Rotary knob 42 mm for TRT 200, 40/90 °C	67342	
Rotary knob 42 mm for TRT 200, 0/120 °C	**67343**	
Rotary knob 42 mm for TRT 200, 0/210 °C	67344	
Rotary knob 42 mm for TRT 200, 0/300 °C	67345	
Cover for TRT 200, black	**67346**	
Cover for TRT 200, chrome-plated	**67347**	
Fixing clamp	**67348**	
Stop pin	**67349**	
Threaded stop pin	**67350**	

* Minimum order quantity for non-stock items = 300 pieces

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Additional product details on request.

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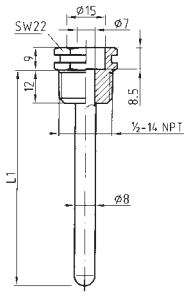
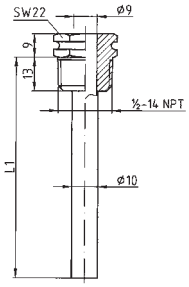
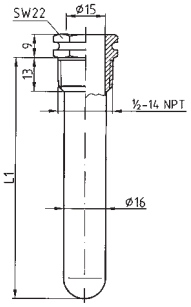
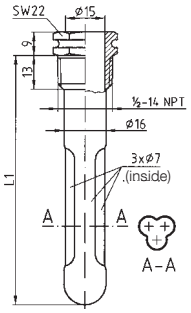
Pockets for pressure gauges, thermometers and thermostats with capillary tube

DG: G

Type	Pocket TG ½" 7 x 8 mm		Pocket TG ½" 9 x 10 mm		Pocket TG ½" 15 x 16 mm		Profile pocket TG ½" 15 x 16 mm	
Dimensions (mm)								
Connection	½ NPT		½ NPT		½ NPT		½ NPT	
P_{max}*	4 bar		4 bar		4 bar		4 bar	
T_{max}*	200 °C		200 °C		200 °C		200 °C	
Material	Brass/Cu alloy							
Stem length L1	**Price €** Part no.	PU**	**Price €** Part no.	PU**	**Price €** Part no.	PU**	**Price €** Part no.	PU**
50 mm	**67320**	250	67326	250	---		---	
100 mm	**67321**	250	67327	250	67331	250	**67335**	250
120 mm	67322	-	67328	-	67332	-	67336	-
150 mm	**67323**	200	67329	200	67333	200	**67337**	200
200 mm	**67324**	200	67330	200	67334	200	**67338**	200
	As above, but nickel-plated							
Stem length L1	**Price €** Part no.	PU**	**Price €** Part no.	PU**	**Price €** Part no.	PU**	**Price €** Part no.	PU**
50 mm	67320N	250		-	---		---	
100 mm	**67321N**	250		-	67331N	250	**67335N**	250
120 mm	67322N	-		-	67332N	-	67336N	-
150 mm	**67323N**	200		-	67333N	200	**67337N**	200
200 mm	**67324N**	200		-	67334N	200	**67338N**	200

* Applies to static load (load always depends on medium, pressure and temperature of medium, flow rate, installation length and material of thermowell).
** Delivery only in packing units (PU) – minimum order quantity for non-stock items = 1 packing unit.

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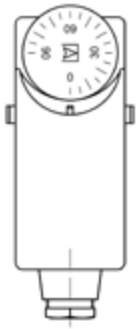
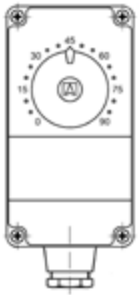
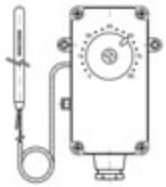
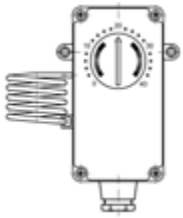
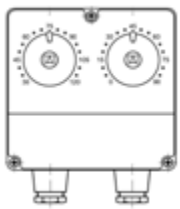
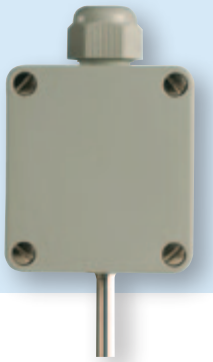
Thermostats with housing

DG: G	Adjustment	Operating range/ switching point	Capillary length	Stem length	Type	Part no.	Price €
Surface mounting thermostats with housing							
	External	0/60 °C	---	---	GAT/7RC	**67400**	
	External	0/90 °C	---	---	GAT/7RC	**67401**	
	Internal	0/60 °C	---	---	GAT/7HC	**67402**	
	Internal	0/90 °C	---	---	GAT/7HC	**67403**	
	Internal	30/70 °C	---	---	GSA/9SC	67404	
Immersion thermostats with housing							
	External	0/60 °C	---	100 mm	GTT/7RG	67405	
	External	0/90 °C	---	100 mm	GTT/7RG	**67407**	
	External	0/90 °C	---	150 mm	GTT/7RG	**67408A**	
	External	0/90 °C	---	200 mm	GTT/7RG	**67408B**	
	Internal	0/60 °C	---	100 mm	GTT/7HG	67411	
	Internal	0/90 °C	---	100 mm	GTT/7HG	**67413**	
	Internal	0/90 °C	---	150 mm	GTT/7HG	**67414A**	
	Internal	0/90 °C	---	200 mm	GTT/7HG	**67414B**	
	Fixed	100 °C	---	100 mm	GST/9SG	**67417**	
Capillary type thermostats with housing/room thermostats with housing							
	External	0/60 °C	1,000 mm	---	GTK/7RD	**67419**	
	External	0/90 °C	1,000 mm	---	GTK/7RD	**67421**	
	External	0/90 °C	2,000 mm	---	GTK/7RD	**67424**	
	External	-35/+35 °C	1,500 mm	---	GTK/7RD	67423	
	Internal	70/110 °C	1,500 mm	---	GSK/9SF	67418	
	External	0/40 °C	---	---	GRT/7RT	**67464**	
	External	0/60 °C	---	---	GRT/7RT	**67465**	
	Internal	0/40 °C	---	---	GRT/7HT	67466	
	Internal	0/60 °C	---	---	GRT/7HT	67467	
	External	0/40 °C	1,000 mm	---	GRT/7WD	67468	
	External	0/60 °C	1,000 mm	---	GRT/7WD	67469	
	Internal	0/40 °C	1,000 mm	---	GRT/7KD	67435	
	Internal	0/60 °C	1,000 mm	---	GRT/7KD	67437	
Twin thermostats with housing							
	External/external	0/60 °C – 30/120 °C	---	100 mm	GDT/8RR	67439	
	External/external	0/90 °C – 30/120 °C	---	100 mm	GDT/8RR	67441	
	Internal/external	0/60 °C – 30/120 °C	---	100 mm	GDT/8HR	67445	
	Internal/external	0/90 °C – 30/120 °C	---	100 mm	GDT/8HR	**67447**	
	Fixed/external	0/60 °C (100 °C)	---	100 mm	GDT/8RS	67451	
	Fixed/external	0/90 °C (100 °C)	---	100 mm	GDT/8RS	**67453**	
	Fixed/external	0/90 °C (100 °C)	---	150 mm	GDT/8RS	**67454A**	
	Fixed/external	0/90 °C (100 °C)	---	200 mm	GDT/8RS	**67454B**	

* Minimum order quantity for non-stock items = 100 pieces

Resistance thermometers WTh 20/21/22



WTh 20

Technical specifications

Version
Plug-in type resistance thermometer.

Sensor
1 x Pt 100
2-, 3- or 4-wire
Class B, IEC 751

Probe
Ø 6 mm, length 50 mm
Stainless steel 316 Ti

Electrical connection
Cable with wire ferrules

Cable
PVC (heat-resistant)

Measuring range
With installation type
Fixed: -40/+105 °C
Moving: -5/+105 °C

Options

- Coated measuring line
- Sensor class A
- Process connection as adjustable compression fitting or fixed male connection
- Connector ISO 4400
- Miniature circular plug
- Lemosa connector
- Other probe diameters
- Other probe lengths
- Other cables:
  Silicone (-50/+180 °C)
  PTFE (-200/+260 °C)
  Glass fibre with stainless steel braiding (-50/+400 °C)
- Bending protection

WTh 21

Version
Room and outside resistance thermometer for wall mounting.

Sensor
1 x Pt 100
2-, 3- or 4-wire
Class B, IEC 751

Probe
Ø 6 mm, length 42 mm
Stainless steel 316 Ti

Electrical connection
Cable gland

Measuring range
-50/+90 °C

Housing
Impact-resistant plastic
W x H x D: 58 x 64 x 36 mm

Degree of protection
IP 65 (EN 60529)

- Open probe
- Sensor class A
- Sensor Pt 1.000/Ni 1.000
- Transmitter installation

WTh 22

Version
Resistance thermometer especially for use in air ducts.

Sensor
1 x Pt 100
2-, 3- or 4-wire
Class B, IEC 751

Thermowell
Ø 8 x 1 mm, perforated
Stainless steel 316 Ti

Process connection
Mounting flange Ø 40 mm, adjustable, stainless steel

Installation lengths
100, 160, 250 mm

Housing
Impact-resistant plastic
W x H x D: 58 x 64 x 36 mm

Degree of protection
IP 54 (EN 60529)

Measuring range
0/130 °C

- Process connection G½B (adjustable compression fitting or fixed male connection)
- Transmitter installation (standard: 0/100 °C = 4–20 mA)

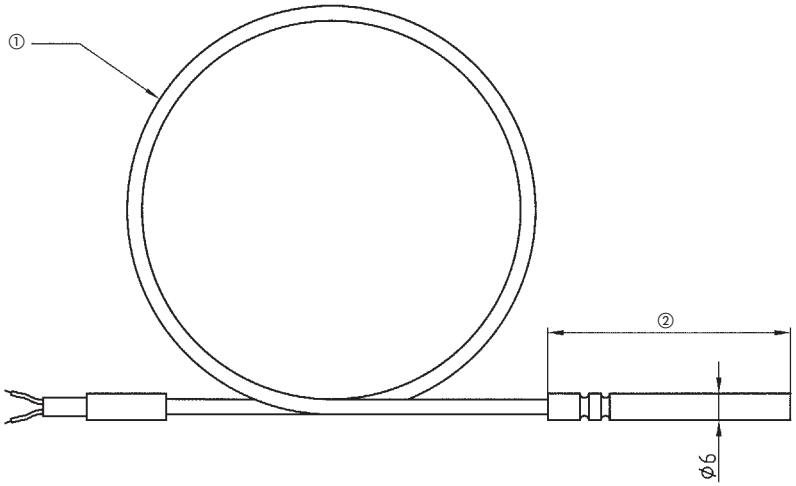
12

See page 521 for prices.

Resistance thermometers types WTh 20/21/22

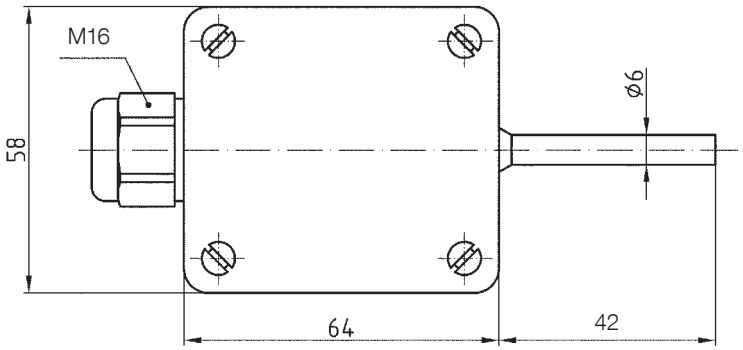
Dimensions (mm)

Type WTh 20

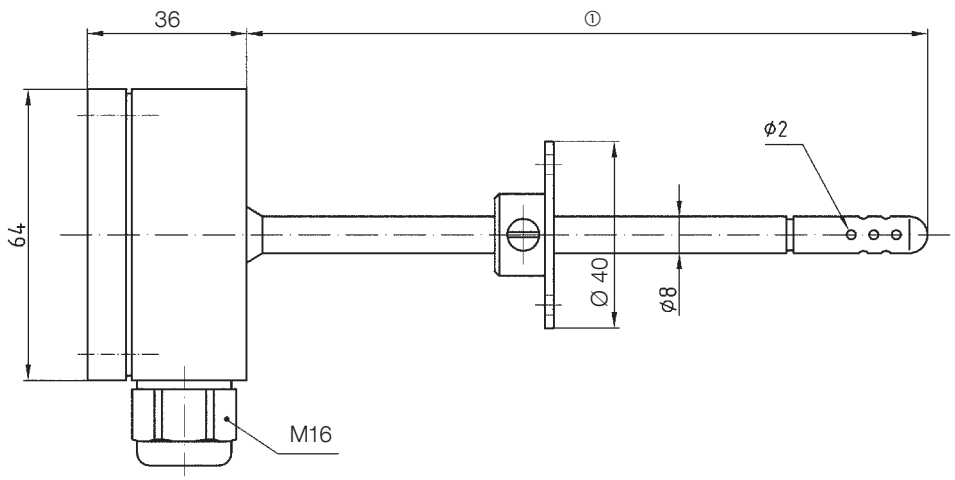


① Cable
② Probe length

Type WTh 21

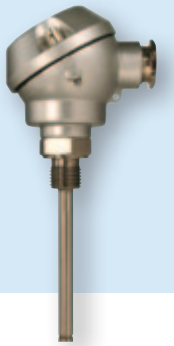


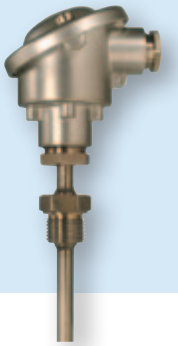
Type WTh 22



① Installation length

Resistance thermometers WTh 23/24/25





	WTh 23	WTh 24	WTh 25
Description	**Version** Compact screw-in resistance thermometer specially for heating, ventilation and air conditioning applications.	**Version** Screw-in resistance thermometer for medium pressure and flow loads, specially for mechanical engineering and plant engineering.	**Version** Screw-in resistance thermometer for medium pressure and flow loads at higher temperatures.
Technical specifications	**Sensor** 1 x Pt 100 2-, 3- or 4-wire Class B, IEC 751 **Measuring insert** Not replaceable **Thermowell** Ø 6 mm, stainless steel 316 Ti **Process connection** G¼B stainless steel 316 Ti **Installation length** 100 mm **Connection head (degree of protection)** Type J, aluminium die cast (IP 54) **Measuring range** -35/+180 °C	**Sensor** 1 x Pt 100 2-, 3- or 4-wire Class B, IEC 751 **Measuring insert** Replaceable **Thermowell** As per DIN 43772 Ø 9 x 1 mm, stainless steel 316 Ti **Neck** Ø 9 x 1 mm, 25 mm long Stainless steel 316 Ti **Process connection** G½B stainless steel 316 Ti **Installation lengths** 100, 160, 250 mm **Connection head (degree of protection)** Type B as per DIN 43729 Aluminium die cast (IP 54) **Measuring range** -35/+180 °C	**Sensor** 1 x Pt 100 2-, 3- or 4-wire Class B, IEC 751 **Measuring insert** Replaceable, Ø 6 mm **Thermowell** As per DIN 43772 Ø 9 x 1 mm, stainless steel 316 Ti **Neck** Ø 9 x 1 mm, 120 mm long Stainless steel 316 Ti **Process connection** G½B stainless steel 316 Ti **Installation lengths** 100, 125, 160, 250, 400 mm **Connection head (degree of protection)** Type B as per DIN 43729 Aluminium die cast (IP 54) **Measuring range** -35/+400 °C
Options	▪ Sensor class A ▪ Other thermowell diameters ▪ Thermowell with bend, measuring tip with spring ▪ Neck ▪ Other process connections ▪ Other installation lengths	▪ Transmitter installation (standard: 0/100 °C = 4–20 mA)	▪ Sensor class A ▪ Reduced measuring tip (6 mm) ▪ Transmitter installation ▪ EX version ▪ Other thermowell materials, process connections, installation lengths

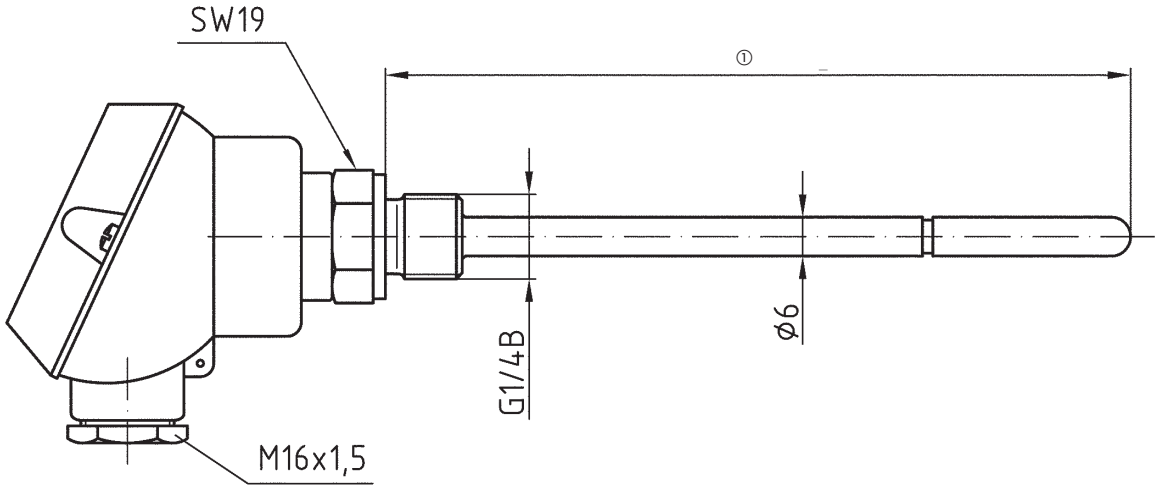
12

i
See page 521 for prices.

Resistance thermometers types WTh 23/24/25

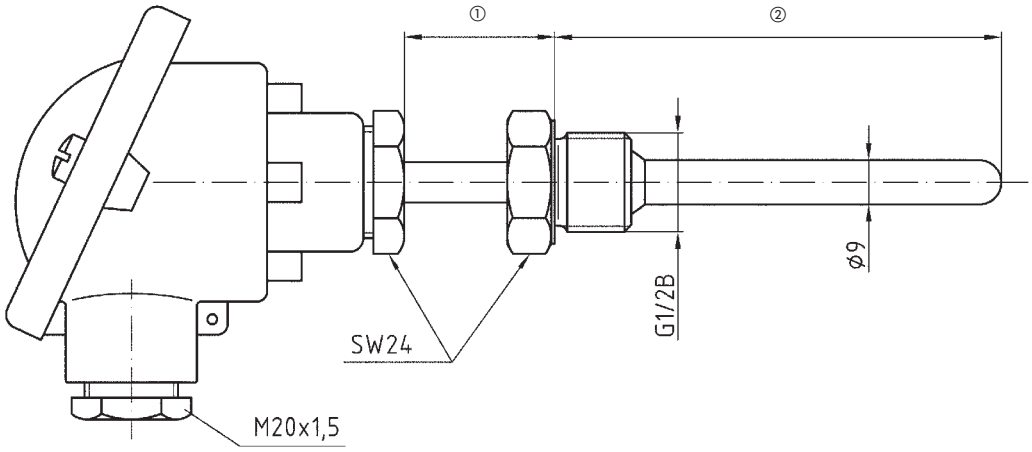
Dimensions (mm)

Type WTh 23



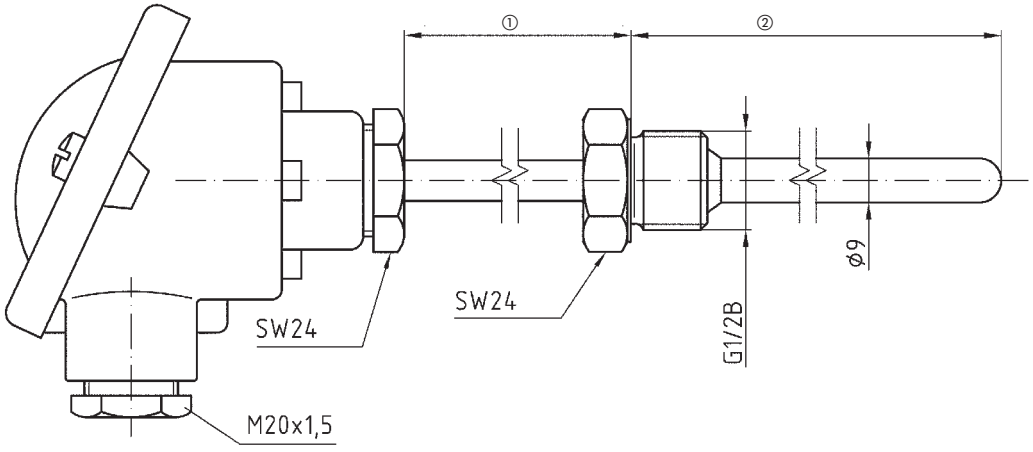
① Installation length

Type WTh 24



① Neck length (standard = 25)
① Installation length

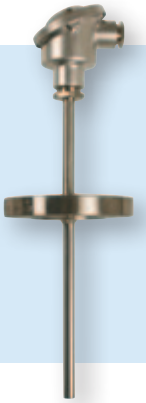
Type WTh 25



① Neck length (standard = 140)
① Installation length

12

Resistance thermometers WTh 26/27/28



Technical specifications

WTh 26

Version
Weld-in resistance thermometer for high pressure and flow loads.

Sensor
1 x Pt 100
2-, 3- or 4-wire
Class B, IEC 751

Measuring insert
Replaceable, Ø 6 mm

Thermowell
As per DIN 43772-4
Stainless steel 316 Ti

Neck
Ø 11 x 2 mm, 140 mm long
Stainless steel 316 Ti

Installation lengths (L1/L3)
65/110, 65/140, 65/200,
125/ 200, 125/260

Connection head (degree of protection)
Type B as per DIN 43729
Aluminium die cast (IP 54)

Measuring range
-35/+550 °C

WTh 27

Version
Flanged resistance thermometer for medium pressure and flow loads at higher temperatures.

Sensor
1 x Pt 100
2-, 3- or 4-wire
Class B, IEC 751

Measuring insert
Replaceable, Ø 6 mm

Flanged thermowell
Several parts, Ø 11 x 2 mm
Flange connection as per EN 1092-1 type B 1, DN 25, PN 40
Stainless steel 316 Ti

Neck
Ø 11 x 2 mm, 120 mm long
Stainless steel 316 Ti

Installation lengths
100, 160, 250, 400 mm

Connection head (degree of protection)
Type B as per DIN 43729
Aluminium die cast (IP 54)

Measuring range
-35/+400 °C

WTh 28

Version
Resistance thermometer for hygienic processes, e.g. food, beverages, pharmaceutical, biotechnology applications.

Sensor
1 x Pt 100
2-, 3- or 4-wire
Class B, IEC 751

Measuring insert
Replaceable, Ø 6 mm

Thermowell
Ø 9 x 1 mm, stainless steel 316 Ti

Neck
Ø 9 x 1 mm, 140 mm long
Stainless steel 316 Ti

Process connection
Either clamp, screw connection DIN 11851, weld-in ball, weld-in socket

Installation length
100, 125, 160, 250, 400 mm

Connection head (degree of protection)
Type B, type BUZ
Aluminium die cast (IP 54)

Measuring range
-35/+300 °C

Options

- Sensor class A
- Without thermowell (thread M 18 x 1.5 or M 14 x 1.5)
- Transmitter installation
- EX version
- Other thermowell materials, process connections, installation lengths, connection heads

- Sensor class A
- Reduced measuring tip (6 mm)
- Transmitter installation
- EX version
- Other thermowell materials, process connections, installation lengths, connection heads

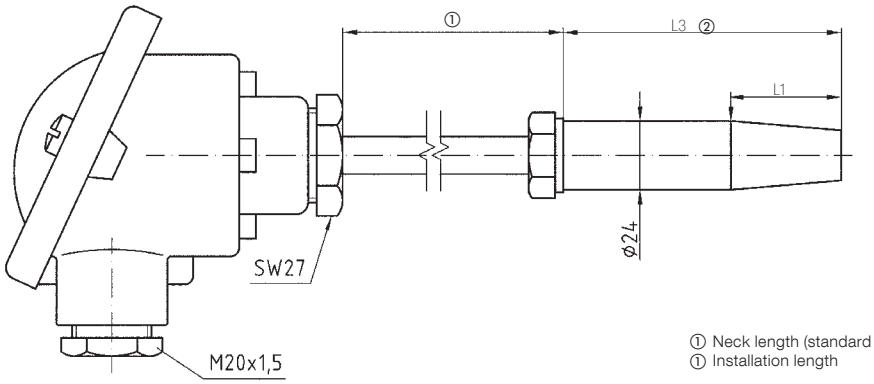
- Sensor class A
- Reduced measuring tip (6 mm)
- Other thermowell materials
- Other process connections
- Other installation lengths
- Transmitter installation
- EX version
- Field housing

i
See page 521 for prices.

Resistance thermometers WTh 26/27/28

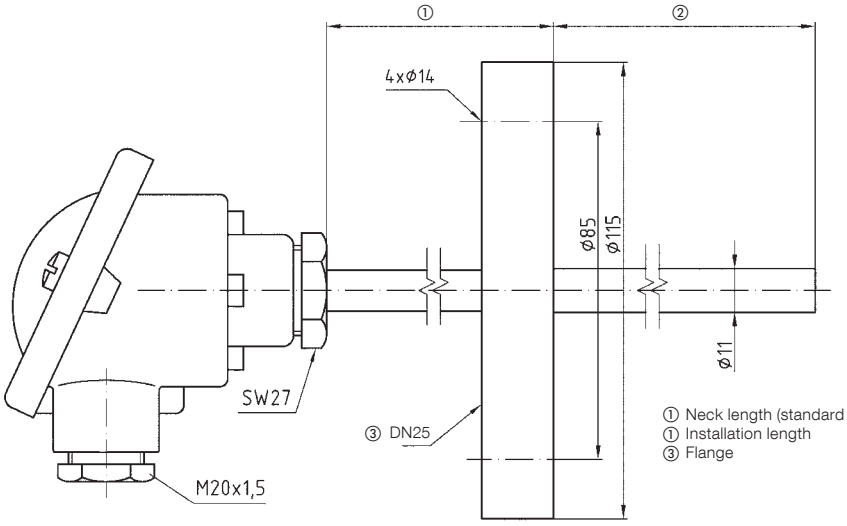
Dimensions (mm)

Type WTh 26



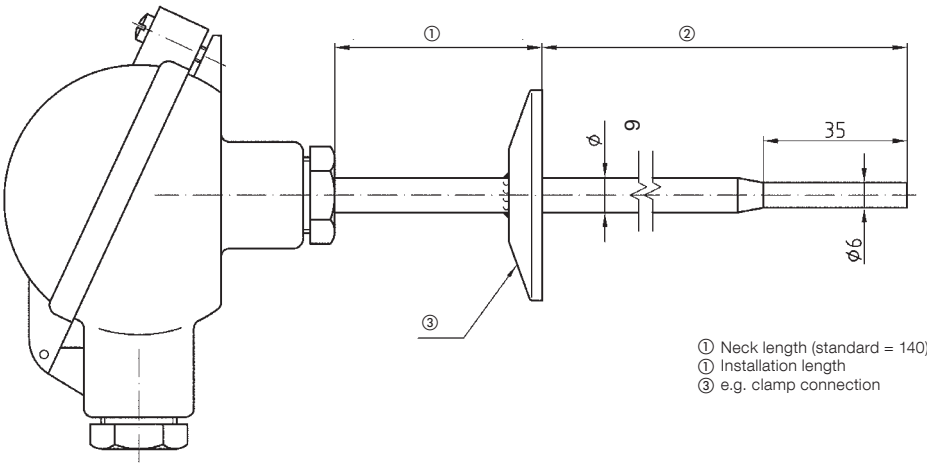
① Neck length (standard = 140)
① Installation length

Type WTh 27



① Neck length (standard = 120)
① Installation length
③ Flange

Type WTh 28

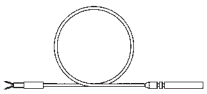
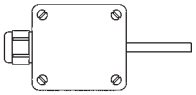
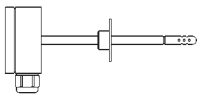
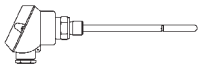
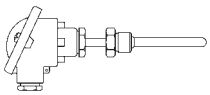


① Neck length (standard = 140)
① Installation length
③ e.g. clamp connection

12

Resistance thermometers

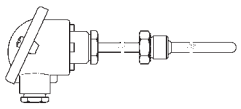
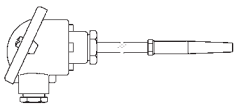
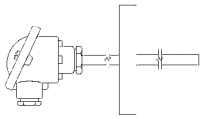
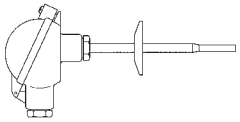
DG: E

Type	WTh 20	WTh 21	WTh 22	WTh 23	WTh 24
Version					
Sensor	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B
Thermowell/probe diameter Material	6 mm Stainless steel 316 Ti	6 mm Stainless steel 316 Ti	Perforated 8 mm Stainless steel 316 Ti	6 mm Stainless steel 316 Ti	9 mm Stainless steel 316 Ti
Neck	---	---	---	---	25 mm
Process connection	---	---	Mounting flange Ø 40 mm	G¼B Stainless steel 316 Ti	G½B Stainless steel 316 Ti
Connection head / electrical connection	PVC cable Wire ferrules	Plastic/cable gland	Plastic/cable gland	Type J/cable gland	DIN 43729, type B Cable gland
Measuring range fixed (moving)	-40/+105 °C (-5/+105 °C)	-50/+90 °C	0/130 °C	-35/+180 °C	-35/+180 °C
Installation length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
44 mm	Probe length 50 mm up to cable length 2,000 mm **9.50** 32220 Cable extension per 500 mm **0.50**	32400	---	---	---
100 mm		---	32215	32225	32210
160 mm		---	32216	32226	32211
250 mm		---	32217	32227	32212
400 mm		---	---	32228	---
Extra charges	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
Per additional 100 mm installation length	---	---			
1 x Pt 100 4-wire					
2 x Pt 100 2-wire	---	---	---		---
Sensor class A					
Connection head Type BBK	---	---			---
Transmitter installation* DC 7.5-30 V/4–20 mA	---				
Transmitter installation* DC 15–30 V/0–10 V	---			---	

* Applies to standard measuring ranges (-50/+50, 0/50, 0/100, 0/120, 0/150, 0/200, 0/300 °C), extra charge in all other cases

Resistance thermometers

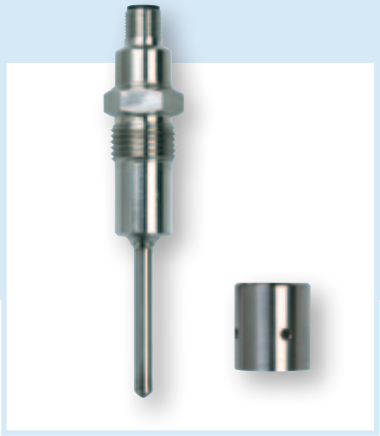
DG: E

Type	WTh 25	WTh 26	WTh 27	WTh 28
Version				
Sensor	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B	1 x Pt 100 3-wire, class B
Thermowell/probe Diameter Material	9 mm Stainless steel 316 Ti	Weld-in thermowell As per DIN 43772* Stainless steel 316 Ti	11 mm Stainless steel 316 Ti	9 mm Stainless steel 316 Ti
Neck	120 mm	140 mm	120 mm	140 mm
Process connection	G½B Stainless steel 316 Ti	Weld-in thermowell As per DIN 43772*	Flange EN 1091-1 Type B1 DN 25/PN 40	Clamp 1"
Connection head/ electr. connection	DIN 43729, type B Cable gland	DIN 43729, type B Cable gland	DIN 43729, type B Cable gland	Type B, type BUZ Cable gland
Measuring range	-35/+400 °C	-35/+550 °C	-35/+400 °C	-35/+200 °C
Installation length	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
65 mm	---	32250	---	---
100 mm	32240	32251	32260	32230
125 mm	32241	---	---	32231
160 mm	32242	32253	32261	32232
250 mm	32243	32254	32262	32233
400 mm	32244	---	32263	32234
Extra charges	**Price €**	**Price €**	**Price €**	**Price €**
Per additional 100 mm installation length		---		
Transmitter installation* DC 7.5-30 V/4–20 mA				
1 x Pt 100 4-wire				
2 x Pt 100 2-wire				
Sensor class A				
Reduced measuring tip (Ø 6 mm)		---		
Clamp 1½'"	---	---	---	
DIN 11851, DN 40	---	---	---	
Hygienic, DN 40	---	---	---	
Weld-in ball		---	---	
Weld-in socket	---	---	---	
EX version WTh				
EX transmitter Ex ib** DC 12–36 V/4–20 mA				

* See page 504 for other thermowell materials.
** Applies to standard measuring ranges (-50/+50, 0/50, 0/100, 0/120, 0/150, 0/200, 0/300, 0/400, 0/500 °C), extra charge in all other cases .

Resistance thermometers WTh 30 for hygienic processes

- Hygienic design as per EHEDG recommendations
- Compact design
- High accuracy
- Fast response
- Various process connections
- Transducer can be integrated



Application

For temperature measurement in tanks and pipelines and applications requiring hygienic process connections, materials and processing. Specially suitable for food, pharmaceutical and biotechnology applications due to the compact design and the high accuracy.

Description

WTh 30 consists of a sturdy stainless steel housing with diverse process connections and a Pt 100 measuring insert which is directly integrated in a thermowell. The change in resistance depending on the measured temperature is directly available as a signal or can be detected by a transducer and converted into a 4–20 mA output signal. The instrument is connected by means of a compact M12 plug connection.

Technical specifications

Measuring range
-50/+200 °C

Response time
According to IEC 751, test in flowing water (without transducer) T 90 = 5.5 s

Sensor
1 x Pt 100, 4-wire
Class A, IEC 751

Thermowell
Stainless steel 316 L, 4, Ø 6 mm

Installation lengths
30, 35, 50, 100, 150, 200 mm

Housing
Stainless steel, Ø 18 mm

Degree of protection
IP 67 (EN 60529)

Electrical connections
M 12 connection,
connector housing stainless steel

Process connections
Stainless steel 316 L, one of the following: G½B;
G½B conical, metal seal;
grooved union nut DIN 11851;
Clamp DIN 32676;
Clamp ISO 2852;
Tri-Clamp
VARIVENT® type N

Surface roughness
Ra < 0.8 µm
Welding seam < 1.6 µm

Operating pressure
Max. 16 bar
(VARIVENT® type N max. 10 bar)

Technical specifications Transducer (option)

Version
Transducer directly integrated in the plug housing, with encapsulated electronics.

Measuring range
-50/+150 °C (configuration as per specification)
minimum span 10 K

Supply voltage
DC 10–35 V

Output signal
4–20 mA, 2-wire

Options

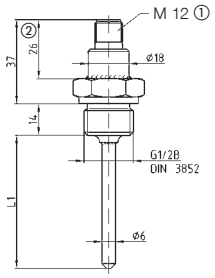
- Integrated transducer
- Other process connections
- Electropolishing
- Replaceable measuring insert
- Other installation lengths
- Weld-in sockets

i
See page 525 for prices.

Resistance thermometers WTh 30

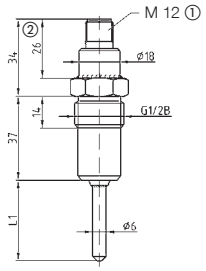
Electrical connections and dimensions (mm)

Connection G½B



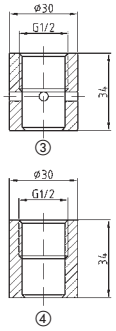
① Connector 4-pin
② Version with integrated transducer (24 mm longer)

Connection G½B, conical metal seal



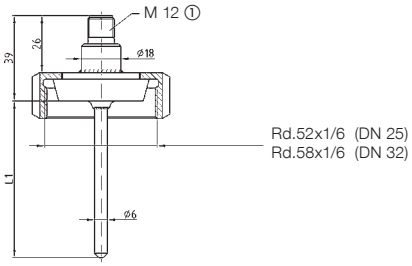
① Connector 4-pin
② Version with integrated transducer (24 mm longer)

Weld-in socket



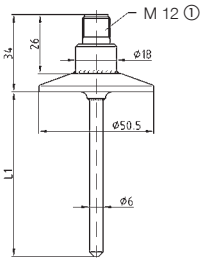
③ Socket with inspection hole
③ Socket without inspection hole

Tapered socket with grooved union nut DIN 11851



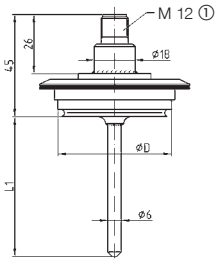
① Connector 4-pin

Clamp connection



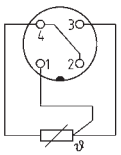
① Connector 4-pin
Clamp DIN 32676 DN 25, DN 40
Clamp ISO 2852 1", 1½"
Tri-Clamp 1", 1½"

VARIVENT® connection



D=68 for VARIVENT® type N

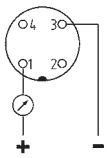
Pin assignment Without transducer



1 Brown
2 White
3 Blue
4 Black

1 x Pt 100, 4-wire

Pin assignment With transducer



DC 10–35 V 0 V

4–20 mA, 2-wire

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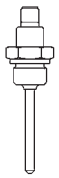
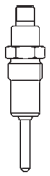
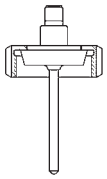
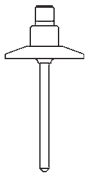
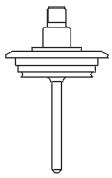
AFRISO EURO-INDEX

Resistance thermometers WTh 30

DG: E

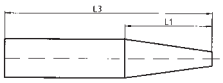
Type	WTh 30	WTh 30 DK	WTh 30 MR	WTh 30 CP	WTh 30 VT
Version					
Sensor	1 x Pt 100 4-wire, class A	1 x Pt 100 4-wire, class A	1 x Pt 100 4-wire, class A	1 x Pt 100 4-wire, class A	1 x Pt 100 4-wire, class A
Thermowell/probe Diameter Material	6 mm Stainless steel 316 L	6 mm Stainless steel 316 L	6 mm Stainless steel 316 L	6 mm Stainless steel 316 L	6 mm Stainless steel 316 L
Process connection	G½B	G½B, conical, metal seal	Grooved union nut DIN 11851 DN 25/PN 40	Clamp ISO 2852 DN 25	VARIVENT® Type N
Electrical connection	M 12 connector	M 12 connector	M 12 connector	M 12 connector	M 12 connector
Measuring range	-50/+200 °C	-50/+200 °C	-50/+200 °C	-50/+200 °C	-50/+200 °C
Installation length L1	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.	**Price €** Part no.
30 mm	32302	32310	32318	32326	32334
35 mm	32303	32311	32319	32327	32335
50 mm	32304	32312	32320	32328	32336
100 mm	32305	32313	32321	32329	32337
150 mm	32306	32314	32322	32330	32338
200 mm	32307	32315	32323	32331	32339
Extra charges	**Price €**	**Price €**	**Price €**	**Price €**	**Price €**
Installed transducer 4–20 mA*					
Process connection					
DIN 11851 DN 32	---	---		---	---
ISO Clamp DN 38	---	---	---		---
DIN Clamp DN 25	---	---	---		---
DIN Clamp DN 40	---	---	---		---
Tri-Clamp 1"	---	---	---		---
Tri-Clamp 1½"	---	---	---		---

Accessories	Part no.	**Price €**
Weld-in socket for G½B conical, metal seal, without inspection hole	32340	
Weld-in socket for G½B conical, metal seal, with inspection hole	32341	

* Please specify desired measuring range: 0/100 °C, 0/150 °C, -50/+100 °C (corresponding to 4–20 mA each)

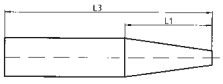
Thermowells for resistance thermometers

Weld-in thermowells, bar stock as per DIN – type 4
Permissible operating pressure as per DIN 43772



Design	Thermometer connection	Hole	Length L3	Cone length L1	Thermowell material	Part no.	**Price***
D1	M 18 x 1.5	7 mm	140 mm	65 mm	1.0460 (C 22.8)	64590	
					1.4571 (CrNiMoTi)	64591	
					1.7335 (13CrMo44)	64592	
					1.5415 (15Mo3)	64593	
					1.7380 (10CrMo910)	64594	
D2	M 18 x 1.5	7 mm	200 mm	125 mm	1.0460 (C 22.8)	64595	
					1.4571 (CrNiMoTi)	64596	
					1.7335 (13CrMo44)	64597	
					1.5415 (15Mo3)	64598	
					1.7380 (10CrMo910)	64599	
D3	M 18 x 1.5	7 mm	200 mm	65 mm	1.0460 (C 22.8)	64600	
					1.4571 (CrNiMoTi)	64601	
					1.7335 (13CrMo44)	64602	
					1.5415 (15Mo3)	64603	
					1.7380 (10CrMo910)	64604	
D4	M 18 x 1.5	7 mm	260 mm	125 mm	1.0460 (C 22.8)	64605	
					1.4571 (CrNiMoTi)	64606	
					1.7335 (13CrMo44)	64607	
					1.5415 (15Mo3)	64608	
					1.7380 (10CrMo910)	64609	

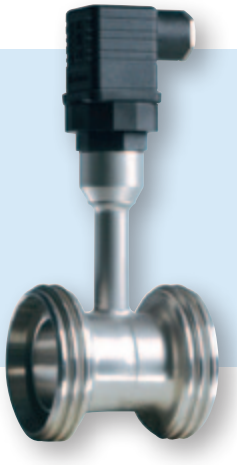
Weld-in thermowells, bar stock, similar to DIN – type 4
Permissible operating pressure as per DIN 43772



Design	Thermometer connection Thermometer	Hole	Length L3	Cone L1	Thermowell material	Part no.	**Price***
D 0 S	M 18 x 1.5	7 mm	110 mm	65 mm	1.4571 (CrNiMoTi)	64610	
					1.7335 (13CrMo44)	64611	
					1.5415 (15Mo3)	64612	
					1.7380 (10CrMo910)	64613	
D 1 S	M 18 x 1.5	7 mm	140 mm	65 mm	1.4571 (CrNiMoTi)	64614	
					1.7335 (13CrMo44)	64615	
					1.5415 (15Mo3)	64616	
					1.7380 (10CrMo910)	64617	
D 4 S	M 18 x 1.5	7 mm	200 mm	65 mm	1.4571 (CrNiMoTi)	64618	
					1.7335 (13CrMo44)	64619	
					1.5415 (15Mo3)	64620	
					1.7380 (10CrMo910)	64621	
D 5 S	M 18 x 1.5	7 mm	200 mm	125 mm	1.4571 (CrNiMoTi)	64622	
					1.7335 (13CrMo44)	64623	
					1.5415 (15Mo3)	64624	
					1.7380 (10CrMo910)	64625	

*The prices of the above thermowells vary greatly depending on the quantities ordered. Please enquire for project-specific prices.

Pipeline temperature sensors RTS



- The pipe can be cleaned with a scraper
- No swirls in the pipe
- No danger of sensor damage in highly viscous media

A
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Application

For temperature measurement in pipes in which a probe must not extend into the medium. Specially for hygienic applications in the food and pharmaceutical industries as well as for biotechnology and painting systems.

Description

The RTS pipe temperature sensor consists of a pipe piece with variable process connections and a sensor part contained in the centre. The sensor part contains a flush Pt 100 sensor. A number of thermal coupling and decoupling measures at the Pt 100 sensor minimise thermal errors. This allows for optimum detection of the temperature of the medium. The pipe temperature sensor can be easily installed at any point of the pipe. Measurements are made without a probe extending into the medium. Special inner pipe coatings are available for corrosive media. Superior surface quality is possible by means of electropolishing.

Technical specifications

Measuring range
0/150 °C

Sensor
1 x Pt 100 2-, 3- or 4-wire
Class B, IEC 751

Base values
As per IEC 751

Measuring current
Approx. 1 mA (film measuring resistor)

Process connection (both ends)
One of the following: Clamp DIN 32676,
pipe connection DIN 11851/SMS with grooved nut,
male thread DIN 11887/SMS,
Flange as per DIN EN/ANSI

Nominal diameters
DN 25 to DN 100
or 1" to 4"

Pipe material
Stainless steel 304

Insulation resistance
≥ 100 MOhm at 20 °C (DC 500 V)

Electrical connection
Connector ISO 4400

Degree of protection
IP 65 (EN 60529)

Technical specifications transmitter (option)

Version
Ceramic hybrid transmitter,
mounted directly in the neck

Ambient temperature
Max. 100 °C

Supply voltage
DC 12–28 V

Output signal
4–20 mA, 2-wire

Options

- Transmitter installation
- Other pipe materials
- Inner pipe electropolished
- Other process connections
- Other pipe dimensions
- Other measuring ranges
- Fixed cable connection
- Other connectors
- Sensor class A
- Digital plug-in display DA 06 (for version with transmitter)

i Prices on request.

Flue gas analysers

Temperature measuring instruments

Pressure measuring instruments

Gas detectors

CHAPTER 13

Portable measuring instruments BlueLine series, testers for servicing

OVERVIEW

Overview portable measuring instruments 530

FLUE GAS ANALYSIS

Flue gas analyser EUROLYZER ST 532

Flue gas analyser EUROLYZER STe 534

Flue gas analyser MULTILYZER NG 536

Flue gas analyser MAXILYZER NG 538

Flue gas analyser MAXILYZER NG Plus 540

Gas treatment system MAXISYSTEM 542

HEATING SYSTEM CHECK

Measuring instruments for heating system check and 4 Pa test DMG-HC / DMG-K 543

PRESSURE

Handheld pressure measuring instruments Series S2600 544

Handheld pressure measuring instruments Series S4600 545

TEMPERATURE

Handheld temperature measuring instruments TM7, TMD7, TM6, TM8-IR 546

TEMPERATURE/HUMIDITY

Handheld temperature measuring instrument TM9-IR 548

Handheld measuring instrument for moisture MFM10 548

Humidity/air temperature measuring instruments Series FT30-FT50 549

AIR SPEED

Air speed measuring instrument LGM 1 550

GAS LEAK

Gas detectors GSP1, GSP3, GSP3 Flex 551

ACCESSORIES

Probes for EUROLYZER ST / STe and MULTILYZER NG 552

Accessories and spare parts for EUROLYZER ST / STe and MULTILYZER NG 553

TANK SYSTEMS/HEATING SYSTEMS

Pressure test set AS-2, instrument for volume flow and temperature measurement FLOWTEMP 555

Leak test sets DPK 60, DPK 60-2, DPK 61, DPK 54 556

Pressure gauge for pump test set RF 50 PPS 559

Test and refill sets PNG-1, PNG-3, PNG-2, refill cylinder 560

Testers PGA and PGW 561

Testers for tank servicing S2610, KWT 5 562

Level sensor testers GPR 4, ME 5, ME 5 P 563

The BlueLine measuring instrument series at a glance

		EUROLYZER ST	EUROLYZER STe	MULTILYZER NG	MAXILYZER NG / NG Plus	Series S2600
O_2	Parameters/measured values	•	•	•	•	
CO (up to 4,000 ppm)		•	•	•	•	
CO (up to 10,000 ppm)		•	•			
CO_2 (calculated)		•	•	•	•	
NO		•	•	•	•	
NO_2				•	•	
NO_x		•	•	•	•	
CO (20,000 ppm) / CO (40,000 ppm)				•**	•**	
SO_2				•	•	
Methane						
Propane						
Butane						
Lambda		•	•	•	•	
Eta efficiency / eta coefficient		•	•	•	•	
qA		•	•	•	•	
Temperature		•	•	•	•	
Pressure		•	•	•	•	•
Dew point		•	•	•	•	
Humidity in %						
Volume flow						
Measurements of filters, ventilation systems, ducts	Typical applications areas					•
Measurements of production facilities, tanks, gas pipes						•
Burner adjustment/servicing (gas, oil, solid fuel systems)		•	•	•	•	•
CO concentration safety checks at gas fired systems		•	•	•	•	
Servicing of water heaters						
Servicing of CHP systems		•	•	•	•	
Flue gas measurement		•	•	•	•	
Pressure measurement		•	•	•	•	•
Measurement of inlet pressure, flow pressure, static pressure, nozzle pressure		•	•	•	•	•
Pressure / vacuum measurement		•	•	•	•	•
Differential pressure measurement		•	•	•	•	•
Vacuum measurement						•
Temperature measurement (flue gas, air, external wall)		•	•	•	•	
Temperature measurement (water)						
Temperature measurement (moving objects)						
Surface temperature measurement		•	•	•	•	
Differential temperature measurement		•	•	•	•	
Draft		•	•	•	•	•
Chimney draft measurement		•	•	•	•	•
Ventilation measurement		•	•			
Flue gas loss measurement		•	•	•	•	
Heating system check		•	•			
4 Pa test		•	•			
Gas leak detection						
Gas concentration measurement						
Flow rate measurement (water)						
Humidity / climatic conditions in rooms / mould						
Inspection of structure of buildings						
Air speed		•	•	•	•	
Gas treatment					-/•	
BImSchV	Approvals	•	•	•	•	
DIN EN 50379-2		•	•	•	•	•
DIN EN 15378		•	•			
KÜO		•	•	•	•	
		Page 532	Page 534	Page 536	Page 538	Page 544

* See product description on the catalogue page or in the operating instructions
** Depends on product version

Series S4600	HC-10 / HC-M	LGM 1	TM7 / TMD7	TM6	TM8-IR / TM9-IR	MFM10	FT series	GSP series	FLOWTEMP
	•	•	•	•	•		•		•
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Flue gas analyser EUROLYZER ST

- **All-in-one: Flue gas analysis, pressure measurement, temperature measurement, heating system check and 4 Pa test with a single device**
- **qA mean value as per German Federal Immission Act**
- **Multitasking: Battery can be charged while the instrument takes measurements**

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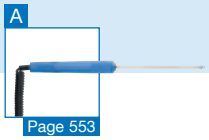
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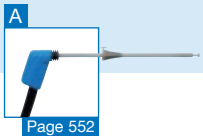
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Application

Universal application for measuring small and medium-sized oil, gas and pellets fired heating systems according to the German Federal Immission Act and for CO concentration safety checks at gas fired systems. EUROLYZER ST is ideally suited for measurements at bivalent and modulating CHP systems and also provides exact calculation of the Eta value for all condensing heating systems with fuel-specific dew point calculation. Perfect for measurements within the framework of a heating system check as per EN 15378 and for 4 Pa measurements.

Description

EUROLYZER ST is an ergonomically designed flue gas analyser with a robust protective sleeve and an integrated magnet. It is operated via a touch pad with a special recess for easy scrolling. The high-resolution TFT display, colour-coded menus and colour-coded representation of the measured values ensure maximum ease of use. With automatic device check during programme start.
Measuring is possible with two active display levels. This all-rounder can be equipped with a total of three measuring cells (O_2, CO, NO). Due to its H_2-compensated CO measurement up to a maximum of 9,999 ppm, the analyser is also suitable for measurements of pellets fired systems.
A MicroSD card allows for system-independent data storage. In addition to a USB interface for communication with a PC or a netbook, EUROLYZER ST features optional data transmission via Bluetooth – also for communication with pressure probes and temperature probes. The printer is connected via infrared.

Technical specifications

Measuring ranges (measured values)

Flue gas temperature/differential temperature
0/+1,000 °C

Air temperature/combustion air temperature
-20/+200 °C

Draft
± 50 hPa

Differential pressure
± 130 hPa

O_2
0/21 % by volume

CO_{H2}
0/5,000 ppm (nom.)
0/9,999 ppm (max.)

NO
0/2,000 ppm

Indication (calculated values)
CO_2, CO undiluted (air-free), lambda, Eta efficiency, flue gas losses qA

Operating temperature range
Ambient: +5/+40 °C
Storage: -20/+50 °C

Weight (housing)
Approx. 400 g

Dimensions
W x H x D 70 x 210 x 40 mm

Display
Colour TFT display
W x H: 45 x 48 mm

Connections
Draft/pressure: Ø 7 mm
Gas: Ø 8 mm

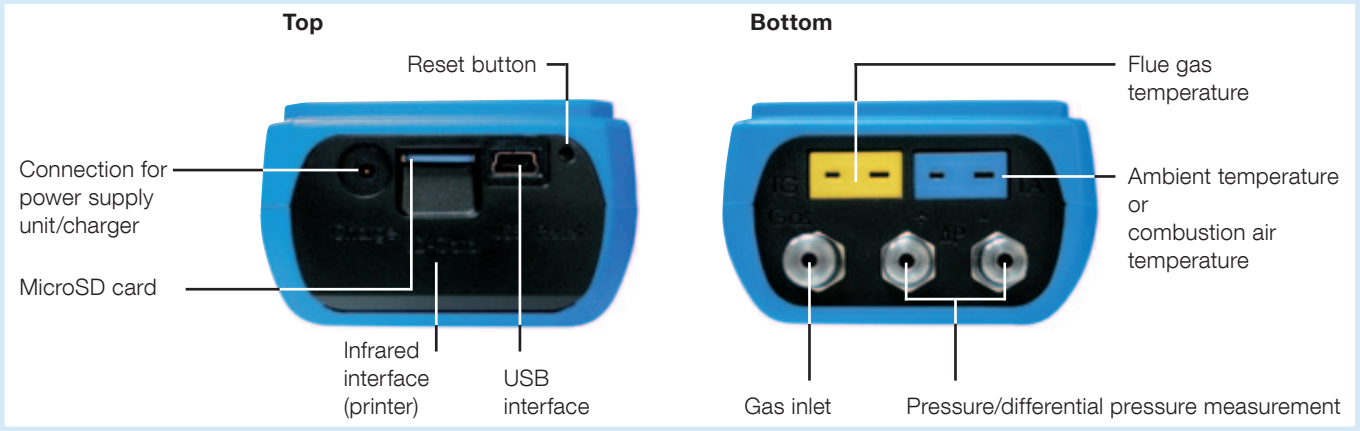
Supply voltage
NiMH battery (4.8 V/2 Ah)

Hours of operation (Eco mode)
8 hours

Memory
MicroSD card, max. 2 GB

Interfaces
USB, infrared, Bluetooth

Approvals
BImSchV, KÜO (TÜV ByRgG 190), EN 50379-2, EN 15378



EUROLYZER ST Sets

DG: H	O_2, CO_{H2} (differential) temperature	Draft	Differential pressure	NO	Calibration report, condensate filter cartridge KFP, protective sleeve with magnet, aluminium case, power supply unit, Infiltec fine filter (5 pieces), Teflon membrane (10 pieces)	Flue gas probe without draft connection	Flue gas probe with draft connection	Ambient air probe (stub probe, blue)	Connection kit for differential pressure measurement	Part no.	Price €
EUROLYZER ST Set 1	•				•	•		•		**69332**	
EUROLYZER ST Set 2	•	•			•		•	•	•	**69333**	
EUROLYZER ST Set 3	•	•	•		•		•	•	•	**69334**	
EUROLYZER ST Set 4	•	•		•	•		•	•	•	**69251**	
EUROLYZER ST Set 5	•	•	•	•	•		•	•	•	**69252**	

DG: H	Part no.	Price €
EUROLYZER ST O_2, CO, (differential) temperature (instrument only)	**69332G**	
EUROLYZER ST O_2, CO, (differential) temperature, draft (instrument only)	**69333G**	
EUROLYZER ST O_2, CO, (differential) temperature, draft, differential pressure (instrument only)	**69334G**	
EUROLYZER ST O_2, CO, NO, (differential) temperature, draft (instrument only)	**69251G**	
EUROLYZER ST O_2, CO, NO, (differential) temperature, draft, differential pressure (instrument only)	**69252G**	
Options		
Memory functions package: memory card, slot adapter, data cable	**69303**	
Bluetooth interface	**69236**	
Retrofitting for NO	**69351**	
Mean value programme for solid fuels in the case of pellet systems	**68985**	
Package: 4 Pa kit, EP-Check and hose kit	**69274**	
Package: heating system check, EP-Check, Pitot tube and surface probe	**69253**	
Package: heating system check, 4 Pa kit, EP-Check, Pitot tube, hose kit and surface probe	**69254**	
Accessories		
Power supply unit	**69337**	
Protective sleeve with magnet	**69255**	
Please enquire for maintenance contracts.		

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i See page 552 for further accessories.

Flue gas analyser EUROLYZER STe

NEW

- All-in-one flue gas analyser
- ECO sensor: First lead-free O_2 sensor for flue gas analysers with extended service life
- CO room air monitoring
- qA mean value measurement as per amendment to the 1st German Federal Immission Act BImSchV

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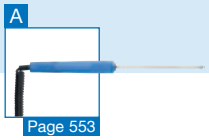
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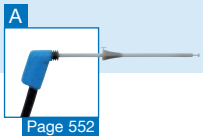
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Application

Universal application for measuring small and medium-sized oil, gas and pellets fired heating systems according to the new 1st German Federal Immission Act (qA mean value measurement) and for CO concentration safety checks at gas fired systems.
EUROLYZER STe is the analyser of choice for measurements of bivalent, modulating CHP systems and for all measurements within the framework of a heating system check as per DIN EN 15378. Ideal for measurements at heating systems with a high proportion of biofuels.

Description

EUROLYZER STe is an ergonomically designed flue gas analyser with a robust protective sleeve and an integrated magnet. It is operated via a touch pad with a special recess for easy scrolling. The high-resolution TFT display, colour-coded menus and colour-coded representations of the measured values ensure maximum ease of use. With automatic instrument check during programme start and during the calibration phase.
Measuring is possible with two active display levels. A MicroSD card allows for system-independent storage of measurement logs. In addition to a USB interface for communication with a PC or a net-book, EUROLYZER STe features optional data transmission via Bluetooth – also for communication with pressure probes and temperature probes. The printer is connected via infrared.
The new sensor technology of EUROLYZER STe ensures optimised calibration phase and a prolonged service life. ECO sensors for oxygen do not contain lead – a great contribution to a cleaner environment!

Technical specifications

Measuring ranges (measured values)

Flue gas temperature/differential temperature
0/+1,000 °C

Air temperature/combustion air temperature
-20/+200 °C

Draft
± 50 hPa

Differential pressure
± 130 hPa

O_2 measurement
0/21 % by volume

CO_{H2}
0/5,000 ppm (nom.)
0/9,999 ppm (max.)

NO measurement
0/2,000 ppm

Indication (calculated values)
CO_2, CO undiluted (air-free), lambda, Eta efficiency, flue gas losses qA

Operating temperature range
Ambient: +5/+40 °C
Storage: -20/+50 °C

Weight (housing)
Approx. 400 g

Dimensions
W x H x D 70 x 210 x 40 mm

Display
Colour TFT display
W x H: 45 x 60 mm

Connections
Draft/pressure: Ø 7 mm
Gas: Ø 8 mm

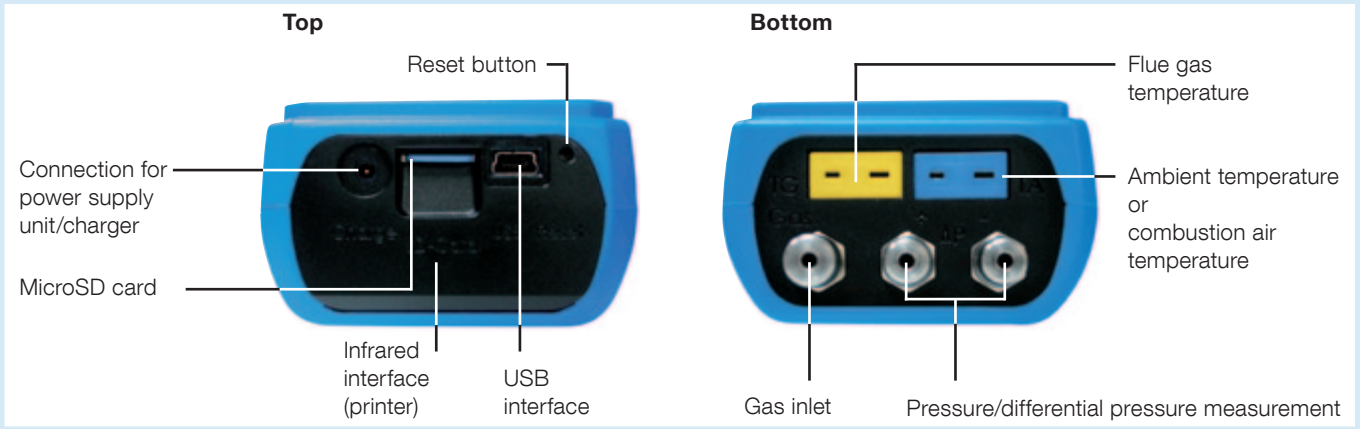
Supply voltage
NiMH battery (4.8 V/2 Ah)

Hours of operation (Eco mode)
12 hours

Memory
MicroSD card, max. 2 GB

Interfaces
USB, infrared, Bluetooth

Approvals
As per BImSchV, KÜO (TÜV ByRgG 190), EN 50379-2, EN 15378



EUROLYZER STe Sets

DG: H	O_2, CO_{H2} (differential) temperature	Draft	Differential pressure	NO	Calibration report, condensate filter cartridge KFP, protective sleeve with magnet, aluminium case, power supply unit, Infiltec fine filter (5 pieces), Teflon membrane (10 pieces)	Flue gas probe with draft connection	Ambient air probe (stub probe, blue)	Connection kit for differential pressure measurement	Part no.	Price €
EUROLYZER STe Set 1	•	•			•	•	•	•	**70099**	
EUROLYZER STe Set 2	•	•	•		•	•	•	•	**70100**	
EUROLYZER STe Set 3	•	•		•	•	•	•	•	**70101**	
EUROLYZER STe Set 4	•	•	•	•	•	•	•	•	**70102**	

DG: H	Part no.	Price €
EUROLYZER STe O_2, CO, (differential) temperature, draft (instrument only)	**70099G**	
EUROLYZER STe O_2, CO, (differential) temperature, draft, differential pressure (instrument only)	**70100G**	
EUROLYZER STe O_2, CO, NO, (differential) temperature, draft (instrument only)	**70101G**	
EUROLYZER STe O_2, CO, NO, (differential) temperature, draft, differential pressure (instrument only)	**70102G**	
Options		
Memory functions package: memory card, slot adapter, data cable	**69303**	
Bluetooth interface	**69236**	
Retrofitting for NO	**69351**	
Mean value programme for solid fuels in the case of pellet systems	**68985**	
Package: 4 Pa kit, EP-Check and hose kit	**69274**	
Package: heating system check, EP-Check, Pitot tube and surface probe	**69253**	
Package: heating system check, 4 Pa kit, EP-Check, Pitot tube, hose kit and surface probe	**69254**	
Spare parts		
Power supply unit	**69337**	
Protective sleeve with magnet	**69255**	
Please enquire for maintenance contracts.		

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See page 552 for further accessories.

Flue gas analyser MULTILYZER NG

- Separate measurement programmes for flue gas analysis, pressure and temperature
- Sensor equipment with up to six measuring cells possible
- Separate flushing pump for the CO measuring cell
- Measuring configuration can be programmed as required

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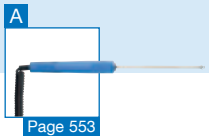

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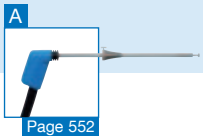

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Application

Flue gas analyser for measuring small and medium-sized oil, gas and pellets fired heating systems according to the German Federal Immission Act and for CO concentration safety checks at gas fired systems. Ideal for servicing solid fuel systems (for example, wood fired systems with temporary CO peaks up to 20,000 ppm) or bivalent, modulating combined heating and power plants.

Description

MULTILYZER NG is a portable flue gas analyser with a robust protective sleeve and an integrated magnet. A large LC display allows you to display five or ten measured values. The min./max. display function for measured values with reset function, graphical evaluation of the measured values and the core search function ensure maximum ease of use. Measuring is possible with two active display levels. The measured gas values can be displayed in four and the measured pressure values in six different units. With automatic instrument check during programme start and limit value monitoring. The compact design allows the device to be equipped with any combination of up to six measuring cells (O_2, CO, CO_{H2}, NO, NO_2, SO_2). Calculated parameters: CO undiluted (air free), lambda, CO_2, eta efficiency, flue gas loss, dew point, temperature difference. The CO measuring cell is H_2-compensated for official measurements. A USB interface is available for communication with, for example, a PC or a netbook. The printer is connected via infrared – measurement data can be sent directly from the programme or the memory.

Technical specifications

Measuring ranges (measured values)

Flue gas temperature/differential temperature
0/+1,000 °C

Air temperature/combustion air temperature
-20/+200 °C

Draft
± 70 hPa

Differential pressure
± 150 hPa

O_2
0/21 % by volume

CO_{H2}
0/4,000 ppm

CO
0/20,000 ppm

NO
0/2,000 ppm

NO_2
0/200 ppm

SO_2
0/2,000 ppm

Indication (calculated values)
CO_2, CO undiluted (air free), lambda, eta efficiency, flue gas losses qA

Operating temperature range
Ambient: +5/+40 °C
Storage: -20/+50 °C

Weight (housing)
Approx. 750 g

Dimensions
W x H x D 95 x 215 x 45 mm

Display
LCD, W x H: 60 x 80 mm

Connections
Draft/pressure: Ø 7 mm
Gas: Ø 8 mm

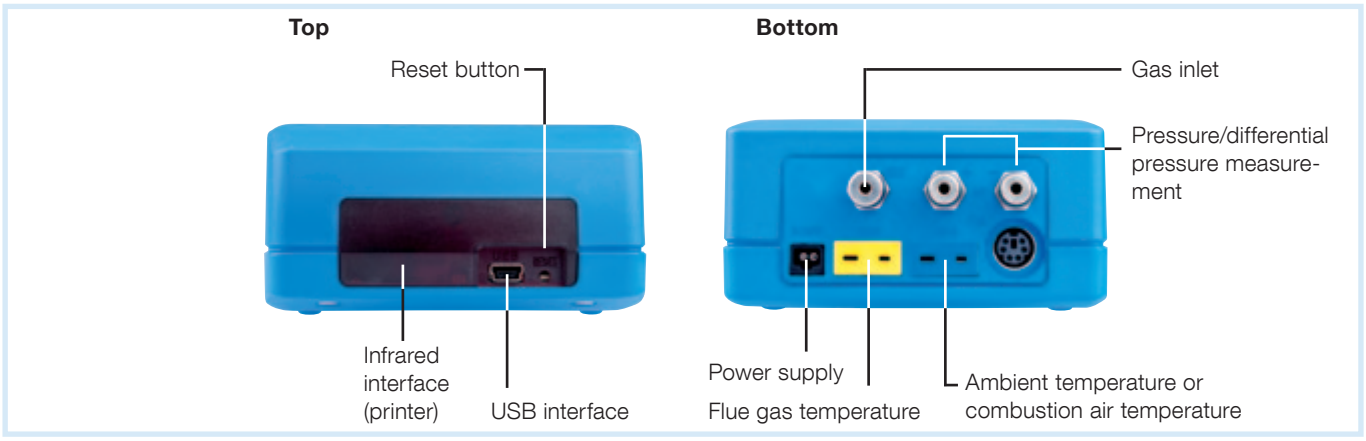
Supply voltage
NiMH battery (6 V/2 Ah)

Hours of operation
12 hours

Memory
Up to 100 memory blocks

Interfaces
USB, infrared, Bluetooth

Approvals
BImSchV, KÜO (TÜV ByRgG 246), EN 50379-2



MULTILYZER NG Sets

DG: H	O_2	CO_{H2}	NO	CO 20,000	Draft, differential pressure	Calibration report, condensate filter cartridge KFP, protective sleeve with magnet, aluminium case, power supply unit, Infiltec fine filter (5 pieces), Teflon membrane (10 pieces)	Flue gas combination probe	Ambient air probe (stub probe, blue)	Connection kit for differential pressure measurement	Part no.	Price €
MULTILYZER NG Set 1	•	•			•	•	•	•	•	**69631A**	
MULTILYZER NG Set 2	•	•	•		•	•	•	•	•	**69632A**	
MULTILYZER NG Set 3	•	•		•	•	•	•	•	•	**69633A**	
MULTILYZER NG Set 4	•	•	•	•	•	•	•	•	•	**69634A**	

DG: H	Part no.	Price €
MULTILYZER NG O_2, CO_{H2}, draft, differential pressure (instrument only)	**69631G**	
MULTILYZER NG O_2, CO_{H2}, NO, draft, differential pressure (instrument only)	**69632G**	
MULTILYZER NG O_2, CO_{H2}, $CO_{20,000}$, draft, differential pressure (instrument only)	**69633G**	
MULTILYZER NG O_2, CO_{H2}, $CO_{20,000}$, NO, draft, differential pressure (instrument only)	**69634G**	
MULTILYZER NG – special equipment	69635	
Options		
Bluetooth interface	**69236**	
Mean value programme for solid fuels in the case of solid fuel systems	**68984**	
Spare parts		
Power supply unit	**69406**	
Protective sleeve with magnet	**69350**	
Please enquire for maintenance contracts.		

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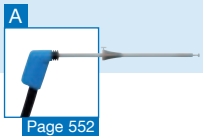
i See page 552 for further accessories.

Flue gas analyser MAXILYZER NG

- Robust housing, dust- and water-tight, with vent valve
- Sensor equipment with up to six measuring cells possible
- Flushing function, depending on intensity of measurement
- Powerful battery (24 hours of operation with active display backlit function)
- Integrated printer



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Application

Universal application for measuring small and medium-sized oil, gas and pellets fired heating systems according to the German Federal Immission Act and for CO concentration safety checks at gas fired systems. Ideally suited for servicing solid fuel systems (e.g. log wood fired systems with short-term CO peaks up to 20,000 ppm) or bivalent, modulating CHP systems. The gas treatment system MAXISYSTEM is required for precise gas analyses during long-term measurements or at different sites subject to pollution and condensate in the flue gas.

Description

Flue gas analyser with integrated thermal printer and dual-stage gas treatment system (condensate filter cartridge and dust filter cartridge) in plastic housing with dust and splash water protection. A graphical, bright, backlit LC display allows for indication of ten measured values. Hold and zoom functions, core search, 15-minute mean value programme (solid fuels), conversion of units, automatic instrument check during programme start and graphical evaluation of the measured values with combustion chart ensure maximum ease of use.
Memory for 100 measurement blocks. With sensor status diagnostics and automatic CO flushing function via a second pump to protect the sensors. MAXILYZER NG can be equipped with up to six measuring cells (O_2, CO_{H2}, $CO_{20,000}$, NO, NO_2, SO_2). Calculated parameters: CO undiluted (air-free), lambda, CO_2, eta efficiency, flue gas loss qA. Powerful battery with intelligent quick-charging technology.

Technical specifications

Measuring ranges (measured values)

Flue gas temperature/differential temperature
0/+1,000 °C

Air temperature/combustion air temperature
-20/+200 °C

Draft
±70 hPa

Differential pressure
±150 hPa

O_2
0/21 % by volume

CO_{H2}
0/4,000 ppm

CO
0/20,000 ppm

NO
0/2,000 ppm

NO_2
0/200 ppm

SO_2
0/2,000 ppm

Indication (calculated values)
CO_2, CO undiluted (air free), lambda, eta efficiency, flue gas losses qA

Operating temperature range
Ambient: +5/+40 °C
Storage: -20/+50 °C

Weight (housing)
2.8 kg

Dimensions
W x H x D 273 x 125 x 247 mm

Display
LCD, W x H: 60 x 80 mm

Degree of protection
IP 65 (when closed)

Connections
Draft/pressure: Ø 7 mm
Gas: Ø 8 mm

Supply voltage
NiMH battery
(6 V/4.5 Ah)

Hours of operation
24 hours

Memory
Up to 100 memory blocks

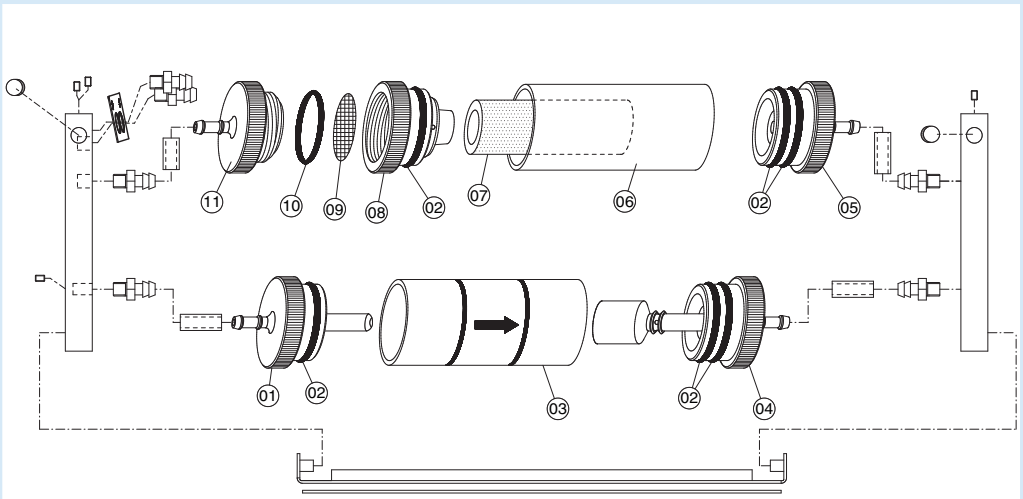
Interfaces
USB, Bluetooth

Approvals
BimSchV, KÜO (TÜV ByRgG 247), EN 50379-2

Scope of delivery
Maxilyzer NG with max. 6 cells (O_2, CO_{H2}, $CO_{20,000}$, NO, NO_2, SO_2), calibration report, case with charger, ambient air probe, flue gas combination probe, connection kit for differential pressure measurement

DG: H	Part no.	Price €
MAXILYZER NG O_2, CO_{H2}, draft, differential pressure	69233	
MAXILYZER NG O_2, CO_{H2}, NO, draft, differential pressure	69234	
MAXILYZER NG O_2, CO_{H2}, $CO_{20,000}$, draft, differential pressure	69237	
MAXILYZER NG O_2, CO_{H2}, $CO_{20,000}$, NO, draft, differential pressure	69235	
Options: Immediate installation when instrument is ordered		
Bluetooth	69236	
Mean value programme for solid fuels in the case of solid fuel systems	68984	
CO measuring cell: CO-20,000 ppm	69535	
SO_2 measuring cell: SO_2-2,000 ppm	69537	
Accessories		
Printer paper (5 rolls)	**69481**	
Please enquire for maintenance contracts.		

Gas treatment system MAXILYZER NG/MAXILYZER NG Plus



DG: H	Part no.	Price €
Spare parts for gas treatment system MAXILYZER NG / MAXILYZER NG Plus		
01 Inlet piece	**695 000 94**	
02/10 Assortment of O rings	**69427**	
03 Glass piston with arrow	**695 000 95**	
04 Outlet piece with cylinder	**695 000 91**	
05 Inlet piece particle filter element	**695 000 93**	
06 Glass piston with logo	**695 000 99**	
07 Infiltec fine filter (5 pieces)	**69412**	
08 Intermediate piece	**695 000 97**	
09 Teflon membrane (10 pieces)	**69206**	
11 Outlet piece	**695 000 98**	

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See page 542 for gas cooling and filtration with MAXISYSTEM.

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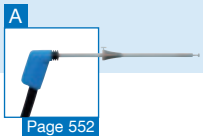
Flue gas analyser MAXILYZER NG Plus

NEW

- Separate measurement programmes for flue gas analysis, pressure and temperature
- Gas treatment for reproducible gas analyses
- Sensor equipment with up to six measuring cells possible
- Peltier gas cooler to avoid the formation of condensate in the flue gas analyser



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Application

For universal use at small and medium-sized oil, gas and pellets fired systems according to the German Federal Immission Act as well as for CO concentration safety checks at gas fired systems. Ideally suited for servicing solid fuel systems (e.g. log wood fired systems with short-term CO peaks up to 40,000 ppm) or bivalent, modulating CHP systems. For precise gas analyses during long-term measurements or at different sites subject to pollution and condensate in the flue gas. Suitable for measurements of highly water-soluble gases (e.g. NO_2 and SO_2) since the measured gas is cooled and filtered.

Description

Flue gas analyser with integrated thermal printer and a gas treatment system in a dust- and splash water-protected plastic housing. A graphical LC display allows you to display five or ten measured values. Hold and zoom functions, core search, conversion of units and graphical representation of the measured values as per combustion chart ensure maximum ease of use. With sensor status diagnostics, CO limit value monitoring with sensor protection function.
MAXILYZER NG Plus can be equipped with up to six measuring cells (O_2, CO_{H2}, $CO_{40,000}$, NO, NO_2, SO_2). Calculated parameters: CO undiluted (air-free), lambda, CO_2, eta efficiency, flue gas loss qA. The gas to be measured is cooled by means of a Peltier cooler and filtered by means of a fine particulate filter. An optional Bluetooth interface is available for communication with, for example, a PC or a netbook.

Technical specifications

Measuring ranges (measured values)

Flue gas temperature/differential temperature
0/1,000 °C

Air temperature/combustion air temperature
-20/+200 °C

Draft
± 70 hPa

Differential pressure
± 150 hPa

O_2
0/21 % by volume

CO_{H2}
0/4,000 ppm

CO
0/40,000 ppm

NO
0/5,000 ppm

NO_2
0/500 ppm

SO_2
0/5,000 ppm

Indication (calculated values)
CO_2, CO undiluted (air free), lambda, eta efficiency, flue gas losses qA

Operating temperature range
Ambient: +5/+40 °C
Storage: -20/+50 °C

Weight (housing)
6.9 kg

Dimensions
W x H x D 410 x 175 x 330 mm

Display
LCD, W x H: 60 x 80 mm

Degree of protection
IP 65 (when closed)

Connection draft
Draft/pressure: Ø 7 mm
Gas: Ø 8 mm

Supply voltage
Gas analysis:
NiMH battery (6 V/4.5 Ah) or mains operation (230 V)
Cooler and heated line:
mains operation (230 V)

Hours of operation
24 hours

Memory
Up to 100 memory blocks

Interfaces
USB, Bluetooth

Approvals
BImSchV, KÜO (TÜV ByRgG 247), EN 50379-2

Scope of delivery
Maxilyzer NG Plus with max. 6 cells (O_2, CO_{H2}, $CO_{40,000}$, NO, NO_2, SO_2), calibration report, case with charger, ambient air probe, flue gas combination probe, connection kit for differential pressure measurement

DG: H	Part no.	Price €
MAXILYZER NG Plus O_2, CO_{H2}, NO, draft, differential pressure	69239	
MAXILYZER NG Plus O_2, CO_{H2}, NO, SO_2, draft, differential pressure	69240	
MAXILYZER NG Plus O_2, CO_{H2}, NO, $CO_{40,000}$, NO_2, draft, differential pressure	69241	
MAXILYZER NG Plus O_2, CO_{H2}, NO, SO_2, $CO_{40,000}$, NO_2, draft, differential pressure	69242	
MAXILYZER NG Plus O_2, CO_{H2}, $CO_{40,000}$, draft, differential pressure	69243	
MAXILYZER NG Plus O_2, CO_{H2}, NO, $CO_{40,000}$, draft, differential pressure	69244	
Options: Immediate installation when instrument is ordered		
Bluetooth	69236	
Mean value programme for solid fuels in the case of solid fuel systems	68984	
CO measuring cell: CO-40,000 ppm	69141	
SO_2 measuring cell: SO_2-2,000 ppm	69142	
Accessories		
Gas sampling probe PSP 4000: portable, heated	68900	
Heated line: 5 m*	69476	
Heated line: 3 m*	69478	
Printer paper (5 rolls)	69481	
Please enquire for maintenance contracts.		

* Probe tube 300 mm and cone included.

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See page 539 for gas treatment system spare parts and design.

Gas treatment system MAXISYSTEM

- **For fast, reproducible gas analyses**
- **Robust housing, dust- and water-tight**
- **Adapted to the flue gas analyser MAXILYZER NG**
- **Peltier gas cooler to avoid condensate and keep dirt particles out of the device**

Gas sampling probe PS P4000
with external ceramic filter element

Application

For long-term measurements and applications at changing sites requiring high-precision gas analyses and involving pollution and condensate in the flue gas. In conjunction with flue gas analysis computers, MAXISYSTEM is ideally suited if highly water-soluble gases (such as NO_2 and SO_2) are to be measured.

Description

Portable gas treatment system consisting of:
- Gas cooling with Peltier gas cooler
- Gas filtration with fine particulate filter
- Condensate removal with hose pump

The gas is transported by means of the gas pump in the analyser. MAXISYSTEM is equipped with a status unit for detecting the operating states of cooler and heating hose. When the condensate alarm LA+ is triggered, the 3/2 way solenoid valve for free suction via the analyser is opened. In addition, there is a master switch and a switch for the internal gas pump.

Technical specifications

Flow rate/filtration of the internal pump
60 l/h at 200 mbar

Operating temperature range (cooler)

Operation:	+8/+40 °C
Storage:	-15/+55 °C
Gas inlet:	Max. +60 °C
Dew point (gas):	+100 °C

Filter
Fine particulate filter with glass fibre filter 2 µm

Materials (wetted parts)
Duran glass, PVDF, Viton®, stainless steel

Weight
4 kg

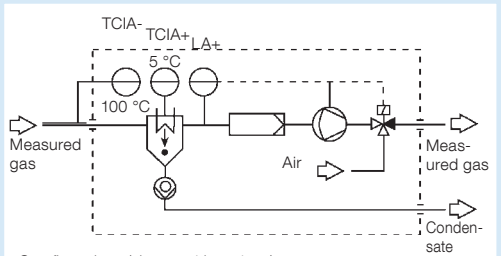
Dimensions
W x H x D 273 x 178 x 247 mm

LED
- Temperature status cooler and heating hose
- Status 'Cooling active'
- Condensate alarm LA+

Degree of protection (EN 60529)
IP 20 operating state (open)
IP 65 closed

Connection
Hose NW 8 mm, hose connector, pluggable

Supply voltage
AC 230 V/50 Hz



Gas flow chart (shown with options)

DG: H	Part no.	Price €
MAXISYSTEM with controller for heated line and condensate pump without gas pump, with mains cable	69486	
Thermocouple for measurement of the flue gas temperature	69683	
Gas pump 60 l/h and activation of pump ON/OFF when cooler is ready for operation	69486A	
Gas sampling probe PSP 4000, portable, heated probe temperature adjustable from +100 °C to +180 °C	68900	
Heated line 5 m*	69476	
Heated line 3 m*	69478	

* Probe tube 300 mm and cone included.

Series S6600 measuring instrument for heating system check and/or 4 Pa test

NEW

Evaluation instrument S6600

EP-Check with Pitot tube

- **Automatic calculation of the evaluation points**
- **Fast, convenient measurement with stable zero**
- **Wireless data transmission via radio**
- **Immediate measurement and display of surface losses and ventilation losses**

Scope of delivery including hose kit

Application

Professional evaluation of energetic weak points of heating systems (surface and ventilation losses) as per EN 15378 as well as pressure (e.g. 4 Pa test) and temperature.

Description

DMG-K-1000: Measuring instrument solution consisting of the evaluation instrument S6600, the EP-Check, a straight Pitot tube, a surface temperature probe and the 4 Pa hose kit. The evaluation instrument S6600 features a high-resolution colour TFT display and an infrared interface for data transmission to the EUROprinter. The measured values are acquired via the EP-Check, which is equipped with a differential pressure sensor and a temperature sensor.
The S6600 evaluation instrument receives the measured value via wireless transmission and performs an automatic calculation of the evaluation points for a heating system check as per EN 15378. Separate differential pressure measurement within the range +/- 20 mbar is also possible.

DMG-HC 1000: Heating system check instrument for measuring ventilation and surface loss as per EN 15378, consisting of evaluation instrument S6600, EP-Check, Pitot tube and surface temperature probe.

DMG-Pa 1000: 4 Pa test measuring instrument for differential pressure, consisting of evaluation instrument S6600, EP-Check and 4 Pa hose kit.

Technical specifications

Air temperature/combustion air temperature
-20/+200 °C

Differential pressure
± 20 hPa

Operating temperature range
Ambient: +5/+40 °C
Storage: -20/+50 °C

Weight (housing)
Approx. 250 g

Dimensions
W x H x D 66 x 143 x 37 mm

Display
Colour TFT display
W x H: 45 x 60 mm

Supply voltage
Lithium-ion battery (3.6 V/1.8 Ah)
or USB power supply unit

Hours of operation (Eco mode)
Max. 8 hours

Memory
Internal memory (optional)

Interfaces
USB, infrared, radio

Approvals
EN 15378

Scope of delivery
Evaluation instrument and EP-Check with Pitot tube and surface probe and/or hose kit as required

DG: H	Part no.	Price €
Measuring instrument DMG-HC 1000 for heating system check	68795	
4 Pa test measuring instrument DMG-Pa 1000	68796	
Combination measuring instrument DMG-K 1000	68797	
4 Pa kit, retrofit, for DMG-HC 1000	68798	
Heating system check unit, retrofit, for DMG-Pa 1000	68799	

i EUROLYZER STe for the heating system check page 534.

Handheld pressure measuring instruments Series S2600

- **Four (differential) pressure measuring ranges**
- **High measuring accuracy**
- **Measured values displayed in mbar, Pa, hPa, kPa, mmHg, inHg, psi, bar**
- **Automatic zero correction**
- **Hold function for short-term freezing of measured value**

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Application

For measuring pressure, vacuum and differential pressure. For non-corrosive gaseous, dry media. Ideal for industrial, medical and air conditioning technology applications.
Other typical application areas: Measurement of chimney draft, measurement of inlet pressure, flow pressure and nozzle pressure, pressure drop in flowing gases, filter inspection, ventilation systems or ducts, production and extraction facilities, vacuum measurement (laboratory), check of the connection pressure (natural gas supply pipes), burner pressure check, inspection of tanks for liquids (inlet and outlet pressure).

Description

Series S2600 pressure meters are ergonomically shaped, light-weight handheld instruments. A large, lit LC display allows for simultaneous indication of two measured values. All measured values can be displayed in six different units (mbar, Pa, kPa, mmHg, inHg, psi and bar). A magnet is provided at the rear side of the instrument to allow for hands-free operation, e.g. for adjustment work at gas heaters. The series S2600 instruments feature manual and automatic zero correction as well as automatic instrument checks.

Technical specifications

Model	Measuring range (mbar)	Max. over-pressure (bar)	Resolution (mbar)	Accuracy (% of measured value)
S2601 (FZM 30)	-20/+150	1.35	0.01 (< 19.99) or 0.1 (> 20)	1.0 ± 1 digit (< 130.0 mbar) 1.5 ± 1 digit (> 130.0 mbar)
S2610 (DMG 15)	-50/+1,000	3	0.1 (< 199.9) or 1.0 (> 200)	1.0 ± 1 digit (< 1,000 mbar) 1.5 ± 1 digit (> 1,000 mbar)
S2650 (DMG 25)	-100/+5,000	10	1.0 (< 1,999) or 10 (> 2,000)	1.0 ± 1 digit (< 5,000 mbar) 1.5 ± 1 digit (> 5,000 mbar)
S2680 (DMG 35)	-100/+8,000	10.5	0.1 (< 1,999) or 1.0 (> 2,000)	1.0 ± 1 digit (< 8,000 mbar) 1.5 ± 1 digit (> 8,000 mbar)

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Operating temperature range
Ambient: 0/+40 °C
Storage: -20/+50 °C

Hours of operation
Max. 100 hours

Weight (housing)
Approx. 250 g

Dimensions
W x H x D 66 x 143 x 37 mm

Display
LCD, transflective
W x H: 46 x 48 mm

Hose connection
S2601, S2610: Ø 8 mm
S2650, S2680: Ø 3 mm (Festo)

Supply voltage
2 x 1.5 V Mignon (AA) batteries

Approvals
BImSchV, EN 50379-2

Scope of delivery
Measuring instrument with batteries, in protective sleeve with magnet

DG: H	Part no.	Price €
S2601 (FZM 30)	69680	
S2610 (DMG 15)	69681	
S2650 (DMG 25)*	69682	
S2680 (DMG 35)*	69684	
Connection kit for pressure gauges	69691	

* With Festo connection

i See page 552 for accessories.

Handheld pressure measuring instruments Series S4600

NEW

- Four (differential) pressure measuring ranges
- High measuring accuracy
- Measured values displayed in mbar, Pa, hPa, kPa, mmWC, mmHg, inWC, psi, bar
- Large TFT display
- ECO mode for energy-saving operation

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A Page 554

Connection kit for pressure measuring instruments

Application

For measuring pressure, vacuum and differential pressure. For non-corrosive gaseous, dry media. Ideal for industrial, medical and air conditioning technology applications. Other typical application areas: Measurement of chimney draft, measurement of inlet pressure, flow pressure and nozzle pressure, pressure drop in flowing gases, filter inspection, ventilation systems or ducts, production and extraction facilities, vacuum measurement (laboratory), check of the connection pressure (natural gas supply pipes), burner pressure check, inspection of tanks for liquids (inlet and outlet pressure).

Description

Series S4600 pressure meters are ergonomically shaped, light-weight handheld instruments. A large TFT display allows for convenient visualisation of the measurement results. Up to four measured values can be displayed simultaneously. All measured values can be displayed in nine different units (mbar, Pa, kPa, hPa, mmWC, mmHg, inWC, psi, bar). Minimum and maximum values can be set before the measurement; if these values are reached, visual or audible alarms are triggered. Magnets at the back of the instrument allow for hands-free operation. The series S4600 instruments feature manual and automatic zero correction as well as automatic instrument checks. The ECO mode allows for energy-saving operation – the instrument automatically switches off if no key is pressed for a period of 30 minutes. Wireless printer connection via infrared.

Technical specifications

Model	Measuring range (mbar)	Max. over-pressure (bar)	Resolution (mbar)	Accuracy (% of measured value)
S4601	± 150	1.35	0.01 (< 99.99) or 0.1 (> 100)	0.5 ± 1 digit (< 130.0 mbar) 1.0 ± 1 digit (> 130.0 mbar)
S4610	-1,000/+1,000	3	0.1 (< 999.9) or 1.0 (> 1,000)	0.5 ± 1 digit (< 1,000 mbar) 1.0 ± 1 digit (> 1,000 mbar)
S4650	-1,000/+5,000	10	0.1 (< 999.9) or 1.0 (> 1,000)	0.7 ± 1 digit (< 5,000 mbar) 1.0 ± 1 digit (> 5,000 mbar)
S4680	-1,000/+8,000	10.5	0.1 (< 999.9) or 1.0 (> 1,000)	1.0 ± 1 digit (< 8,000 mbar) 1.5 ± 1 digit (> 8,000 mbar)

Operating temperature range
Ambient: 0/+40 °C
Storage: -20/+50 °C

Hours of operation
Max. 55 hours

Weight (housing)
Approx. 250 g

Dimensions
W x H x D 66 x 143 x 37 mm

Display
Colour TFT display, W x H: 45 x 60 mm

Hose connection
S4601, S4610: Ø 8 mm
S4650, S4680: Ø 3 mm (Festo)

Supply voltage
Lithium-ion battery (3.6 V/1.8 Ah)
or USB power supply unit

Approvals
BImSchV, EN 50379-2

Scope of delivery
Measuring instrument with power supply unit, in protective sleeve, with magnet

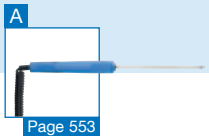
DG: H	Part no.	**Price €**
S4601 (± 150 mbar)	69685	
S4610 (± 1,000 mbar)	69686	
S4650 (± 5,000 mbar)	69687	
S4650 (± 5,000 mbar)*	69688	
S4680 (± 8,000 mbar)*	69689	
Accessories		
Power supply unit	68903	
Connection kit for pressure measuring instruments	69691	

* With Festo connection

Handheld temperature measuring instruments TM7 / TMD7

NEW

- Short response time for measurements at cycles of a second
- Hold function for measured values
- A magnet at the back of the instrument allows for hands-free operation
- Robust protective sleeve to protect against dirt, impact and shock



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Application

For temperature measurement of surfaces, liquids, soft plastic media or in air and gases.

Description

The TM7 / TMD7 electronic thermometers are ergonomically shaped, light-weight, handheld devices. A large, lit LC display allows for simultaneous indication of two measured values (current value, min. or max. value). The instruments feature a hold function, indication of the measured value in °C or °F as well as an automatic segment test during programme start. A magnet is provided at the rear side of the instrument to allow for hands-free operation, e.g. for adjustment work at gas heaters.
In addition to measuring the temperature, TMD7 lets you determine the differential temperature at the press of a key.

Technical specifications

Model	Measuring range	Resolution	Accuracy (% of measured value)
TM7	-50/+1,100 °C	0.1 °C (-50.0/+99.9 °C)	3.0 % ± 2.0 K (-50.0 to 0 °C) 0.5 % ± 0.5 K (0 to 99 °C) 0.5 % ± 0.5 K (100 to 1,100 °C)
		1 °C (100/1,100 °C)	
TMD7	-50/+1,100 °C	0.1 °C (-50.0/+99.9 °C)	3.0 % ± 2.0 K (-50.0 to 0 °C) 0.5 % ± 0.5 K (0 to 99.9 °C) 0.5 % ± 0.5 K (100 to 1,100 °C)
		1 °C (100/1,100 °C)	

Operating temperature range
Ambient: 0/+50 °C
Storage: -10/+50 °C

Hours of operation
Max. 100 hours

Weight
Approx. 250 g

Dimensions
W x H x D 66 x 143 x 37 mm

Display
LCD, transflective
W x H: 46 x 48 mm

Probe connection
TM7: 1 x socket for thermocouple
TMD7: 2 x socket for thermocouple

Supply voltage
2 x 1.5 V Mignon (AA) batteries

Approvals
BImSchV, EN 50379-2

Scope of delivery
Measuring instrument with batteries, in protective sleeve with magnet

DG: H	Part no.	Price €
TM7	**70056**	
TMD7	**70057**	
Accessories		
HT probe 700 mm	69853	
HT probe 1,000 mm	69854	
Spike probe	**69868**	
Air, gas, liquid probe	**69867**	
Surface probe	**69866**	
Clamp probe	**69011**	

i
See page 553 for temperature probes and other accessories.

Handheld temperature measuring instruments TM6 / TM8-IR

TM6

Application

For temperature measurement of surfaces, liquids, soft plastic media or in air and gases.

Description

Handy, robust electronic thermometer with intuitive operation. The instrument features a min./max. and hold function and a memory for 19 measured values. In addition, it is possible to correct measured values, for example to compensate for probe tolerances (1 point cal function). Short response time for measurements at cycles of a second. With standard connector for all NiCr-Ni probes (type K).

Technical specifications

Measuring range
-99.9/+1,370 °C

Resolution
0.1 °C from -99.9/+299.9 °C

Accuracy
± 0.5 °C ± 1 digit

Operating temperature range
Ambient/storage: 0/+50 °C

Hours of operation
200 hours

Weight
240 g

Dimensions
W x H x D 65 x 130 x 25 mm

Display
LCD, 1 line
W x H: 42 x 21 mm

Supply voltage
2 x 1.5 V AA batteries

DG: H	Part no.	Price €
TM6	**70038**	

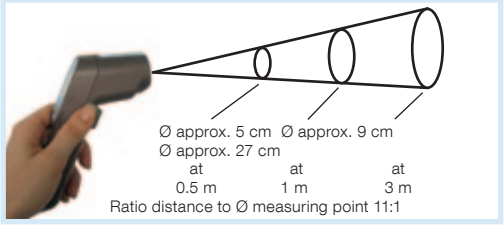
TM8-IR

Application

For temperature measurements of surfaces and for measurements of moving parts (e.g. paper reels, tyres) or live parts (e.g. electrical assemblies, transformers). Ideal for applications in the food industry.

Description

Non-contact infrared thermometer with laser aim and large, backlit LC display. Hold function for measured values. TM8-IR excels with an extremely short response time (< 1 s). Scope of delivery includes robust protective pocket to protect against dirt. An optional NiCr-Ni thermocouple can be connected.



Measuring range
Infrared: -33/+500 °C
Thermocouple: -64/+1,400 °C

Accuracy
Infrared: ± 2 °C
Thermocouple: ± 1 °C

Operating temperature range
Ambient: 0/50 °C
Storage: -20 °C/+65 °C

Hours of operation
140 hours

Weight
180 g

Dimensions
W x H x D 39 x 175 x 80 mm

Display
LCD, W x H: 25 x 24 mm

Supply voltage
2 x 1.5 V AAA batteries

DG: H	Part no.	Price €
TM8-IR	**70039**	

i
See page 553 for temperature probes.

Handheld measuring instruments for temperature and moisture TM9-IR / MFM10

NEW

NEW

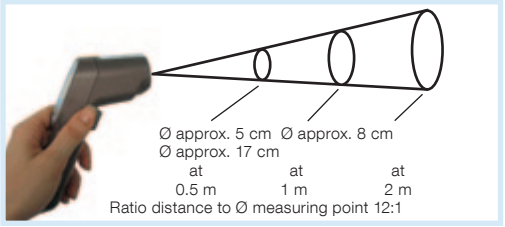
Temperature/humidity measuring instrument TM9-IR

Application

For measuring temperature and humidity in rooms. Ideal for measuring climatic conditions in rooms, detecting thermal bridges and insulation damage as well as protecting against mould in indoor walls.

Description

Non-contact infrared thermometer with humidity sensor, laser aim and large, backlit LC display. Hold function for measured values. TM9-IR excels with an extremely short response time (< 1 s). Scope of delivery includes robust protective pocket to protect against dirt.



Technical specifications

Measuring range thermocouple
-60/+500 °C

Measuring range humidity
0/100 % rH

Resolution
0.1 °C from -9.9/199.9 °C

Accuracy
± 1 °C

Operating temperature range
Ambient/storage: 0/50 °C

Hours of operation
140 hours

Weight
400 g

Dimensions
W x H x D: 46 x 143 x 184 mm

Display
LCD, W x H: 26 x 24 mm

Supply voltage
2 x 1.5 V AAA batteries

DG: H	Part no.	Price €
TM9-IR	**70037**	

Moisture measuring instrument MFM10

For fast measurement of the moisture content of sawn timber, firewood or construction materials (such as plaster, mortar).

Compact, robust measuring instrument with LC display. Measured values are shown via bar charts. Separate measuring scales for construction materials and wood. With automatic instrument check during programme start.

Measuring range wood
6/44 % rH

Measuring range construction materials
0.2/2 % rH

Operating temperature range
Ambient/storage: 0/40 °C

Weight
100 g

Dimensions
W x H x D 130 x 40 x 21 mm

Display
LCD, W x H: 20 x 67 mm

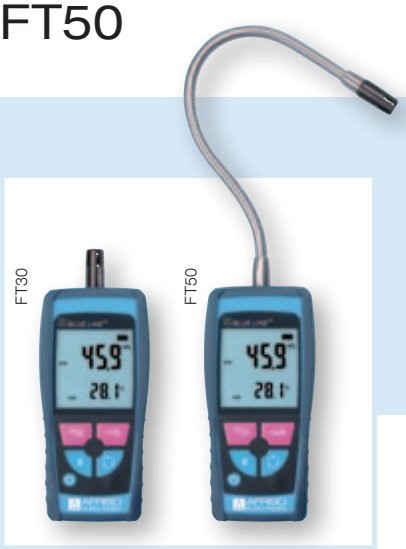
Supply voltage
3 x CR2032 coin cell

Scope of delivery
Measuring instrument with clip and batteries

DG: H	Part no.	Price €
MFM10	**70051**	

Humidity and air temperature measuring instruments Series FT30–FT50

- High accuracy
- Hold function for measured values
- Various probe versions
- Robust protective sleeve to protect against dirt, impact and shock



Application

Ideal for facility management companies, real estate experts and energy consultants to quickly check climatic conditions in rooms. For temperature and relative humidity measurements.

Description

Digital display humidity and temperature measuring instruments with electronic sensor system. With four-digit LC display for temperature, dew point and relative humidity (%). The instruments feature a min./max. and hold function. Measured values can be displayed in °C or °F. The different types of probes are permanently connected to the instruments.
FT30: probe on measuring instrument housing
FT40: probe with flexible spiral cable
FT50: sensor fitted to 30 cm long flexible probe

Technical specifications

Measuring range temperature
-40/+80 °C

Measuring range humidity
0/100 % rH

Measuring range dew point (calculated)
-40/+120 °C

Operating temperature range
Ambient: 0/40 °C

Hours of operation
Max. 100 hours

Weight (with battery)
210 g/250 g (depending on version)

Dimensions
W x H x D 70 x 125 x 34 mm

Display
LCD, transflective
W x H: 46 x 48 mm

Supply voltage
2 x 1.5 V AA batteries

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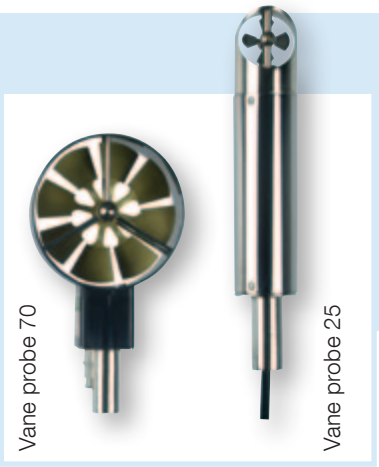
DG: H	Part no.	Price €
FT30	**70052**	
FT40	**70053**	
FT50	**70054**	

Air speed measuring instrument LGM 1

- High accuracy
- Minimum and maximum values can be stored
- Unit and measuring time can be switched (0.01 m/s to 1 ft/min or 2 s to 16 s)
- The current and mean values can be displayed for both measuring periods



Application

For setting the air speed of air conditioning systems and fans and for measurements in ventilation and exhaust ducts.

Description

Anemometer with LC display and microprocessor for connection to vane probes.

Technical specifications

Measuring range probe Ø 70 mm
0.20/40 m/s

Measuring range probe Ø 25 mm
0.30/35 m/s

Resolution
0.01 MPS

Accuracy (% of measured value)
1.0 ± 1 digit

Operating temperature range
Probe: -30/+100 °C
Ambient/storage: 0/50 °C

Hours of operation
Approx. 40 hours

Weight (with battery)
0.15 kg

Dimensions
W x H x D 60 x 125 x 36 mm

Display
LCD, 13 mm
W x H: 44 x 18 mm

Supply voltage
Battery 9 V IEC 6 LR 61

Scope of delivery
Measuring instrument, vane probe 25 or 70 (please specify desired vane probe when ordering), extension rod, connection cable and case.

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DG: H	Part no.	Price €
Air speed measuring instrument LGM 1 (one vane probe included)	69900	
Spare parts and individual parts		
Vane probe 25	69905	
Vane probe 70	69906	
Kit of accessories	69907	

Gas detectors GSP

Application

Detection of gas leaks (inflammable gases) in gas pipes as well as connection pieces and fittings, gas meters, gas burners and gas tanks.

GSP1

Description

Portable gas detector with luminous band for indication of gas concentration and flexible gas probe for use in locations that are difficult to access. The high-sensitivity sensor is suitable for the detection of a wide range of different inflammable gases such as methane, propane and butane (base calibration for methane); the sensor is protected against contamination for a long service life. When the gas concentration reaches > 1 % by volume, the unit activates an audible alarm. Zero correction can be performed by the press of a button; the alarm threshold is fully adjustable. Automatic switch off after five minutes.

Technical specifications

Measuring range (methane)
0/2,000 ppm

Sensitivity (methane)
20/50 ppm

Operating temperature range
Ambient: +5/+40 °C
Storage: -5/+40 °C

Hours of operation
24 hours

Weight (with battery)
360 g

Dimensions
W x H x D 72 x 130 x 26 mm

Display
Diode chain, 20 diodes

Supply voltage
NiMH battery 5 V/1.6 Ah, external power supply unit

GSP3/GSP3 Flex

Portable gas detector with LEDs for indication of gas concentration, also available with flexible gas probe. The gas sensor is suitable for the detection of all inflammable gases such as methane, propane and butane (base calibration for methane); the sensor is protected against contamination for a long service life. To detect a leak, the sensor is moved over the suspected leak position. The intensity of the escaping gas is indicated by the three LEDs. At the same time, the instrument generates an audible signal whose frequency is proportional to the gas concentration. Automatic switch off after four minutes.

Measuring range (methane)
0/2,000 ppm

Sensitivity (methane)
20/50 ppm

Operating temperature range
Ambient: 5/40 °C
Storage: -5/+40 °C

Hours of operation
10 hours

Weight (with battery)
160 g

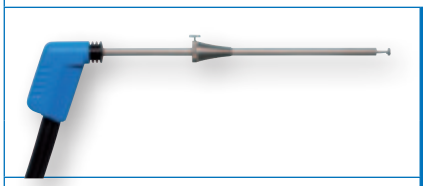
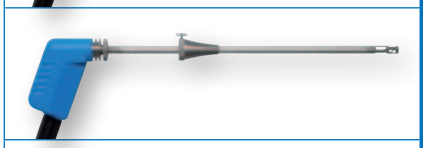
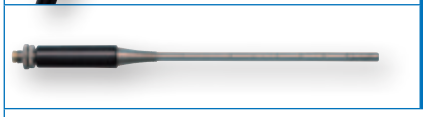
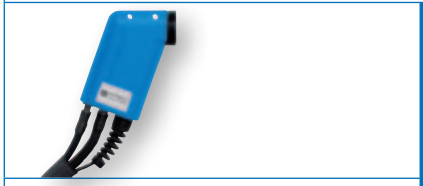
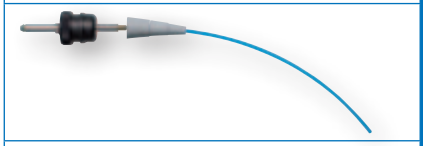
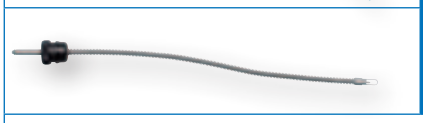
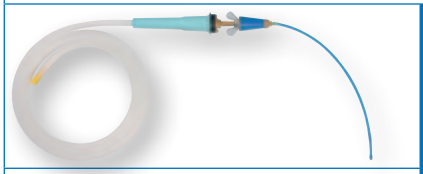
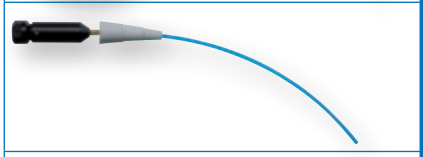
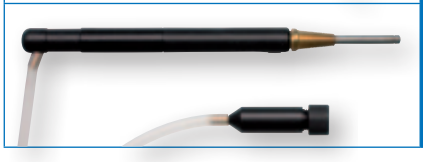
Dimensions
W x H x D 60 x 124 x 30 mm

Display
3 LEDs

Supply voltage
2 x 1.5 V alkaline battery (Mignon, AA)

DG: H	Part no.	Price €
Gas detector GSP1 with flexible probe, battery and charger	**61191**	
Gas detector GSP3	**61194**	
Gas detector GSP3 Flex	**61194F**	
Accessories		
Protective pocket for GSP1	**61196**	
Protective sleeve for GSP1	**69425**	

Probes for EUROLYZER ST / STe and MULTILYZER NG

DG: H		Part	Description	Part no.	Price €
	Individual probes	**Flue gas combination probe standard**	300 mm, without draft connection, without condensate filter cartridge	**69399**	
			170 mm, without draft connection, without condensate filter cartridge	**69482**	
			300 mm, with draft connection, without condensate filter cartridge	**69387**	
		Flue gas combination probe flexible	With draft connection, without condensate filter cartridge	**69122**	
		**Flue gas combination probe exclusive**	With removable plug-on pipe and draft connection, without condensate filter cartridge	**69437**	
		**Multi-hole probe** can be plugged onto flue gas probe exclusive	Length-adjustable from 0–190 mm, without condensate filter cartridge	**69422**	
	Modular probe system	**Base handle for inter-changeable probes**	With compensation line and draft connection, without condensate filter cartridge	**70072**	
		Interchangeable probe suitable for base handle	100 mm, Ø 8 mm	**70084**	
			180 mm, Ø 8 mm	**70073**	
			300 mm, Ø 8 mm	**70074**	
			500 mm, Ø 8 mm	70075	
			750 mm, Ø 8 mm	70076	
			1,000 mm, Ø 8 mm	70077	
			1,500 mm, Ø 8 mm	70078	
		Multi-hole probe suitable for base handle	Length-adjustable 60–170 mm, Ø 8 mm	**70080**	
		**Annular gap probe**	For measuring CO and O_2 concentrations in the annular gap of double-walled chimneys of gas furnaces	**70083**	
		**Flexible probe**	400 mm, Ø 9 mm	**70079**	
	Universal plug-in units	**Annular gap probe**	2 m hose length with connection piece	**69392**	
		**Annular gap probe**	Universal, can be plugged onto all flue gas probes	**70082**	
		**Multi-hole probe** with connection fitting	Length-adjustable 60–250 mm, without condensate filter cartridge	**69580A**	

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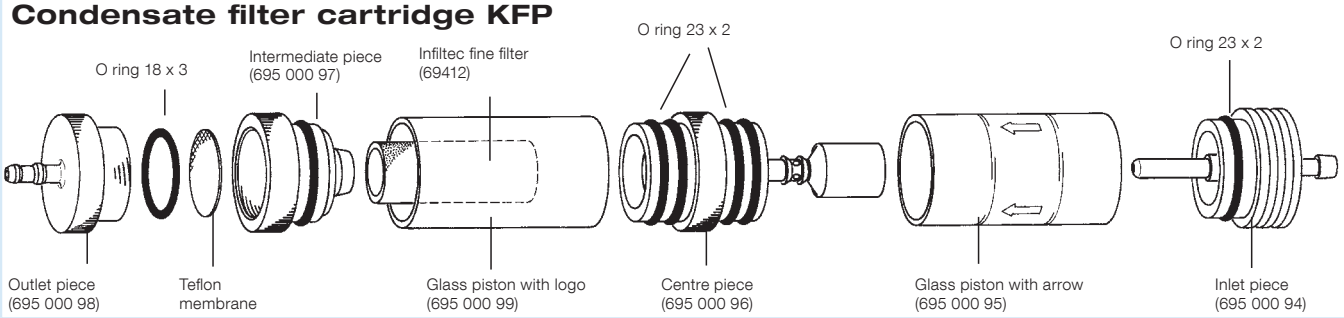
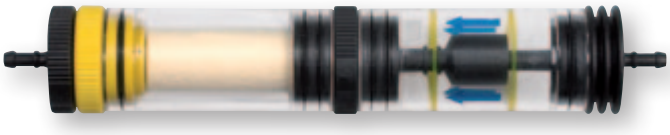
Accessories and spare parts for EUROLYZER ST / STe and MULTILYZER NG

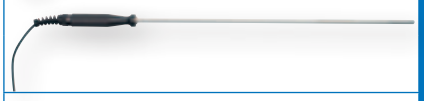
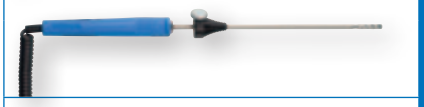
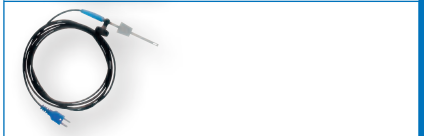
Condensate filter cartridge KFP





DG: H	Part no.	Price €
Condensate filter cartridge KFP	69411	
Infiltec fine filter (5 pieces)	69412	
Assortment of O rings, sorted	69427	

DG: H	Part no.	Price €
Inlet piece	695 000 94	
Glass piston with arrow	695 000 95	
Centre piece	695 000 96	
Intermediate piece	695 000 97	
Outlet piece	695 000 98	
Glass piston with logo	695 000 99	
Teflon membrane (10 pieces)	69206	

DG: H		Part	Description	Part no.	Price €
	Temperature probe	**Spike probe**	Also suitable for temperature measuring instruments TM	69868	
		Air, gas, liquid probe	Also suitable for temperature measuring instruments TM	69867	
		Surface probe	Also suitable for temperature measuring instruments TM	69866	
		**HT probe**	700 mm, also suitable for temperature measuring instruments TM	69853	
		HT probe	1,000 mm, also suitable for temperature measuring instruments TM	69854	
		**Combustion air probe**	200 mm	69428	
			290 mm	69460	
		Combustion air probe	With magnetic holder	69404	
		**Combustion air probe**	With magnetic holder and rubber cone	69358	
		Ambient air probe	"Stub probe" design	69359	
		Clamp probe		69011	

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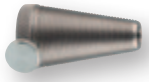
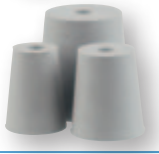
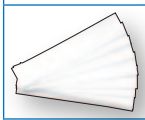
Due to the standardised interfaces, all AFRISO temperature probes can be used with all BlueLine devices:

- EUROLYZER ST Page 532
- EUROLYZER STe Page 534
- MULTILYZER NG Page 536
- MAXILYZER NG Page 538
- MAXILYZER NG Plus Page 540
- TM7/TMD7 Page 546

Accessories and spare parts for EUROLYZER ST / STe and MULTILYZER NG

DG: H		Part	Description	Part no.	Price €
	Cones for probes	**Clamping cone**	Stainless steel, hole Ø 8.8 mm, suitable for EP-Check	**68979**	
		Clamping cone	Stainless steel, hole Ø 8.0 mm, suitable for flue gas probe	**68978**	
		**Clamping cone**	Stainless steel, hole Ø 6.0 mm, suitable for combustion air probe	**68977**	
		Clamping cone	Teflon, hole Ø 8.0 mm, suitable for flue gas probe	**68980**	
		Clamping cone	PDM, hole Ø 5.0 mm, suitable for combustion air probe	**68986**	
		**Rubber cones**	3 pieces, Ø 5.0 mm, suitable for combustion air probe	**68981**	

DG: H	Part	Description	Part no.	Price €
	Aluminium case		**69032**	
	Aluminium case professional	Robust system case with 3 drawers and convenient tool holders for probes	**69030**	
	Thermal printer EUROprinter		**69480**	
	Printer paper for EUROprinter	5 rolls	**69481**	
	Printer paper for EUROprinter	Self-adhesive, 1 roll	**69033**	
	Printer paper for HP printer	5 rolls	**69421**	
	Soot pump	With soot comparison scale and filter paper	**69581**	
	**Filter paper for soot pumps**	200 pieces	**68400**	
	Soot comparison scale		**68300**	
	Plugs for measurement holes (adhesive label)	10 pieces	**61099**	
	Software Eurosoft		**69391**	
	Hose kit 4 Pa test		**68982**	

Pressure test set AS-2, instrument for volume flow/temperature measurement

FLOWTEMP

Application

For checking and adjusting water heaters.

Description

The volume flow measuring range is selected by means of a disc with different holes. FLOWTEMP is held under an open water tap and indicates the water temperature reached at the corresponding flow rate.

Technical specifications

Measuring ranges
1.6/4 l/min
4/8 l/min
8/16 l/min

Scope of delivery
Instrument with robust plastic enclosure to protect against dirt, impact and shock.

Pressure test set AS-2

For tightness tests of pipes, fittings and small tanks. Preferably for load tests of gas lines. Also suitable for checking pressure switches and performing safety tests on pressure monitors as well as general pressure, vacuum and differential pressure measurements.

The pressure test set consists of a pluggable pressure test valve with quick-action coupling, hose fitting with conical test plugs 12–21 mm and 18–34 mm as well as a ball type pump. AS-2 can be combined with all AFRISO series S2600 and S4600 pressure measuring instruments, depending on the requested pressure range. Measured data can be quickly and easily documented with the EUROprinter thermal printer via the infrared interface of the S4600.

Pressure test valve with quick-action coupling. Suitable for all BlueLine series pressure measuring instrument.

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See page 544 for suitable pressure measuring instruments for AS-2.

Thermal printer EUROprinter see page 554.

DG: H	Part no.	Price €
Measuring instrument for volume flow and temperature FLOWTEMP	69790	
Pressure test set AS-2 in aluminium case, without pressure measuring instrument	39590	
Pressure test valve	69692	

Leak test sets DPK

- Tightness tests of pipe installations for municipal gas, grid gas and natural gas according to the "pressure measurement method" with air: B 3
- Tightness test according to the visual inspection method with air: A 3
- Pressure tests of pipes according to DVGW-TRGI (DVGW worksheet G 600)

TRGI 2008 distinguishes between the following with regard to tests of pipe systems:

a) with operating pressures up to 100 mbar.

b) Pipes with operating pressures of 100 mbar to 1 bar.

a) Tests of pipes with operating pressures up to 100 mbar.

1. Load test of newly installed pipes without fittings or with fittings if the nominal pressure rating of such fittings is at least as high as the test pressure. Pipe openings must be closed with metallic components; connection of gas-carrying pipes is not permitted.
Test pressure: 1 bar–10 min.
Suitable leak testers: DPK 60, DPK 60-2

2. The tightness test of all pipes including fittings, but without gas devices and the corresponding control and safety equipment.
Test pressure: 150 mbar–10, 20, 30 min.
Suitable leak tester: DPK 60-2 with pressure measuring instrument S4610 (capable of detecting pressure drops of 0.1 mbar within a measuring range up to 199.9 mbar)

b) Test of pipes with operating pressures of 100 mbar to 1 bar:

The **combined load and tightness test** of the pipes including fittings if the normal pressure rating is at least as high as the test pressure; however, without pressure controllers, gas meters, gas devices and the corresponding control and safety equipment.
Pipe openings must be closed with metallic components; connection of gas-carrying pipes is not permitted.
Test pressure: 3 bar at a maximum pressure increase of 2 bar/min..

Suitable leak tester: DPK 60-2 with pressure measuring instrument S4610 and a recorder.

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Additional application areas

1. The **main test** or the **combined load and tightness test** of pipes (before gas is admitted) which are out of service or shut down, and the **pressure test** which are used to prove that openings of pipes are correctly sealed (generated pressure is maintained for a short period of time).

2. **Tightness tests** according to the **visual inspection method with air**: A 3 with foam producing solutions according to EN 14291:
- Connections and transition points
- Shut-off fittings
- Pressure controllers
- Gas meters, gas devices
- Connection pipes for devices and fittings
- Seals and test ports under consideration of the nominal pressure ratings shown on the nameplates of these devices; the test pressure should not exceed these nominal pressure ratings.

3. **Pressure tests** of **gas supply pipes and installations** on the basis of the visual inspection method with air A 3 and the pressure measurement method with air B 3 according to DVGW worksheet G 469 and in accordance with the regulations stipulated by DVGW sheets G 459, 461/I, 462/I and 472.

Leak test sets DPK

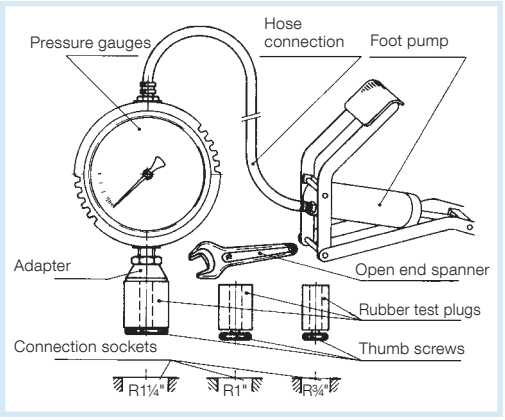
DPK 60

Application

For pressure tests as per DVGW worksheet G600. For load tests of pipes without fittings up to 100 mbar.

Description

Leak test set in sturdy wooden case, consisting of:
- Leak test pressure gauge Ø 100 mm with shock protection, measuring range 0/1.5 bar with expanded initial graduation (up to 200 mbar), with zero correction.
- Leak test seal system directly fitted to pressure gauge, with 3 plugs (nominal diameter 20, 25, 32 mm).
- Foot-operated pump with check valve, capacity per stroke approx. 200 cm³
- Connecting hose 2.5 m
- Spanner size SW 19



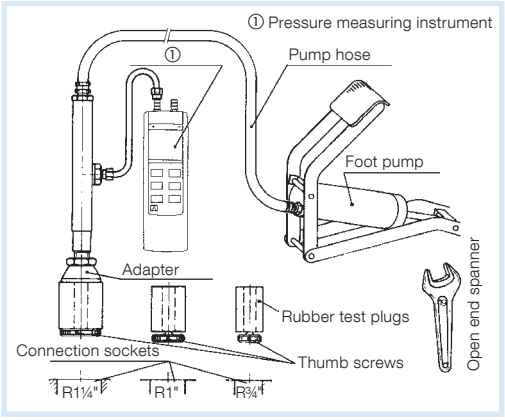
DPK 60-2

Application

Particularly suitable for pressure tests according to DVGW worksheet G 600. For load and tightness tests of pipes with operating pressures from 100 mbar to 1 bar.

Description

Leak test set in sturdy wooden case, consisting of:
- Electronic pressure measuring instrument S4610 with measuring range ± 150 mbar, resolution 0.1 mbar, pressure range up to 199.9 mbar
- Leak test seal system with 3 plugs (nominal diameter 20, 25, 32 mm).
- Foot-operated pump with check valve, capacity per stroke approx. 200 cm³
- 2 connecting hoses 2.5 m
- Open end spanner



DG: H	Part no.	Price €
DPK 60	**39600**	
DPK 60-2	**39603**	
Spare parts/accessories		
Pressure gauge for DPK 60	**39601**	
Upgrade kit DPK 60-2 (S4610, insert, connection piece)	**39608**	
Connection piece for DPK 60-2	**39604**	
Pressure test valve with quick-action coupling	**69692**	

Leak test sets DPK

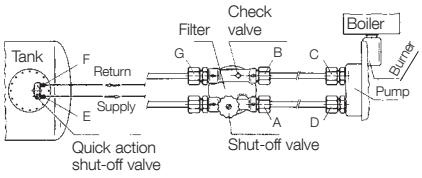
DPK 61

Application

Particularly suitable for pressure tests of fuel oil pipes.

Description

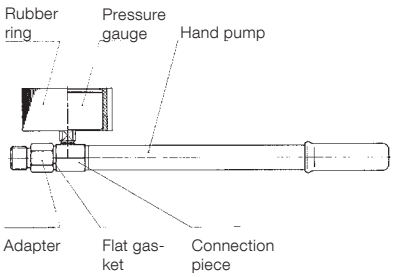
Leak test set in sturdy wooden case, consisting of:
- Leak test pressure gauge Ø 100 mm with shock protection, measuring range 0/6 bar.
- Foot-operated pump with check valve, capacity per stroke approx. 200 cm³
- Connecting hose 2.5 m
- Spanner size SW 19
- Various adapters



DPK 54

Particularly suitable for pressure tests of pipes of liquid gas installations or for tightness tests with air according to the pressure measuring principle of the visual inspection method.

Leak test set in sturdy wooden case, consisting of:
- Leak test pressure gauge Ø 63 mm with shock protection, measuring range 0/2 bar with expanded initial graduation (up to 250 mbar), with zero correction.
- Connection piece
- Hand pump
- Various adapters



DG: H	Part no.	Price €
DPK 61	**39610**	
DPK 54	**39540**	
Spare pressure gauges		
Pressure gauge for DPK 61	**39611**	
Pressure gauge for DPK 54	**39541**	
Connection piece for DPK 54	**37303**	

Pressure gauge RF 50 PPS for pump test set

Description

Pressure gauge for checking the pressure and suction capacity at oil burner pumps. Preferably in conjunction with standard pump test valve with G1/8.

Technical specifications

RF 50 PPS D 101 – without glycerine filling

Housing diameter
50 mm

Connection
G1/8B bottom without sealing plug

Housing
Plastic

Window
Plastic

Accuracy class (EN 837-1/6)
1.6

RF 50 PPS D 601 – with glycerine filling

Housing diameter
50 mm

Connection
G1/8B bottom without sealing plug

Housing
Plastic with crimped bezel

Window
Plastic

Accuracy class (EN 837-1/6)
1.6

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DG: M	Range	Part no.	Price €
RF 50 PPS D 101 – without glycerine filling	-1/0 bar	**63991**	
RF 50 PPS D 101 – without glycerine filling	0/25 bar	**63995**	
RF 50 PPS D 601 – with glycerine filling	-1/0 bar	**67165**	
RF 50 PPS D 601 – with glycerine filling	0/25 bar	**67166**	

Test and refill sets PNG

	PNG-1/ PNG-3	PNG-2	Liquid for vessels
Application	For testing and adjusting the pressure cushion of diaphragm expansion vessels of heating systems and oil supply systems.	For testing and adjusting the pressure cushion of diaphragm expansion vessels of heating and oil supply systems, specially for systems with test valves which are not easily accessible.	Refill cylinder for increasing the pressure cushion in expansion vessels.
Description	The test and refill set consisting of a 60 cm long, flexible filling hose with union nut Vg8 for the test valve at the expansion vessel and a ball valve with 7/16-28 UNEF thread for refill cylinder and a test pressure gauge Ø 40 mm. The refill cylinder is not included.	Test and refill set consisting of a rigid, 200 mm long test lance with test head for pressing against the test valve of the expansion vessel and a ball valve with 7/16-28 UNEF thread for refill cylinder and a test pressure gauge Ø 40 mm, 0/4 bar. During testing and refilling, the fitting is pressed against the test valve.	Cylinder for PNG-1, PNG-2 and PNG-3. With corrosion protection component, not inflammable.
Technical specifications	**Ranges** PNG-1: 0/4 bar PNG-3: 0/10 bar **Accuracy class** 1.6	**Ranges** 0/4 bar **Accuracy class** 1.6 **Scope of delivery** PNG-2 including refill cylinder and plastic case	**Connection thread** 7/16-28 UNEF **Contents** 400 ml

DG: H	Part no.	Price €
Test and refill set PNG-1, 0/4 bar	39616	
Test and refill set PNG-3, 0/10 bar	39637	
Refill cylinder, 400 ml	39633	
Test and refill set PNG-2	39634	
Spare case of PNG-2	39635	

Testers PGA/PGW

Test set PGA-4-Set

Application For pressure tests of expansion vessels, tanks and tyres.

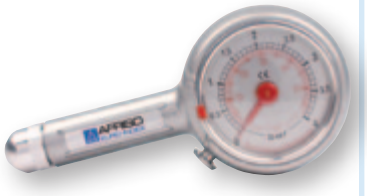
Description Robust, very accurate pressure gauge in aluminium housing with ring for zero correction. Measuring range 0/4 bar. With three adapters for car valves which are also used for expansion vessels. The three adapters (straight, 45°, 90°) allow for usage even if space is limited. Plastic case with insert included in scope of delivery.

Test set PGA-4-Set

Tester PGA

Application For pressure tests of expansion vessels, tanks and tyres.

Description Robust, very accurate pressure gauge in aluminium housing with ring for zero correction. Measuring range 0/4 bar. With 45° adapter for use even if space is limited.



Tester PGA

Tester PGWA-Set

Application For pressure tests of water pipes and expansion vessels.

Description Combination of PGA-4-Set and PGW-10-Set plus rigid connection extension and flexible hose with refilling valve (Vg8) at the side.

Test set PGW-10-Set

Application For pressure tests of water pipes, tanks and tyres.

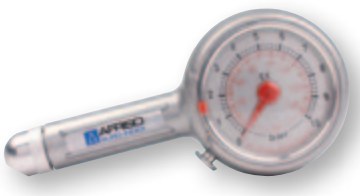
Description Robust, very accurate pressure gauge in aluminium housing with ring for zero correction. Measuring range 0/10 bar. With adaptor for hose tap ½" (thread G¾), aerator M 24 x 1 female thread and M 22 x 1 male thread. Scope of delivery includes plastic case with insert and a connector piece for car valves.

Test set PGW-10-Set

Tester PGW

Application For measruing the tyre pressure.

Description Robust pressure gauge in aluminium housing with ring for zero correction. Measuring range 0/10 bar, with adapter for car valves. Also suitable for testing water pressure when used in conjunction with adapters from PGW-10-Set.



Tester PGW

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DG: H	Part no.	Price €
Test set PGW-10-Set	**39617**	
Tester PGW, 0/10 bar	**39618**	
Test set PGA-4-Set	**39614**	
Tester PGA, 0/4 bar	**39615**	
Test device set PGWA-Set	**39619**	

Testers for tank servicing

Handheld pressure/vacuum measuring instrument S2610 (DMG 15)

Application

For measuring pressure, vacuum and differential pressure. For non-corrosive gaseous, dry media. Ideal for checking the pump capacity, switching and alarm points of vacuum type and pressure type leak detectors as well the tightness of the tank installation.

Description

Ergonomically designed hand-held measuring instrument with a large, lit LC display for simultaneous indication of two measured values. Measured values are displayed in mbar, Pa, hPa, kPa, mmHg, inHg and psi. With manual and automatic zero correction, automatic instrument check as well as min./max. function. Hold function for short-term freezing of measured value. Scope of delivery includes robust protective sleeve with magnet at the back of the device for hands-free operation as well as 2 hoses (Ø 8 mm) and adapters for Eurovac/Europress.

Technical specifications

Measuring range
-50/+1,000 mbar

Overpressure
Max. 3 bar

Hours of operation
Max. 100 hours

Dimensions
W x H x D 66 x 143 x 37 mm

Supply voltage
2 x 1.5 V Mignon (AA) batteries

Approvals
EN 50379-2

Scope of delivery
Instrument with batteries, in protective sleeve with magnet, hose kit, adapters for Eurovac/Europress

Condensate water tester KWT 5

Condensate water tester for checking fuel oil and diesel fuel tanks.

Battery-operated tester based on conductivity principle. The probe is lowered to the floor of the tank. The presence of condensate water is indicated by a lamp. When the probe is raised, the lamp is switched off when the probe reaches the water/oil interface. This allows the exact condensate water level to be determined.

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See page 544 for additional technical information on S2610 (DMG 15).

DG: H	Part no.	Price €
Pressure measuring instrument S2610 (DMG 15)	69683	
Condensate water tester KWT 5	44010	

AFRISO EURO-INDEX

Level sensor testers GPR/ME

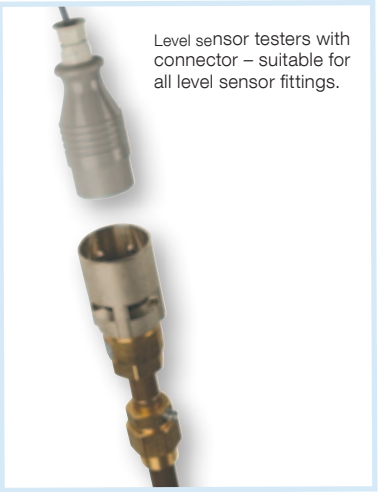
GPR 4

Application

For use with storage tanks for fuel oils and diesel fuels. Not permitted for use in hazardous areas and not for level sensors which are installed in tanks containing hazardous media.

Description

Simple level sensor tester with connector, suitable for all level sensor fittings. A signal lamp indicates function or error. Battery-operated. Delivery with level sensor connection fitting, also suitable for level sensor with brass fitting.



Level sensor testers with connector – suitable for all level sensor fittings.

ME 5/ ME 5 P

For genuine function checks of all level sensors approved as per EN 13616 (TRbF 511/512). For use with storage tanks for fuel oils and diesel fuels; also permitted for use in hazardous areas and for level sensors which are installed in tanks containing hazardous media (zone 0).

EX-approved level sensor tester with intrinsically safe level sensor power circuit. The characteristic of the PTC thermistor is fully checked via a microprocessor program. Test instructions as well as the test result are alphanumerically displayed. Version with connector, suitable for all level sensor fittings. Battery-operated.

Version ME 5 P with additional product ID.

EC Type Examination Certificate
TÜV 03 ATEX 2141 Ex II (2) G Ex ia IIB

DG: H	Part no.	Price €
Level sensor tester GPR 4	**62301**	
Level sensor tester ME 5	**62230**	
Level sensor tester ME 5 P	62240	
Accessories		
Carrying case of ME 5	**62231**	
Charger for ME 5	**62232**	

i See page 50 for the complete range of PTC thermistor level sensors.

Emission measurement

Oxygen analysers

Gas treatment systems and gas coolers

Stationary gas analysis

CHAPTER 14

Stationary gas analysers

STATIONARY GAS ANALYSIS

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Universal filters for gas analysis 569

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GAS COOLER

Gas cooler MGK 741 571

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Oxygen analyser Oxystem P 577

Gas analyser BIOLYZER 578

EMISSION DATA ACQUISITION

Emission computer 579

Stationary gas analysis – information on gas concentration measurement

Typical applications:

- Emission measurement
- Combustion processes
- Large combustion systems
- Turbo generator monitoring
- Industrial gas filling
- Incineration
- Crematoria
- Biological systems
- Tunnel monitoring
- Cooling plants
- Fruit and vegetable storage houses
- Purity measurements

Task

The objective of gas concentration measurement is to measure a component of a gas mixture continuously, selectively and quantitatively and to transform the results into electrical, standardised signals. These signals can be processed for logging, control, calculation or analysis purposes. Each gas component is measured on the basis of different chemical/physical or physical measuring principles.

Such measuring principles include:
- **Absorption of infrared radiation** for measuring heteroatomic gases
- **Paramagnetism** for measuring oxygen concentrations
- **Ion conductivity** of solid electrolytes and liquid electrolytes

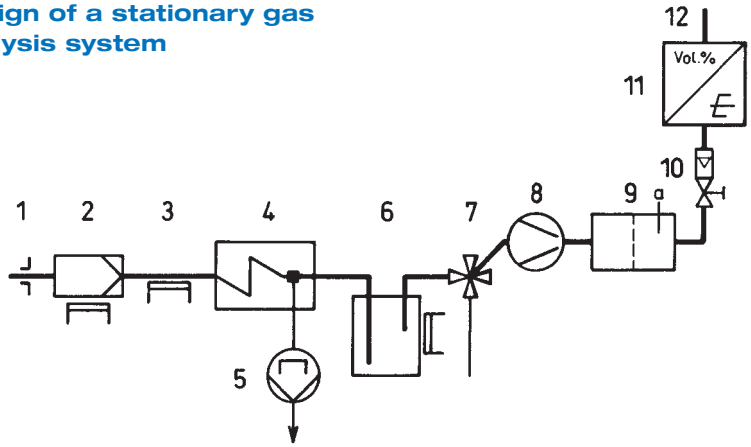
The selectivity of the component to be measured is a key factor in finding a suitable measuring system. Selectivity refers to the specific technical detectability of a certain component in the gas to be measured without it being influenced by other gases.

Application

The analysis of gas mixtures with continuously operating measuring systems is a part of industrial measuring technology. By using continuously operating gas analysers it is possible to recognise tendencies, monitor, control and/or evaluate processes. The technical analysis of gas emissions is prescribed by numerous environmental acts in many countries. For example, in Germany, legislation and directives such as TA-Luft and BImSchG stipulate that certain systems must be equipped with emission measuring facilities. AFRISO supplies tested and approved analysers, turnkey analysis systems and/or auxiliary equipment (such as gas sampling probes, filters, coolers) for such applications; these units make continuous analysis of gas components possible.

Source: Binderholz, Kösching

Design of a stationary gas analysis system



1. Sampling point
2. Gas sampling probe
3. Heated gas line
4. Cooler
5. Condensate separation
6. Filter
7. Changeover valve
8. Gas pump
9. Flow monitoring
10. Flow measurement
11. Analyser
12. Gas outlet

Design features

Due to the varied nature of measuring tasks and gas components, it is imperative to consider the operating conditions and ambient conditions in addition to the selection of the measuring principle and the measuring range. Therefore, the operating conditions (such as pressure, temperature, humidity, dirt/pollution) and the ambient conditions (such as ambient temperature, corrosive environments, shocks, dust concentration) play a key role in the design of a measuring system.

Gas treatment

The accuracy and the reliability of a gas analysis system are determined by the selection of the gas sampling and gas treatment systems. In most cases, the gas sampled for analysis cannot be directly processed by the gas analyser. The performance of the analyser can be adversely affected by high dust concentrations or high humidity, high dew points, excessively high or low pressures, excessively high temperatures as well as other detrimental components.

Therefore, the design of the gas analysis system is a crucial factor determining the viability of the analysis values generated by the analyser. The most important conditions for minimum maintenance and trouble-free operation are the sampling point as well as suitable accessories and their proper arrangement.

Precise and efficient gas analysis therefore requires a targeted design of the entire gas treatment system. Take advantage of AFRISO's many years of experience and competence as a supplier of complete analysis systems for solutions to your measuring problems. AFRISO supplies gas analysis systems:

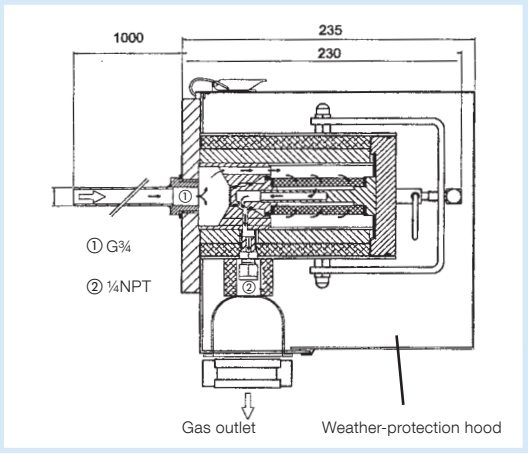
1. Individual system components
2. Completely mounted on panel, wired and with all hoses connected
3. Completely mounted, wired, with all hoses connected, already installed in measuring cabinets
4. As a complete measuring station in a container or built onto a vehicle.

Application example: Emission measurement in biomass combustion plants

Measuring cabinet with two lines for emission measurement in a log wood combustion system for heat and power generation. Pertinent legislation such as the 13th German Federal Immission Act requires continuous monitoring of CO, O_2 and dust limit values. Monitoring of an existing oil fuelled plant was also integrated into the system. Data is acquired, calculated and visualised once a second.

Custom-built systems to your specifications – please enquire.

Stationary gas sampling probe SP 210



- **Low dead volume, short response time**
- **Simple filter replacement**
- **Easy cleaning of filter chamber and sampling pipe**
- **Self-controlling electrical heating system with undertemperature alarm contact**
- **Modular design for optimum adaptation to process requirements**

Application

For stationary, continuous sampling of gases and filtration of particulate matter at the sampling point. Part of the required maintenance of a complete analysis system can thus be focused on the first component in the chain of components; mixtures of particulate matter and coarse dust are filtered to a high degree.

Description

Stationary gas sampling probe with external, electrically heated ceramic filter; with mounting flange and G¾ female thread for sampling pipe or pre-filter. A deep-bed ceramic filter element with a large surface is located in a housing with a low dead volume outside of the sampling space. The filter element is easy to replace; no tools are required and the heated pipe does not need to be dismantled. Heating of the complete filter housing including the mounting flange ensures reliable operation without dew point problems in external areas. The unit is heated to +180 °C by means of self-controlling heating elements. Therefore, heating controllers or thermostats are not required. A thermo switch monitors the sampling probe for undertemperature. Version SP 210-HP with weather protection hood for outdoor applications.

Technical specifications

Operating temperature range
Ambient: -20/+80 °C

Sampling temperature: Max. 600 °C

Sampling pressure: 0.4/2 bar absolute

Dust admission: Max. 1 g/m³

Filter space volume: 100 ml

Filter element
Type F-2K, filter fineness 2 µm, ceramic

Probe heating
+180 °C, self-controlling
Alarm contact: < 160 °C
Switch rating: AC 250 V/ DC 30 V, 3 A (AC/DC)

Connection gas outlet
¼ NPT female with
Swagelok pipe connector Ø 6 x 1 mm

Supply voltage
AC 110 to 240 V, 50/60 Hz

Power input
Starting phase: 400 VA
Operation: 70 VA
Fuse: 6 A

Mounting flange
DN 65 PN 6, type B as per EN 1092
Stainless steel 316 Ti

Wetted parts
Stainless steel 1.4571, FFM, ceramic

Housing
W x H x D: 170 x 220 x 230 mm
Weight: 6.5 kg (SP 210-H)
8.5 kg (SP 210-HW)
Degree of protection: IP 54 (EN 60529)

Options
Stainless steel sampling pipe SP 210/SS (1 m), to be screwed into G¾ thread

DG: E			Part no.	**Price €**
Gas sampling probe SP 210-H, heated	1	1	68935	
Gas sampling probe SP 210-H/W, heated	1	1	68936	
Accessories				
Stainless steel sampling pipe SP 210/SS Length 1 m (max. 600 °C)	1	1	68940	
Titanium sampling pipe Length 1 m, for highly corrosive gases (max. 600 °C)	1	1	68941	
Kanthal sampling pipe (max. 1300 °C)	1	1	68942	
Pre-filter for dust admission 2–16 g/m3	1	1	68945	
Pre-filter for dust admission >10 g/m3	1	1	68946	
Filter element F-2K	1	1	68950	

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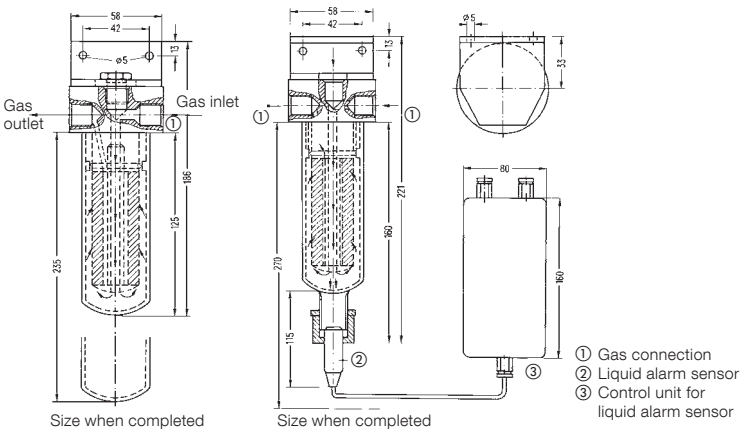
Please enquire for other gas sampling probes and heated gas sampling lines.

Universal filters for gas analysis



- Optimum filtration of particulate matter
- With or without liquid alarm sensors
- Easy, fast wall mounting with brackets

Application

For filtration of solid matter.

Description

Unheated universal filter for optimum filtration performance and removal of extremely small particles with filter elements with high filter fineness. Versions with or without conductivity based liquid alarm sensors. The sensor can detect the breakthrough of liquids (e.g. if a gas dryer is used upstream of the unit). If condensate water breaks through, the stream flow effect directs the drops to the sensor. The control unit of the liquid alarm sensor has a relay output that can be used to activate a pump or a solenoid valve or to signal an alarm. If condensate breaks through, the filter housing acts as a buffer space so that the liquid cannot immediately reach other components. Wall mounting with bracket.

Version FT-3G-H2 as a heated universal filter for inserts which require heating of the entire measuring system for process-related or technical reasons.

Technical specifications

Operating temperature range
Ambient control unit: -5/+55 °C

Gas connections
3 x G¼ female thread
Inlet: Top or side
Outlet: Side

Filter insert
Teflon (PTFE), pore size 2 µm or glass fibres, pore size 0.1 µm

Gas pressure
Max. 5 bar

Filter surface
70 cm²

Dead volume
65 cm³

Switching output
Relay contact: 1 voltage-free changeover contact

Contact rating
AC 250 V, 750 VA
DC 12 V, 1 A

Sensor cable length
1.5 m

Supply voltage
AC 230 V or AC 115 V

Power input
2 VA

Housing
Makrolon
Weight: approx. 0.31 kg (filter)
approx. 0.35 kg (control unit)

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DG: E			Part no.	Price €
Universal filter with filter insert Teflon (PTFE), pore size 2 µm	1	1	68960	
Universal filter type FT-3G-H2 heated to max. 180 °C	1	1	68971	
Suspended washing bottle type FP-W for washing individual components out of the sampled gas.	1	1	68961	
Accessories				
Liquid alarm sensor with control unit	1	1	68965	
Filter insert Teflon, pore size **2 µm**	1	1	68966	
Filter insert glass fibre, pore size 0.1 µm	25	25	68967	
Screw connection G¼ with hose connection	1	1	68970	
Empty cartridge FP-AP Transparent PVC, for adsorption or absorption agents	1	1	68972	

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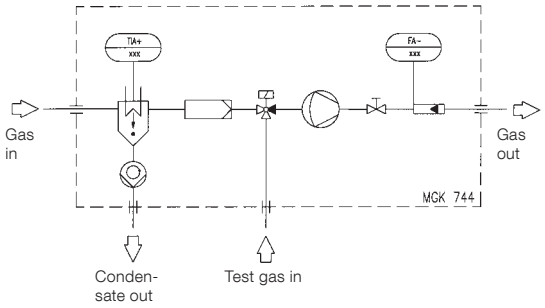
Please enquire for other filters, rotameters, gas pumps, solenoid valves, changeover valves, heated sampling pipes and other gas treatment equipment.

Gas treatment system MGK 744

- **Compact design 1/2 19" rack housing**
- **Can be used as a portable or stationary gas treatment system**

Gas flow chart MGK 744



Application

For gas analysis systems which withdraw a gas sample for the analysis process. Especially for long-term or continuous measurements and measurements involving pollution and/or condensate. Decisive for precise and reproducible measuring results.

Description

Compact, portable and stationary gas treatment system in 1/2 19" rack housing with permanently installed Peltier gas cooler which cools down the gas to be measured to a temperature of +5 °C, irrespective of the sampling temperature or the ambient temperature. With hose pump for automatic condensate removal, gas pump, extra fine particle filter and flow meter with needle valve. The gas treatment system is equipped with a status unit for detecting the operating state of the cooler as well as an additional master switch for the gas pump.

- Gas cooling: To +5 °C with Peltier gas cooler
- Gas filtration: Fine particulate filter
- Gas flow: Flow setting by means of rotameter and needle valve
- Gas transport: Gas pump
- Condensate transport: Condensate removal by means of hose pump

Technical specifications

Operating temperature range
Ambient: +5/+40 °C
Storage: -15/+55 °C

Gas outlet dew point
5 °C

Gas inlet
Max. 40 °C dew point
Max. 80 °C Gas temperature at 50 l/h and 20 °C ambient temperature

Gas flow and filtration
- 60 l/h at 200 mbar
- Fine particulate filter with glass fibre filter 2 µm

Status indication of gas cooler
via LEDs at the front
- Temperature ok
- Cooling active
- Fault

Connection
Hose: 4 x 1 mm compression fitting

Wetted parts
Duran glass, PA, PC, Viton

Supply voltage
AC 230 V/50 Hz, 60 W

Housing
W x H x D: 42 HP x 3 U x 290 mm
Weight: Approx. 4.5 kg
Degree of protection: IP 20 (EN 60529)

Options
- 3/2 solenoid distribution valve (operation via switch on the front side or via digital input)
- Desktop/portable housing ½ 19", 3 U

DG: E	Part no.	**Price €**
Gas treatment system MGK 744	69640	
Options		
Extra charge for 3/2 solenoid distribution valve	69641	
Extra charge for desk-top/portable housing	69642	

Gas cooler MGK 741

- Virtually maintenance-free since there are no moving parts
- Temperature monitoring
- Low dead volume for short analysis times
- Resistant to shocks and vibrations
- Small dimensions and low weight

Mounting position
of gas cooler MGK 741

Application

For dew point reduction of humid gases to help avoid condensation in the analyser. A stable gas outlet dew point avoids water vapour cross sensitivity and volumetric errors.

Description

Peltier gas cooler, low maintenance and self-monitoring. MGK 741 provides optimum cooling of the gas, reduces the wash-out effect to a minimum and separates the condensate. The condensate is automatically discharged by means of an integrated hose pump. The heat exchanger consists of Duran glass and is arranged in a heat-insulated cooling block. The heat is dissipated by means of a fan and cooling fins. LEDs are used to indicate the operating state. High and low temperature alarms are available as general alarms via a relay contact (voltage-free changeover contact). The compact and space-saving design enables easy integration in stationary gas treatment systems.

Technical specifications

Operating temperature range
Ambient: +5/+40 °C
Storage: -15/+55 °C

Heat exchanger
Single-stage Duran glass reverse unit

Gas inlet conditions
Max. 40 °C dew point and max. 120 °C gas temperature at 50 l/h and 20 °C ambient temperature

Status alarm
Voltage-free changeover contact
AC 120 V, 0.5 A, DC 48 V, 1 A

Mounting
Wall mounting

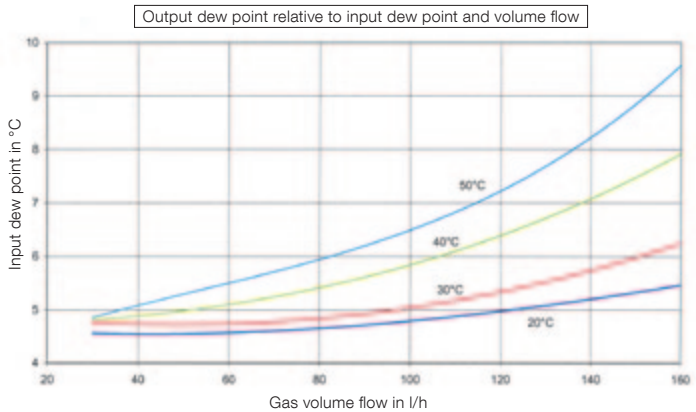
Connection
Hose: 4 x 1 mm, compression fitting

Wetted parts
Duran glass, PVDF, Viton, stainless steel

Supply voltage
AC 230 V, 50 Hz

Housing
W x H x D: 230 x 230 x 95 mm
Weight: Approx. 3.5 kg

Characteristic



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Please enquire for other gas coolers such as compressor type gas coolers.

DG: E	Part no.	**Price €**
Gas cooler MGK 741 with hose pump	69510	

Infrared gas analysers

- **Extremely small measuring ranges**
- **Selective measurement of up to four gas components**
- **Tested components for measurements as per German TA-Luft and 13./17. BImSchV**

Application

- Room air monitoring (CO, CO_2, fluorcarbons)
- Monitoring of activated carbon filters (CO, CO_2)
- Monitoring of inertisation (CO_2, O_2)
- Monitoring of biological processes (CO_2, O_2)
- Measurement of landfill gases (CH_4, CO_2)
- Monitoring of cold stores (O_2, difluorodichloromethane)
- Optimisation of boilers (CO, O_2)

Description

This NDIR unit provides continuous operation and can selectively measure and display the concentrations of up to four different gas components. The NDIR (non-dispersive infrared absorption) measuring principle is based on the absorption of infrared radiation by heteronuclear molecule gases with several atoms. Optimum sensitivity and high selectivity with regard to other components in the measurement gas are achieved by means of opto-pneumatic radiation receivers. An optional electro-chemical sensor makes it possible to additionally measure the O_2 concentration. Measuring range for O_2 up to 25 % by volume. The conventional method with test gas can be used for calibration. If the integrated calibration unit is used, test gas cylinders are not required.

Technical specifications

Supply voltage: AC 230 V

Gas throughput: 20 to 100 l/h

Analogue output: 4–20 mA

Interface: RS 232 C/V.24

Display: 4-digit lit LC display

Setup time: 15 s

Heat-up time: 30 min

Housing
19" rack housing or wall mounting housing
Weight: Approx. 10 kg

Tested
for measurement as per German TA-Luft and 13./17. BImSchV for the following components:

- 0 to 250 mg CO
- 0 to 500 mg SO_2
- 0 to 400 mg NO
- 0 to 10/25 O_2 % by volume

Options
- Wall mounting housing
- Pneumatic unit

DG: E	Part no.	Price €
IR analyser CO	69966	
IR analyser CO_2	69967	
IR analyser NO	69968	
IR analyser SO_2	69969	
IR analyser CO/CO_2	69971	
IR analyser CO/NO	69972	
IR analyser CO/SO_2	69973	
IR analyser NO/SO_2	69974	
IR analyser NO/CO_2	69975	
IR analyser $NO/CO/SO_2$	69976	
Extra charges (option)		
O_2 measurement	69977	
Wall mounting housing	69970	
Calibration unit for 1 IR component	69981	
2 calibration units for 2 IR components	69982	
Pneumatic unit (pump and flow monitoring)	69983	
Second measuring range for single-channel devices	69986	
Second measuring range for multi-channel devices	69987	

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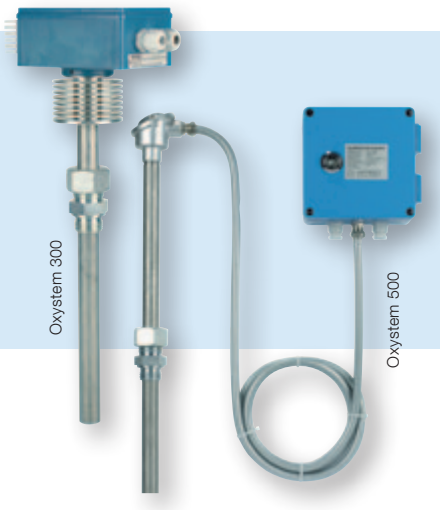
We are continuously extending the range of components and combinations. An AFRISO expert will be pleased to answer any questions you have concerning your application.

Oxygen probe
Oxystem 300/500



- In situ measurement directly in the gas duct
- Compact design
- Fail-safe oxygen sensor
- No gas treatment required
- No test gas for probe calibration required

Application

For monitoring combustion and production processes as well as storage facilities and storage containers which require the oxygen concentration to be measured and/or controlled.

Description

Compact electronic oxygen measuring probe for stationary installation. Consisting of a 300 mm long zirconium dioxide measuring probe with an adjustable screw fitting and control electronics.
Inline oxygen measurement without gas treatment. A reliable dynamic O_2 probe based on ZrO_2 is used to acquire the measured values. The probe is calibrated in atmospheric air. No reference gases are required. Due to the compact dimensions, the probe can be easily installed in the flue gas pipe. The probe provides fast and precise measuring results. Oxystem 300/Compact is suitable for flue gas temperatures of up to 300 °C.

Version Oxystem 500 with separate electronics in wall mounting housing. Control electronics and zirconium dioxide probe are connected by means of a special 2 m long cable.

Technical specifications

Operating temperature range
Medium: Type 300 max. 300 °C
Type 500 max. 450 °C
Ambient: 0/+50 °C

Measuring range
0.3/24.6 % O_2 by volume
corresponding to: 0.12/10 V

Measuring accuracy
±0.1 % O_2 by volume

Sensor operating temperature
700 °C

Probe pipe (V2A)
Ø 25 mm, L = 380 m

Adjustable measuring point
75/300 mm

Supply voltage
Selectable: AC 230 V, 10 VA
AC 110 V, 10 VA

Heat-up time until ready for measurement
5 min

Analogue output
0–10 V

Housing
Type 300: Impact-resistant plastic (ABS)
W x H x D: 104 x 170 x 65 mm
Type 500: Sheet steel, lacquered
W x H x D: 165 x 160 x 90 mm
Weight: 2 kg
Degree of protection: IP 40 (EN 60529)

Options
- Output 4–20 mA

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DG: E	Part no.	Price €
Oxystem 300/Compact	**69549**	
Oxystem 500/Wall mounting	**69560**	
Spare probe Oxystem 300/500, 300 mm long	69556	
Extra charge probe extension by 150 mm	69538	
Extra charge probe extension by 300 mm	69539	
Extra charge probe extension by 450 mm	69540	

Oxygen analyser Oxystem 600

- In situ measurement directly in the gas duct
- Fast response
- Relay output for connection of external equipment
- Easy operation

Application

For monitoring and controlling combustion processes in power plants and other heating systems. Suitable for continuous operation, even under rough ambient conditions.

Description

The analyser consists of a probe and a control unit. The probe is directly immersed into the gas to be measured (in situ). The probe tip should be approximately in the centre of the chimney. The control unit is equipped with a cable (5 m) with a connector which is plugged directly into the probe. The sensor of the flue gas probe is based on the principle of solid electrolytes (zirconium dioxide). The free oxygen ion movement begins at temperatures of more than 500 °C (solid electrolyte potentiometric method). The sensor is heated. The oxygen concentration is calculated from the cell voltage and the temperature according to Nernst's law. The display shows the current oxygen concentration in percent by volume (0/21 % O_2) and the temperature of the measuring cell. 3 relay outputs (2 x limit value, 1 x alarm) as well as 1 analogue output are available. The system can be set to automatic calibration.

Technical specifications

Operating temperature range
Medium: +150/+680 °C
Ambient: -15/+80 °C (probe)
+5/+50 °C (control unit)
-15/+50 °C (power supply unit)

Permissible reference gas throughput
0.5/10 l/h

Permissible gas velocity
< 10 m/s

Supply voltage
AC 42 V (probe)
AC 110–230 V, 50–60 Hz V (control unit)

Power input
160 VA (probe)
20 VA (control unit)

Analogue output
0–20 mA or 4–20 mA
(selectable)

Switching outputs
Relay contacts: 3 voltage-free changeover contacts
Contact rating: 0.5 A

Display
Four-line, alphanumerical LC display (temperature, oxygen concentration % by vol.). Measuring range can be selected as required between 21 % by volume and 1 % by volume O_2 via the software. Operation via keypad and menus.

Housing
W x H x D: 310 x 270 x 220 mm
Weight: 4.5 kg

Dimensions probe
(Ø x L): 51 x (250/400/800/1300/1800) mm
Degree of protection: IP 55 (EN 60529)

Dimensions power supply unit
W x H x D: 260 x 180 x 130 mm
Weight: 7.5 kg

DG: E	Part no.	Price €
Probe 250 mm	69447	
Probe 400 mm	69448	
Probe 800 mm	69449	
Probe 1,300 mm	69450	
Probe 1,800 mm	69451	
Control unit	69453	
2 contacts for limit values	69454	
Wall duct	69455	
Power supply unit for temperatures > 45 °C	69457	

Oxygen analyser Oxystem 1800 High temperature version

- In situ measurement directly in the gas duct
- Fast response
- No gas treatment required
- Easy operation

Application

For monitoring combustion processes and controlling the furnace atmosphere at high temperatures, e.g. in industrial furnaces used in the ceramics or aluminium industry. Measurement directly in the gas with short response times.

Description

The sensor of the probe is based on the principle of solid electrolytes (zirconium dioxide). The free oxygen ion movement begins at temperatures of more than 500 °C (solid electrolyte potentiometric method). The probe is heated by the gas atmosphere, it does not have its own heating. The oxygen concentration is calculated from the cell voltage and the temperature according to Nernst's law. The analyser consists of two components, the probe and the control unit. The probe is mounted horizontally or suspended vertically (at temperatures of more than 1,200 °C). The control unit and the probe are connected by means of a two-wire shielded cable and a shielded temperature compensation lead, type S (Pt/PtRh10). The maximum length is 20 m. Operation via keypad and display. The display shows the current oxygen concentration in % or ppm and the temperature of the measuring cell. The ranges automatically switch from % by volume to ppm and to e xx % O_2 by volume.

Technical specifications

Operating temperature range
Medium: +700/+1,450 °C
Ambient: +5/+50 °C (control units)
-15/+70 °C (probe)

Permissible reference gas throughput
Not required, in special cases 0.5 to 5 l/h

Supply voltage
AC 42 V (probe)
AC 110–230 V, 50–60 Hz (control unit)

Power input
160 VA (probe)
20 VA (control unit)

Analogue output
0–20 mA or 4–20 mA
(selectable)

Switching outputs
Relay contacts: 3 voltage-free changeover contacts
Contact rating: 0.5 A

Display
Four-line, alphanumerical LC display (temperature, oxygen concentration % by vol.). Measuring range can be selected as required between 21 % by volume and 0.1 ppm O_2 via the software. Operation via keypad and menus.

Housing
W x H x D: 310 x 270 x 220 mm
Weight: 4.5 kg

Dimensions probe
(Ø x L): 25 x 600 mm, other lengths on request

Degree of protection: IP 55 (EN 60529)

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DG: E	Part no.	Price €
Measuring probe 600 mm	69562	
Extension to 1 m	69563	
Control unit	69564	
2 contacts for limit values	69454	
Wall duct	69455	
Temperature compensation lead	69565	
2-wire measuring cable	69566	

Oxygen trace analyser Oxystem S

- **Oxygen analyser with largest range possible**
- **Completely self-monitoring**
- **Maintenance-free**
- **Fully automatic operation**

Application

Monitors inert gas atmospheres for absence of oxygen in order to avoid oxidation.
Measurement of residual oxygen concentration in the production of noble gases and nitrogen.
Oxygen measurement without cooling (hot measurement); the system can directly process gas with temperatures of up to 350 °C.

Description

The analyser is designed as a 19" rack housing 3 U, 84 HP. All components are integrated in a single housing. The electronic system is operated via keypad and display. The ranges % by volume, ppm and e xx % by volume O_2 are fully automatically switched over on the display. The menu item "Error status" provides more detailed information on the self-monitoring functions. All status and alarm messages are indicated at the front plate (display with blinking exclamation marks) and output via a voltage-free contact. The sensor is based on the principle of solid electrolytes (zirconium dioxide). The free oxygen ion movement begins at temperatures of more than 500 °C (solid electrolyte potentiometric method).
The sensor is heated. The oxygen concentration is calculated from the cell voltage and the temperature according to Nernst's law.

Technical specifications

Operating temperature range
Medium: +5/+350 °C
Ambient: +5/+45 °C

Permissible reference gas throughput
2/10 l/h

Gas inlet/gas outlet
6 mm Swagelok/4 mm hose connection

Supply voltage
AC 230 V, 50–60 Hz

Power input
40 VA

Analogue output
0–20 mA or 4–20 mA (selectable)

Switching outputs
Relay contacts: 3 voltage-free changeover contacts
Contact rating: 0.5 A

Display
Four-line, alphanumerical LC display (temperature, oxygen concentration % by vol./ppm). Measuring range can be selected as required between 100 % by volume and 0.1 ppm O_2 via the software. Operation via keypad and menus.

Housing
19" rack housing, 3 U
W x H x D: 470 x 134 x 315 mm
Weight: 10 kg
Degree of protection: IP 10 (EN 60529)

DG: E	Part no.	**Price €**
Oxystem S	69551	
Flow meter with needle valve	69552	
Integrated **gas pump**	69553	
2 relays for limit values	69454	
Outlet 6 mm Swagelok	69554	

Oxygen analyser Oxystem P paramagnetic

NEW

- **Proven measuring principle for maximum reliability**
- **Highly resistant to corrosive gases**
- **Self-monitoring**
- **Low maintenance**

Application

For continuous determination of the oxygen concentration in gas mixtures or process gases, e.g. in corrosive process gases in the chemical industry.

Description

The analyser consists of a thermostat-controlled sensor and a control unit in a 19" rack housing, 4 U. The sensor uses the paramagnetism of oxygen and operates on the basis of the thermomagnetic principle. Oxystem is to be operated in conjunction with a gas treatment system. After a heat-up time of 3 hours and horizontal alignment, the analyser is ready for measurements. The analyser is equipped with two contacts for limit values and one contact for system alarms.

Technical specifications

Measuring range
Standard: 0/100 % O_2 by volume
0/21 % O_2 by volume
selectable via the software

Measuring accuracy
± 1.5% of maximum range value – analogue
± 0.1 % O_2 by volume – digital

Operating temperature range
Medium: +5/40 °C
Ambient: +5/45 °C

Supply voltage
AC 230 V, 50/60 Hz, 100 VA

Ready for measurement
Heat-up time: 3 hours

Gas throughput
30/60 l/h

Gas inlet / gas outlet
6 mm Swagelok or 4 mm hose connection

Analogue output
0-20 mA or 4-20 mA (selectable)

Limit values
2 limit values selectable
1 contact for alarms

Display
Four-line, alphanumerical LC display (oxygen concentration % by vol.).

Housing
19" rack housing 4 U
W x H x D: 178 x 470 x 315 mm
Weight 18 kg
Degree of protection: IP 10 (EN 60529)

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DG: E	Part no.	Price €
Oxystem P	69545	
Options		
Corrosion-resistant version, VA/Viton	69541	
Integrated **gas pump**	69542	
Measuring range < 5 % O_2 by volume	69543	
Wall mounting housing (mounting of analyser included)	69544	

Gas analyser BIOLYZER for discontinuous measurement

- For discontinuous measurement
- Ideal for biogas plants
- Monitors up to four gas components
- Compact wall mounting housing system ready for installation

Application

For discontinuous analysis and regular process monitoring of biogenous process gases such as biogas, sewage gas and landfill gas. All important gas types such as methane, hydrogen sulphide, oxygen and carbon dioxide can be monitored.

Description

Gas measuring system for discontinuous, selective measurement and indication of up to four different gas components (CH_4, H_2S, O_2 and CO_2). CH_4 and CO_2 are detected by means of infrared technology, O_2 and H_2S by means of electrochemical sensors. All components are integrated in a robust wall mounting housing. BIOLYZER features an LED display, status indicators for each measurement channel as well as a lit LC display. The memory has a history function, the values can be displayed. With freely adjustable alarm thresholds and binary outputs for: active, error, calibration, alarm. The gas treatment system with all important components (gas cooler with hose pump, fine filter, aerosol filter, rotameter with needle valve, anti-detonation device) is integrated in a robust, air-flushed wall mounting housing. BIOLYZER is delivered complete with wiring, hoses, calibration and ready to be mounted.

BIOLYZER LT is intended for simple routine checks. Version without gas cooler and load limitation for hydrogen sulphide measurements. Therefore, the standard measuring range is 0 to 1,000 ppm H_2S.

Technical specifications

Gas types/measuring ranges

CH_4	0/100 % by vol., IR double beam
CO_2	0/100 % by vol., IR double beam
O_2	0/25 % by vol., electrochemical
H_2S	0/5,000 ppm, electrochemical

Measuring intervals can be programmed for the individual gases. Manual measurement is possible at all times.

Gas treatment
With anti-detonation device, protective filters, 2 pumps, 2 rotameters, needle valves, gas cooler with condensate trap and hose pump.

Display
4-digit LED: status indicators for each channel, 4-line lit LC display, memory with history function, values can be displayed.

Communication
RS 232, analogue output for each gas type, output 4–20 mA, linearised, data memory/history

Operating temperature range
Ambient: +5/+40 °C

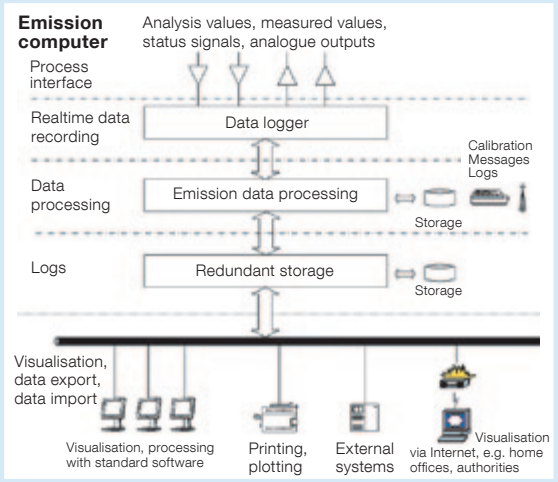
Supply voltage
AC 85–264 V
47–63 Hz

Dimensions
W x H x D: Approx. 300 x 400 x 165 mm

Options
- Profibus
- Second measuring point
- Continuous measurement

DG: E	Part no.	Price €
BIOLYZER for CH_4, H_2S, O_2, CO_2	69643	
BIOLYZER for CH_4, H_2S, O_2	69644	
BIOLYZER for CH_4, H_2S	69645	
BIOLYZER LT for CH_4, H_2S, O_2, CO_2	69646	
BIOLYZER LT for CH_4, H_2S, O_2	69647	
BIOLYZER LT for CH_4, H_2S	69648	
Options (extra charges)		
Profibus	69637	
Second measuring point	69636	
Continuous measurement		

Emission computer



- **Process data acquisition system with data logger for emission measurement**
- **Real-time data processing (cycles of one second)**
- **Redundant storage of data for compliance with official requirements**
- **Design, installation, commissioning and service from a single supplier**

Application

Continuous monitoring, acquisition and visualisation of emission values according to the the pertinent legislation and standards such as the German TA Luft, 13th / 17th / 27th / 30th German Federal Immission Act, harmonised practice concerning emission computers (German Department of the Environment BMU August 2, 2004) and EN 14181.

Description

Modular process data acquisition system. All data (e.g. scaling) is acquired, calculated and visualised in cycles of one second. This is considerably faster than the German statutory requirement of 5 seconds. There are practically no restrictions in terms of the number of channels for analogue and digital acquisition. The software is Java-based so that it can run on different hardware platforms and under various operating systems. Due to the redundant storage of data, it is not necessary to run an additional recorder and to automatically generate hard copies (e.g. classification logs or messages), as stipulated by the authorities.

The data logger records data in real time. It processes analogue and digital input signals as well as analogue and digital output signals. The measuring accuracy can be set to either 12 or 16 bits. The number of measurement channels is practically unlimited. If a single data logger is not sufficient for the task at hand, additional data loggers can be cascaded as required.

i

The emission computer performs the following main tasks:

- Storage of values recorded in single-second cycles
- Calculation of derived values in single-second cycles
- Computation and storage of scaled values and classification data
- Generation of messages
- Generation of digital and analogue output data
- Clock synchronisation according to DCF77 or GPS

The data is processed on a separate computer. The values measured by the data logger are stored every second. These values are scaled to obtain integral values which, in turn, serve as the basis for classifications according to the various legal requirements.

i

Prices on request.

Transducers

Display units and signalling devices

Isolation amplifiers/ Zener barriers

Event reporting systems EMS

CHAPTER 15

Signalling devices/display units/signal processing, monitoring and communication systems

SIGNAL ISOLATION/AMPLIFICATION

Isolation amplifiers TV 22 GL, TV 200 GS 582

Supply isolation amplifiers STV 22 GL 582

Trip amplifier MK 330 GS 583

Selectors MSU 6/12 583

EX safety barriers 787 583

EX supply isolation amplifiers STV 5104 B 584

Multifunctional transducers MFU 585

DISPLAY/CONTROL

Digital plug-in display DA 06 586

Digital display units DA 10/12/14 587

Digital display and control units VarioFox 12/14 589

Horns KH 1, HPW 2 590

Combined alarm light and horn 590

Warning light with rotating reflector 591

Alarm acknowledgement unit AQ 220 591

EVENT REPORTING

AFRISO event reporting systems EMS – overview 592

Event reporting system EMS 220 594

Event reporting system EMS 323 595

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Signal isolation/signal amplification

TV 22 GL

Description

The TV 22 GL isolation amplifier is used for galvanic isolation and amplification of DC current signals (mA). Input and output are galvanically isolated with a high degree of isolation. The integrated high-efficiency electronic power supply unit helps to avoid overheating and allows for high output loads.
The extremely narrow design results in a high packing factor.

Technical specifications

Housing
DIN rail housing
W x H x D: 18 x 78 x 103 mm

Supply voltage
AC/DC 20–253 V

Input
0–20 mA or 4–20 mA

Output
0–20 mA or 4–20 mA
1:1 to input signal

Output load
Max. 400 Ohm

TV 200 GS

The TV 200 GS isolation amplifier is used for galvanic isolation, conversion and amplification of standard output signals (V/mA). Input and output are galvanically isolated with a high degree of isolation. The integrated high-efficiency electronic power supply unit helps to avoid overheating and allows for high output loads. Offset and gain can be set by means of two potentiometers on the front.

Housing
DIN rail housing
W x H x D 23 x 78 x 103 mm

Supply voltage
AC/DC 20–253 V

Input
Part no. 53704: 4–20 mA
Part no. 53705: 0–10 V

Output
Part no. 53704: 0–10 V
Part no. 53705: 4–20 mA

Output load
Max. 500 Ohm current output
Min. 1 kOhm voltage output

STV 22 GL

The STV 22 GL supply isolation amplifier is used for galvanic isolation and amplification of DC current signals (mA). The connected transducer is directly supplied by means of a galvanically isolated and limited supply voltage. Input and output are galvanically isolated with a high degree of isolation. The integrated high-efficiency electronic power supply unit helps to avoid overheating and allows for high output loads.

Housing
DIN rail housing
W x H x D: 18 x 78 x 103 mm

Supply voltage
AC/DC 5–253 V

Sensor supply
DC 24 V open circuit voltage
DC 17 V at 20 mA

Input
0–20 mA or 4–20 mA

Output
0–20 mA or 4–20 mA
1:1 to input signal

Output load
Max. 400 Ohm

15

DG: H	Part no.	Price €
Isolation amplifier TV 22 GL	53701	
Isolation amplifier TW 41 GM (isolator without power supply)	53702	
Isolation amplifier TWH 41 GM (HART-enabled)	53703	
Isolation amplifier TV 200 GS* (input 4–20 mA/output 0–10 V)	53704	
Isolation amplifier TV 200 GS* (input 0–10 V/output 4–20 mA)	53705	
Supply isolation amplifier STV 22 GL	53706	
Supply isolation amplifier STH 22 GL (HART-enabled)	53707	

* Please enquire for other signals.

Trip amplifiers, selectors, Zener barriers

MK 330 GS

Description

The MK 330 GS trip amplifier compares the measurement signal at the input with the values set by means of the coding switches (0–99 %). If the measurement signal exceeds or falls below the set value, the corresponding output relay responds according to the selected function (relay energises or de-energises). The SMK 330 GS trip amplifier with supply also supplies the connected transducer.

Technical specifications

Housing
DIN rail housing
W x H x D 23 x 78 x 103 mm

Supply voltage
AC/DC 5–253 V

Input
0–10 V or (0)4–20 mA

Input resistance
I 50 Ohm/U 400 kOhm

Output
2 relay changeover contacts
250 V, 2 A, 100 VA
Function 2 max, 2 min or
1 max/min

MSU 6/12

Designed for manual operation, MSU 6 allows up to 6 3-wire or 4-wire transducers to be connected to a common control unit (e.g. indicator or recorder), MSU 12 up to 12 2-wire transducers.

Housing
Standard rack housing
W x H x D: 96 x 48 x 134 mm

Panel cut out
W x H: 92 x 45 mm

Degree of protection (front)
IP 40 (EN 60529)

Mechanical service life
>25,000 switching cycles

Input
Voltage < 42 V, current < 2 A

Switch rating (resistive load)
At 1 V/1.5 A (AC/DC)
At 42 V/0.2 A (AC/DC)

Z 787

The Zener barrier limits the amount of energy transferred from the non-hazardous area to the hazardous area. It is used for evaluation of up to 2 signals from the hazardous area.
No separate supply voltage required.

Housing
DIN rail housing
W x H x D: 12.5 x 115 x 110 mm

Supply voltage
Max. 28 V DC

Fuse rating
50 mA

Connection
2-channel
DC version
Positive polarity

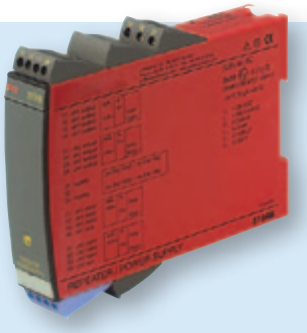
Current circuits (max. data)
U_0 28 V
I_0 93 mA
P_0 650 mW

Operating temperature range
-20/+60 °C

EC Type Examination Certificate
BAS 01 ATEX 7005
Ex II (1) GD [Ex ia] II C

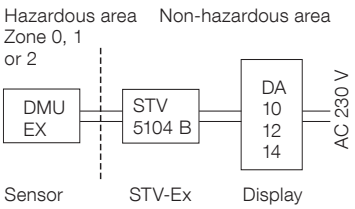
DG: H	Part no.	Price €
Trip amplifier MK 330 GS	53708	
Trip amplifier with power supply SMK 330 GS	53709	
Selector MSU 6	53710	
Selector MSU 12	53711	
Zener barrier Z 787	**31296**	

EX supply isolation amplifier STV 5104 B



- Single- or dual-channel version
- 2-wire supply
- > 18 V at 20 mA
- 20 programmable measuring ranges
- Universal AC or DC supply

Connection diagram



Description

STV 5104 B is used to supply, galvanically isolate and amplify 2-wire and 3-wire transducers in hazardous areas. Input and output are galvanically isolated with a high degree of isolation.

Technical specifications

Housing
DIN rail housing
W x H x D: 23.5 x 109 x 130 mm

Degree of protection
IP 20 (EN 60529)

Supply voltage
AC/DC 21.6–253 V

Power input
≤ 3 W

Sensor supply
DC 18–28 V
(> 18 V at 20 mA)

Input
0(4)–20 mA (min. 16 mA)
0–10 V (min. 8 V)

Output
0(4)–20 mA (min. 16 mA)
0–10 V (min. 8 V)
Configurable as required

Accuracy
≤ 0.1 % FS

Temperature coefficient
≤ 0.01 % FS/°C

Response time
< 25 ms

Operating temperature range
Ambient: -20/+60 °C

Calibration temperature
20–28 °C

EX data

U_m	≤ 250 V
U_0	28 V DC
I_0	93 mA DC
P_0	≤ 0.65 W
L_0	≤ 3 mH
C_0	≤ 0.08 µF

EX approvals
DEMKO 99 ATEX 126013 [Ex ia] II C
ATEX II (1) G D
Applied to zone 0, 1 or 2 or 20, 21 or 22

Compliance

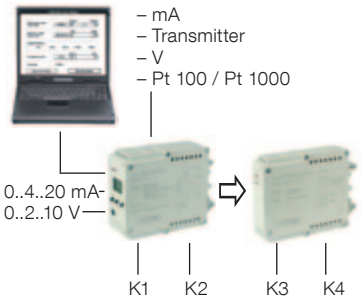
EMC 2004/108/EC:	EN 61326-1
LVD 2006/95/EC:	EN 61 010-1
PELV/SELV:	IEC 364-4-41 and EN 60 742
ATEX 94/9/EC:	EN 50 014 EN 50 020 and EN 50281-1-1

DG: H	Part no.	Price €
EX supply isolation amplifier STV 5104 B, 1 channel	53720	
EX supply isolation amplifier STV 5104 B, 2 channels	53721	

Multifunctional transducer MFU

- Scalable as required
- Programming interface
- Extensible
- Universal input
- Integrated supply voltage for transducer
- 2 analogue outputs
- Linearisation 16 x-y points

Application



Description

Universally programmable, multifunctional transducer for current, voltage, resistance sensors (Pt 100 and others), potentiometer. Two linear analogue outputs (1 x (0)4–20 mA, 1 x (0)2–10 V), galvanically isolated from the input. Two programmable, voltage-free contacts for limit values (can be extended to include four limit value contacts). Interface for configuration via PC.
Three-colour, two-line LCD for direct indication of the operating state.
Supply via universal power supply unit.

Technical specifications

Display
Two-line, 4-digit, 12 mm high, 3-colour LCD

Range
0 to 9999 digit (min. and max. values scalable as required)
Indication of unit

Accuracy
± 0.3 % of maximum value

Resolution
Decimal point position can be set as required

Sensor input
2-wire transmitter (DC 24 V)
3-wire transmitter (DC 24 V)
Current max. 20 mA
Voltage max. 10 V
Pt 100 2-wire, 3-wire or 4-wire (as per DIN IEC 751)
Pt 1000 (as per DIN IEC 751)

Analogue outputs
2 synchronous analogue outputs, scalable as required 0/100 %

Analogue output 1 (current)
(0)4–20 mA, freely configurable, galvanically isolated from the input

Analogue output 2 (voltage)
(0)2–10 V, freely configurable, galvanically isolated from the input

Switching outputs
2 x voltage-free changeover contact, fully configurable AC 250 V 2 A 100 VA
(a total of 4 voltage-free changeover contacts if the contact extension module is used)
2 x open collector output, max. 30 V, 50 mA (earth-switching) for contact extension module

Linearisation (via software)
Customer-specific linearisation with a max. of 16 x-y points for volume indication (e.g. litres) in non-linear tanks.

Supply voltage
AC/DC 20–253 V

Housing
DIN rail housing
W x H x D: 33 x 78 x 103 mm

Accessories (options)

- **Contact extension module**
  Input: 3 control lines from MFU
  Output: 2 changeover contacts AC 250 V, 2 A, 100 VA
  W x H x D: 23 x 78 x 103 mm
- **Programming software**
  WIN 95/98/2000/XP

DG: H	Part no.	Price €
Transducer MFU 01 with display and keys	53712	
Transducer MFU 02 without display and keys	53713	
Contact extension module MFU-KEM	53714	
Software MFU-S and interface cable	53715	

Digital plug-in display DA 06

- Easy and fast mounting via plug-in system
- Indication scalable as required
- Housing and display can be rotated at any angle
- Integrated diagnostics system
- Open collector switching output / PNP

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Application

Cost-effective digital display unit with local indication for all transducers with 4–20 mA output and ISO 4400 (DIN 43650-A) connector. Easy and fast mounting via plug-in system. Optional EX protection (zones 0/1).

Description

DA 06 is mounted between the plug and the junction box and is immediately ready for operation. As the unit is supplied via the 4–20 mA loop, it does not require a separate supply. The unit is programmed by means of two keys at the front. The following parameters can be set: scaling, decimal point, dampening, switching point and delay. In addition, the unit features a memory for min. and max. values.
The settings are not lost in case of a power failure. Out of range values can be displayed as messages (both ends of the range). The integrated diagnostics system continuously monitors all functions of the display. The housing can be turned by 300°, the display by 330°.

Technical specifications

Measuring range
-1,999/+9,999 digit
(start and end values scalable as required)

Display
4-digit, 7 mm high, red LED display
Display housing can be turned by 330°

Accuracy
0.1 % ±1 digit

Adjustable parameters
Scaling, decimal point,
dampening, switching point

Min./max. value memory
The highest and lowest values reached during operation can be displayed.

Housing
Plastic PA 6.6/polycarbonate
W x H x D: 47 x 47 x 68 mm
Housing can be turned by 300°

Degree of protection
IP 65 (EN 60529)

Operating temperature range
Ambient/
Electronics: -25/+85 °C
Storage: -40/+85 °C

Electrical connection
Adapter for connector as per ISO 4400 (DIN 43650-A)

Input signal
4–20 mA, 2-wire

Switching output
1 open collector (PNP), max. 125 mA
(with EX protection max. 70 mA, 4.7 mH)
On/off delay: 0 to 100 s
Temperature influence: 0.1 %/10K

CE conformity
EN 61326

Options

- EX protection II (1) 2 G Ex ia IIC T4
- Other electrical connections
- 3-wire 0–10 V

DG: H	Part no.	Price €
DA 06	**31278**	
DA 06-Ex	31279	

Digital display units DA 10/12/14

- Text-based user interface
- Linearisation for volume indication (24 points)
- Selectable units
- Integrated supply voltage for transducer
- Universal power supply unit

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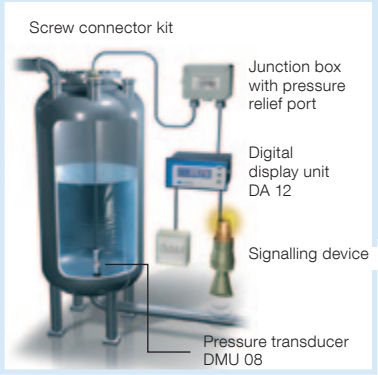


Description

Digital display device (DA 10), also available with additional relay output (DA 12/14) for electronic transducers.

Technical specifications

Display
5-digit graphical LC display, backlit (white), text-based user interface, user interface language selectable (German/English/French), selectable units.

Measuring range
± 99,999 digits (start and end values scalable as required)

Linearity
±0.1 % of measuring range

Resolution
Decimal point position can be set as required

Response time
< 0.2 s

Operating temperature range
Ambient: -10/+55 °C

Supply voltage
AC/DC 20–253 V

Sensor supply
Integrated, galvanically isolated power supply for transducer:
DC 20 V/20 mA

Sensor input
All analogue standard signals, e.g. 4–20 mA, 0–20 mA, 0–1 V, 0–10 V

Analogue output
0/4–20 mA, galvanically isolated

Housing
Standard rack mounting housing
W x H x D: 96 x 48 x 135 mm

Panel cut out
W x H: 92 x 45 mm

Degree of protection (front)
IP 65 (EN 60529)

Electrical connection
Plug-in screw terminals (1.5 mm²)

Linearisation
Customer-specific linearisation with a max. of 24 points for the indication of volume (e.g. litres) in non-linear tanks. Bearing charts for cylindrical horizontal tanks and spherical tanks are pre-programmed.

Min./max. value memory
The highest and lowest values reached during operation can be displayed.

Additional functions DA 12

Analogue output 2
0–10 V, galvanically isolated

Switching outputs
Relay contacts: 2 x voltage-free changeover contact (adjustable switching hysteresis)
Contact rating: AC 250 V, 2 A, 100 VA

Additional functions DA 14

Analogue output 2
0–10 V, galvanically isolated

Switching outputs
Relay contacts: 4 x voltage-free changeover contact (adjustable switching hysteresis)
Contact rating: AC 250 V, 2 A, 100 VA

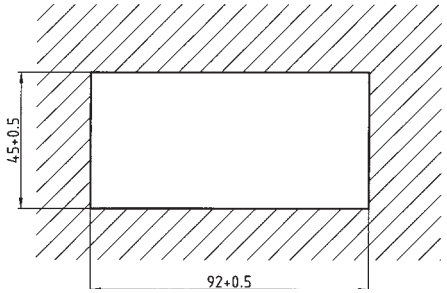
DG: H	Part no.	Price €
DA 10	**31281**	
DA 12	**31282**	
DA 14	**31283**	
Wall mounting housing WAG 01 for one DA*	31287	
WAG 02 for two DA*	31288	
WAG 03 for three DA*	31289	
WAG 04 for four DA*	31290	

* Price includes mounting if DA and WAG are ordered together.

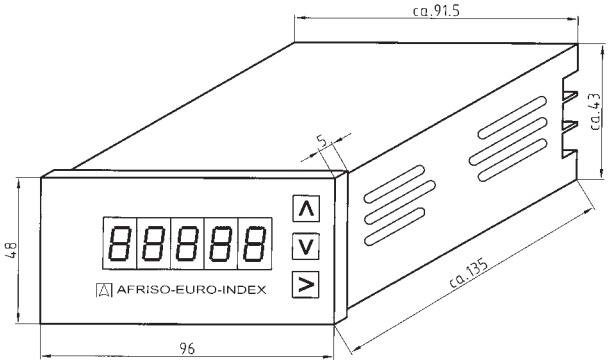
Digital display units DA 10/12/14

Dimensions (mm) and connection diagrams

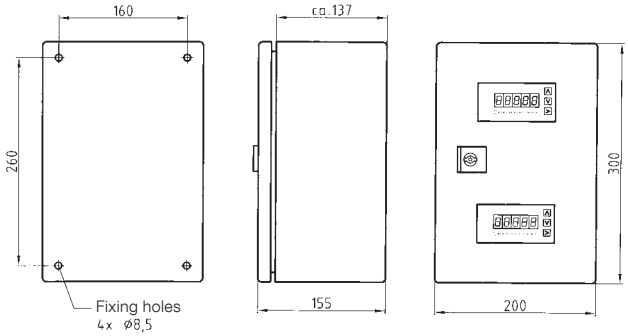
Panel cut out



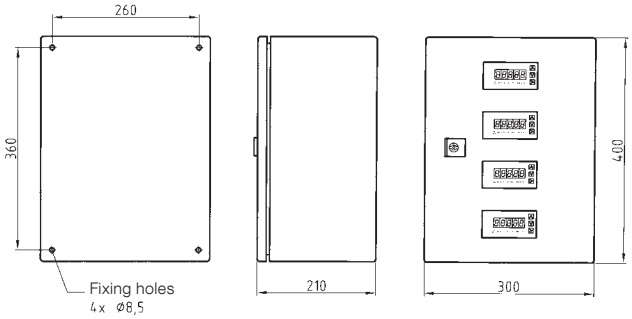
DA 10/12/14



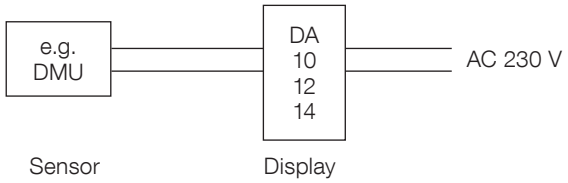
Wall mounting housing WAG 01/02
for up to 2 DA 10/12/14



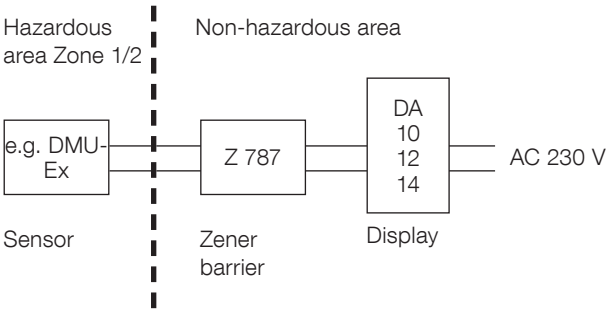
Wall mounting housing WAG 03/04
for up to 4 DA 10/12/14



Connection diagram for standard application



Connection diagram for EX application



Digital display and control units VarioFox® 12/14

- **Can be used as compact, ready-to-connect filling or emptying controller**
- **Text-based user interface**
- **Selectable units**
- **2 or 4 switching outputs**
- **Data logger function**

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Application

For recording process parameters. Together with the event reporting system EMS and the AFRISO Net web service, this unit serves as an economical measuring and control station with data logging and remote monitoring functionality.

Description

Compact, ready-to-connect display and control unit in a robust wall-mounting housing. With integrated sensor supply and 2 relay outputs. Together with a transducer (e.g. for pressure, temperature, level, etc.), VarioFox® forms an autonomous measuring and control system. VarioFox® is universally applicable and freely configurable.

Technical specifications

Display
5-digit graphical LC display, backlit (white), text-based user interface, user interface language selectable (German/English/French), selectable units.

Measuring range
99,999...– 9.999 (start and end values as well as decimal point can be adjusted)

Linearity
±0.1 % of measuring range

Resolution
10 bits, decimal point position can be set as required

Response time
< 0.2 s, filter can be activated

Operating temperature range
Ambient: -10/+55 °C

Supply voltage
AC 50–253 V
DC 20–253 V

Sensor supply
Integrated, galvanically isolated power supply for transducer: DC 20 V/20 mA

Analogue input
All analogue standard signals, e.g. 4–20 mA, 0–20 mA, 0–10 V.

Binary input
Transistor PNP (e.g. for VibraFox® GVG)

Visual alarm
1 red LED

Audible alarm
Integrated piezo-buzzer, can be acknowledged

Analogue output 1
0/4–20 mA, galvanically isolated

Analogue output 2
0–10 V, galvanically isolated

Switching outputs
Relay contacts: 2 voltage-free changeover contacts (adjustable switching hysteresis)
Contact rating: AC 250 V
2A, 100 VA

Housing
Robust wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 54 (EN 60529)

Linearisation
Customer-specific linearisation with a max. of 24 points for the indication of volume (e.g. litres) in non-linear tanks. Bearing charts for cylindrical horizontal tanks and spherical tanks are pre-programmed.

Min./max. value memory
The highest and lowest values reached during operation can be displayed.

Data storage and clock
Long-term monitoring data is stored on a memory card (SD/MMC). Memory card not included.
PC evaluation software VarioView for storing the data in daily files (option).

Additional functions VarioFox®14

Relay contacts: 4 voltage-free changeover contacts (adjustable switching hysteresis)

DG: H	Part no.	Price €
VarioFox® 12 (2 relay contacts)	31235	
VarioFox® 14 (4 relay contacts)	31236	
VarioView evaluation software	31238	
SD memory card	31237	

Signalling devices

Horn KH 1

Description

Horn with continuous tone for use in dry rooms.

Technical specifications

Sound pressure
90 dB (A), distance 1 m

Supply voltage
AC 230 V

Power input
6 VA

Degree of protection
IP 20 (EN 60529)

Weight
0.18 kg

Combined warning light and horn

Combination warning light and horn, can be controlled separately.

Sound pressure
90 dB (A), distance 1 m

Supply voltage
AC 230 V

Power input
10 VA

Degree of protection
IP 33 (EN 60529)

Weight
0.19 kg

Horn HPW 2

Horn with continuous tone for use in humid rooms and for outdoor installation.

Sound pressure
110 dB (A), distance 1 m

Supply voltage
AC 230 V

Power input
22 VA

Degree of protection
IP 55 (EN 60529)

Weight
1 kg

DG: G			Part no.	**Price €**
Horn KH 1	1	-	**61011**	
Combined warning light and horn	1	-	**61020**	
Horn HPW 2	1	-	**61012**	

Signalling devices

Warning light with rotating reflector

Application

For humid rooms and for outdoor installation.

Description

Yellow warning light with rotating reflector. Robust design with Al base. Maintenance-free, suitable for continuous use.

Technical specifications

Supply voltage
AC 230 V

Degree of protection
IP 55 (EN 60529)

Weight
1.8 kg

Mounting position
Any

Alarm acknowledgement unit AQ 220

For connection to overfill prevention systems and leak alarm systems.

Integrated visual and audible alarms indicate fault conditions. The audible alarm can be muted with the Acknowledge button. The visual alarm remains on until the probe is no longer in contact with the medium (e.g. "Tank full" signal) or until a fault condition is corrected. As soon as the visual alarm is switched off, the system resumes normal operation. Additional external alarm equipment can also be connected and acknowledged.

Supply voltage
AC 230 V

Outputs
1 voltage-free, normally open contact (horn), can be acknowledged
1 voltage-free, normally open contact (lamp)

Contact rating
Max. 250 V, 2A

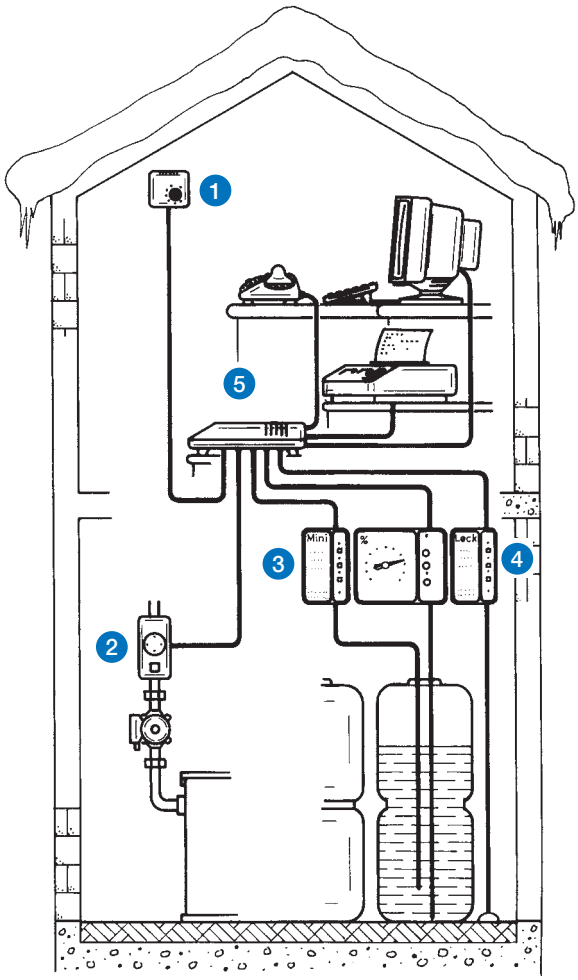
Operating temperature range
-10/+60 °C

Housing (degree of protection)
Wall mounting housing (IP 30)
W x H x D: 53 x 113 x 107 mm

DG: H	Part no.	Price €
Warning light with rotating reflector	**61015**	
Alarm acknowledgement unit AQ 220	**53230**	

AFRISO event reporting systems EMS

Remote reporting, alarm generation, logging, remote control, remote switching



Application example
Sensors and alarm unit monitor all the functions of the heating system and the security of the building around the clock.

1. **Temperature sensors** monitor vulnerable or critical rooms.
2. **Surface mounting thermostats** check whether the water is heated, and whether the burner and boiler as well as the circulation pumps function properly.
3. **Minimelder level probes** or **tank contents indicators** signal when you have to refuel. A remote indicator also allows for easy and regular level monitoring, e.g. in underground tanks or basement tanks which are not easily accessible.
4. We provide suitable **leak detection systems** for all types of tanks and pipes.
5. The sensors and alarm units activate the **AFRISO event reporting system** and provide messages via GSM, Internet or e-mail to one or more recipients. Depending on the system configuration, the individual problems can be treated as a single alarm or they can be differentiated. This allows the system to send different types of messages to different addresses. For example, a low oil message is sent to your oil supplier, a burner error to your burner customer service, etc.

Monitoring functions:
- Events such as leaks, heating system failure, glass breakage, movements, burglary or robbery
- Events such as smoke, fire, gas or flooding
- Levels in tanks and containers
- Leaks in tanks or pipes
- Measured values such as temperature, level, pressure

We provide a comprehensive range of devices generating the appropriate signals. Depending on the system configuration, the AFRISO event reporting systems allow for full remote control of complete residential installations and technical facilities.

Features of EMS event reporting systems

1. Event reporting
The system calls via GSM and reports the events.

2. Remote control
You can also call the event reporting system and send commands by phone to control lights, heating systems, air conditioning systems, shutters, blinds, etc.

3. Data logging
Event reporting systems log data at configurable intervals.

4. Remote data polling
You can access the event reporting system via GSM or Internet and receive current and stored data.

5. Remote programming
You can program various parameters via GSM. For example, it is possible to remotely change the telephone number to which the system is to report the events.

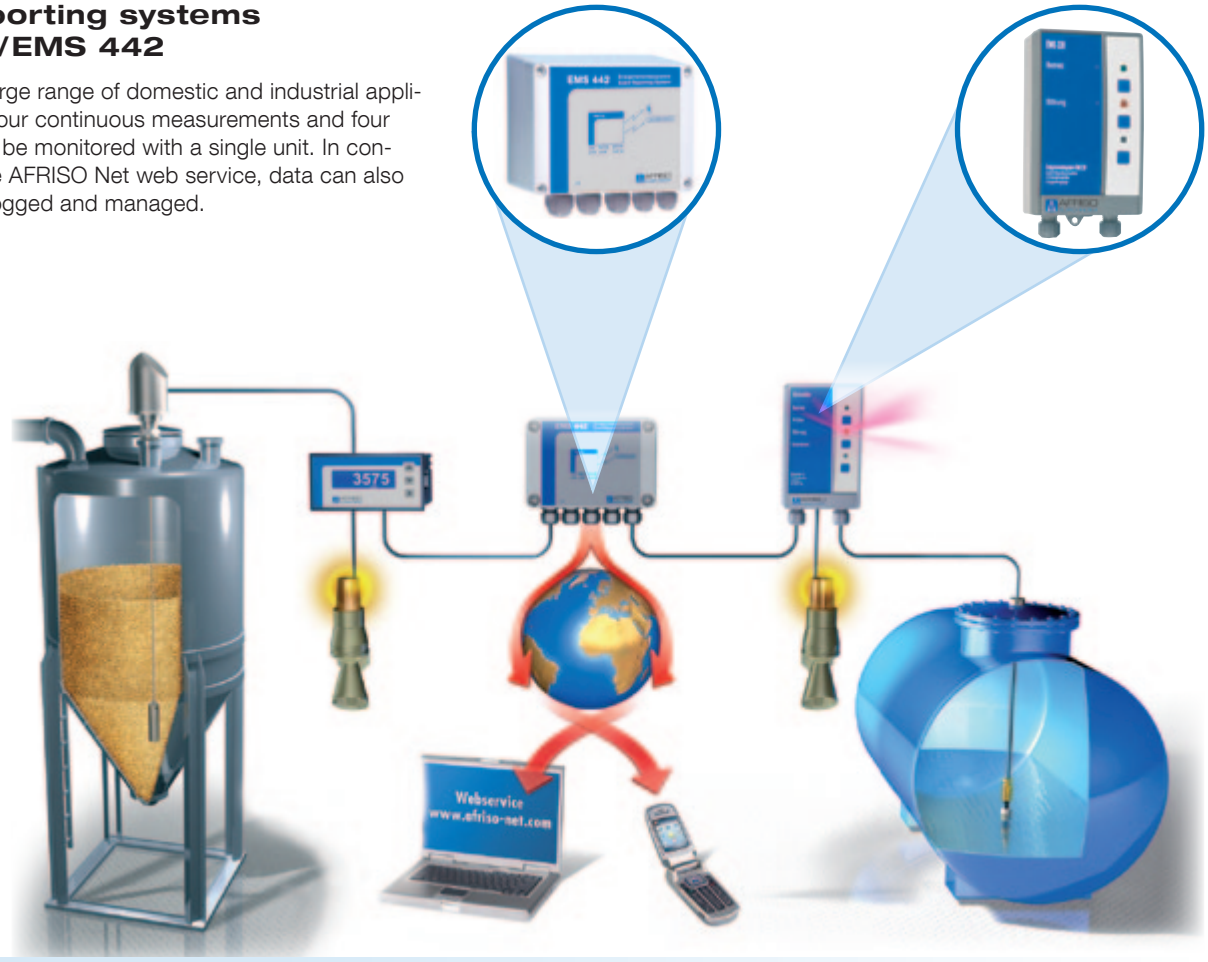
6. Integrated security system
- A PIN ensures that unauthorised persons cannot access the event reporting system
- If the number to be called by the system is busy, the system redials automatically
- If the number is still busy after several attempts, the system calls another number specified
- All program settings, voice messages and alarms not yet processed are saved in the case of power failure; the system resumes processing when power is restored.

AFRISO event reporting systems – overview

GSM

Event reporting systems EMS 220/EMS 442

Suitable for a large range of domestic and industrial applications. Up to four continuous measurements and four limit values can be monitored with a single unit. In connection with the AFRISO Net web service, data can also be visualised, logged and managed.



Event reporting system EMS 323

- 2 digital, 3 analogue inputs
- A text message is sent if the status of an input changes
- Events are reported via text message, fax or e-mail
- INCALL function for free switching from anywhere in the world
- Programming via easy-to-use software
- EMS 323 can be remotely programmed via text messages at any time
- Manual status request

The event reporting systems allow you to remotely monitor all AFRISO signal transducers.

Event reporting system EMS 220

- For building technology
- 2 analogue and 2 digital inputs
- Event reporting directly to the mobile phone
- Data recording, visualisation and management with AFRISO Net web service

Application

Suitable for a large range of domestic and industrial remote monitoring applications. Up to two analogue measured values and two digital limit values can be monitored with a single unit. In connection with the AFRISO Net web service, data can also be visualised, logged and managed.

Typical applications areas:
- Monitoring and management of fuel oil tanks
- Monitoring of heating and service rooms
- Monitoring of ducts, drip pans or pipes
- Signal forwarding of danger and status messages

EMS 220 can e.g. be combined with the following AFRISO signal transducers:
- Level indicators
- Level switches
- Leak detectors
- Gas and smoke detectors

Description

EMS 220 has 2 analogue and 2 digital inputs. EMS 220 sends alarm signals or results of continuous measurements to the mobile phone of the user or to the AFRISO Net server for documentation and further distribution. From the server, messages can be sent via Internet, text message or e-mail. The owner/operator can request information on the system status or change parameters via mobile phone at any time. Measuring intervals, limit values and data transmission intervals can be adjusted as required.

Technical specifications

Operating temperature range
Ambient: -20/+50 °C

Supply voltage
AC 230 V

Sensor supply
1 x DC 24 V, max. 25 mA
1 x for probe DIT 01

Alarm inputs
- 1 analogue input 4–20 mA, active or passive
- 1 analogue input for probe DIT 01
- 2 digital inputs, for voltage-free assignment

Data transmission
GSM text message with integrated GSM modem 900/1800 MHz

Measuring intervals/ data transmission intervals
Adjustable as required

Parameterisation/configuration
Via mobile phone

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm

Degree of protection
IP 40 (EN 60529)

Electrical connections
Cable glands

i

The AFRISO Net web service is a cost-effective way of requesting data online anywhere and at any time. See page 597 for a detailed description.

DG: H	Part no.	Price €
EMS 220	90220	
Setup on AFRISO Net server (one-time fee)	90013	
Monthly base fee	90014	

Event reporting system EMS 323

- **Monitoring and switching from anywhere on the globe**
- **3 analogue and 2 digital alarm inputs**
- **2 analogue and 3 digital outputs**
- **Events are reported via text message, fax or e-mail**
- **INCALL function for free switching via telephone**

GSM antenna

Application

For a large variety of remote monitoring tasks, specially in domestic and building control . Up to three analogue measured values (4–20 mA) and two digital signals can be monitored with a single unit.

Typical applications areas:
- Monitoring of installations, equipment and sensors
- Monitoring and management of fuel oil tanks
- Monitoring of heating and service rooms
- Monitoring of ducts, drip pans or pipes
- Monitoring of alarm systems
- Monitoring of technical equipment (e.g. air conditioning systems, lifts)
- Signal forwarding of danger and status messages

EMS 323 can e.g. be combined with the following AFRISO signal transducers:
- Level indicators, e.g. TankControl
- Level probes, e.g. HydroFox® DMU 08
- Level switches, e.g. Maximelder
- Leak detectors, e.g. oil/water alarm unit ÖWWG 3
- Gas and smoke detectors, e.g. GRM

Description

EMS 323 has 3 analogue and 2 digital inputs. If the status of an input changes, a message is sent to pre-defined telephone or fax numbers or to e-mail addresses. Up to 12 telephone numbers, 4 fax numbers and 4 e-mail addresses can be configured. GSM Quadband allows you to control devices and installations and get information on their status from anywhere in the world with EMS 323. The GSM M2M technology (Machine-to-Machine) enables switching, receiving and measuring via text message or call. The unit is programmed via the software supplied with the system. All settings (measuring intervals, limit values, data transmission intervals, etc.) can be made via the integrated USB-A interface (e.g. laptop). In addition, parameters can always be changed via a mobile phone. EMS 323 needs a standard unlocked SIM card of any mobile network operator.

Technical specifications

Operating temperature range
Ambient: -20/+60 °C

Supply voltage
AC 230 V

Sensor supply
24 VDC

Alarm inputs
- 3 analogue inputs: 4–20 mA
- 2 digital inputs, for voltage-free assignment

Data transmission
GSM text messages with integrated GSM modem
Frequency ranges:
GSM Quadband 850/900/1800/1900 MHz

Switching outputs
Relay contacts: 3 voltage-free changeover contacts
AC 250 V, max. 5 A

Housing
Wall mounting housing made of impact-resistant plastic (ABS)
W x H x D: 100 x 188 x 65 mm
Degree of protection: IP 40 (EN 60529)

Scope of delivery
- EMS 323
- USB-A connection cable
- Programming software on CD
- GSM antenna with self-adhesive back, cable length 3 m

DG: H	Part no.	**Price €**
EMS 323 (without SIM card)	90030	

Event reporting system EMS 442

- For industrial remote monitoring tasks
- 4 analogue and 4 digital inputs
- Event reporting directly to the mobile phone
- Data recording, visualisation and management with AFRISO Net web service

Application

The event reporting system EMS 442 is ideal for a wide range of industrial remote monitoring tasks. Up to 4 analogue measured values and 4 digital limit values can be monitored with a single unit. In connection with the AFRISO Net web service, data can also be visualised, logged and managed.

Typical applications areas:
- Monitoring and management of tank farms, oil storage facilities, silos, food tanks and facilities for storing chemicals
- Level measurement in wells, drilling holes, rivers, lakes, etc.
- Monitoring of ducts, pump stations, waste water systems, separators
- Monitoring of production processes
- Monitoring of technical facilities such as heating systems, air conditioning systems, refrigeration systems, lifts, etc.

Description

EMS 442 has 4 analogue and 4 digital inputs as well as 2 switching outputs (relay outputs) for connection of additional alarm equipment on site. EMS 442 sends alarm signals or results of continuous measurements to the mobile phone of the user or to the AFRISO Net server for documentation and further distribution. From the server, messages can be sent via Internet, text message or e-mail. The owner/operator can request information on the system status via mobile phone at any time. Measuring intervals, limit values and data transmission intervals can be adjusted as required.

Technical specifications

Operating temperature range
Ambient: -20/+50 °C

Supply voltage
AC 230 V

Sensor supply
4 x DC 24 V, max. 25 mA

Alarm inputs
- 4 analogue inputs 4–20 mA, active or passive
- 4 digital inputs, for voltage-free assignment

Switching outputs
Relay contacts: 2 voltage-free changeover contacts
Contact rating: AC 250 V, 5 A/500 VA
DC 24 V, 5 A/100 VA

Data transmission
GSM text message with integrated GSM modem 900/1800 MHz

Measuring intervals/ data transmission intervals
Adjustable as required

Parameterisation/configuration
Via mobile phone

Housing
Wall mounting housing made of impact-resistant plastic (polycarbonate)
W x H x D: 175 x 125 x 75 mm

Degree of protection
IP 65 (EN 60529)

Electrical connections
5 x cable gland M 16

i

The AFRISO Net web service is a cost-effective way of requesting data online anywhere and at any time. See page 597 for a detailed description.

DG: H	Part no.	Price €
EMS 442	90442	
Setup on AFRISO Net server (one-time fee)	90013	
Monthly base fee	90014	

AFRISO Net web service

- Internet-based remote monitoring system
- Continuous monitoring and logging, 24/7
- Automatic connection monitoring, alarm if connection is lost
- No separate application programs required
- Alarms can be transmitted via text message or e-mail

www.afriso-net.com

Application

The user can view measurements and alarms of the EMS 220/442 event reporting systems at any time and from anywhere on the globe, e.g. via Web browser, mobile phone and e-mail. The AFRISO Net server collects the data and archives it in a database. This measurement data can be visualised and documented. Reports and trend charts for selectable periods can be created automatically.

Typical applications areas

Visualisation of level, pressure, temperature, flow measurements. Alarm messages such as maximum levels/overfill, minimum levels/low alarms, oil and grease separator alarms.

- Level Inventory: industrial level inventory
- Fuel: level measurement and control (alarm messages) at petrol stations
- PumpControl: remote monitoring of pump facilities and waterworks
- WasteControl: logistics for waste disposal
- TransControl: access monitoring

Description

AFRISO Net is self-monitoring, i.e. it features automatic connection monitoring and generates an alarm if a connection is lost. Individual device identification authenticates the sender and the data. AFRISO Net can forward alarms as text messages and e-mails; an alarm can be sent to several recipients at the same time or chained.
The device settings are completely managed via the AFRISO Net server. Access to specific data can be limited for each user; the passwords are managed securely. Unauthorised access is blocked by a firewall. Daily backups and automatic storage of the measured results (up to five years) round off the security concept of the AFRISO Net web service.

Technical specifications

Compatible event reporting systems
EMS 220, EMS 442

Data transmission
- Encrypted connection between server and browser
- Text messages
- E-mails
- ERP systems, e.g. SAP/R3

Data transmission protocols
GSM, text messages SMS, GPRS, TCP/IP

Web browser
Internet Explorer, Firefox

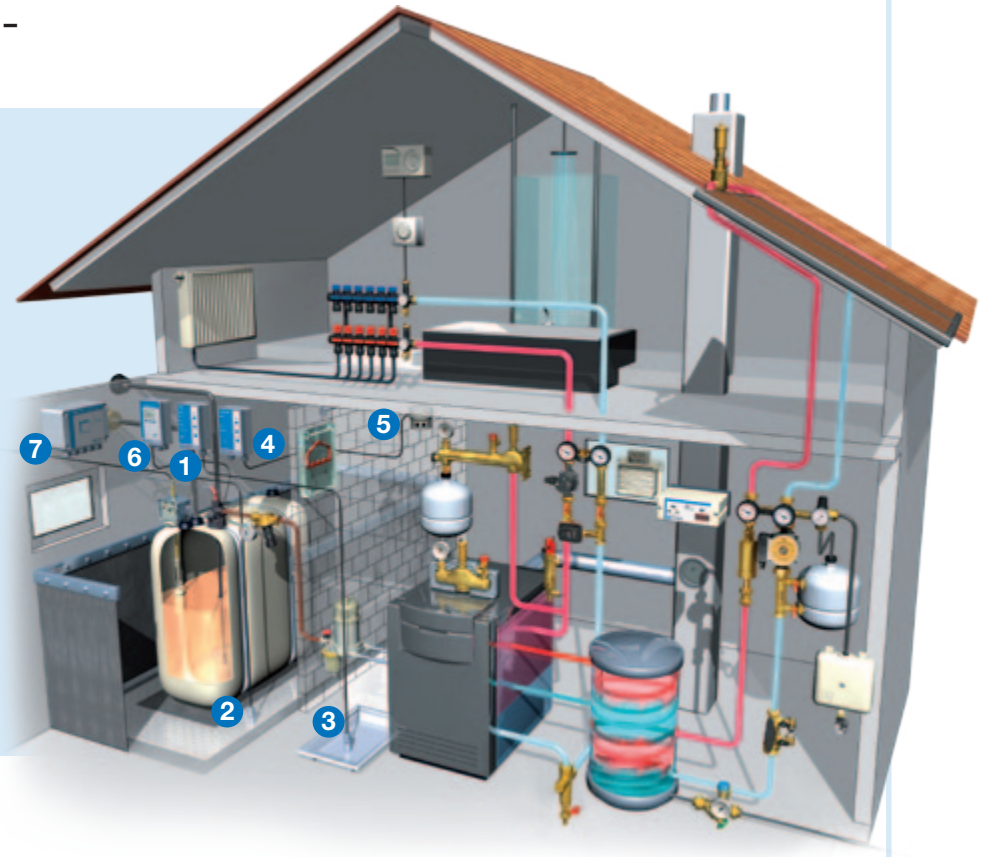
User interface languages
German, English, Finnish, Swedish, Danish

DG: H	Part no.	Price €
Setup on AFRISO Net server (one-time fee)	90013	
Monthly base fee	90014	

AFRISO WATCHDOG alarm units for event reporting systems EMS

AFRISO-WATCHDOG – for maximum safety

1. Oil/water alarm unit
2. Probe for tank room monitoring
3. PTC thermistor probe with drip pan
4. Gas and smoke detector GRM
5. Smoke sensor
6. Level indicator TankControl® with reserve level alarm
7. Event reporting system EMS for reporting dangers such as leaks, backwater, flooding, smoke and fire as well as tank contents via text messages or the AFRISO Net web service

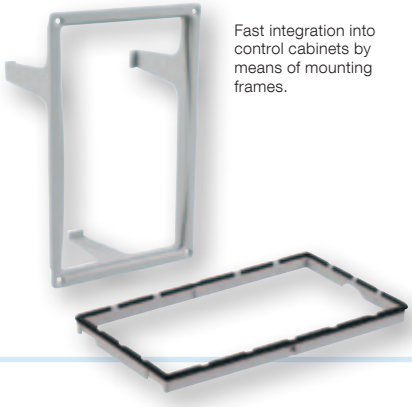


In the building technology sector there are many risks which should be considered and kept under control to avoid annoyance to home owners, janitors, property managers or maintenance personnel and to avert extensive damage.

AFRISO WATCHDOG alarm units report undesirable events, danger and emergency conditions early so that immediate measures can be taken.

AFRISO WATCHDOG devices excel with easy and intuitive operation. A large variety of probes and sensors enable instant detection of liquid levels, leakages and accumulations of liquids, gases or smoke. Integrated visual and audible alarms provide the appropriate signals in danger conditions – this way, residential buildings, factories and facilities can be protected and monitored reliably. From standard wall mounting to integration into control cabinets using mounting frames – AFRISO WATCHDOG devices are easy and quick to install. With very little effort, the devices can also be retrofitted with seal kits for use under rough application conditions (IP 54).

DIN rail clips for fast and easy mounting of the alarm units.



Fast integration into control cabinets by means of mounting frames.

With seal kit IP 54 for rough application conditions.

AFRISO WATCHDOG alarm units

- **Audible and visual alarms for maximum safety**
- **Additional signal equipment (EMS, horn, alarm light) can be connected**
- **Devices are ready to be connected for easy installation and commissioning**
- **High reliability and long service life**

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Page 592

Typical application areas

- Catchment areas below oil and water consuming equipment
- Drip pans below storage tanks, burners or motors in buildings or outdoors
- Containers, barrels and tanks/double-walled tanks
- Sewage tanks
- Cisterns and water storage tanks
- Oil depots, boiler rooms and rooms with mains water connection
- Heating systems
- Cable and pipe ducts
- Canal shafts, manholes and inspection ducts
- Cellars, kitchens, laundry rooms
- Warehouses and storage areas
- Machinery rooms
- Museums, archives, office buildings
- Lift shafts
- High-tech equipment rooms and server rooms
- Pumping stations and control rooms
- Catchment and overflow basins
- Flood risk areas
- For oil, petrol and grease separators
- Protective pipes and pipelines

Detectable media

- Water, waste water, groundwater
- Heating system water
- Cooling water
- Rainwater
- Fuel oil EL, L, M
- Diesel fuels or low-viscosity lubricating oils class A III (according to former classification VbF)
- Motor oils, gearbox oils and hydraulic oils
- Vegetable oils and transformer oils
- Antifreeze liquids and fertilisers
- Emulsions
- Sludge, sand
- Oil, petrol and grease layers
- Conductive water mixtures and liquids
- Gases, vapours, smoke

In conjunction with the AFRISO EMS event reporting system, the alarm units signal events such as low level messages, error messages, level information, malfunctions and accidents via text messages, all around the globe, 24/7.

i See chapter 4 for the complete range of alarm units.

CHAPTER 16

Appendix – Technical Information

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Courses and Training

Professional and practical. With our courses, workshops and seminars, you benefit from our many years of in-depth experience in the field of measuring and control technology. Our entire offering responds to current issues and standards as well as customer requirements. Of course, it is also possible to arrange for individual in-house courses and seminars to be provided at your site.

AFRISO training programme

Tank protection and leak protection lining
Two-day seminar on the installation of inner linings and leak detectors (theory and practice)

DVGW-TRGI 2008
One-day seminar on new aspects of the Technical Regulations for Gas Installations

Gas check
One-day seminar on checking gas installations

Heating system check
One-day seminar on the inspection and evaluation of heating systems

In-depth information on 1. BImSchV (German Federal Immission Act)
One-day seminar with the latest information on the directive on small combustion systems

Visit us at www.afriso.com/training for our full training programme and additional information.

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We will be glad to answer your questions concerning our seminars. Please get in touch with us.
E-mail: training@afriso.de
Phone: +49 7135 102-222

Our Service – Your Benefit

Flexible, cost-aware, on schedule, solution-orientated and fast – the AFRISO team always provides the decisive added value.

Information and presentation

Whether telephone support or on site: Our consultants speak your language – we provide you with personal and individual consulting worldwide. And if you have an in-house event for your customers, we will be glad to participate.

After sales service

Whether commissioning, professional maintenance, calibration or function checks – a network of service centres and our specialists in the plant support you in getting the maximum out of your AFRISO product. For safe processes, precise measuring results, compliance with legal requirements and a long service life.

Repair service

In the case of a malfunction, send us your instrument along with a short description of the problem. We will repair it within five workdays. Promise.

Rental service

You cannot afford to do without your instrument? No problem, our on-site service ensures that you remain on duty. We have your instrument picked up and send you a rental instrument. For a low rental fee. Get in touch with us to see whether this service is available in your country.

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Our service and repair department will be glad to answer your questions. Please get in touch with us.
Phone: +49 7135 102-222

AFRISO information material – brochures, flyers and CD-ROMs

Discover new opportunities and sales potential with AFRISO quality products. We offer a large variety of information materials and media for wholesalers, points of sale, associations, HVAC companies and tank protection companies. You can order these media from us free of charge – even large numbers of copies. All printed materials allow you to add your company stamp to the back page.

Flyers, brochures, product overviews

Flyers, brochures, and product overviews provide information on individual products or complete product ranges for various application areas.

New media: CD-ROMs

In addition to the complete catalogue 2011/2012, the current Datanorm information is also available on CD-ROM.

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All information material can be downloaded from www.afriso.com.
If you want to order printed material for free, simply specify the number of copies required in your e-mail to **marketing@afriso.de.**

Downloads

Visit www.afriso.com for comprehensive product information and details, technical specifications, terms and conditions, valuable downloads and the latest news.

Operating instructions

In addition to product descriptions, the operating instructions include detailed technical data, mounting, installation and safety information as well as information on approvals for all AFRISO products.

Forms

Checklists with indication of application conditions and planned use of AFRISO products allow us to quickly process your enquiries or returns.

Software

Due to continuous improvements and to changes in legislation and directives, we provide software updates for electronic measuring instruments on an ongoing basis. The updates and the appropriate instructions can be downloaded from our website for free.

Certificates

A number of manufacturer certificates and declarations as well as numerous specific approvals, certificates and compliance tests attest to the outstanding quality and performance of AFRISO products.

AFRISO specialised company search

Find a specialised professional company fast

AFRISO has an excellent reputation with end users – numerous consumers visit our website every day. The feature "Specialised company search" on our website assists users in finding qualified companies specialised in AFRISO products. You are a company specialised in HVAC, electrical engineering or tank protection and like to use AFRISO quality products for the professional equipment of tanks, heating systems or drinking water supply systems? Then register for our service – free of charge, no obligations **www.afriso.com/registration**.

This is how the "Find a specialised company" feature works

1. Enter the post code/ZIP or the city, limit the range, if required, and start the search.

2. All registered specialised companies are shown on a map with the appropriate information, sorted by distance from your site.

Certificates and approvals

At AFRISO, quality is systematically planned and, at every stage of product development and production, managed and monitored. A wide variety of approvals and certificates attests to this. Stringent testing by national and international approval bodies ensure maximum reliability.

ZERTIFIKAT ◆ CERTIFICATE ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Management Service

ZERTIFIKAT

Die Zertifizierungsstelle
der TÜV SÜD Management Service GmbH
bescheinigt, dass das Unternehmen

AFRISO-EURO-INDEX GmbH
Lindenstr. 20
D-74363 Güglingen
Friedhofstr. 3
D - 63916 Amorbach

für den Geltungsbereich

Entwicklung, Produktion und Vertrieb von
Mess-, Regel- und Überwachungsgeräten für die
Haustechnik, Industrie und Umweltschutz

ein Qualitätsmanagementsystem
eingeführt hat und anwendet.
Durch ein Audit, Bericht-Nr. 70010777
wurde der Nachweis erbracht, dass die Forderungen der

ISO 9001:2008

erfüllt sind. Dieses Zertifikat ist gültig bis 2013-08-02
Zertifikat-Registrier-Nr. 12 100 14587 TMS

München, 2010-09-13

TÜV SÜD Management Service GmbH • Zertifizierstelle • Ridlerstraße 65 • 80339 München • Germany

ZERTIFIKAT ◆ CERTIFICATE ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Management Service

ZERTIFIKAT

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Entwicklung, Produktion und Vertrieb von
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Zertifikat-Registrier-Nr. 12 104 14587 TMS

München, 2010-09-13

TÜV SÜD Management Service GmbH • Zertifizierstelle • Ridlerstraße 65 • 80339 München • Germany

ZERTIFIKAT ◆ CERTIFICATE ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

TÜV SÜD Product Service

EG-Zertifikat
Nr. EX2 09 11 15639 009

Zertifikatsinhaber: AFRISO-EURO-INDEX GmbH
Lindenstr. 20
74363 Güglingen
DEUTSCHLAND

Betriebsstätte(n): AFRISO-EURO-INDEX GmbH
Lindenstr. 20, 74363 Güglingen, DEUTSCHLAND

Geltungsbereich: Ex Elektrische Betriebsmittel in den Zündschutzarten
Eigensicherheit "i" (Eigenherstellung) und
Eigensicherheit "i", erhöhte Sicherheit "e",
druckfeste Kapselung "d"
(Fremdherstellung)

Die Zertifizierstelle von TÜV SÜD Product Service GmbH bescheinigt mit diesem EG-Zertifikat, dass das oben genannte Unternehmen ein Qualitätssicherungssystem anwendet, das den Anforderungen gemäß Anhang IV der Richtlinie des Rates Nr. 94/9/EG für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen (ATEX) entspricht. Die Gültigkeit dieses EG-Zertifikates setzt eine regelmäßige Überwachung voraus. Umseitige Hinweise sind zu beachten.

Bericht Nr.: 71360407

Gültig bis: 2012-10-31

Datum, 2009-11-16 (Siegfried Mösch)

TÜV SÜD Product Service GmbH ist benannte Stelle gemäß der Richtlinie des Rates Nr. 94/9/EG für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen mit der Kennnummer 0123.

Seite 1 von 1

TÜV SÜD Product Service GmbH · Zertifizierstelle · Ridlerstrasse 65 · 80339 München · Germany

Zertifikat seit 2006
audit berufundfamilie

Dieses Zertifikat ist gültig bis
30. August 2013
Auditierungsnummer
Z2-20100830-7525

www.beruf-und-familie.de

Zertifikat 2010

AFRISO-EURO-INDEX GmbH

Lindenstraße 20, 74363 Güglingen

Die berufundfamilie gemeinnützige GmbH bescheinigt hiermit die erneute erfolgreiche Durchführung des audit berufundfamilie.

Im Rahmen der Re-Auditierung wurden der Bestand der Angebote zur Vereinbarkeit von Beruf und Familie begutachtet und weiterführende Ziele einer familienbewussten Personalpolitik definiert. Die daraus resultierenden Maßnahmen werden innerhalb der nächsten drei Jahre umgesetzt.

30. August 2010
Frankfurt am Main

berufundfamilie gemeinnützige GmbH
Geschäftsführung

berufundfamilie gemeinnützige GmbH
Kuratorium

berufundfamilie gemeinnützige GmbH
Friedrichstraße 34
60323 Frankfurt am Main

Telefon 069 300388-0
Telefax 069 300388-77
info@beruf-und-familie.de
www.beruf-und-familie.de

berufundfamilie

Eine Initiative der Gemeinnützigen Hertie-Stiftung

Zertifikat

2011 Arbeitsschutz-Management-System BG auditiert

Die Berufsgenossenschaft Energie Textil Elektro zertifiziert
die erfolgreiche Einführung eines Arbeitsschutz-Management-Systems.

Das Unternehmen

AFRISO-EURO-INDEX GmbH
Lindenstraße 20
74363 Güglingen

mit der Betriebsstätte
Friedhofstraße 3, 63916 Amorbach

erfüllt die Anforderungen an einen systematischen und wirksamen Arbeitsschutz auf Basis der branchenspezifischen Umsetzung des **NLF / ILO-OSH 2001**, des Verfahrensgrundsatzes zur Auditierung von Arbeitsschutz-Management-Systemen, Stand 2007-11 sowie der Anforderungen gemäß **OHSAS 18001:2007.**

Das Zertifikat (Ersatz für die Ausgabe vom 14.11.2008) ist gültig bis zum 30. November 2011.

Leiter der Präventionsabteilung
Dr. Jens Jühling

AMS-Zertifizierung
Dipl.-Ing. Wolfgang Pechoc

Köln, den 6. Oktober 2009

Registrierungs-Nr. 093284400000/214

DNV

DET NORSKE VERITAS
TYPE APPROVAL CERTIFICATE

CERTIFICATE NO. A-10961
This Certificate consists of 3 pages

This is to certify that
Pressure Indicator

with type designations
RF_ _, Series D4_ _, D7_ _ and D8_ _

as specified on page 2

Manufactured by
Afriso-Euro-Index GmbH
Amorbach, Germany

is found to comply with
Det Norske Veritas' Rules for Classification of Ships, High Speed & Light Craft and Det Norske Veritas' Offshore Standards

Location classes:

Type	RF_ _, Series D4_ _, D7_ _ and D8_ _
Temperature	D
Humidity	B
Vibration	B,C
EMC	Not relevant
Enclosure	C

Place and date
Høvik, 2008-10-09
for DET NORSKE VERITAS AS
Odd Magne Nesvig
Head of Section

Local Office
DNV Essen

This Certificate is valid until
2012-10-31
Jan Aksel Nilsen
Surveyor

Notice: This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

DET NORSKE VERITAS AS — VERITASVEIEN 1, 1322 HØVIK, NORWAY — TEL: (+47) 67 57 99 00 — FAX: (+47) 67 57 99 11
Form No.: 20.90a Issue: January 08 — Page 1 of 3

PROOFED BARRIER®

Zertifikat

Die Qualitätsgemeinschaft Geruchsgesperrte Heizöltanks e.V.
verleiht der Fima

AFRISO-EURO-INDEX GmbH
D-74363 Güglingen

für folgende 7 Produkte:

- Automatische Heizölentlüfter Flow-Control in Verbindung mit einem PA Schlauch 4 x 1 mm
- Heizölfilter, Zweistufenfilter Z 500
- Grenzwertgeber GWG 12/K
- Membran-Antiheberventile MAV
- Automatische Heizölentlüfter FloCo-TOP in Verbindung mit einem PA Schlauch 4 x 1 mm
- Mechanische Füllstandmessgeräte MF-Profil R
- Entnahmegarnituren Euroflex

das Recht die Marke **PROOFED BARRIER®** zu führen

Die Verleihung erfolgt auf Grund des positiven Berichtes des Qualitätsausschusses vom 16.04.2007 unter Zugrundelegung des Erstprüfungsberichtes des Fraunhofer Institutes für Verfahrenstechnik und Verpackung ivv, 85354 Freising vom 05.03.2007. Die Firma AFRISO-EURO-INDEX GmbH unterwirft sich der laufenden Überwachung durch das Fraunhofer Institut ivv und den Regeln der Qualitätsgemeinschaft Geruchsgesperrte Heizöltanks e.V. (QgH e.V.) sowie der Markensatzung der QgH e.V. in der jeweils geltenden Fassung.

Würzburg, den 16.04.2007

Wolfgang Dehoust
Vorsitzender der Qualitätsgemeinschaft Geruchsgesperrte Heizöltanks e.V.

Member of TÜV CERT

TÜV SÜD Industrie Service

ZERTIFIKAT ◆ CERTIFICATE ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

ZERTIFIKAT

Die
Benannte Stelle nach Druckgeräterichtlinie
- Zertifizierungsstelle für Qualitätssicherungssysteme -
der
TÜV SÜD Industrie Service GmbH

bescheinigt, dass das Unternehmen

AFRISO-EURO-INDEX GMBH

Lindenstraße 20
74363 Güglingen, Deutschland

für den Geltungsbereich

Wassermangelsicherungen und Wasserstandsbegrenzer als Ausrüstungsteile mit Sicherheitsfunktion
nach EG-Baumusterprüfungen

ein Qualitätssicherungssystem nach der Europäischen Druckgeräterichtlinie 97/23/EG Anhang III, Modul D

eingeführt hat und anwendet.

Durch ein Audit, Bericht -Nr.: IS-DDB-MAN-Q-550-09, wurde der Nachweis erbracht, dass die betreffenden Anforderungen erfüllt sind.

Der Hersteller ist berechtigt, die im Rahmen des Geltungsbereiches dieses Qualitätssicherungssystems hergestellten Druckgeräte bei der Kennzeichnung mit unserer Kenn-Nummer wie dargestellt zu versehen:

CE 0036

Zertifikat - Nr. DGR-0036-QS-805-09
gültig bis 14. November 2012

Mannheim, 03. November 2009

TÜV SÜD Industrie Service GmbH · Tel.: +49 621 39 52 33 · Fax: +49 89 5155 1090 · e-mail: gerhard.bundenthal@tuev-sued.de

Notified Body No.: 0036
Member of
CONFEDERATION EUROPÉENNE
CEOC
D'ORGANISMES DE CONTRÔLE

TÜV SÜD Industrie Service GmbH · DGR-QS-Zertifizierungsstelle · 68167 Mannheim · Germany

TÜV®

ФЕДЕРАЛЬНОЕ АГЕНТСТВО
ПО ТЕХНИЧЕСКОМУ РЕГУЛИРОВАНИЮ И МЕТРОЛОГИИ

СЕРТИФИКАТ

об утверждении типа средств измерений

PATTERN APPROVAL CERTIFICATE OF MEASURING INSTRUMENTS

DE.C.30.004.A № 30601

Действителен до
«01» марта 2013 г.

Настоящий сертификат удостоверяет, что на основании положительных результатов испытаний утвержден тип манометров показывающих KP, RF, HY, HZ, PF

фирма «AFRISO-EURO-INDEX GmbH», Германия

который зарегистрирован в Государственном реестре средств измерений под № 37048-08 и допущен к применению в Российской Федерации.

Описание типа средства измерений приведено в приложении к настоящему сертификату.

Заместитель Руководителя В.Н.Крутиков
«02» 12 2008 г.

Продлен до
«__» _____ г.

Заместитель Руководителя
«__» _____ 200 г.

ФЕДЕРАЛЬНАЯ СЛУЖБА
ПО ЭКОЛОГИЧЕСКОМУ, ТЕХНОЛОГИЧЕСКОМУ И АТОМНОМУ НАДЗОРУ

РАЗРЕШЕНИЕ

№ РРС 00-30081

На применение

Оборудование (техническое устройство, материал):
Оборудование для систем отопления, контроля процессов горения и состояния окружающей среды, включающие в себя все необходимые компоненты и приборы для установки, наладки и обслуживания отопительных систем, согласно перечню в приложении к настоящему разрешению.

Код ОКП (ТН ВЭД): Согласно приложению.

Изготовитель (поставщик): Фирма "AFRISO EURO-INDEX GmbH" (Германия).

Основание выдачи разрешения: Техническая документация, сертификаты соответствия ОС "ОБОРОНТЕСТ" № РОСС DE.AE63.H00476 + № РОСС DE.AE63.H00478 от 27.11.2007 г., № РОСС DE.AE63.B05271 + № РОСС DE.AE63.B05278 от 15.11.2007 г.; № РОСС DE.AE63.H00461 + № РОСС DE.AE63.H00473 от от 15.11.2007 г. в ОС АНО "КВАНТ-ТЕСТ" № РОСС DE.AE28.B00806 от 15.11.2007 г.

Условия применения:
1. Соблюдение требований законодательства Российской Федерации в области промышленной безопасности.
2. Предоставление заказчикам технических паспортов, сертификатов, руководств по эксплуатации, монтажу и техническому обслуживанию оборудования на русском языке.

Срок действия разрешения до 25.06.2013

Дата выдачи 25.06.2008

Заместитель руководителя
Б.А. Красных

АВ 035786

ПРИЛОЖЕНИЕ Лист 1 из 4

к разрешению № РРС 00-30081 от 25.06.2008
(без разрешения недействительно)

ПЕРЕЧЕНЬ
оборудования фирмы "AFRISO EURO-INDEX GmbH" (Германия), разрешенного к применению на территории Российской Федерации:

1. Уровнемеры моделей:
- Unimes, MT-Profil, Unitop, Unitel, Pneumofix, Montagefix, Unitel-Set, Unitop-Set, Unitop-Set AdBlue, Unimat, DIT, TankControl, CapFox® Serie 20, CapFox® EFM 741/752/762, CapFox®S 74x, CoFox® ELT 68 C, CapFox® ENT 7, SonarFox®, MagFox MMG 01, PulsFox® PMG 01, Minimelder, Minimelder-R, Maximelder-R, RotaFox® MLS 10, CapFox® ENT 20 Ex, CoFox®ELT 8, CoFox® ELT 500/4, CapFox® EFT 7, VibraFox® GVG, DMU 04, DMU 07, DMU 08, DMU 09, RENA, NB 220 H, NB 220 QSA, NB 220 QS, LS 500.

в комплекте с датчиками моделей:
- GWD 81-D-Ex-R, GWG 23-T, GWG 84-UVT-R-600-Ms, GWG 84-UVT-R-900-Ms, GWG 23-Ro, GWG 23-Wa, GWG 84-UVT-R-900-Ms, GWG 12, 76 A, 76 W, 76 N, LS 300, RG 210, Tnn 150, Tnn 937.
- аксессуарами, зондами, индикаторами и шкалами.

2. Сигнализаторы и анализаторы газов моделей:
- GS, GRM, GW-S, GW-SE, GW-S4, GRM, 400 ST, 500 ST, 510 Ex, 600 ST, 700 ST, 800 ST, GSP1, GPS3, EUROLYZER, MULTILYZER, MULTILYZER NG, MAXILYZER, MAXILYZER NGn, KFP, MGA-1, MAXISYSTEM, PSP, PS, PT, MGK, ИК-газоанализатор, PMA, кислородные анализаторы Oxystem, Oxystem 600, Oxystem 1800, Oxystem S, EasySystem, BIOLYZER, BIOLYZER-System в комплекте с запасными частями и принадлежностями.

3. Пылеизмерительные приборы моделей: S303, S305.

4. Разделительные усилители моделей: MSR, KFAG, KH, TV, TW, TWH, STV, MK, SMK, MSU, GHG.

5. Многофункциональные измерительные преобразователи моделей: MFU 02, MFU-KEM, MFU-S.

Заместитель руководителя
Б.А. Красных

АВ 087440

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ПРИЛОЖЕНИЕ Лист 2 из 4

к разрешению № РРС 00-30081 от 25.06.2008
(без разрешения недействительно)

6. Цифровые индикаторы моделей: DA 06, DA 06 Ex, DA 10, DA 12, DA14.

7. Волноанализаторы моделей: AQUALYZER в комплекте, AQUASYSTEM в комплекте, датчики, электроды.

8. Приборы для измерения температуры, скорости, влажности: LFT-M 1, FT3, FT4, FT5, FT6, AGHH в комплекте с принадлежностями, LGM 1.

9. Арматура для забора топлива моделей: Euroflex, Miniflex.

10. Воздухоотводчики, сепараторы воздуха "AFRISO" артикулов: 77700, 77706, 7772, 77753, 77900, 77996, 77851.

11. Биметаллические термометры моделей: BiTh 40 K, BiTh 50 K, BiTh 63 K, BiTh 80 K, BiTh 100 K, BiTh 40, BiTh 50, BiTh 63, BiTh 80, BiTh 100, ATh 63 F, ATh 80 F, ATh 63 S, ATh 63 exe, RT 80, RTC 80, HTh 160 G, HTh 160 W, BiTh 63 I, BiTh 80 I, BiTh 100 I, BiTh 160 I, BiTh 63 IKF, BiTh 80 IKF, BiTh 100 IKF, BiTh 63 IKB, BiTh 80 IKB, BiTh 100 IKB, BiTh 63 E, BiTh 80 E, BiTh 100 E, BiTh 63 Ch, BiTh 100 Ch, BiTh 160 Ch, FTh 100 Ch, FTh 160 Ch, VMTh 110, VMTh 150, VMTh 200, THK 113/37 S, THK 115/40 S, THK 110/52 S, THK130/45 S, THK 150/58 S, THK 150 S/58 S, THK 171/62 S, THK 181/62 S, RFK 360/40 S, RFK 320/52 S, RFK 340/45 S, RFK 343/37 S, THMK 560/40 S, THMK 520/52 K, THMK 540/73 S, TRT 200, SRB, TG.

12. Сигнализаторы, индикаторы и регуляторы наличия, уровня и давления жидкости моделей:
- Minimelder, Minimelder-R, Maximelder-R, CoFox® ELT 8, CoFox ELT 500/4, BWS 11, WSS, AQ 220, LS 500, LS 500 AK5, LS 300 EU, LS 300 FU, LS 300 ESPU, LS 300 FSPU, NB 220 QS Тип 76 A, Тип 76 W, Тип 78 N), RG 210 (в комплекте с зондами моделей: типов 150 и 937;
- оптоэлектронный зонд с предохранителем, WGA 01/02/03/04/05/06 (в комплекте с зондами моделей: WGA-R6, WGA-ES4, WGA-SD, WGA-AS, WGA-SN, WGA-OW, DA 12 G, LAS 230/72/24 EK, LAG-14 ER, LAG-13 K,

Заместитель руководителя
Б.А. Красных

АВ 087441

ПРИЛОЖЕНИЕ Лист 3 из 4

к разрешению № РРС 00-30081 от 25.06.2008
(без разрешения недействительно)

LAG-13 KR, Eurovac 04-I (LAZ 04/1), Eurovac 04-3 (LAZ 04/3), Europress LAD-10, Europress LAD-R, OWWG 3, OM5, WM5, WWG 1, WWG 2, OWU, OAWD-8, OAWD-1, SWS, TraceTek®, DA 10/12/14.

13. Приборы для измерения объемного расхода газа моделей: VMG 01, VMG 02.

14. Приборы преобразования и передачи аварийных сигналов или сообщений о состоянии контролируемых параметров моделей: EMS 220, EMS 422.

15. Фильтры жидкостные:
- Optimum, Opticlean, однотрубные V 500, однотрубные R 500, однотрубные V ½ 500, двухтрубные Z 500, двухтрубные Z ½ 500, Flow-Control, FloCo-TOP-K, FloCo-TOP-M, FloCo-Optimum-K, FloCo-Optimum-M, FloCo-TOP-KM, FloCo-TOP-KMF, FloCo-TOP-MM, FloCo-TOP-KM- Opticlean, FloCo- Opticlean-KM, поточные и водяно-поточные "AFRISO" арт.: 78210-78214, со сменным элементом и обратной промывкой "AFRISO" арт.: 42690, 42691, 42688, 46693, с редукционным клапаном "AFRISO" арт.: 42683, 42684, 42681, 42686.

16. Тестеры для обслуживания емкостей моделей: ME 5, ME 5 P, GPR 4, KWT 5.

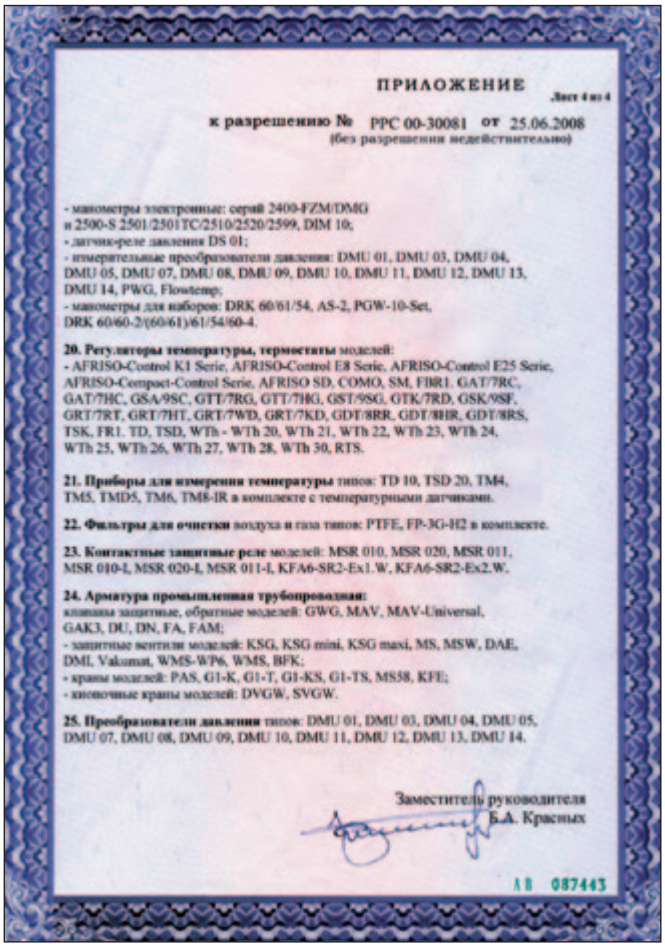
17. Комплекты для проверки давления баков и доливки расширительных баков моделей: PNG-1, PNG-2, PGA-4-Set, тестер модели: PGA, Flowtemp, наборы тестеров моделей: PGWA-Set, PGW-10-Set.

18. Наборы для опрессовки модели AS-2 и проверки на герметичность моделей: DPK 60, DPK 60-2, DPK 60/61, DPK 61, DPK 54, DPK 60-4.

19. Манометры и датчики давления:
- манометры трубчатые, мембранные, поршневые, дифференциальные моделей: TM63, TM80, TH80, THK 150, THK 171, THK 181, RFK 360, RFK 320, RFK 340, RFK 343, THMK 560, THMK 520, THMK 540, KP63, KP72, KP80, KP96, KP100, KP144, KP160, RF40, RF50, RF63, RF72, RF80, RF96, RF100, RF130, RF144, RF160, RF250, HY100, HZ50, HZ63, HZ80, PF100, PF160, MAG80, MAG100, MAG115, MF160, MFW100;

Заместитель руководителя
Б.А. Красных

АВ 087442



ПРИЛОЖЕНИЕ Лист 4 из 4

к разрешению № РРС 00-30081 от 25.06.2008
(без разрешения недействительно)

- манометры электронные: серий 2400-FZM/DMG и 2500-S 2501/2501TC/2510/2520/2599, DIM 10;
- датчик-реле давления DS 01;
- измерительные преобразователи давления: DMU 01, DMU 03, DMU 04, DMU 05, DMU 07, DMU 08, DMU 09, DMU 10, DMU 11, DMU 12, DMU 13, DMU 14, PWG, Flowtemp;
- манометры для наборов: DRK 60/61/54, AS-2, PGW-10-Set, DRK 60/60-2/(60/61)/61/54/60-4.

20. Регуляторы температуры, термостаты моделей:
- AFRISO-Control K1 Serie, AFRISO-Control E8 Serie, AFRISO-Control E25 Serie, AFRISO-Compact-Control Serie, AFRISO SD, COMO, SM, FIR1. GAT/7RC, GAT/7HC, GSA/9SC, GTT/7RG, GTT/7HG, GST/9SG, GTK/7RD, GSK/9SF, GRT/7RT, GRT/7HT, GRT/7WD, GRT/7KD, GDT/8RR, GDT/8HR, GDT/8RS, TSK, FR1. TD, TSD, WTh - WTh 20, WTh 21, WTh 22, WTh 23, WTh 24, WTh 25, WTh 26, WTh 27, WTh 28, WTh 30, RTS.

21. Приборы для измерения температуры типов: TD 10, TSD 20, TM4, TM5, TMD5, TM6, TM8-IR в комплекте с температурными датчиками.

22. Фильтры для очистки воздуха и газа типов: PTFE, FP-3G-H2 в комплекте.

23. Контактные защитные реле моделей: MSR 010, MSR 020, MSR 011, MSR 010-I, MSR 020-I, MSR 011-I, KFA6-SR2-Ex1.W, KFA6-SR2-Ex2.W.

24. Арматура промышленная трубопроводная:
клапаны защитные, обратные моделей: GWG, MAV, MAV-Universal, GAK3, DU, DN, FA, FAM;
- защитные вентили моделей: KSG, KSG mini, KSG maxi, MS, MSW, DAE, DMI, Vakumat, WMS-WP6, WMS, BFK;
- краны моделей: PAS, G1-K, G1-T, G1-KS, G1-TS, MS58, KFE;
- кнопочные краны моделей: DVGW, SVGW.

25. Преобразователи давления типов: DMU 01, DMU 03, DMU 04, DMU 05, DMU 07, DMU 08, DMU 09, DMU 10, DMU 11, DMU 12, DMU 13, DMU 14.

Заместитель руководителя
Б.А. Красных

АВ 087443

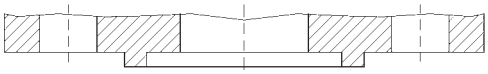
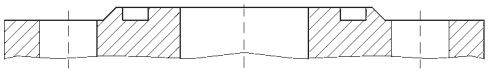
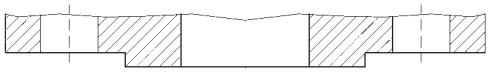
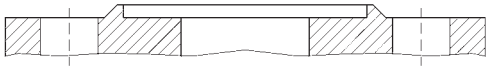
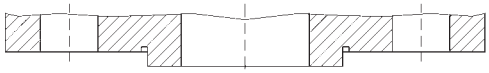
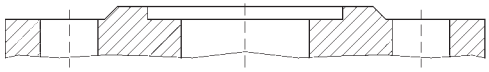
Information on the flange standard EN 1092/ international comparison of grades

Conversion to EN 1092

The new flange standard EN 1092-1 for all flange types has been in effect since June 2002. Currently, the old standards are still in use. However, this will change since the old standards are no longer maintained and updated. New standards will exclusively refer to EN 1092.

AFRISO flanges

AFRISO usually ships type B1 flanges as per EN 1092.
This flange type differs from the former type C flanges as per DIN 2630 only in terms of the surface quality of the sealing surface.
Flanges according to the old standard are available upon request.

		OLD (DIN 25../26..)			NEW (EN 1092-1)	
Flanges	**Sealing surface**	**Type**	**Standard**	**R_z (µm)**	**Type**	**R_z (µm)**
Flat		A B	DIN 2573 DIN 2576	– 40 – 160	A	12.5 – 50
Raised face		C D E	DIN 2630 to DIN 2638	40 – 160 40 16	B1 * B2 **	12.5 – 50 3.2 – 12.5
Tongue		F	DIN 2512		C	3.2 – 12.5
Groove		N			D	
Spigot		V 13	DIN 2513		E	12.5 – 50
Recess		R 13			F	
Spigot		V 14	DIN 2514 for O rings		H	3.2 – 12.5
Recess		R 14			G	

* Typically PN 2.5 to PN 40 ** Typically PN 63 and PN 100

Stainless steel – international comparison of grades

Material no.		DIN	AISI
1.4301		X 5 CrNi 18 10	304
1.4401		X 5 CrNiMo 17 123	316
1.4404	Chemically identical	X 2 CrNiMo 17 132	316 L
1.4435	Resistance	X 2 CrNiMo 18 143	316 L
1.4462		X 2 CrNiMoN 22 53	318 L
1.4571		X 6 CrNiMoTi 17 122	316 Ti
1.4542		X 5 CrNiCuN6 16-4	630

DIN: Deutsches Institut für Normung

AISI: American Iron Steel Institute

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Conversion table for standard pressure units

Unit	bar	mbar	Pa	kPa	MPa	kp/mm²	kp/cm²	atm	mmHg	mWC	mmWC	psi	"H_2O	"Hg
1 bar	1	1000	100000	100	0.1	0.01019716	1.019716	0.986923	750.062	10.19716	10197.16	14.50377	401.463	29.53
1 mbar	0.001	1	100	0.1	0.001	0.0000101972	0.001019716	0.000986923	0.750062	0.01019716	10.19716	0.01450377	0.401463	0.02953
1 Pa	0.00001	0.01	1	0.001	0.000001	0.000000102	0.000010197	0.000009869	0.00750062	0.0001019716	0.1019716	0.000145038	0.00401463	0.0002953
1 kPa	0.01	10	1000	1	0.001	0.0001019716	0.01019716	0.00986923	7.50062	0.1019716	101.9716	0.1450377	4.01463	0.2953
1 MPa	10	10000	1000000	1000	1	0.1019716	10.19716	9.86923	7500.62	101.9716	101971.6	145.0377	4014.63	295.3
1 kp/mm²	98.0665	98066.5	9806650	9806.65	9.80665	1	100	96.7841	73555.9	1000	1000000	1422.3344	39370.08	2895.9016
1 kp/cm²	0.980665	980.665	98066.5	98.0665	0.0980665	0.01	1	0.967841	735.559	10	10000	14.223344	393.7008	28.959016
1 atm	1.01325	1013.25	101325	101.325	0.101325	0.01033227	1.033227	1	760	10.33227	10332.27	14.6959	406.38858	29.92126
1 mmHg	0.001333224	1.333224	133.3224	0.1333224	0.000133322	0.0000135951	0.00135951	0.001315789	1	0.01360	13.60	0.019336	0.53524	0.03937
1 mWC	0.0980665	98.0665	9806.65	9.80665	0.00980665	0.001	0.1	0.0967841	73.556	1	1000	1.4223274	39.37008	2.8959016
1 mmWC	0.000098067	0.0980665	9.80665	0.00980665	0.000009807	0.000001	0.0001	0.000096784	0.073556	0.001	1	0.001422327	0.03937008	0.002895902
1 psi	0.06894757	68.94757	6894.757	6.894757	0.006894757	0.0070307	0.070307	0.068046	51.715217	0.70307	703.07	1	27.68	2.03529
1 "H_2O	0.00249089	2.49089	249.089	0.249089	0.000249089	0.0000254	0.00254	0.002458317	1.86832	0.0254	25.4	0.03613	1	0.07356
1 "Hg	0.0338639	33.8639	3386.4	3.3864	0.0033864	0.000345312	0.0345312	0.03342104	25.4	0.345316	345.316	0.49115	13.595	1

Information on the Pressure Equipment Directive (PED) 97/23/EC

The European Pressure Equipment Directive (PED) came into force on May 30, 2002. The following paragraphs provide some information on the Directive itself and on our activities within the framework of this Directive.

- AFRISO-EURO-INDEX GmbH pressure gauges with a full scale value of > 0.5 bar are subject to the Pressure Equipment Directive and meet the appropriate requirements.
- Since the future application conditions of most pressure gauges are normally not completely known at the time of manufacture, we always manufacture our products in accordance with the most stringent criteria (gases of group 1).
- This way, our pressure gauges with a full scale value of 200 bar receive a CE mark according to the conformity assessment procedure.
- Pressure gauges with a connection flange of > DN 25 receive a CE mark with a full scale range of 0.5 bar and greater.
- The CE mark is attached to the outside of the housing (type designation plate).
- A declaration of conformity is provided on request.
- Detailed operating instructions and the appropriate data sheets are available at www.afriso.com. They can also be sent to you on request.
- Pressure gauges with a full scale value of less than 0.5 bar and loose chemical seals do not fall under the PED and must not carry a CE mark.
- Pressure gauges with a full scale value of between 0.5 bar and 200 bar fall under "Good Engineering Practice" and must not carry a CE mark (section 3, paragraph 3).
- We are not authorised to CE mark pressure gauges without a company name or a company logo.
- Pressure gauges which are used as a part of a safety system installed to protect against exceeding permissible limit values (equipment parts with a safety function) are treated separately.
- Our pressure gauges comply with the European Standard EN 837-1 and are manufactured and tested according to the appropriate requirements.

Selection criteria/safety considerations for pressure gauges as per EN 837-2

Medium	Liquid							
Housing	Without filling				With filling			
Nominal size	40/50/63/80		100/160/250		40/50/63/80		100/160/250	
Range bar	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25
Code for minimum safety version	0	0	0	0	S1	S1	S1	S1
AFRISO type designation	All	All	All	All	D6/D7/D8	D6/D7/D8	D7/D8	D7/D8

Medium	Gas or steam (attention: not applicable to oxygen + acetylene*)							
Housing	Without filling				With filling			
Nominal size	40/50/63/80		100/160/250		40/50/63/80		100/160/250	
Range bar	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25	≤ 25	> 25
Code for minimum safety version	0	S2	S1	S3	S1	S2	S1	S3
AFRISO type designation	All	"A"	D4/D9	RF 100/160 Si D4x2	D6/D7/D8	"B"	D6/D7/D8	RF 100/160 Si D8x2

Explanations of key:

"A" RF 63 Ch D 9x2, RF 63 Si D 4x2, RF 50/63 ST, RF 50/63 GT, RF 63 RG, RF 50 SK D 902, RF 63 MK/IK D 3x2
"B" RF 63 D 7x2, RF 63 Si D 8x2

0 Pressure gauges without blow-out
S1 Pressure gauges with blow-out
S2 Safety pressure gauges without solid baffle wall
S3 Safety pressure gauges with solid baffle wall (for higher safety level)

Note 1:
Pressure gauges for oxygen and acetylene must meet the requirements for safety pressure gauges (NS 40 – 80 S2, NS 63/100/160 S3).

Note 2:
Pressure gauges with glycerine filling must not be used for oxygen or other oxidation process fluids. High-concentration fluorine liquids and chlorinated liquids (e.g. halocarbon) are suitable for such applications.

Note 3:
This table contains the standard safety version with the corresponding keys. Users must take into consideration any information they have concerning their special requirements and may also use safety pressure gauges at pressures below than 25 bar.

* See page 615 for pressure gauges for oxygen or acetylene.

Selection criteria/safety considerations for pressure gauges as per EN 837-2

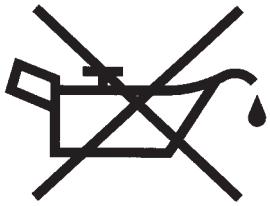
Pressure gauges for oxygen and acetylene

Only safety pressure gauges (S2 and S3) may be used.
All materials for wetted parts (parts coming into contact with oxygen or acetylene) must comply with EN 29539.

Pressure gauges for oxygen

The Bourdon tube and other wetted parts must be free from oil and grease. Only those lubricants suitable for oxygen at maximum operating pressure may be used.

The dial must bear the word "oxygen" in English and the international symbol for "free from oil and grease" (symbol 0248 according to ISO 7000 with the "oil prohibited" symbol):



Oxygen and acetylene

	NG 40 - 80 S 2/S 3	NG 100 - 250 S 3
Version	RF 50 ST RF 50 GT adapted to EN 562 RF 63 ST RF 63 GT adapted to EN 562 RF 50 SK D 902 RF 63 MK/IK D 3x2 RF 63 Si D 4x2	RF 100 Si D 4x2 RF 160 Si D 4x2

Dials for pressure gauges – graduation

Housing diameters (NG) 40, 50, 63, 72x72 – accuracy classes 1.6 and 2.5

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 1 bar	0.05 bar	0 ... 10 mbar	0.5 mbar	-60 ... +40 mbar	5 mbar	
-1 ... 0 bar	0.05 bar	-4 ... +6 mbar	0.5 mbar	-100 ... 0 mbar	5 mbar	
0 ... 10 bar	0.5 bar	-6 ... +4 mbar	0.5 mbar	0 ... 1000 mbar	50 mbar	
-1 ... +9 bar	0.5 bar	10 ... 0 mbar	0.5 mbar	-400 ... +600 mbar	50 mbar	
0 ... 100 bar	5 bar	0 ... 100 mbar	5 mbar	-600 ... +400 mbar	50 mbar	
0 ... 1000 bar	50 bar	-40 ... +60 mbar	5 mbar	-1000 ... 0 mbar	50 mbar	

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 1.6 bar	0.05 bar	0 ... 16 mbar	0.5 mbar	0 ... 160 mbar	5 mbar	
-1 ... +0.6 bar	0.05 bar	-6 ... +10 mbar	0.5 mbar	-60 ... +100 mbar	5 mbar	
0 ... 16 bar	0.5 bar	-10 ... +6 mbar	0.5 mbar	-100 ... +60 mbar	5 mbar	
-1 ... +15 bar	0.5 bar	-16 ... 0 mbar	0.5 mbar	-160 ... 0 mbar	5 mbar	
0 ... 160 bar	5 bar					

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 2.5 bar	0.1 bar	0 ... 25 mbar	1 mbar	0 ... 250 mbar	10 mbar	
-1 ... +1.5 bar	0.1 bar	-10 ... +15 mbar	1 mbar	-100 ... +150 mbar	10 mbar	
0 ... 25 bar	1 bar	-15 ... +10 mbar	1 mbar	-150 ... +100 mbar	10 mbar	
0 ... 250 bar	10 bar	-25 ... 0 mbar	1 mbar	-250 ... 0 mbar	10 mbar	

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 4 bar	0.2 bar	0 ... 40 mbar	2 mbar	0 ... 400 mbar	20 mbar	
-1 ... +3 bar	0.2 bar	-15 ... +25 mbar	2 mbar	-150 ... +250 mbar	20 mbar	
0 ... 40 bar	2 bar	-25 ... +15 mbar	2 mbar	-250 ... +150 mbar	20 mbar	
0 ... 400 bar	20 bar	-40 ... 0 mbar	2 mbar	-400 ... 0 mbar	20 mbar	

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 0.6 bar	0.02 bar	0 ... 60 mbar	2 mbar	0 ... 600 mbar	20 mbar	
-0.6 ... 0 bar	0.02 bar	-20 ... +40 mbar	2 mbar	-200 ... +400 mbar	20 mbar	
0 ... 6 bar	0.2 bar	-40 ... +20 mbar	2 mbar	-400 ... +200 mbar	20 mbar	
-1 ... +5 bar	0.2 bar	-60 ... 0 mbar	2 mbar	-600 ... 0 mbar	20 mbar	
0 ... 60 bar	2 bar					
0 ... 600 bar	20 bar					

Dials for pressure gauges – graduation

Housing diameters (NG) 80, 100, 160, 96x96, 144x144 – accuracy classes 1.0 and 1.6

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 1 bar	0.02 bar	0 ... 10 mbar	0.2 mbar	-60 ... +40 mbar	2 mbar	
-1 ... 0 bar	0.02 bar	-4 ... +6 mbar	0.2 mbar	-100 ... 0 mbar	2 mbar	
0 ... 10 bar	0.2 bar	-6 ... +4 mbar	0.2 mbar	0 ... 1000 mbar	20 mbar	
-1 ... +9 bar	0.2 bar	-10 ... 0 mbar	0.2 mbar	-400 ... +600 mbar	20 mbar	
0 ... 100 bar	2 bar	0 ... 100 mbar	2 mbar	-600 ... +400 mbar	20 mbar	
0 ... 1000 bar	20 bar	-40 ... +60 mbar	2 mbar	-1000... 0 mbar	20 mbar	

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 1.6 bar	0.05 bar	0 ... 16 mbar	0.5 mbar	0 ... 160 mbar	5 mbar	
-1 ... +0.6 bar	0.05 bar	-6 ... +10 mbar	0.5 mbar	-60 ... +100 mbar	5 mbar	
0 ... 16 bar	0.5 bar	-10 ... +6 mbar	0.5 mbar	-100 ... +60 mbar	5 mbar	
-1 ... +15 bar	0.5 bar	-16 ... 0 mbar	0.5 mbar	-160 ... 0 mbar	5 mbar	
0 ... 160 bar						
0 ... 1600 bar						

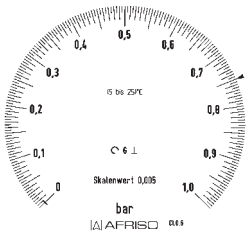
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 2.5 bar	0.05 bar	0 ... 25 mbar	0.5 mbar	0 ... 250 mbar	5 mbar	
-1 ... +1.5 bar	0.05 bar	-10 ... +15 mbar	0.5 mbar	-100 ... +150 mbar	5 mbar	
0 ... 25 bar	0.5 bar	-15 ... +10 mbar	0.5 mbar	-150 ... +100 mbar	5 mbar	
0 ... 250 bar	5 bar	-25 ... 0 mbar	0.5 mbar	-250 ... 0 mbar	5 mbar	

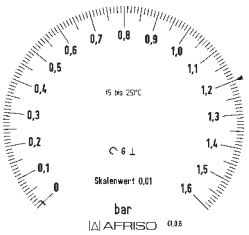
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 4 bar	0.1 bar	0 ... 4.0 mbar	0.1 mbar	-25 ... +15 mbar	1 mbar	
-1 ... +3 bar	0.1 bar	-1.5 ... +2.5 mbar	0.1 mbar	-40 ... 0 mbar	1 mbar	
0 ... 40 bar	1 bar	-2.5 ... +1.5 mbar	0.1 mbar	0 ... 400 mbar	10 mbar	
0 ... 400 bar	10 bar	-4 ... 0 mbar	0.1 mbar	-150 ... +250 mbar	10 mbar	
		0 ... 40 mbar	1 mbar	-250 ... +150 mbar	10 mbar	
		-15 ... +25 mbar	1 mbar	-400 ... 0 mbar	10 mbar	

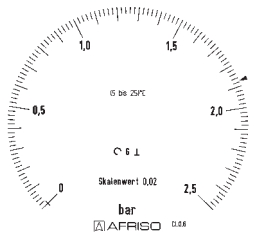
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 0.6 bar	0.01 bar	0 ... 6 mbar	0.1 mbar	-40 ... +20 mbar	1 mbar	
-0.6 ... 0 bar	0.01 bar	-2 ... +4 mbar	0.1 mbar	-60 ... 0 mbar	1 mbar	
0 ... 6 bar	0.1 bar	-4 ... +2 mbar	0.1 mbar	0 ... 600 mbar	10 mbar	
-1 ... +5 bar	0.1 bar	-6 ... 0 mbar	0.1 mbar	-200 ... +400 mbar	10 mbar	
0 ... 60 bar	1 bar	0 ... 60 mbar	1 mbar	-400 ... +200 mbar	10 mbar	
0 ... 600 bar	10 bar	-20 ... +40 mbar	1 mbar	-600 ... 0 mbar	10 mbar	

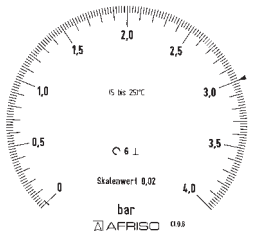
Dials for pressure gauges – graduation

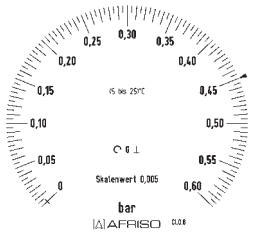
Housing diameter (NG) 160, 250 – accuracy class 0.6 – DIN 16123

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 1 bar	0.005 bar	0 ... 10 mbar	0.05 mbar	-60 ... +40 mbar	0.5 mbar	
-1 ... 0 bar	0.005 bar	-4 ... +6 mbar	0.05 mbar	-100 ... 0 mbar	0.5 mbar	
0 ... 10 bar	0.05 bar	-6 ... +4 mbar	0.05 mbar	0 ... 1000 mbar	5 mbar	
-1 ... +9 bar	0.05 bar	-10 ... 0 mbar	0.05 mbar	-400 ... +600 mbar	5 mbar	
0 ... 100 bar	0.5 bar	0 ... 100 mbar	0.5 mbar	-600 ... +400 mbar	5 mbar	
		-40 ... +60 mbar	0.5 mbar	-1000 ... 0 mbar	5 mbar	

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 1.6 bar	0.01 bar	0 ... 16 mbar	0.1 mbar	0 ... 160 mbar	1 mbar	
-1 ... +0.6 bar	0.01 bar	-6 ... +10 mbar	0.1 mbar	-60 ... +100 mbar	1 mbar	
0 ... 16 bar	0.1 bar	-10 ... +6 mbar	0.1 mbar	-100 ... +60 mbar	1 mbar	
-1 ... +15 bar	0.1 bar	-16 ... 0 mbar	0.1 mbar	-160 ... 0 mbar	1 mbar	
0 ... 160 bar	1 bar					

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 2.5 bar	0.02 bar	0 ... 25 mbar	0.2 mbar	0 ... 250 mbar	2 mbar	
-1 ... +1.5 bar	0.02 bar	-10 ... +15 mbar	0.2 mbar	-100 ... +150 mbar	2 mbar	
0 ... 25 bar	0.2 bar	-15 ... +10 mbar	0.2 mbar	-150 ... +100 mbar	2 mbar	
0 ... 250 bar	2 bar	-25 ... 0 mbar	0.2 mbar	-250 ... 0 mbar	2 mbar	

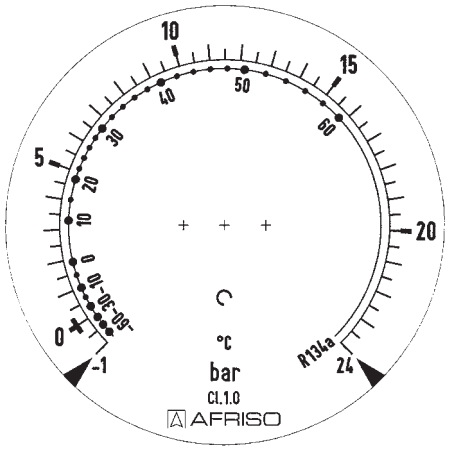
Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 4 bar	0.02 bar	0 ... 40 mbar	0.2 mbar	0 ... 400 mbar	2 mbar	
-1 ... +3 bar	0.02 bar	-15 ... +25 mbar	0.2 mbar	-150 ... +250 mbar	2 mbar	
0 ... 40 bar	0.2 bar	-25 ... +15 mbar	0.2 mbar	-250 ... +150 mbar	2 mbar	
0 ... 400 bar	2 bar	-40 ... 0 mbar	0.2 mbar	-400 ... 0 mbar	2 mbar	

Ranges	Graduation	Ranges	Graduation	Ranges	Graduation	Example
0 ... 0.6 bar	0.005 bar	0 ... 6 mbar	0.05 mbar	-40 ... +20 mbar	0.5 mbar	
-0.6 ... 0 bar	0.005 bar	-2 ... +4 mbar	0.05 mbar	-60 ... 0 mbar	0.5 mbar	
0 ... 6 bar	0.05 bar	-4 ... +2 mbar	0.05 mbar	0 ... 600 mbar	5 mbar	
-1 ... +5 bar	0.05 bar	-6 ... 0 mbar	0.05 mbar	-200 ... +400 mbar	5 mbar	
0 ... 60 bar	0.5 bar	0 ... 60 mbar	0.5 mbar	-400 ... +200 mbar	5 mbar	
0 ... 600 bar	5 bar	-20 ... +40 mbar	0.5 mbar	-600 ... 0 mbar	5 mbar	

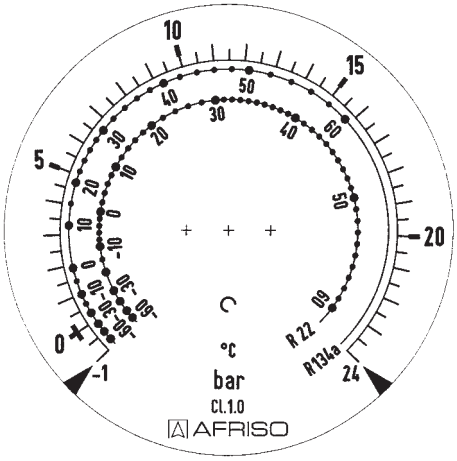
Temperature scales for refrigerant dew point temperature

Examples range -1/+24 bar

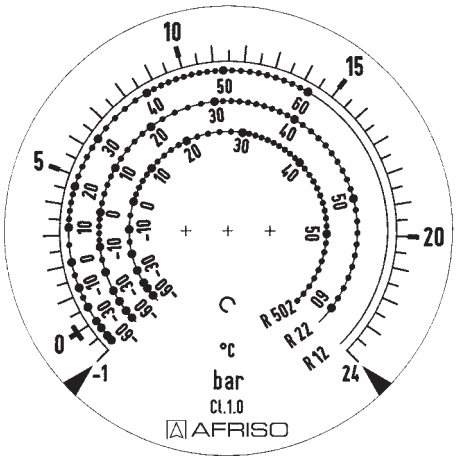
R 134a



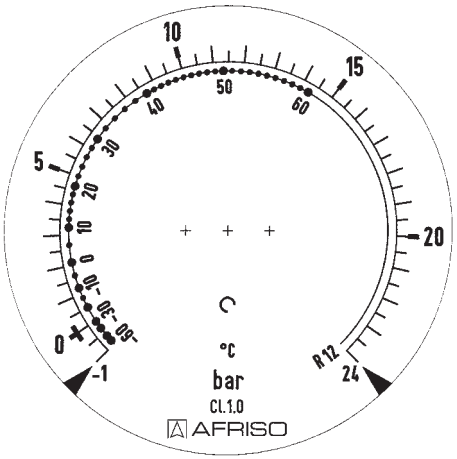
R 134a/R 22



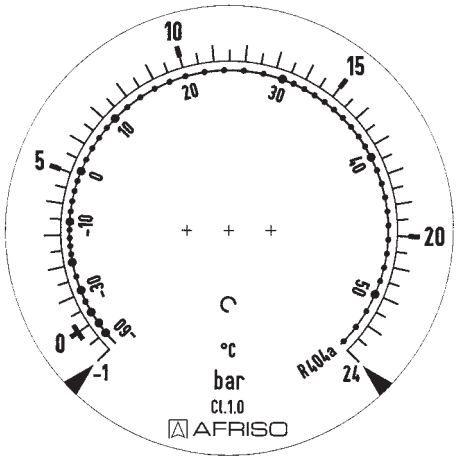
R 22/R 12/R 502



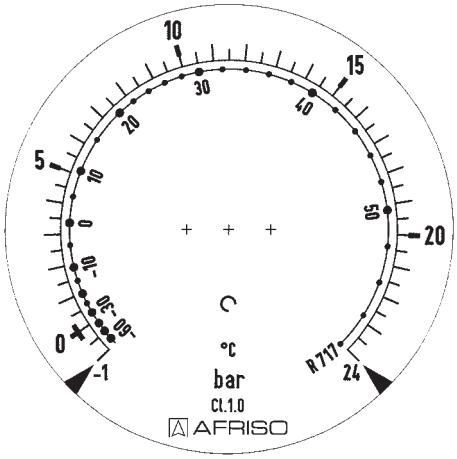
R 12



R 404A



R 717 (NH3)



Standard colours for temperature scales: R 12 = blue, R 22 = green, R 502 and R 717 = red

Information on EN 50379 (portable measuring instruments)

As of March 01, 2007 EN 50379 for portable measuring instruments went into effect. This standard covers devices used to determine the gas concentration and other combustion parameters in the installation and maintenance of domestic and industrial heating systems with standard fuels. The standard defines the design, testing and operating requirements for portable devices which are used to determine specific flue gas parameters such as the concentration of individual gas components, the temperature and/or the pressure in combustion processes in order to ensure the compliance of the operating behaviour of combustion systems with national directives.

The standard is divided into three parts:

- **Part 1: General requirements and test procedures**
  EN 50379-1 specifies the general requirements concerning the design, testing and operating behaviour of devices used for short-term measurements to determine specific flue gas parameters such as the concentration of individual gas components, the temperature and/or the pressure in combustion processes in order to ensure the compliance of the operating behaviour of combustion systems using commercially available fuels in domestic and industrial applications with national directives.

- **Part 2: Requirements concerning the operating behaviour of devices used in statutory measurements and assessments**
  EN 50379-2 applies to devices which are used in statutory measurements or measurements specified by regulations. National legislation covering the operating behaviour of combustion systems exists in several European countries. Authorised inspectors use such devices to measure flue gas parameters and verify the compliance of combustion systems with national directives.
  Since the results of such measurements have statutory consequences, there are stringent requirements concerning the accuracy of these devices. Therefore, EN 50379-2 specifies maximum values for measuring inaccuracy. Tests with real flue gases constitute an essential part in the proof of suitability for statutory measurements. The determination of the measuring inaccuracy must be demonstrated and confirmed with internationally approved methods for the entire measuring range.

- **Part 3: Requirements for devices in non-regulated areas in the maintenance of gas-fuelled heating facilities**
  EN 50379-3 applies to devices which are used in non-statutory applications. The requirements are less stringent because the devices are used in determining whether a gas-fuelled combustion system may require maintenance or in setting up a gas-fuelled combustion system during maintenance. The measuring inaccuracy does not need to be determined for such devices. These devices do not meet the technical measuring specifications as required in part 2. Therefore, devices certified according to EN 50379-3 are not suitable for measuring combustion systems.

All flue gas measuring instruments as well as BlueLine pressure and temperature measuring instruments meet the stringent requirements of EN 50379-2. The TÜV quality mark (OCTAGON) certifies EN 50379-2 compliance and may only be used if the production is audited by TÜV-SÜD at regular intervals. This line of measuring instruments with the TÜV-OCTAGON mark is backed by experience and competence. High quality pays off – both price/performance ratio and cost of ownership are convincing. High-quality measuring instruments also help you avoid conflicts and problems in terms of product liability. **All BlueLine instruments meet the stringent requirements of EN 50379-2 and can continue to be used without limitations after March 01, 2007.**

Checklist for enquiries – level measurement

Company:	Project/enquiry:
Quantity	
Requirements	☐ Level measurement with local display ☐ Level measurement without local display ☐ Min. level switch ☐ Max. level switch ☐ Level control ☐ Other:
Preferred measuring principle	Level detection: ☐ PTC thermistor ☐ Conductivity ☐ Vibration ☐ Rotary paddle ☐ Capacitance Continuous measurement: ☐ Mechanical ☐ Pneumatic ☐ Capacitance ☐ Hydrostatic ☐ Ultrasonic ☐ Guided micropulse (TDR) ☐ Magnetostrictive
Required outputs	☐ 4-20 mA ☐ 0-10 V ☐ HART ☐ RS 232 ☐ Limit level contacts, no. ☐ Other:
Required accuracy	
Medium to be measured	
Viscosity/density/granule size	
Dielectric constant (ε_r)	
Surface	☐ Calm ☐ Turbulent Foam ☐ Yes, ☐ No Thickness:_____ Water content:_____
Changing media	☐ Yes ☐ No
EX protection	☐ No ☐ Yes, EX zone _____
Overfill prevention system required	☐ No ☐ Yes, (WHG/TRbF)
Temperatures	T_{max} medium: T_{max} ambient:
Tank height / diameter	
Tank shape	☐ Cylindrical ☐ Rectangular ☐ Square ☐ Vertical ☐ Horizontal
Is the tank pressurised?	☐ Not pressurised ☐ Yes, max. pressure _____bar
Is the tank under vacuum?	☐ No ☐ Yes, max. vacuum_____bar
Required process connection	☐ G1B ☐ G1½B ☐ G2B ☐ Flange: ☐ Other:
Mounting type	☐ Top mounting ☐ Side mounting ☐ Other:
Location of tank	☐ Aboveground ☐ Underground ☐ Welded in basement
Tank material	
Are there stirrers, struts or other obstructions in the tank (please enclose sketch)?	

Checklist for enquiries – thermometers

Company:	Project/enquiry:
Quantity	
Application	
Medium to be measured	
Version	☐ Bimetal thermometer ☐ Every angle version
Housing diameter	☐ 34 ☐ 50 ☐ 63 ☐ 80 ☐ 100 ☐ 160 ☐ 250
Range	
Connection position	☐ Bottom ☐ Back ☐ Can be rotated and tilted
Connection type	☐ Plain ☐ Sep. screw-in thermowell ☐ Sep. weld-in thermowell ☐ DIN/EN thermowell ☐ Loose male connection ☐ Loose union nut ☐ Compression fitting, adjustable. ☐ Fixed male connection Neck ☐ No ☐ Yes _____mm
Connection thread	☐ G ☐ NPT ☐ BSPT ☐ For welding ☐ ¼ ☐ ⅜ ☐ ½ ☐ ¾ ☐ Other:
Stem length	
Mounting for capillary type	☐ Wall bracket ☐ Back flange ☐ 3-hole fixing, panel mounting bezel
Capillary length	
Housing	☐ Plastic ☐ Sheet steel ☐ Stainless steel with push on bezel ☐ Stainless steel with bayonet bezel
Filling	☐ No filling ☐ Glycerine ☐ Silicone oil ☐ Other:
Stem material	☐ Brass ☐ Stainless steel 1.4571/1.4541 ☐ Other:
Thermowell material	☐ Brass ☐ Steel ☐ Stainless steel ☐ Other:
Dial	☐ Single scale as per EN ☐ Dual scale: ☐ Special scale: Customer logo ☐ Yes ☐ No Manufacturer logo ☐ Yes ☐ No
Accuracy	Class ☐ 1 ☐ 2 as per EN 13190
Electrical contacts (only for gas filled thermometers)	☐ No ☐ Magnetic spring contact ☐ Inductive contact ☐ Electronic contact ☐ Single ☐ Dual ☐ Triple Switching function:
Other	

Checklist for enquiries – resistance thermometers

Company:	Project/enquiry:
Quantity	
Application	
Medium to be measured	
Temperatures	T_{max} medium: T_{max} ambient:
Pressure loads	Static: Dynamic: from to
Measuring range	
Sensor	☐ 1 x ☐ 2 x ☐ Pt 100 ☐ Pt 500 ☐ Pt 1000 ☐ Other: ☐ Class B ☐ Class A as per IEC 751 ☐ 2-wire ☐ 3-wire ☐ 4-wire
Neck	☐ No ☐ Yes, length _____mm ☐ Material 1.4571 ☐ Other material:
Installation length	_____mm
Process connection	☐ Fixed male connection ☐ Union nut ☐ Compression fitting ☐ G ☐ NPT ☐ M ☐ Other: ☐ ¼ ☐ ½ ☐ 18x1.5 ☐ 14x1.5 ☐ Other: ☐ Mounting flange ☐ Ø 41 mm ☐ Ø 80 mm, adjustable ☐ Clamp DN_____ ☐ DIN 11851 DN_____ ☐ Hygienic DN_____ ☐ Other:
Thermowell	☐ Weld-in thermowell as per DIN: ☐ Flanged thermowell, blind flange DN 25, PN 40 ☐ Other:
Material for process connection / thermowell	☐ Stainless steel 1.4571 ☐ Other:
Reduced measuring tip	☐ No ☐ Yes ☐ 6 mm ☐ 4 mm
Required connection head or electrical connection	
Transmitter installation	☐ No ☐ Yes, output signal ☐ 4–20 mA ☐ 0–10 V ☐ Measuring range of transmitter:
EX protection	☐ No ☐ Yes, for zone _____
Other	

Checklist for enquiries – pressure gauges

Company:	Project/enquiry:
Quantity	
Application	
Medium to be measured	
Temperatures	T_{max} medium: T_{max} ambient: T_{min} medium: T_{min} ambient:
Pressure loads	Static: Dynamic: from to
Measuring system	☐ Bourdon tube ☐ Capsule element ☐ Diaphragm ☐ Magnetic piston ☐ Other: ☐ Spring diaphragm
Housing diameter	☐ 40 ☐ 50 ☐ 63 ☐ 80 ☐ 100 ☐ 160 ☐ 250 mm ☐ 4½"
Range	
Connection position	☐ Bottom ☐ Back ☐ Radial at _____ o'clock
Connection thread	☐ G ☐ NPT ☐ BSPT ☐ ⅛ ☐ ¼ ☐ ⅜ ☐ ½ ☐ ¾ ☐ Other:
Mounting type	☐ Direct ☐ Back flange ☐ Sheet steel, black ☐ Stainless steel ☐ 3-hole fixing, panel mounting bezel ☐ Black ☐ Chrome-plated ☐ Stainless steel ☐ Panel mounting bezel for clamp fixing + clamp fixing ☐ Black ☐ Chrome-plated ☐ Stainless steel
Housing	☐ Plastic ☐ Sheet steel, black ☐ Sheet steel with clip-in window ☐ Stainless steel with bayonet bezel
Housing with blow-out	☐ Yes ☐ No ☐ Safety version S3
Filling	☐ Without ☐ Glycerine ☐ Silicone oil ☐ Other:
Window	☐ Plastic ☐ Instrument-grade glass ☐ Laminated safety glass Must be resistant to solvents ☐ Yes ☐ No Must be resistant to:
Wetted parts	☐ Brass ☐ Steel ☐ Stainless steel 316 L ☐ Monel ☐ Other:
Special coatings (diaphragm)	☐ PTFE ☐ Other:
Measuring system helium-tested	☐ Yes qpv= 10^{-6} ☐ No
Dial	☐ Single scale as per EN ☐ Dual scale: ☐ Special scale: Customer logo ☐ Yes ☐ No Manufacturer logo ☐ Yes ☐ No
Accuracy class	☐ 0.1 ☐ 0.25 ☐ 0.6 ☐ 1.0 ☐ 1.6 ☐ 2.5
Electrical contacts	☐ No ☐ Magnetic spring contact ☐ Inductive contact ☐ Electronic contact ☐ Single ☐ Dual ☐ Triple ☐ Quadruple Switching function:
Other	

Checklist for enquiries – chemical seals

Company:	Project/enquiry:	
Quantity		
Application		
Medium to be measured		
Material for wetted parts		
Temperatures	T_{max} medium: T_{min} medium:	T_{max} ambient: T_{min} ambient:
Pressure loads	Static:	Dynamic: from to
Vacuum	☐ Yes ☐ No	
Special requirements		
Information on the pressure gauge	☐ Pressure gauge	☐ Pressure transducer
Housing diameter	☐ 63 ☐ 100 ☐ 160	---
Range/measuring range		
Connection position	☐ Bottom ☐ Back	---
See checklists "Pressure gauges" and "Pressure transducers" for additional specifications.		
Details on the chemical seal	☐ Diaphragm seal ☐ Inline chemical seal ☐ Tongue type chemical seal	
Process connection (thread type and size / nominal diameter and nominal pressure)		
Material		
Other		
Fitting of pressure gauge to chemical seal		
Direct mounting	☐ Yes ☐ No	
Cooling element between pressure gauge and chemical seal	☐ Yes ☐ No	
Fitting with capillary tube	Capillary length_____m Protective hose ☐ Yes ☐ No Height difference between pressure gauge and chemical seal_____cm	
Calibration temperature	☐ +20 °C (=standard) ☐ Other:_____	
Preferred filling liquid		
Other		

Checklist for enquiries – pressure transducers

Company:	Project/enquiry:
Quantity	
Application	
Medium to be measured	
Material for wetted parts	
Temperatures	T_{max} medium: T_{max} ambient:
Pressure loads	Static: Dynamic: from to
Measuring principle	☐ Piezo-resistive ceramic measuring cell ☐ Piezo-resistive stainless steel measuring cell ☐ Capacitance ceramic measuring cell
Measuring range	
Pressure type	☐ Relative pressure ☐ Absolute pressure ☐ Differential pressure
Connection type/connection thread	☐ Standard ☐ Protruding diaphragm ☐ Flush ☐ G ☐ NPT ☐ Other: ☐ ⅛ ☐ ¼ ☐ ½ ☐ Other: ☐ Chemical seal fitted:_____ Clamp connection:_____ Dairy fitting DIN 11851:_____
Housing	☐ Standard ☐ Field housing ☐ Submersible probe ☐ Field housing with display
Electrical connection	☐ Connector ISO 4400 (DIN 43650-A) ☐ Fixed cable_____metres ☐ PUR cable ☐ FEP cable ☐ Plug connector:_____
Output signal	☐ 4-20 mA ☐ 0-20 mA ☐ 0-10 V ☐ Other: ☐ HART ☐ RS 232
Measuring accuracy	☐ 0.1 ☐ 0.25 ☐ 0.35 ☐ 0.5 ☐ 1.0 % FSO
EX protection	☐ No ☐ Yes, for zone:_____
Accessories	☐ Digital display unit for panel mounting ☐ Without switching output ☐ Digital plug-in display ☐ With ___ switching outputs ☐ Integrated display ☐ Isolation amplifier ☐ Supply isolation amplifier
Other	

Checklist for enquiries – event reporting systems

Company:	Project/enquiry:		
Quantity			
Application			
Parameters to be monitored	☐ **Level**	☐ **Leak**	☐ **Hazards**
	☐ Limit level ☐ Continuous ☐ Liquid ☐ Solid	☐ Tank leaks ☐ Pipe leaks ☐ Other: _____	☐ Gas ☐ Smoke ☐ Fire ☐ Water ☐ Low water ☐ Process temperature ☐ Room temperature ☐ Doors ☐ Windows ☐ Burglary
	☐ Other parameters: _____		
EX protection	☐ No ☐ Yes, for zone:_____		
Supply voltage	☐ Battery ☐ Mains		
Data transmission	☐ GSM ☐ Telephone network ☐ Other:_____		
Required alarm inputs	☐ Digital Number:_____ ☐ Analogue Number :_____		
Required alarms	☐ Text/SMS ☐ Call ☐ Internet / E-mail ☐ Local alarm: ☐ Visual ☐ Audible ☐ Other: ☐ Additional switching outputs:_____ ☐ Additional alarm units:_____		
Remote data polling	☐ Not required ☐ Required – desired parameters: _____		
Remote programming	☐ Not required ☐ Required – desired parameters: _____		
Safety function	☐ Not required ☐ Required – desired parameters: _____		
Data logging	☐ Not required ☐ Required – desired parameters: _____		
Data management and visualisation via Webservice (www.afriso-net.com)	☐ Not required ☐ Required – desired parameters: _____		
Other			

Checklist for enquiries – gas analysis

Company:	Project/enquiry:
Quantity	
Application	
Type of gas to be measured (designation)	☐ Flue gas ☐ Exhaust gas ☐ Natural gas ☐ Inert gas ☐ Process gas ☐ Ambient air
Fuel type (for flue gas measurement)	☐ Gas ☐ Oil ☐ Coal ☐ Waste ☐ Wood ☐ Other:_____
Composition of gas to be measured	Concentration range (physical unit)* Measured component** _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ *mg/m³, ppm, Vol. % **Please check
Measuring point	☐ Continuous measurement ☐ Discontinuous measurement (selectable)
Dew point of gas to be measured Separation of water possible?	_____ °C ☐ No ☐ Yes, gas cooler already available ☐ Yes, please offer gas cooler
Desired temperature in gas paths	☐ Not heated ☐ Frost protection ☐ High temperature version (max. 200 °C)
Pressure of gas at sampling point	☐ Minimum_____ mbar ☐ Mean_____ mbar ☐ Maximum_____ mbar
Temperature of gas at sampling point	☐ Minimum_____ °C ☐ Mean_____ °C ☐ Maximum_____ °C
Sampling point	☐ Outdoor ☐ Indoor ☐ Ex zone at sampling point, Class:_____, Zone:_____, Group:_____
Ambient temperature at installation site	☐ Minimum_____ °C ☐ Mean_____ °C ☐ Maximum_____ °C
Installation site	☐ Outdoor ☐ Indoor ☐ Ex zone at sampling point, Class:_____, Zone:_____, Group:_____
Pollution of gas to be measured, e.g. tar fog, coal dust, fly ash, metal dust, etc.	_____ mg/m³ _____ mg/m³ _____ mg/m³

Checklist for enquiries – gas analysis

(cont.)

Corrosive gas components (please indicate component and concentrations)	_____ _____ % by volume/ppm _____ _____ % by volume/ppm _____ _____ % by volume/ppm _____ _____ % by volume/ppm
Length of gas line between sampling point and gas analyser	☐ Not heated_____ m ☐ Heated_____ m
Number of measuring points	☐ 1 ☐ 2 ☐ 3
Output signals	☐ 4–20 mA ☐ 0–10 V ☐ 2–10 V ☐ 0–20 mA ☐ Interface: _____
Automatic calibration	☐ Yes ☐ No
Type of measuring system	☐ Portable ☐ Mobile Cabinet: ☐ Wall mounting ☐ 19" rack mounting ☐ Sheet steel ☐ Glass-fibre reinforced plastic Mounting frame/Field device: ☐ Cabinet ☐ Accessible container ☐ Wall mounting
Measuring system	Emission measuring system ☐ No ☐ Yes: ☐ TA-Luft ☐ 13. BImSchV ☐ 17. BImSchV ☐ 27. BImSchV ☐ 30. BImSchV ☐ Operational measurement Process measurement: ☐ No ☐ Yes: ☐ Chemical/petrochemical industry ☐ Other, specify industry:_____
Other/system sketch	

General Terms and Conditions

of AFRISO-EURO-INDEX GmbH · Lindenstraße 20 · 74363 Güglingen

§ 1 General – Validity

(1) The following general terms of sale (general terms and conditions) shall apply exclusively to all of our services rendered and goods delivered. We do not accept conflicting or different terms and conditions of our customers, unless we have explicitly agreed in writing to the validity of such.
Our general terms and conditions shall also apply in the case that we accept without reserve the customer's request to conclude the contract or the customer's services or goods, even if we are aware of conflicting or different terms and conditions of our customers.

(2) Our general terms and conditions shall only apply to business made with companies.

(3) Our general terms and conditions shall also apply to all future contracts with the customer.

§ 2 Prices – Costs – Delivery

(1) Our supply prices are based on currently effective purchase prices as well as scales of wages and salaries. If the period between closing of the contract and delivery (in the case of call orders, the date agreed for the respective partial delivery shall be deemed to be effective) exceeds four months, AFRISO shall have the right to reasonably increase the delivery price if the above costs have increased.

(2) The customer shall bear the shipment costs. All shipments are insured for transport. The customer shall bear the packaging costs.

(3) All specifications given in sketches as well as dimensions and weight specifications are approximate values only.

(4) In cases of small orders with a net purchase value of less than EUR 75.00, AFRISO will charge a processing fee of EUR 15.00 in addition to shipping and packaging.

(5) We reserve the full right of property and title to sketches, cost estimates and similar documents as well as tools which were produced for the order even if the customer is charged separately for such items.

(6) Partial delivery is possible.

(7) The delivery period specified shall commence on the day on which all details concerning the contract are finalised. If the customer has to provide technical specifications, materials or tools or has to make down payments, the delivery period shall commence with receipt by us of such specifications, materials, tools or payments. If the delivery period is exceeded for reasons for which we are responsible, the customer shall have the right – after giving reasonable notice – to withdraw from the contract. Further claims are excluded, unless they are the result of at least gross negligence on our part.

§ 3 Passage of risk – Production delay

(1) All deliveries are made at the risk of the customer.

(2) We have fulfilled our delivery obligations as soon as the goods are turned over to the post office, the railway station, the carrier or the carrying agent or as soon as they have been loaded on one of our vehicles.

(3) Circumstances beyond our control which obstruct or make impossible the production or the delivery of the ordered goods, e.g. acts of God, war, measures of the authorities, shutdowns, strikes, lockouts in our or in our sub-contractors' facilities, release us from our delivery obligations for as long as these obstacles and their after-effects last.

§ 4 Warranty – Customer's disposal obligations

(1) Notices of defect must be made immediately upon receipt of the goods. A sample must be provided.

(2) Notices of defect concerning latent defects must be made immediately after the discovery of the defect. A sample must be provided. Our warranty obligations end 12 months after the passage of risk. This does not apply to parts subject to wear and tear. If the notice of defect is legitimate, the customer shall have the right to request us to take back the goods and to make a replacement delivery. We shall have the right to remedy the defect at our discretion.
If the goods continue to be defective after such remedy, the customer shall have the right to request a price reduction or to withdraw from the contract, at the customer's discretion. We shall bear the costs of replacement deliveries to customers. Further warranty claims, especially reimbursement of mounting/installation costs and other costs of third parties, are excluded. Further claims are excluded unless a warranted quality is lacking.

(3) We shall not be liable for defects caused by inappropriate or careless usage and incorrect mounting, installation, commissioning or operation.

(4) Insignificant or typical variations in colour, dimensions, weight and quality shall not be considered to be defects.

(5) The customer shall be obliged to dispose of the delivered goods when they are no longer used at his own cost and in full compliance with all pertinent regulations. The customer shall indemnify us from the obligations according to § 10, section 2 of the German Electronic Equipment Act (obligation of manufacturers to take back their products) and from any claims of third parties in connection with this. The customer shall contractually oblige any other commercial third party to which the customer transfers the delivered goods to dispose of such goods according to the pertinent regulations when such goods are no longer used. If the goods are transferred to further parties, such further parties shall also be contractually obliged to dispose of the goods accordingly. Our claim to indemnification through the customer shall be extended by a period of limitation of two years after the final termination of the usage of the device. The two-year period of suspension of the limitation shall not begin until we receive a written notice of the customer stating that he has ceased to use the device.

§ 5 Customer's violation of rights of third parties

If an order is to be filled (design, etc.) according to customer specifications, the customer shall be responsible for his rights of commercial exploitation of the documents. If the production according to the specifications of the customer violates the rights of third parties or labelling provisions, the customer shall be obliged to exempt us from all possible compensation claims and cost claims of third parties and to reimburse any costs incurred.

§ 6 Terms of payment

(1) Payment shall be due ten days after the billing date with a discount of two percent – if the net value exceeds EUR 50.00 – or thirty days after the billing date without discount. Payment shall be considered to have been made in due time if it is made available in Afriso's account in due time. In cases of cash on delivery or cash before delivery, we grant a discount of three percent (invoices for repair work excluded).

(2) If no other agreements are made, the customer shall be obliged to pay the usual bank interest after delivery and the 30th day following the billing date.

(3) If no other agreements are made, payments are set off against the oldest outstanding account including corresponding accessory claims.
For each written request for payment caused by default, we charge a fee of EUR 10.00.

(4) We accept bills only upon prior agreement. The discount depends on our bank's rates and shall be due starting with the due date of payment. The customer shall bear the discount and collection fees for bills and cheques. Such fees shall be due for immediate payment.
Payment by bills and cheques shall be considered as payment only after such bills and cheques are cashed.

(5) Accepting assignments is in our sole discretion. Assignments of any type whatsoever may only be made with our express consent in writing.

(6) A right of retention shall be excluded unless it results from rights/claims of the customer not disputed by us, or from final and conclusive legal titles.

(7) Offset against our claims shall only be possible in the case of undisputed or final and conclusive counterclaims of the customer.
(8) In the case of customer default, we shall not be obliged to deliver or manufacture ordered goods until all overdue amounts are paid. In such cases as well as in case of the deterioration of the customer's financial position (e.g. protest for non-payment) or the transfer of the customer's business to a third party or the liquidation of the customer's business or the death of the customer, we shall have the right to demand cash before delivery for all undelivered goods. If the customer refuses to accept this procedure, all claims shall become due for immediate payment.

§ 7 Retention of title

(1) We retain the title to the delivered goods until all claims resulting from the business relations are fulfilled. This includes interest, accessory claims, costs of a possible prosecution and costs of necessary intervention resulting from a seizure of the delivered goods by a third party. In the event that an execution is levied upon the delivered goods, the customer shall be obliged to notify us immediately. The customer shall bear the costs of the necessary intervention.
(2) In case of violations of the contract by the customer, in particular default in payment, we shall have the right to take back the delivered goods. In case we take back the delivered goods, this does not constitute a withdrawal from the contract by us, unless we have explicitly declared the termination of the contract. Seizure of the delivered goods by us shall always constitute a termination of the contract. After taking back the goods, we shall have the right to exploit such goods. The returns from such exploitation shall be offset against claims against the customer, with reasonable exploitation costs being deducted from such offset.
(3) In case of seizure or other interventions of third parties, the customer shall immediately notify us in writing so that we can institute an action as per § 771 ZPO (German Code of Civil Procedure). If the third party is unable to reimburse the legal and extrajudicial costs, the customer shall be liable for the loss incurred by us.
(4) The customer shall be entitled to resell the delivered goods within the course of regular business. If the customer resells the goods, all claims against customer's buyer or third parties to the complete invoice amount (including VAT) shall be assigned to us, regardless of whether the goods are sold as they are or further processed. The customer shall remain entitled to collect such claims even after the assignment. This does not affect our right to collect such claims ourselves. We undertake not to collect such claims under the following conditions: the customer meets his payment obligations from the returns and is not defaulting in payment, no insolvency proceedings are filed against the customer, payment is not stopped. If any of the latter conditions are not met, we shall be entitled to request the customer to notify us of the assigned claims and the corresponding debtors and provide us with any information and the appropriate documents necessary for us to collect such claims, and to notify its customer of such assignment.
(5) Processing or modification of the delivered goods by the customer shall always be made on behalf of us. If the delivered goods are combined with other goods not belonging to us, we shall hold the title to the new product to a proportion that corresponds to the ratio of the value of the goods delivered by us and the value of the other objects used in the new product at the time of processing. The same provisions that apply to the goods delivered under retention of title shall apply to the new product resulting from further processing.
(6) If the goods delivered by us are combined with other objects not belonging to us in a way that it is impossible to separate such goods and objects, we shall acquire co-ownership to such new product to a proportion that corresponds to the ratio of the value of the goods delivered by us and the value of the other objects used in the combination at the time of processing. If the goods and objects are combined in such a way that the object of the customer is the main object, we shall acquire co-ownership to a proportional share. The customer shall keep such sole ownership or co-ownership for us.
(7) The customer shall also assign the claims to secure our claims against him which result against a third party from the combination of the delivered goods with real estate.
(8) Upon request by the customer, we undertake to release the securities if the value of our securities exceeds the claims to secure by more than twenty percent. The selection of the securities to be released shall be at our discretion.

§ 8 Liability

(1) We shall not be liable in case of violations of immaterial contractual obligations caused by slight negligence. In other cases of slightly negligent violations of obligations, our liability shall be limited to the foreseeable, contractually typical direct average damage with regard to the type of goods or services covered by the contract.
This shall also apply to slightly negligent violations of obligations committed by our legal representatives and vicarious agents (such as employees, other staff, subcontractors, etc.).
(2) In case of gross negligence committed by simple vicarious agents, the amount of damages shall be limited to the foreseeable, contractually typical direct average damage with regard to the type of goods or services covered by the contract.
(3) Customer's liability claims shall be subject to a period of limitation of one year after delivery of the goods or acceptance of the service.
(4) Above liability limitations as per § 8 section 1 and § 8 section 2 as well as the period of limitations as per § 8 section 3 shall not apply in case of injury or loss of life.
Above liability limitations as per § 8 section 1 and § 8 section 2 as well as the period of limitations as per § 8 section 3 shall neither apply in case of claims according to the product liability act nor in case we have guaranteed certain qualities.
Above liability limitations as per § 8 section 1 and § 8 section 2 as well as the period of limitations as per § 8 section 3 shall not apply in case of wilful acts or gross negligence on our part. However, in case of gross negligence on the part of simple vicarious agents, the liability limitation as per § 8 section 2 as well as the period of limitations as per § 8 section 3 shall remain in effect.
Above liability limitations as per § 8 section 1 and § 8 section 2 as well as the period of limitations as per § 8 section 3 shall not apply in case of inability of impossibility to perform, provided we are responsible for such inability or impossibility to perform.
(5) Any other liability claims against us, regardless of the legal grounds, shall be excluded.
(6) If our liability is excluded or limited, such exclusion or limitation shall also apply to the personal liability of our legal representatives and our vicarious agents.

§ 9 Governing law – Place of performance – Jurisdiction

(1) The legal relations between us and our customers are subject exclusively to the laws of the Federal Republic of Germany.
(2) Güglingen is the place of performance of our contractual obligations; this is also the place of performance of the customer's contractual obligations.
(3) Our place of business in 74363 Güglingen, Germany, shall be the exclusive place of jurisdiction in case there is no other legal, exclusive place of jurisdiction.

January 2011

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Measuring, control and monitoring devices
for building, industry and environmental protection.

AFRISO EURO-INDEX

AFRISO-EURO-INDEX GmbH
Lindenstraße 20
74363 Güglingen

Phone +49 7135 102-0
Fax +49 7135 102-147

info@afriso.de
www.afriso.de